

IMPACT OF FINANCAL INNOVATIONS ON INDIAN BANKING INDUSTRY

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CERTIFICATE

This is to certify that the thesis entitled “**Impact of Financial Innovations on Indian Banking Industry**” submitted in fulfillment of the requirement for the award of the degree of **DOCTOR OF PHILOSOPHY (Ph.D)** to Lovely Professional University, Phagwara, Punjab is a bona fide research work carried out by **Mr. Taranjeet Singh** Registration No. 41801055) under my guidance and Supervision. No part of the thesis has been submitted for any degree or diploma.



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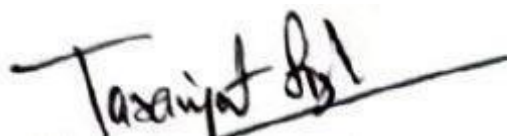
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DECLARATION

I hereby declare that the project work entitle “**Impact of Financial Innovations on Indian Banking Industry**” is an authentic record of my work carried at **Lovely Professional University** as requirements of research work for the award of degree of **Doctor of Philosophy (Ph.D.)** Under the Guidance of **Dr. Prof. Pavitar Parkash Singh** Professor, School of Humanities, Lovely Professional University, Phagwara, Punjab, India. I also declare that the material contained in this thesis has not been published earlier in any manner.

A handwritten signature in black ink, appearing to read 'Taranjeet Singh', with a long horizontal line extending from the end of the signature.

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fTaranjeet Singh

IMPACT OF FINANCIAL INNOVATIONS ON INDIAN BANKING INDUSTRY

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ABSTRACT

Financial Innovations has immensely impacted banking industry globally, the Indian banking industry is not an exception as these innovations have impacted range of product segments and customer segments. Financial innovations had transformed various banking products in country; it has also impacted the consumer segments using these products. Some of major innovations that can be named are digital payment systems and mobile banking solutions. Services such as the Immediate Payment Service (IMPS), Unified Payments Interface (UPI), and mobile wallets have simplified the transaction process and ease of banking. Products like micro-loans, Bill now pay later and investment products has made financial services accessible to rural households, small business owners, women, and low-income families.

These innovations led to more financial inclusion and allowed banks and fintechs to reach new markets. In India, the demand for financial innovations has risen due to availability of affordable smart phones, cheap internet and demand for efficient and cost effective banking solutions. Younger generation and educated lower middle and middle class customers started preferring online banking over traditional methods which led to more product and process innovations.

On supply side, advancements in technology, regulatory support and encouragement, and large scale availability of tech savvy and tech efficient work force led to growth in fields like artificial intelligence, block chain, and data analytics which in turn made it possible to introduce new banking services and products. The pace and focus of financial innovations are different in developed and developing nations. In developed countries, innovations are more products oriented and aimed at enhancing operational efficiency, reduce costs, and improve the customer experience, with significant use of technologies like artificial intelligence and block chain to streamline processes and boost security.

On other hand, in developing countries such as India, financial innovation focuses on enhancing accessibility and ensuring widespread financial inclusion. Innovations like

mobile banking, peer-to-peer lending, and digital wallets are essential for connecting unbanked or under banked populations with formal financial services. These innovations often include features like micro-insurance and small loans tailored for the needs of the economically disadvantaged and rural residents. The developed nations are ahead in both product and process innovations from developing nations but this gap is wider in case of product innovations.

CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

One of the main reasons for India's booming economy is the country's thriving banking industry. Banks serve as more than simply treasuries; they also provide access to resources vital to the growth of the economy. In July of 1969, the government of India nationalized fourteen of the largest scheduled banks, and in April of 1980, they nationalized another six. As a result of bank nationalization, financial institutions shifted their attention from catering to a wealthy clientele to serving the general public. Since the majority of people lived in rural regions and small towns, this allowed banks to expand evenly throughout the country.

The Indian banking industry began prioritizing technological advancements and new methods of doing business in the 1990s. Since then, financial innovation has been India's banking industry's primary focus. The revolutionary effects of financial innovation on the Indian banking system are hard to ignore. Customers have more options, and banks have access to new markets, thanks to financial innovation. It has helped financial institutions better anticipate, develop, distribute, and manage their goods in response to market demand. Effective use of technology amplifies progress and expansion. By eliminating the need for branches in remote areas, technological advancements in the banking industry have allowed institutions to bring their services directly to their customers.

Indian financial institutions have used IT-based strategies to improve profitability, provide a better client experience, streamline operations, and control risks. Eventually, technological advances will allow banks to provide a wider range of services. Banking experts predict that by 2020, India's financial industry might rank fifth globally, and by 2025, it could rank third.

Webster's Collegiate Dictionary defines "innovate" as "to introduce as or as if new, with the origin of the term stemming from the Latin word "Novus" meaning new." Financial innovation is defined broadly as "the act of developing and then popularizing new financial instruments, as well as new financial technology, institutions, and markets" (Reuben, 2012). Financial innovation increases the efficiency of financial intermediation by lowering transaction costs and risks, and as a result, the financial sector broadens, deepens, and integrates (Bhatt, 1989). Most financial breakthroughs are evolutionary adaptations of preceding goods, thus innovation comprises both creation and spread. Financial innovation refers to the pursuit of new ideas that result in the development of new products, processes, and technologies. It is not only vital to create a new concept, but also to bring it to market, put it into practice, and utilizes it in a way that results in new goods, processes, or technologies that add value or enhance quality. Exploiting new technology and thinking outside the box to create new value and make substantial changes in society is also an example of innovation.

1.2 INNOVATIONS IN BANKING

Banking innovation is believed to be a process; hence banks should concentrate on the outcome of the whole process involved in innovation. It is acceptable for banks to understand how to build something unique and generate value by presenting such ideas to current and new clients. Service organizations must concentrate on identifying where and how new goods might be generated and supplied to clients (Reuben, 2012). The five aspects of financial innovations in the service business are product, process, market, technology, and organization. The banking business should concentrate on aspects that provide chances for innovation. Banking innovations should be capable of boosting bank performance and client happiness.

Because banking innovation is a constant process focused on the demands of consumers, certain important concepts should be addressed to improve the process of innovation. The fundamental one is to understand the demands and desires of clients.

Any new or better product that banks provide should be based on consumer demands. At the same time, innovation must be distinct and based on a strategy that will assist banks in gaining a competitive edge. In the process of innovation, radical and incremental aspects should be addressed. Radical factors are those that assist banks in doing something new than what clients are accustomed to, while incremental factors are those that assist banks in providing already existing services to customers in better ways.

1.3 ORIGIN OF WORD “BANK”

Italian bankers utilized a green tablecloth-covered desk during the Renaissance, when the word "banco" meant "desk" or "bench," and the English word "bank" came from there. Nonetheless, artifacts from the distant past reveal signs of commerce.

Moneylenders in ancient Rome set up business on a long bench called a "Bancu" in the middle of walled country yards called "Macella," which is where the terms "Banco" and "Bank" are said to have originated.

A silver drachm from the ancient Hellenic settlement of Trepezus on the Black Sea, contemporaneous to 350-325 BC, presently resides in the British Museum in London¹ and bears the name "Bank." A pun on the city's name, the coin features a banker's table (Trapeza) piled high with coins. In Modern Greek, the word "Trapeza" may mean either a table or a bank. When the Germans occupied most of Italy in the early 20th century, they changed the Italian word for "bank" (Bank) to "Banco," which means "bank." This seems more plausible at this point.

1.4 DEFINITION OF BANKING

“An organization whose principal operations are concerned with the accumulation of the temporarily idle money of the general public for the purpose of advancing to others for expenditure”- Kent¹

¹

https://www.nrbcommercialbank.com/downloads/Bank_Its%20Origin,%20Meaning,%20Objectives%20&%20Function.pdf

“Banking means the accepting, for the purpose of lending or investment, of deposits of money from the public, repayable on demand or otherwise and withdrawal by cheque, draft, order or otherwise.”- The Banking Regulation Act, 1949, Section 5(b)²

“A bank is an establishment which makes to individuals such advances of money or other means of payment as may be required and safely made and to which individual entrust money or means of payment when not required by them for use.”- Kintey³

“Banking in the full modern sense, of taking money on deposit and lending it out on interest, is of comparatively recent origin.”-The international standard⁴

“Bank is an institution that deals in money and its substitution and provides other financial services. Banks accept deposits and make loans and derive a profit from the difference in the rates paid and charged, respectively. Some banks also have the power to create money.”-Encyclopedia Britannica⁵

“Banks are institutions, whose debts, usually referred to as bank deposits are commonly accepted for final settlement of other people’s debts.”- Sayers⁶

1.5 EVOLUTION OF BANKING IN INDIA AND ITS HISTORY

This section provides a thorough history of Indian banking and how it developed from informal banking in ancient times to its current structure.

1.5.1 Banking in Ancient Times

Banking has been in India since ancient times. The form of banking, however, evolved over time. The details are given below.

² <https://indiankanoon.org/doc/1223029/>

³ Prof. Kintey bank definition, www.newagepublsher.com/samplechapter/001636.pdf.

⁴ S.S.Kapan and N.S. Choubey, Indian banking in electronic era, Sarup and sons, New Delhi, 2003.

⁵ S.S.Kapan and N.S. Choubey, Indian banking in electronic era, Sarup and sons, New Delhi, 2003.

⁶ R. Rajesh and T. Sivgnanasithi, Banking theory law and practice, Tata McGraw hill publication, New Delhi, 2009, p. 3.

1.5.1 (1) Indigenous Bankers

Banking in India is considered to have originated in Vedic times as money lending activities. The Indian Central Banking Enquiry Committee (1931) claims that lending money in India goes back to the Vedic period (c. 2000-1400 BC). Banking as a profession has been around since 500 BC. As early as 400 B.C.E., Kautilya's Arthashastra discusses creditors, lenders, and interest rates. Trade, business, agriculture, and people all benefited from the existing monetary system.

1.5.1 (2) Modern commercial Banking

In the early 18th century, European agency businesses built a network of European-controlled banks with minimal accountability, marking the beginning of modern commercial banking in India. In 1683, East India Company officials founded Madras's first bank. In 1720, Bombay saw the formation of the world's first joint stock bank, the Bank of Bombay. In 1770, Calcutta saw the formation of the Bank of Hindustan. (Pathak, 2011).

1.5.1 (3) Presidency Banks

The East India Company divided India into three Presidencies, each with its own administrative authority. To meet the demand for modern banking services, uniform currency to finance foreign trade, and remittances by British army personnel and civil servants, the British government granted Royal Charters to three banks in these Presidencies: the Bank of Bengal (1806) in Calcutta, the Bank of Bombay (1840), and the Bank of Madras (1843). Banks were originally subject to formal control under the Companies Act of 1850. In the early 1860s, the concept of limited liability emerged. With the enactment of the Paper Currency Act in 1861, the Government took over note issuance from the Presidency banks. The Presidency Bank Act of 1876 unified the regulation of these three financial institutions under a single statute and imposed new restrictions on them. In 1921, these institutions united to become what is now known as the Imperial Bank of India. Commercial, bankers, and government banking were all handled by the Imperial Bank of India until the Reserve Bank of India was established in 1935. The State Bank of India replaced it when India achieved independence. (Pathak, 2011).

1.5.1 (4) Indian banks

In the years leading up to India's independence, the Swadeshi Movement advocated for the creation of several Indian-owned joint stock banks. First established in Allahabad in 1865, the Punjab National Bank moved to Lahore in 1895. Bank of India, Central Bank of India, Bank of Baroda, Canara Bank, Indian Bank, and Bank of Mysore are only some of the other banks that sprang up in India between 1906 and 1913. Whereas shroffs and moneylenders dominated local trade, these banks backed international business. (Pathak, 2011).

1.5.1 (5) Co-operative banks

As part of the co-operative banking movement in India in the last decade of the nineteenth century, the first urban co-operative bank was established in the then-princely state of Baroda in 1889, and the second in Bangalore, in the then-princely state of Mysore, in 1905. These financial institutions aimed to meet the requirements of those living on low incomes in metropolitan areas (Pathak, 2011). There were 68 cooperative banks in March of 1923, but by March of 1929, that number had more than quadrupled to 158 (18 Class A banks and 140 Class B banks). However, they put down far less money. (RBI, 2009).

1.5.1 (6) Banking institutions under the Companies Act 1913

Three Presidency banks, eighteen Class A banks (joint stock banks with capital greater than 5 lakh), twenty-three Class B banks (joint stock banks with capital between 1 lakh and 5 lakh), and twelve exchange banks (foreign owned banks primarily engaged in foreign exchange business) were among the 56 commercial banks in operation in the country by December 1913 (RBI, 1954). The businesses Act of 1913 also recognized as banks a number of lending businesses, indigenous bankers, and nidhis. Between 1913 and 1918, 94 banks failed due to factors such as poor leadership, dishonest maneuvering by directors and managers, and incompetence. (RBI, 2009).

By 1930, there were 107 commercial banks, including 31 Class A banks, 57 Class B banks, and 18 exchange banks (RBI, 1954). The Imperial Bank of India, on the other hand, controlled the Indian banking industry. There were a total of 1258 financial institutions incorporated under the Indian Companies Act 1913, 134 of which collapsed during the Great Depression (1928-1934), mostly owing to poor loans (RBI, 2009).

1.5.1 (7) Reserve Bank of India

In 1935, after passage of the Reserve Bank of India Act in 1934, the Reserve Bank of India became India's central bank. Banker to the government, banker to other banks, note issuer, and keeper of the exchange rate were its principal functions. In 1935, India had a total of 124 commercial banks, comprising 106 joint stock banks and 17 exchange banks in addition to the Imperial Bank of India. The banks were ranked from "A" (the largest) to "D" (the smallest). There was a dedicated section of the Indian Businesses (Amendment) Act of 1936 for banking regulations. However, the RBI lacked proper regulatory and control mechanisms. The Reserve Bank was unable to exert any authority over the proliferation of minor banks that did not appear on any of the schedules. There were limitations, such as a weak financial foundation and inefficient management practices. There were a total of 708 failed small banks in the United States between 1936 and 1945, with 455 of them collapsing during WWII. (RBI, 2009).

1.5.2 Banking in Independent India – 1947 to 1967

Development in Indian banking in the first 20 years after independence is explained below.

1.5.2 (1) All Private Banks

When India gained independence, all Indian banks were private, and the majority of them had a regional emphasis. The biggest bank, Imperial Bank, had deposits of 287 crores, while the other five great banks, Central Bank of India, Punjab National Bank, Bank of India, Bank of Baroda, and United Commercial Bank, each had deposits of 100 crores or more. 97 designated commercial banks accounted for 86% of total deposits totaling 1090

crores. There were 557 non-scheduled banks and 395 co-operative banks, with total deposits of 89 crores and 82 crores, respectively. The Reserve Bank was likewise not entirely state-owned until 1948, when it was nationalized by the Reserve Bank of India (Transfer to Public Ownership) Act. However, 38 banks collapsed in 1947 and 45 banks failed in 1948, generating significant suffering for depositors (RBI, 2009).

1.5.2 (2) Banking Regulation Act

The breakthrough occurred in 1949, when the Government of Independent India adopted the Banking Companies Act 1949 (renamed the Banking Regulation Act 1949 in 1966) in conjunction with the RBI. This was the first regulatory measure that granted the Reserve Bank considerable powers for financial supervision as the country's central banking authority. Bank failures, however, persisted. Efforts were undertaken to improve the banking industry in order to preserve public funds (Pathak, 2011).

1.5.2 (3) State Bank of India

With the passage of the State Bank of India Act, 1955, the Indian government nationalized the Imperial Bank of India and renamed it the State Bank of India. This was done to broaden the reach of financial services, particularly in rural and semi-urban regions, as well as for a variety of other public objectives. After receiving legal authority in 1960, the RBI began the job of consolidation. The number of banks was decreased by mergers, amalgamations, and liquidations. In 1960, the government nationalized eight banks, which became subsidiaries of SBI, bringing one-third of the banking sector under direct supervision (RBI, 2009).

From 1947 through 1967, the financial environment featured three main unsettling elements.

- Bank failures, which increased questions about the financial system's soundness and stability.
- A nexus between banking and industry as a result of resource concentration in the hands of a few corporate dynasties or organizations.
- Agriculture is underserved in bank credit.

1.5.3. Social Control Over Banks – 1967 to 1991

After two decades of private sector control on majority Indian banks, the Indian government used nationalization as the tool to bring banking under social control. The developments that took place are explained below.

1.5.3 (1) Nationalization of banks

The Indian government nationalized 14 banks holding more than 50 crores in deposits in 1969 so that they could better meet the needs of a growing economy in line with official policy objectives. In 1980, the government took over another six banks with deposits of over 200 crores. The objective was to broaden the availability of formal banking services to rural areas and other underserved parts of society in order to promote economic growth, enhance regional economic balance, and disperse economic power. (RBI, 2009).

1.5.3 (2) Regional Rural Banks

As a result of commercial banks' inability to meet the demands of rural residents, the Regional Rural Banks Act of 1976 established a parallel banking system called RRBs. The goal was to improve living standards in rural areas by extending credit to those who needed it most—small and marginal farmers, agricultural workers, craftsmen, and small enterprises (RBI, 2009).

1.5.3 (3) Other Controls

During this time period, numerous controls were implemented, such as increasing the Cash Reserve Ratio (CRR) from 5% in June 1973 to 15% in July 1989 and the Statutory Liquidity Ratio (SLR) from 26% in February 1987 to 15% in July 1989. These measures were put in place to ensure that credit was allocated in accordance with plan priorities and that vulnerable groups received a greater share of available funds. Because of these regulations and the lack of sufficient competition, the banking industry has seen a fall in productivity and efficiency that has eaten away at its profits (RBI, 2009).

1.5.4 Phase of Financial Sector Reforms – 1991-92 Onwards

Nationalization and governmental oversight of the banking industry effectively put an end to competition and innovation. There was no profit motive in the heavily regulated banking system. To bring banks up to globally recognized norms of efficiency, health, and financial soundness, the government enacted the financial sector reforms described below.

1.5.4 (1) First Phase of Reforms – 1991-92 to 1997-98

In 1992, the recommendations of the Committee on the Financial System (CFS) (Narasimham Committee I - 1991) on the financial system were put into action, marking the beginning of sweeping changes to the banking industry that prioritized things like deregulation, liberalization, and increased disclosure and transparency in accounting (RBI, 2009).

Internationally recognized prudential requirements were gradually implemented in the areas of revenue recognition, asset categorization and provisioning, and capital adequacy with the goal of bolstering the financial services industry.

First the State Bank of India and then the Oriental Bank of Commerce went public with their first initial public offerings (IPOs), diluting the government's stake in nationalized banks.

Banks no longer had to worry about outside regulations. Reduced CRR to 9.5% and SLR to 25%. As a result of deregulation, banks are free to set their own interest rates on deposits and loans based on their own assessments of the market's overall liquidity and risk. The financial services industry's bottom line benefited as a result. The government allowed banks the autonomy to set up new branches and install ATMs.

In 1993, the RBI liberalized the banking industry by allowing private sector banks to expand and international banks to set up shop in the country.

For low-cost and speedy settlement of client complaints, the Banking Ombudsman Scheme was established in 1995. There was an attempt to improve the rural credit distribution system by restructuring RRBs.

1.5.4 (2) Second Phase of Reforms –1998-99 onwards

Implementing the recommendations of the Committee on Banking industry changes (CBSR) (Narasimham Committee II - 1998), 1998 saw the second round of extensive changes in the banking industry. Priorities included bolstering the urban co-operative banking sector, enhancing customer service, and enhancing financial inclusion as well as strengthening prudential norms in line with international best practices (RBI, 2009).

Reduced nonperforming assets, higher asset quality, higher profitability, and more credit flowing to farmers and small and medium-sized enterprises (SMEs) were all results. Banks were able to boost their customer service because to increased use of technology and other measures.

1.5.5 Banking in the 21st century

As with other countries, India's banking system underwent progressive transformation as a result of changes in the financial and banking sectors. The RBI planned to introduce Basel standards gradually. The Reserve Bank of India (RBI) requires all banks to keep their Capital to Risk-weighted Asset Ratio (CRAR) or Capital Adequacy Ratio (CAR) at least at 9%. Indian banks are aiming to comply with Basel III regulations by March 31, 2019.

To provide legitimacy to e-commerce and other forms of electronic transaction, the Central Government passed the IT Act in 2000. The Reserve Bank of India (RBI) helped pave the way for the growth of e-banking in India by modernizing the country's payment and settlement infrastructure and improving the quality of its cyber security (Bhasin, 2009).

It was still difficult to reduce the number of bad loans and other NPAs. In 2000, financial organizations in India came together to create the Credit Information Bureau of India Ltd (CIBIL), whose purpose is to ease the exchange of full credit information about borrowers, their payment histories, and any defaults, across financial institutions. The Reserve Bank of India (RBI) and the Central Government (CG) have taken a number of institutional steps to reduce the volume of NPAs and to establish a system for the prompt and open restructuring of the debts of financially sound businesses that have run into trouble. In 2002, lawmakers in the United Kingdom approved the Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act, which authorized the formation of asset management businesses to provide banks a huge boost and guarantee long-term recovery outside of the court system. Since March 2004, the NPA categorization system has adhered to the 90-day delinquency rule. In 2005, the Federal Reserve Board released guidelines for the sale and acquisition of nonperforming assets (NPAs) to provide banks more flexibility in dealing with NPAs (Bhasin, 2009).

In order to conform to FATF recommendations on anti-money laundering standards and the prevention of terror funding, RBI updated its "Know Your Customer" (KYC) requirements in November 2004. The Reserve Bank of India (RBI) has placed a greater emphasis on customer service by implementing a number of steps to improve the quality of customer service, safeguard customers' rights, and strengthen grievance redressal mechanisms in commercial banks (Bhasin, 2009).

The continuing changes in the banking sector have helped the Indian economy shift to a faster growth path, with the added benefits of a more secure financial system and more effective commercial banks.

1.6 CONCEPT OF INNOVATIVE BANKING

For instance, banks have introduced retirement schemes, Akshaynidhi schemes, pension plans, money lending schemes like education loans, car financing, home financing, and

household goods financing, to name just a few examples of the innovative banking that has come to define the industry. In addition to this, many banks now provide services like as online banking, mobile banking, 24/7 banking centres, and Sunday banking locations (CBS Bank, for example) (Pande and Subodhkumar, 2005).

The bank has refocused its strategy on introducing new products and services in order to keep up with the rapidly evolving competitive landscape.

Since the introduction of computers into banks has sped up their operations and provided other benefits, this trend has been dubbed "Innovative Banking." As computers and communication technology improved, so did financial operations. This would allow banks to come up with new ways to serve their clients.

Cyber Banking, a hybrid of electronic commerce and electronic banking, is one of the most significant new developments. What we mean when we say "e-banking" is that we provide online banking services.

Pre-innovative Banking:-

After 1964, a distinct era of "Innovative Banking" emerged. It was during this time frame (1964–1977) that the issue of economic concentration became more controversial.

1.7 FINANCIAL INNOVATION IN THE BANKING INDUSTRY

Financial institutions serve as the backbone of every economy. It's a crucial part of what makes the financial system work, and it can make or break an economy. There can be no contemporary economic growth without a robust financial system. One of the earliest forms of financial intermediary is the bank. The banking system acts as the economy's "fuel injection system," releasing the savings pool and directing it towards productive investment. The financial sector is an indicator of the state of the economy.

Banking in India dates back to a period when domestic bankers were instrumental in funding international trade and commerce via loans. Agency houses took up banking operations during the East India Company era. In 1786, the General Bank of India became

the world's first joint stock bank. Hindustan Bank and the Bengal Bank rounded up the group. The East India Company founded three different banks in the first half of the nineteenth century: the Bank of Bengal in 1809, the Bank of Bombay in 1840, and the Bank of Madras in 1843. In 1920, the three Presidency banks merged to form what would later become the Imperial Bank of India (Suresh & Paul, 2010).

When it comes to the financial sector, innovation is defined as "the process of generating and popularizing new financial instruments, technologies, institutions, and markets that simplify access to information, trade, and methods of payment" (Solans, 2003). Banking sector technical development is known as financial sector innovation (Reuben, 2012). "The process of inventing and then popularizing new financial instruments, as well as new financial technology, institutions, and markets," writes Tufano (1989).

The process of "designing, developing, and implementing novel financial instruments and procedures and the creation of creative solutions to issues in finance" (Lawrence, 2010) is what Lawrence defines as financial innovation. According to Beaver (2002), innovation is "crucial to national development and to maintaining industrial competitiveness." "one of the most essential competitive weapons and typically considered as a firm's core value capacity," as Sandvik & Sandvik (2003) put it. Since many businesses struggle with a lack of resources, Lumpkin and Dess (1996) argue that innovation is a great approach to boost output. Adjustable-rate mortgages and exchange-traded index funds are two examples of products, while online securities trading and Internet banking are two examples of services, while electronic record keeping for securities and credit scoring are two examples of "production" processes and new organizational forms. Innovation in the financial industry has resulted in an influx of new market participants thanks to the development of novel financial products (Noyer, 2007). New payment methods and asset alternatives to keeping money have emerged as a result of advancements in the financial industry, which has also contributed to an expansion in the number of financial institutions. ATMs, debit cards, electronic money, RTGS, EFT, ACH, MICR, Retail Banking, free advisory services, implementation of customers' standing instructions, payments of utility bills, fund transfers, internet banking, telephone banking, mobile banking, selling of insurance

products, issue of free cheque books, travelers cheques, and many more financial innovations are associated with this rapid expansion in the banking sector.

1.8 FINANCIAL TECHNOLOGY (FINTECH)

Fintech is an acronym for "financial technology." Fintech is short for "financial technology," which describes cutting-edge tools designed to streamline and improve the financial services industry. Fintech, at its core, makes use of specialist software and algorithms that run on computers and, increasingly, smart phones to aid businesses, company owners, and individual consumers in managing their financial affairs. In the twenty-first century, fintech arose, however its first applications were mostly in the back-end processes of certain organizations. Fintech adapted to technological changes and focused on growing the market. Fintech has evolved to become more user-friendly and widely available across a wide range of industries, from investment management to banking to insurance to even education.

Fintech has expanded its reach among customers by offering services that were unimaginable in previous ages. In the last ten years, the use of cell phones and the use of the internet has expanded dramatically, and as a consequence, inventors have come up with a number of concepts that may assist minimize human effort. Fintech currently offers services like as depositing checks through mobile applications, paying bills, generating funds for start-ups, and managing investments using artificial intelligence. According to an EY analysis based on the Fintech Adoption Index performed in 2017, individuals are too reliant on their mobile phones, with one-third of respondents utilizing fintech on a regular basis. These customers utilize at least two applications on a daily basis and see fintech as an inseparable part of their lives (EY. (2019).

1.8.1 History of Fintech

Arneris, Barberis, and Ross published a study in which they discuss the three phases of fintech development and history. Fintech is a modern name for an ancient connection. Nothing has changed in the definition of financial technology, but the financial sector has become far more inventive. The first step is termed analogue to digital, and it includes late-nineteenth-century breakthroughs. In the late nineteenth century, financial globalization

gained a fresh start when the telegraph was employed for commercial purposes for the first time in 1938, shortly after the first ever transatlantic cable was established beneath the Atlantic Ocean for telegraphic connection in the year 1866. Aside from all these enhancements, Barclays Bank introduced the ATM (Automatic Teller Machine) in 1967, which became one of the distinguishing qualities of presenting a modern advancement to fintech.

In the second phase of fintech's development, the financial services industry emerged as the world's largest buyer and user of IT solutions. CELENT data on banks IT spending estimates that in 2014, the financial services industry spent more than US\$197 billion on IT. This trend did not begin in the 20th century, but rather in the early to mid-1990s. Thereafter, the financial services industry became the largest buyer of IT in the world. Since 1980, the banking sector has prioritized improving its efficiency by capitalizing on and integrating new technical developments. Customers may now make use of banking services without having to physically visit a bank, thanks to the proliferation of ATMs. Money is the only real commodity left, since everything else has gone digital.

Beyond the peer-to-peer lending platforms provided by the fintech sector, the third stage of financial technology involves developments in the whole area of providing financial services and products to customers.

The legal issues of a fintech company are unaffected by these factors from the past. Policymakers and regulators have missed the boat on this one. The issue here is not with the technology, but with people who use it in finance. Since 2008, technological improvements have been intense. Smartphone usage has skyrocketed, and an increasing number of individuals now have internet access. Fintech developers' technology services and products are undergoing rapid advancements and improvements.

1.8.2 Evolution of Fintech

Fintech arose in the twenty-first century. From 1866 to 1967, the fintech industry was in its early phases of growth. Even though the fintech business was inextricably tied with the technology industry, it remained an analogue industry in the eyes of others. Fintech 1.0 describes this era.

Second-generation financial technologies emerged in 1967. The second phase of fintech saw the financial sector migrate from analogue to digital, including digital communication technology and digital transaction processing. The start of Fintech 2.0 in 2008 marked the end of this period. During the second time period, financial institutions heavily used technology for data processing and enhancing the efficiency of current banking and payment systems. Fintech 3.0, which happened around 2008, marked a significant shift in the sector. New start-ups developed new innovative technology for making payments, obtaining loans, and credit, among other things. From 2008 to now, the fintech industry has evolved; presently, it includes more than simply information technology and finance.

Fintech 1.0 (from 1866 to 1967) Financial technology has existed since the invention of finance. Fintech is defined as any technology associated with finance. The modern banking

and finance sector may trace its origins back to the eighteenth century. Since the development of money following the barter system, financial technology has been around. One of the most important events of the fintech 1.0 period is the construction of the transatlantic connection in 1866. As a consequence, there has been a significant development in fundamental infrastructure facilities to boost communication and transaction facilities internationally. A new era of internationalization in financial technology emerged at this time. With the advent of permanent records, the financial sector flourished during this period. The abacus was a game-changer for calculation after its invention. This whole process helped bring forth a contemporary economic system. Many developments happened in the context of commerce throughout the Renaissance and the Middle Ages, including the introduction of double-entry bookkeeping and accounting and the promotion of the growth of various infrastructural facilities to help in the manufacturing of commodities for trade. Financial technology is bolstering the credentials that were developed over that time period via right technological adaptation (Arner et al., 2015). The Industrial Revolution in the 1600s revolutionized the way companies functioned by introducing insurance, banking, and other services.

In the late nineteenth century, as a result of the convergence of money and innovation, the first era of monetary globalization began and lasted until the beginning of World War One. During this time, technological advances like telegraphs, railroads, trenches, and steamships facilitated international financial connections and the speedy conveyance of financial information and payments. The banking system provided necessary funding for these developments to happen simultaneously. While financial globalization was forced for a number of years after WWII, mechanical innovations, particularly those stemming from the fight, proceeded at a rapid pace, notably in exchanges and data innovation. As a result, fintech 1.0 represents a move from analogue to digital.

Fintech 2.0 (from 1967 to 2008) It is the time when the digitalization of financial services began. Many digital practices that we now consider classic and customary were launched

during this period, according to the existing circumstances. With the introduction of calculators and ATMs in 1967, the modern age of financial technology, or fintech 2.0, officially started. Most of the financial services sector became digital between 1967 and 1987. During this second phase, the US stock market crashed, most famously in 1987. After then, a lot of important shifts occurred in the internationalization of financial services.

In 1968, the United Kingdom established what is now known as BACS (Bankers' Automated Clearing Services), with its roots in the Intern Computer Bureau. The United States constructed the CHIPS clearing house (Clearing House Interbank Payment System) in 1970. Founded in 1973, SWIFT (Society for Worldwide Interbank Financial Telecommunications) aims to facilitate domestic and international transfers between financial institutions worldwide. Greater monetary interconnectivity for payments led to the closure of the Herstatt bank in 1974. The risks of growing financial interconnectedness, especially those enabled by new technologies, became apparent to authorities after then. This crisis shifted the attention of administration away from non-FinTech issues and onto FinTech issues, as worldwide sensitive legal concessions gave way to the development of solid installments frameworks and accompanying counsel.

In 1971, the United States established NASDAQ, ushering in the transition from the physical stock trading that had been the norm since the 1600s to the modern era of computerized stock trading. Most banks and other financial organizations adopted IT in the 1980s, shifting their day-to-day operations from paper to computer. In 1981, Michael Bloomberg launched invention Market Solutions (IMS), a financial technology invention that quickly gained widespread recognition. After four years of IMS's presence in the financial sector, Bloomberg terminals saw widespread adoption among industry players (Arner et al., 2015).

In 1987, policymakers started talking again, this time about the dangers of inter-sector financial links and how they affect creativity. One of the most memorable photographs

from that era is of a trader using a mobile phone not long after the device's 1983 arrival in the United States. Oliver Stone's 1987 film *Wall Street* does a great job of capturing this era. That year's "Black Monday" stock market catastrophe demonstrated unequivocally that innovation has permeated every sector of the global economy to depths not seen since the Great Depression. However, the report did emphasize the use of complicated trading systems by financial organizations, which carried out buys and sells at predefined value levels ("programmed exchanging"), which may have contributed to the disaster. There have been several innovations in response to the rapidity with which values may shift, particularly in the electronic business sectors (also called "circuit breakers"). After the Herstatt tragedy in 1974 and the non-industrial nation obligation emergency in 1982, protections controllers began organizing ways for bank controllers to collaborate on issues that cut across departments. By the latter half of the 1980s, the fax had largely replaced the wire in electronic communications between financial institutions, market players, and customers throughout the world, definitely bettering financial services. By 1998, the discipline of financial management had matured considerably. This has led to widespread unease about the security of modern financial tools.

The Internet age officially began in 1995, when Wells Fargo began offering online record checking over the World Wide Web (WWW). Establishing parallel structures and associated administrative processes to reduce risk as soon as possible among powerful spheres of influence. In 2005, online-only banks began popping up in the United Kingdom.

1.8.3 Fintech 3.0 (2008- Present)

Prior to the 2008 GFC, consumers falsely believed that only a select few financial service providers were really qualified to serve their needs. The Great Recession pushed the industry forward to create financial technology 3.0.

This section also examines the evolution and present situation of the fintech industry, discussing the confluence of factors in the financial services market following the financial

crisis of 2008. Factors included public opinion, tighter regulation, political pressure, and economic developments. As a result of a number of factors coming together at once, 2008 was a watershed year for the financial services sector.

ion has become commonplace in people's everyday lives because to the proliferation of Smartphone applications that facilitate the disbursement of modest loans, such as Lazypay, Simpl, and others.

1.9 FINTECH USAGE IN INDIA

In India, the financial technology industry is rapidly overtaking the country's other technological and service sectors. As of January 2022, India is home to 21 fintech unicorns. The Prime Minister announced a "fintech revolution" and "security shield" during the Infinity Forum's inaugural ceremony on December 3, 2021. The premier also highlighted the need of empowering fintech via advanced security systems, with a particular emphasis on saving, investing, income, and insurance. The proclamation was issued because of fintech's increasing importance. India has the highest rate of fintech adoption in the world, at 87 percent, whereas the global average is 64 percent. Reasons for this high rate include the government's Digital India programme and a policy climate that encouraged innovation.

When Covid-19 hit the Indian economy, every sector save the financial technology sector saw a decline in profits and stock prices. Covid-19 fuelled the banking sector as people relied more on contactless transactions and less on physical activity. The Boston Consulting Group (BCG) and the Federation of Indian Chambers of Commerce and Industry (FICCI) conducted a study projecting that by 2025; India's Fintech industry may be valued between \$150 and 160 billion. In fact, during the quarter ending in June of 2020, the Indian market saw the execution of 33 Fintech investment deals totaling USD 647.5 million. (Briefing, I. (2022).

1.10 FINTECH MARKET IN INDIA

There are presently over 2100 financial businesses in India. Sixty-seven percent of these businesses started up in the last five years. Increased access to capital has helped propel the growth of sectors like fintech. By 2021, India's financial technology sector will have raised over \$8 billion.

Forecasts indicate a CAGR of 20% from 2019-2023 for the value of Fintech transactions, from \$66 billion in 2019. (CAGR). With a monthly volume of 5.7 billion transactions totaling over USD 2 trillion (Briefing, 2022), India has achieved great progress in the area of digital payments.

As a term, the "fintech revolution" encompasses a wide range of phenomena, each of which has significant implications. Understanding fintech requires looking at both the supply and demand sides. On the supply side, we have more powerful computers available, more internet access in both rural and urban areas, and faster, more reliable connections. When considering the demand side, it is clear that customers' expectations and the need for convenient and easy financial services have increased. First and foremost, companies need to save costs without sacrificing quality in order to gain the confidence of their clients by providing them with quicker, safer services.

As Fintech platforms and services expand with a sizable user base and product-market fit, the resulting prospects for diversified income have given rise to a new category of applications known as "super apps." Super apps consolidate a large variety of functions into a single package, opening for a plethora of practical applications. Rising Smartphone penetration, falling prices, and a spike in demand for COVID-driven digital services have all contributed to the meteoric rise of super apps in India. It is also worth noting that major technology firms have customized their systems to provide Indians with tailored versions, such as Google Pay, Amazon Pay, and WhatsApp Payments. Another software with high aspirations is the payment app Paytm.

1.11 SIGNIFICANCE OF THE STUDY

In addition to resolving the problems with traditional financial services, fintech platforms provide a venue where people may seek out opportunities for professional development and employment. With the signing of a Memorandum of Understanding in December 2021, Paytm and the Ministry of Skill Development committed to training and educating over 6,000 young Indians in the field of financial technology. Anyone who enrolls in the six-month training has access to the skill set, and those who do well have the opportunity to be hired after completing the programme.

It's clear that fintech can normalize lending without affecting gender equality. It has helped expand access to credit by simplifying application procedures and setting up standardized frameworks for using credit effectively. Many polls in the financial technology and banking sectors have shown that more and more women have started saving and investing. Women in India are rapidly turning to digital payment methods like smart phones and e-wallets, according to recent studies.

The difficulties in acquiring credit prevented over 70% of the estimated 22 million Indians who needed it prior to COVID 19 from applying for it. With the advent of BNPL (Buy Now Pay Later), the financial technology industry has made it so that people may get the credit they need to take care of their day-to-day expenses without a lot of hassle. Credit extends

CHAPTER 2: LITERATURE REVIEW

The researcher has undertaken a comprehensive literature review in order to understand the nature and scope of previous empirical studies on the issue and to pinpoint any existing knowledge gaps. Here, we give a survey of the relevant published work in the field.

Section 1 – Conceptual and Theoretical Background

2.1 GENERAL TRENDS IN INNOVATION

The rate at which new goods and services contribute to a company's bottom line is a good indicator of its "innovation intensity." When asking whether a product, method, or service is genuinely "innovative," i.e. if such an Innovation is new to the market itself (i.e. local, national, or worldwide), a narrow emphasis on Innovation Intensity is not sufficient. Therefore, it is possible for a company to have a high value of Innovation Intensity without really being "creative" enough to present a new product or service to the market since they are continually launching counterfeit items. Therefore, Innovation Intensity is not examined separately from the introduction of "new to the industry," "new to the Indian market," or "new to the worldwide market" Innovations for the sake of clarity in this research. When we talk about "Highly Innovative" companies, we're talking about ones who have brought a "new to world" Innovation into their business model within the previous five years.

2.2 TYPES OF INNOVATION

Product innovation, process innovation, and market innovation are the three forms of innovation that aid in the natural growth of a company. The paper claims that a sharper emphasis on market innovation, which is defined as enhancing the variety of target markets and the manner in which they are supplied, is a potent tool for finding promising new business prospects. Successful financial services companies have used market innovation

to expand their operations and protect themselves from rivals.

2.2.1 Product Innovation

The most direct path to income generation is the introduction of new products. On the other side, process innovation offers the potential for cost savings, enhanced quality, and protection of the product's integrity. Companies that consistently provide new and significantly revised goods are more likely to succeed over the long run (Hart, 1996). It's undeniable that new product introductions help businesses keep and expand their market share. Keeping a solid foothold in the industry necessitates regular product updates and revamps. Some managers refer to excessive product innovation as "innoflation" (Mitchell, 1996), although this is not sufficient. Clearly defining which aspects of the product are in need of revision is essential. Analysts have made a distinction between "core" product features and additional support for assessing, purchasing, and using the core product for this same reason. The level of service or assistance offered to each client will vary.

In most cases, it is reasonable to charge a premium for assistance. Having support may be a lucrative tool for edging out the competition. Providers may now market and sell variants of the same fundamental product to distinct markets (Storey and Easingwood, 1998). There are a variety of creative ways to help customers. First Direct, a division of Midland Bank, the UK's fastest-growing retail bank, attributes its success to a revolutionary business model. The only way to get in touch with First Direct is through phone.

The self-assured, time-pressed millennial professionals who are the target audience for this strategy find it very appealing. It's not the banking goods themselves that draw customers in, but the service around them. Now you may get assistance whenever you need it by calling in. This is far more practical than speaking with a bank teller in person, which often requires visiting the bank during business hours and waiting in a long queue. The new method of client care has significantly disrupted the industry norm for the provision of financial services.

Product innovation is a critical aspect of business strategy that involves creating new or improved products to meet consumer needs, differentiate from competitors, and drive growth. This process can include developing entirely new products, enhancing existing ones, or adapting products to new markets or uses. By continually developing new and improved products, companies can maintain a competitive edge, satisfy customer needs, and drive growth. Leading examples like Apple, Tesla, Dyson, and Amazon demonstrate how innovation can lead to success, setting benchmarks for others to follow.

Importance of Product Innovation in Fintech and Banking

Enhanced Customer Experience: Innovations such as mobile banking apps and personalized financial services have significantly improved the customer experience, making banking more convenient and accessible.

Increased Efficiency: Automation and advanced analytics streamline processes, reduce operational costs, and improve the accuracy of financial services.

Financial Inclusion: Innovative products and services reach underserved populations, providing access to banking and financial services to those who previously lacked it.

New Revenue Streams: By offering new and innovative products, financial institutions can tap into additional revenue sources.

Risk Management: Advanced technologies such as AI and block chain enhance security and reduce fraud, thereby managing risks more effectively.

Competitive Advantage: Innovation helps companies stand out in a crowded market. Unique products can attract more customers and create a loyal customer base.

Customer Satisfaction: By meeting the changing needs and desires of consumers, innovative products can enhance customer satisfaction and loyalty.

Market Expansion: Innovation can open up new markets and opportunities. By adapting products to different regions or demographics, companies can expand their reach.

Increased Efficiency: Innovation often leads to more efficient production processes, cost savings, and improved product quality.

Revenue Growth: New and improved products can drive sales and contribute significantly to a company's revenue growth.

Product Innovation Leading Examples

Digital and Mobile Banking Example: Revolut

Revolut is a UK-based fintech company that offers a digital banking alternative. It provides users with a mobile app that offers currency exchange, debit cards, stock trading, crypto currency exchange, and peer-to-peer payments. Revolut's innovative approach allows customers to manage their finances entirely from their smart phones, with features like real-time spending notifications and budgeting tools.

Robo-Advisors Example: Betterment

Betterment is a pioneer in the robo-advisor space, offering automated, algorithm-driven financial planning services. Users can set financial goals, and Betterment's algorithms will create and manage a personalized investment portfolio. This innovation makes investing accessible and affordable for a broader audience by lowering the barriers to entry and reducing the need for human financial advisors.

Block chain and Crypto currencies Example: Bit coin

Bit coin, the first and most well-known crypto currency, introduced the concept of decentralized digital currency using block chain technology. Block chain ensures secure, transparent, and immutable transactions without the need for a central authority. This innovation has paved the way for numerous other crypto currencies and applications of block chain technology in various financial services, including smart contracts and decentralized finance (DeFi).

Peer-to-Peer (P2P) Lending**Example: Lending Club**

Lending Club is an online platform that connects borrowers with investors willing to fund their loans. This P2P lending model bypasses traditional banks, offering borrowers lower interest rates and investor's higher returns. Lending Club's innovation lies in its ability to use data-driven algorithms to assess credit risk, streamline the lending process, and expand access to credit.

AI and Machine Learning in Banking Example: JPMorgan Chase

JPMorgan Chase has embraced AI and machine learning to enhance various aspects of banking. One notable innovation is their Contract Intelligence (Coin) platform, which uses machine learning to analyze legal documents and extract essential data. This technology significantly reduces the time required for document review, enhances accuracy, and allows employees to focus on more complex tasks.

2.2.2 Process Innovation

Quality function deployment and business process reengineering are examples of process innovation (Cumming, 1998). The purpose of this challenging sort of innovation is now apparent. If a supplier is efficient and consistently works to boost production, consumers may eventually get products with the same or better quality at a lower price. Price reductions as a result of these cost savings are optional. In response to the success of Direct Line's (car) and First Direct's (personal banking) new product offerings, several well-known financial and insurance institutions have set up telephone-based subsidiaries. Everyone is making an effort to reduce overhead costs and boost service quality via novel processes. Both the production of the main offering and the provision of any accompanying services depend critically on process innovation. Each part of an offer has to be high-quality and maintain that standard. Services, which by definition rely on connections between people to produce results, present unique challenges for the management of process innovation. (Johne and Storey, 1998).

Process innovation involves the implementation of new or significantly improved production or delivery methods. This type of innovation focuses on enhancing the efficiency and effectiveness of business processes, often leading to cost reductions, quality improvements, and faster production times. Unlike product innovation, which aims at developing new products, process innovation targets the optimization of how products are made and delivered. Process innovation is a key driver of efficiency, quality, and competitiveness in today's business environment. By rethinking and improving how products are made and delivered, companies can achieve significant operational benefits and better meet customer needs. Process Innovation in fintech and banking are now at the forefront of technological and process-driven transformations, leading to more agile and customer-centric services.

Importance of Process Innovation in Fintech and Banking

Operational Efficiency: Streamlining processes reduces redundancy and operational costs, allowing institutions to operate more efficiently.

Enhanced Customer Experience: Innovative processes provide faster, more convenient, and personalized services to customers.

Regulatory Compliance: Advanced processes ensure better compliance with regulatory requirements, reducing the risk of fines and penalties.

Risk Management: Improved processes help in better identification and management of risks, enhancing the overall stability of financial institutions.

Scalability: Innovative processes allow for scalable operations, supporting growth and expansion into new markets.

Cost Reduction: By streamlining processes, companies can reduce waste, lower operational costs, and improve profitability.

Quality Improvement: Innovative processes can enhance product quality and consistency, leading to higher customer satisfaction.

Speed and Efficiency: Faster and more efficient processes can improve time-to-market for products, providing a competitive edge.

Adaptability: Improved processes can make it easier for companies to adapt to changes in the market, such as shifts in demand or new regulatory requirements.

Sustainability: Innovations in processes can lead to more sustainable practices, reducing the environmental impact and improving corporate social responsibility.

Process Innovation Leading Examples

Robotic Process Automation (RPA) in Banking Example: U.S. Bank

U.S. Bank has implemented robotic process automation (RPA) to streamline various back-office operations. RPA involves the use of software robots to automate repetitive and rule-based tasks such as data entry, processing transactions, and compliance reporting. By automating these processes, U.S. Bank has reduced processing times, minimized errors, and freed up employees to focus on more strategic tasks.

Block chain for Cross-Border Payments Example: Ripple

Ripple is a fintech company that uses block chain technology to facilitate real-time cross-border payments. Traditional cross-border transactions can take several days and involve multiple intermediaries, leading to high costs and delays. Ripple's block chain-based solution allows for secure, transparent, and nearly instantaneous transactions, significantly improving the efficiency of international payments.

AI and Machine Learning for Fraud Detection Example: JPMorgan Chase

JPMorgan Chase uses artificial intelligence (AI) and machine learning algorithms to detect fraudulent activities in real-time. These technologies analyze vast amounts of transaction data to identify patterns and anomalies that may indicate fraud. By leveraging AI, JPMorgan Chase can quickly and accurately detect and prevent fraudulent transactions, improving security and reducing losses.

Chat bots and Virtual Assistants Example: Bank of America's Erica

Bank of America introduced Erica, an AI-powered virtual assistant, to provide customers with 24/7 support. Erica helps customers with tasks such as checking account balances, making payments, and providing financial advice. The use of chat bots and virtual assistants streamlines customer service processes, reduces wait times, and offers personalized assistance, enhancing the overall customer experience.

2.2.3 Market Innovation

Improving the selection of target markets and finding the most efficient means to serve them are at the heart of market innovation. The initiative seeks to identify and implement novel approaches to servicing existing and potential markets. Finding potential markets is the first step. Professional market segmentation allows for this id'ing to occur. Profit maximization requires market segmentation, the process of dividing a large prospective market into smaller, more manageable pieces. Unfinished market segmentation will lead to an inefficient distribution of resources over a wide range of unprofitable niches.

Competent market segmentation is essential in many business contexts, such as when multinational businesses target the formerly communist countries of Eastern Europe. Misreading or lost opportunities in the market today may be gone forever. Market researchers are responsible for gathering such information. In common perception, this job entails nothing more than making note of where regional markets are now and where they could go in the future. Geography, however, is only one simple way to divide up markets.

Quantitative criteria based on demographic data and subjective criteria based on lifestyle interpretations of consumer and corporate buying behavior is only two examples of the many possible segmentation criteria. The phrase "benefit segmentation" has been gaining popularity in recent years (Hooley et al., 1998). The theory rests on an examination of consumer sentiment and the belief that it is wants and benefits that create and alter

marketplaces. Use events, or the ways in which buyers look for benefits in various buying situations, are the focal point of this kind of segmentation. Successful market segmentation uses this method to divide a big potential market into more manageable market opportunities. It's robust because it's based on the idea that one customer may have varying needs for the same fundamental product. This happens all the time in practice; for example, someone may fly coach for business but first class for pleasure. Any practical need is a commercial opening waiting to happen.

Enhancing service to existing markets is the second objective of market innovation. Like the last one, this one also requires an accurate assessment of consumer tastes, but this time on a deeper level. Buyers are more likely to buy the offers they like the most, thus it's important to understand their preferences via "benefit segmentation."

On the other hand, Mathur and Kenyon (1997) provide a convincing argument in favor of amplification of consumer purchasing preferences by pointing out that customers with different usage requirements often purchase products with the same fundamental attributes but in different ways. Some consumers, for instance, choose a more "commodity-buy" approach. This happens when buyers have a firm grasp on the fundamentals of the product. This kind of shopping isn't interested in unique features or specialized support. Pricing is the sole factor. In other cases, people decide to buy a product. In this setting, well-informed buyers seek for enhanced essential product features and are prepared to pay more for them. Those who aren't as well-versed in a product's ins and outs prefer to shop in a "system buy" mode, where they are more than prepared to spend more for crucial product features and guidance. Last but not least, some customers choose to make a "consultation buy."

Market or Institution innovation involves introducing new products, services, or business models that significantly change existing markets or create entirely new ones. This type of innovation is crucial for companies looking to differentiate themselves, attract new

customers, and drive growth. Market innovation can lead to enhanced customer experiences, new revenue streams, and a sustainable competitive advantage.

Market innovation in fintech and banking involves introducing new products, services, or business models that create new markets or significantly alter existing ones. This type of innovation can redefine how financial services are delivered and consumed, expanding the reach and impact of financial institutions. Market innovation is critical in addressing unmet customer needs, enhancing customer experiences, and driving industry growth.

Importance of Market Innovation in Fintech and Banking

- **Customer Acquisition:** Attracts new customers by offering novel and more convenient financial products and services.
- **Market Expansion:** Opens up new markets and customer segments, including underserved populations.
- **Competitive Advantage:** Differentiates financial institutions from competitors through unique offerings.
- **Revenue Growth:** Generates new revenue streams through innovative products and business models.
- **Enhanced Customer Experience:** Improves the overall customer experience by addressing specific pain points and offering greater convenience.

Market Innovation Leading Examples

- **Peer-to-Peer Lending Platforms**

- Example: Lending Club**

Lending Club, one of the pioneers in peer-to-peer (P2P) lending, has revolutionized the traditional lending market by directly connecting borrowers with investors. This model bypasses traditional financial intermediaries, offering borrowers lower interest rates and investor's higher returns. Lending Club has created a new market for personal loans, especially for individuals who may have been underserved by traditional banks.

- **Neobanks**

Example: N26

N26 is a leading example of a neobank, a digital-only bank that operates without physical branches. N26 offers a fully digital banking experience, with services accessible via a mobile app. By leveraging technology, N26 provides features such as real-time transaction notifications, no-fee foreign transactions, and seamless integration with financial management tools. This innovation has attracted a tech-savvy customer base looking for more convenience and lower fees than traditional banks offer.

- **Crypto currency Exchanges**

Example: Coinbase

Coinbase is one of the most prominent crypto currency exchanges, providing a platform for buying, selling, and storing crypto currencies. By facilitating easy access to digital currencies, Coinbase has significantly contributed to the mainstream adoption of crypto currencies. This market innovation has not only created a new financial market but also introduced new investment opportunities for individuals and institutions.

- **Buy Now, Pay Later (BNPL) Services**

Example: Afterpay

Afterpay, a leading BNPL service, allows consumers to purchase goods and pay for them in installments, often without interest. This payment model appeals to younger consumers and those without access to traditional credit. Afterpay's innovation has reshaped the retail finance market by providing an alternative to credit cards and traditional loans, thereby expanding consumer purchasing power and merchant sales.

- **Robo-Advisors**

Example: Wealthfront

Wealthfront is a pioneer in the robo-advisor space, offering automated investment management services. By using algorithms and AI, Wealthfront provides personalized investment advice and portfolio management at a fraction of the cost

of traditional financial advisors. This market innovation has made investment services accessible to a broader audience, particularly younger and less affluent individuals who might not have previously engaged with traditional financial advisors.

2.2.4 Fintech companies

Fintech companies like Paytm, Google Pay, and PhonePe have revolutionized the financial services industry by providing digital payment solutions that enhance convenience, speed, and security for users. These platforms have become integral to the daily lives of millions, driving the adoption of digital payments and transforming the financial landscape, especially in emerging markets like India.

- **Paytm**

Founded in 2010, Paytm started as a mobile recharge and utility bill payment platform. Over the years, it has expanded into a comprehensive digital ecosystem offering a wide range of financial services, including mobile banking, online shopping, ticket booking, insurance, and mutual fund investments.

- **Google Pay**

Google Pay, formerly known as Tez in India, was launched in 2017. It leverages the Unified Payments Interface (UPI) to enable seamless peer-to-peer transactions, bill payments, and online shopping. Google's focus on a user-friendly interface and robust security features has made it a popular choice among users. The integration with other Google services, such as Google Play and Google Maps, enhances its utility. Google Pay's use of audio QR and proximity payments through sound waves (without the need for an internet connection) sets it apart in terms of innovation.\

- **PhonePe**

Launched in 2015, PhonePe is another prominent player in the Indian fintech space. It also operates on the UPI platform, offering instant money transfers, bill payments, and online shopping. PhonePe's emphasis on simplicity and speed has

garnered a significant user base. Additionally, PhonePe has expanded into financial services, offering insurance products and mutual fund investments. Its "Switch" platform allows users to access multiple apps from within the PhonePe app itself, providing a seamless and integrated user experience.

Impact on the Market

- The introduction of these fintech platforms has significantly impacted the financial landscape by:
- **Promoting Financial Inclusion:** By making digital payments accessible to a wide audience, including those without traditional bank accounts, these platforms have promoted financial inclusion.
- **Enhancing Convenience:** Users can make transactions anytime, anywhere, without the need for cash or physical cards.
- **Boosting the Economy:** The increased use of digital payments has helped reduce the shadow economy and increase transparency.
- **Stimulating Innovation:** The competition among these platforms drives continuous innovation, leading to improved services and features.

2.2.5 Small Finance Banks:

Small Finance Banks (SFBs) represent a pivotal segment in India's banking landscape, primarily aimed at promoting financial inclusion by catering to underserved and unserved sections of the population. These banks were conceptualized to bridge the gap left by traditional banking institutions, particularly in rural and semi-urban areas, where access to formal financial services remains limited. Small Finance Banks in India exemplify a proactive approach towards inclusive banking, addressing the financial needs of marginalized groups and contributing to the nation's economic development goals. As they continue to evolve, their impact on widening financial access and enhancing economic stability is expected to grow, solidifying their position as key players in the Indian banking sector.

Key Features of Small Finance Banks:

- **Target Audience:** SFBs focus on providing banking services to small businesses, micro and small industries, farmers, and unorganized sector entities, which often struggle to obtain credit and other banking facilities from mainstream banks.
- **Regulatory Framework:** Governed by the Reserve Bank of India (RBI), SFBs must adhere to stringent regulatory norms, ensuring stability and credibility in their operations.
- **Financial Inclusion:** By offering basic banking services such as savings accounts, deposits, loans, and remittances, SFBs empower previously excluded segments to participate in the formal financial system.
- **Technology Integration:** Many SFBs leverage technology to reach remote areas efficiently, employing digital banking solutions and mobile banking platforms to extend their services.

Leading Examples of Small Finance Banks:

- **Equitas Small Finance Bank:** Founded in 2007 as a microfinance institution, Equitas transformed into an SFB in 2016. It operates with a mission to provide financial products and services to underserved individuals and businesses across India.
- **Ujjivan Small Finance Bank:** Originating from a microfinance institution, Ujjivan SFB received its banking license in 2017. It serves over 5 million customers, primarily in urban and semi-urban regions, focusing on (MSEs) and low-income households.
- **AU Small Finance Bank:** Established in 1996 as a vehicle finance company, AU Finance Bank transitioned into an SFB in 2017. It caters to retail, MSME (Micro, Small and Medium Enterprises), and agriculture sectors, offering a range of banking products through a robust digital platform.

Impact and Future Outlook:

Small Finance Banks have made significant strides in advancing financial inclusion by offering tailored products and services to underserved communities. Their role in fostering economic growth at the grassroots level is crucial, as they continue to expand their reach through innovative approaches and technology adoption.

2.2.7 Payment Banks

Payment Banks in India represent a transformative addition to the banking ecosystem, specifically designed to enhance financial inclusion by focusing on digital and cashless transactions. These banks offer a limited range of banking services, primarily catering to the unbanked and under banked segments of society. Payment Banks have significantly enhanced financial inclusion in India by leveraging technology and innovative business models to reach underserved populations. They have facilitated easier and more efficient digital transactions, reducing dependency on cash and enhancing financial literacy among customers.

Looking ahead, Payment Banks are expected to play a pivotal role in advancing India's digital economy agenda. Their ability to scale operations, expand service offerings, and deepen customer engagement through technology-driven solutions will continue to shape the future of banking and financial services in the country. Payment Banks represent a paradigm shift in how banking services are delivered, emphasizing accessibility, affordability, and convenience through digital platforms.

Key Features of Payment Banks:

- **Digital Focus:** Payment Banks leverage technology to provide convenient and accessible banking services, emphasizing digital transactions through mobile banking, internet banking, and other electronic channels.

- **Services Offered:** While Payment Banks cannot issue loans or credit cards, they offer services such as savings accounts, remittance services, bill payments, and prepaid instruments like mobile wallets and prepaid cards.
- **Financial Inclusion:** Targeting individuals who have limited access to traditional banking services, Payment Banks play a crucial role in bringing them into the formal financial system by offering simple and affordable banking solutions.
- **Regulatory Framework:** Governed by the Reserve Bank of India (RBI), Payment Banks operate under strict regulatory guidelines to ensure consumer protection, financial stability, and operational transparency.

Leading Examples of Payment Banks:

- **Airtel Payments Bank:** Established in 2017 by Bharti Airtel, Airtel Payments Bank operates with a mission to empower millions of Indians with access to banking and financial services. It offers savings accounts, digital wallets, and facilitates utility bill payments and mobile recharge services through its extensive network of retail partners.
- **Fino Payments Bank:** Fino Payments Bank started operations in 2017, building on Fino Paytech Limited's expertise in providing technology solutions for financial inclusion. It focuses on serving the unbanked and under banked population by offering savings accounts, remittance services, and utility bill payments through its widespread network of outlets.
- **India Post Payments Bank (IPPB):** Launched in 2018 by the Department of Posts (India Post), IPPB leverages India's extensive postal network to provide banking services across the country.

2.2.8 Digital Banks

Pure digital banks, also known as neo banks are financial institutions that operate exclusively online without any physical branches. These banks leverage cutting-edge technology to offer a wide range of banking services, providing customers with a seamless,

efficient, and cost-effective banking experience. Prominent examples of pure digital banks include DBS Digibank and Jupiter.

Impact on the Banking Industry

- **Enhanced Accessibility:** By eliminating the need for physical branches, these banks make financial services accessible to a broader audience, including those in remote areas.
- **Cost Efficiency:** Operating digitally reduces overhead costs, allowing these banks to offer competitive interest rates and lower fees.
- **Improved Customer Experience:** The focus on user-friendly interfaces, instant services, and personalized financial management tools leads to higher customer satisfaction and engagement.
- **Innovation and Agility:** Pure digital banks are more agile and can quickly adapt to changing market conditions and customer needs, driving continuous innovation in financial services.

DBS Digibank

- **DBS Digibank**, launched by DBS Bank, is one of the first pure digital banks in Asia. It offers a comprehensive suite of banking services, including savings accounts, fixed deposits, loans, and investment products, all accessible through a mobile app. Key features of DBS Digibank include:
- **Paperless Account Opening:** Customers can open an account in minutes using their smart phones, without the need for physical documentation or branch visits.
- **AI-Powered Customer Service:** Digibank utilizes artificial intelligence to provide 24/7 customer support through chat bots and virtual assistants, ensuring quick and accurate responses to customer queries.

Jupiter

- **Jupiter** is a digital-only banking platform in India that aims to redefine the banking experience for tech-savvy consumers. It focuses on providing a user-friendly and transparent banking service. Key features of Jupiter include:
- **Instant Account Opening:** Users can open a bank account quickly using their mobile phones, with minimal documentation required.
- **No Hidden Fees:** Jupiter prides itself on transparency, with no hidden charges or complex fee structures, making it easier for customers to understand and manage their finances.
- **Smart Money Management:** The app provides insights into spending patterns, helps set budgets, and offers personalized financial advice to help users save and invest wisely.

2.3 THEORIES OF FINANCIAL INNOVATION

Different scholars have looked at financial innovation in different contexts, while analyzing different variables they have given different theories behind the experienced financial innovation

2.3.1 Traditional Theory of Financial Innovation

Sundbo established this theory in 1997, proposing two paradigms as a result of the causal patterns: the Technology-economic paradigm and the entrepreneur paradigm. The technology-economic paradigm places a premium on technical progress as the backbone of the unpredictable innovation process.

Sundbo (1997) argued that entrepreneurs are the primary drivers of financial innovation under the entrepreneur paradigm of innovation. In addition to new goods and processes, it also requires the creation of new financial entrepreneurs and the management of established entrepreneurs.

2.3.2 Financial Constraints Theory

In 1950, Schumpeter established the theory of limits by showing how businesses adapt via innovation in response to the difficulties posed by factors such as imperfect markets, government regulation, high operating expenses, and taxation. To optimize returns on capital in the context of the firm's aims, businesses always seek new ways to innovate in the financial sector, as Silber (1983) noted. In order to thrive in today's competitive market, according to Silber, businesses must constantly reinvent themselves.

When interest rates, taxes, and regulation were high, financial innovation resulted, according to Tufano (2002). As a result, people and businesses alike developed novel solutions to these problems in order to lower their borrowing costs, cut their expenditures, and broaden their range of investment opportunities. Low deposits, fewer interest income, restricted lending, reduced demand for deposits, and the drive for efficiency are only some of the financial investment limitations that innovators want to alleviate.

2.3.3 Strategic Theory of Financial Innovation

Sundbo said that the innovation is heavily dependent on the company's strategy. Thus, innovation is conceived within the framework of the firm's strategy and must be maintained within the framework of the firm's strategy to keep the firm's operations under control. In order to boost the efficiency of certain areas, financial engineers will frequently consciously implement new methods, a process known as "financial engineering" (Sundbo, 1997).

Financial markets are more comprehensive, expansive, and productive as a result of innovation, as pointed out by Tufano (1989). All the players in the financial sector are happy since this lowers transaction costs and expands investment options. Therefore, steady income, profitability, and dividends to shareholders result from a strategic policy of continual innovation (Chege, 2008).

2.3.4 Integrated Theoretical Background for Financial Innovation

This section presents a comprehensive theoretical foundation for analyzing financial innovation in the banking industry. A multi-theoretical approach is adopted, combining

classical economic models, behavioral adoption frameworks, and organizational capability theories to contextualize the Indian fintech revolution.

○ **Traditional Theory of Financial Innovation:**

- Financial innovation has long been viewed as a response to market imperfections. Tufano (2002) explains innovation as a tool to redistribute risk, reduce transaction costs, and overcome market frictions. Silber (1983) asserts that regulatory and institutional constraints force banks to create new financial products or delivery systems, particularly under capital and operational pressures. Sundbo (1997) distinguishes between a technology-economic paradigm (macroeconomic innovation driven by systems) and an entrepreneur paradigm (innovation stemming from individual initiative). These foundational perspectives are crucial in understanding how Indian banks and fintech startups respond to systemic barriers and emerging opportunities.

○ **Diffusion of Innovations Theory:**

- Rogers (2003) provides a seminal framework to understand the adoption lifecycle of technological innovations. It categorizes adopters into innovators, early adopters, early majority, late majority, and laggards. Ghosh (2021) applies this theory to India's UPI adoption, highlighting how urban youth led digital payment adoption while rural areas lagged. This segmentation supports the thesis's empirical methodology by allowing targeted demographic analysis.

○ **Dynamic Capabilities and Institutional Theory:**

- Teece et al. (1997) argue that dynamic capabilities enable firms to integrate, build, and reconfigure internal and external competences to address rapidly changing environments. Hussain and Papastathopoulos (2022) apply this to fintech, showing how banks with strong adaptability outperform static institutions. Institutional theory, as discussed by Broby (2021), posits that the regulatory and cultural environment significantly influences innovation diffusion, suggesting that Indian fintech's success is partially shaped by RBI's

regulatory flexibility and consumer trust-building.

○ **Innovation Diffusion Model:**

- Expanding on Rogers' theory, the Innovation Diffusion Model introduces a quantitative basis to understand how different consumer segments adopt innovations. Zouari-Hadiji (2021) demonstrates how performance in Tunisian banks improved when innovation adoption was segmented and risk-managed. This model will guide the thesis's empirical focus on segmentation and behavioral drivers.

Theory	Key Contributor(s)	Core Idea	Application to Study
Financial Constraints Theory	Tufano (2002), Silber (1983)	Innovation responds to frictions	Explains fintech as a workaround to banking inefficiencies
Entrepreneur Paradigm	Sundbo (1997)	Innovation as human-driven	Frames the role of entrepreneurs in Indian fintech
Diffusion of Innovations	Rogers (2003), Ghosh (2021)	Adoption curve segmentation	Supports demographic hypotheses

Dynamic Capabilities		Teece et al. (1997), Hussain &		Organizational reconfigurati		Explains differences in bank
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	Papastathopoul os (2022)	on	responsivene ss
Institutional Theory	Broby (2021)	Cultural/regulatory conditioning	Contextualizes India's fintech rise
Innovation Diffusion Model	Zouari- Hadiji (2021)	Adopter segmentation + performance	Informs survey instrument and segmentation logic

These theories collectively offer a robust lens to frame the study's objectives, hypotheses, and interpretation of findings within India's rapidly evolving digital banking ecosystem.

2.4 FINTECH AN EVOLUTION OR REVOLUTION

There have been two primary impacts on public perception and human resources because of the financial crisis. To begin, people's impressions of banks deteriorated as the crisis's causes became more apparent. Predatory loan practices, for instance, that specifically target low-income groups breach consumer protection legislation on the part of banks and severely damage the reputations of such institutions.

As the financial crisis escalated into a full-blown economic disaster, 8.7 million people lost their employment. The population at large now generally distrusts the financial system. As a result, many people who work in the financial sector have either lost their jobs or seen their pay decrease. These highly skilled but underutilized people may find new opportunities in the emerging FinTech 3.0 industry. Then there is the most recent batch of college and university graduates seeking for jobs who have advanced degrees. Since their

schooling has often equipped them with the abilities necessary to comprehend financial markets, FinTech 3.0 may profit from their knowledge.

Banks' responsibilities have expanded and their business models and objectives have evolved as a result of the fallout from the financial crisis. Because of commitments and increasing regulatory capital, banks no longer have the incentive or capacity to originate low-value loans, which weakens the universal banking notion. Credit risk transfer mechanisms, such as collateralized debt obligations (CDOs), have been criticized for their role in the financial crisis. The need that banks create Recovery and Resolution Plans (RRPs) and conduct stress tests to determine their sustainability has ultimately resulted in the establishment of financial institution resolution regimes in a number of nations. (Arner et al., 2015).

Section II - Financial Innovation and Fintech Evolution

2.5 EVOLUTION OF FINANCIAL TECHNOLOGY

When it comes to the digitization of financial services, Thomas (2014) lays out the different major areas to concentrate on, with a primary emphasis on the banking industry. He highlighted the potential effect that the structural shift toward digitization may have in his study. Since 2014, internet use has increased dramatically, reflecting a greater degree of adoption of cutting-edge internet technology. The report goes on to explain how online businesses may exploit this kind of market share to their advantage. The report finishes by emphasizing, particularly for financial institutions, the significance of turning digital. In order to secure a brighter future, conventional banks must make investments now.

The history of fintech as presented in Douglas et al.'s (2016) research is comprehensive. They refer to the present age of financial technology as "fintech 3.0," which they see as the third phase. They explain in depth how the advanced economies have benefited from this new age. According to the research, government agencies care more about this technological evolution than previously thought, and their current priority is creating a

market that is both technologically diverse and stable while protecting the privacy of its consumers and investors. The authors believe that policymakers' efforts to adapt to the rise of fintech should be applauded since it has the potential to boost competitiveness and expand possibilities for those involved. Because risk management is so important, the authors note that we are not yet in a position to establish globally standardized norms and procedures; by the time we get there, it will be a new era in fintech.

In his discussion of fintech's history, Ryan (2018) brings up the industry's development throughout time. In the financial industry, "fintech" refers to any cutting-edge technological advancement. They constantly see it as the force that causes disruption. The banking industry is particularly at the forefront of technological development. The course of the financial technology revolution has seen the introduction of many novel concepts. Even in India, the banking and financial industry has advanced. Paytm, PhonePe, and others like them have been crucial to the growth of the financial technology industry. Recent innovations in technology, such as blockchain, AI, digitalized banks, mobile banking, etc., have become game-changers in the financial technology industry.

Linda (2019) reveals the flaws of 18th and 19th-century technology. There is a clear link between financial innovation and the financial services industry. Investment in fintech increased from \$18.9 billion in 2013 to \$111.8 billion last year, according to the Fintech Reports of 2018. Payments and clearing and settlement; deposits and lending and capital raising; protection; investment management and market assistance are the five basic areas into which the Financial Stability Board divides fintech.

Lashinsky, Adam; Pressman, Aaron As of now (the year 2020), there is a plethora of technologically advanced financial services to choose from. Facebook-backed digital currency Libra is launching shortly with 27 users. Similarly, bitcoin is attracting more and more attention from financial backers. The survival of the majority of banks would be at risk, necessitating more caution on the part of the banking sector. The banks to advance their traditional banking system to technology backed services and payment options.

2.6 INDIAN PERSPECTIVE OF FINTECH

Kandpal and Mehrotra (2019) provide information about the digitization of the Banking, Financial, and Insurance (BFSI) industries. They claim that the economy has shown mixed results as a result of the push for financial inclusion. Security is the first priority, and if we can make our financial transactions safer, the fintech industry as a whole would benefit. People are more likely to utilize financial services as a result of new laws and regulations. When compared to the past, practically everyone now has their own personal bank account. The financial technology industry in India may grow with more emphasis on digitalization. The author also discusses the challenges faced by the Indian fintech sector. One of the biggest problems is that not enough people have access to the internet; another is that the majority of Indians lives in rural regions and is poor, so they don't see the use in opening a bank account. The shortage of capital is another pressing issue facing the fintech industry. The vast majority of fintech service providers are early-stage businesses that struggle to get enough funding. Financial institutions are hesitant to lend money to these new businesses, which further hinders their capacity to compete. Rakheja, R. (2020).] Fintech companies now have SEBI's permission to begin offering mutual funds to their clients. Previously, SEBI required new organizations to have 50 crores in net worth, 3 years of profitable financial service industry experience, and 5 years of experience before they could add mutual funds to their company. The Securities and Exchange Board of India (SEBI) has lifted these limitations primarily to pave the way for innovative technologies and to encourage more investment in mutual funds via the use of digital tools. Until a mutual fund can prove profitability after 5 years, they must have a minimum net worth of 100 crore INR before they can start.

Poojary (2020) estimates that the fintech industry would grow to be worth \$1 trillion by 2025. Growth prospects abound for the fintech businesses thanks to the widespread use of new payment technologies. G-pay, PhonePe, Paytm, Policy Bazaar, etc. are just a few examples of the many financial-related apps now available. In addition, the Jio effect has

contributed significantly to the development of the technology. It has boosted Smartphone adoption and internet access. Data privacy concerns and security difficulties remain despite these technical advances.

2.7 DIFFERENT FINTECH SEGMENTS IN INDIA

Peer-to-peer lending, insurance consultation, fast loan disbursement, online investment advice, and many more services that used to need human contact are now easily and efficiently provided through fintech platforms. The development of fintech has made it easy and fast for individuals and SMEs to get loans entirely online. Gold loans and personal finance, formerly thought of as unusual, are now commonplace in this sector. In this context, "PayTech" means any electronic payment method. This sector of the fintech

industry specializes on handling specific financial transactions, such as payments, as opposed to fintech as a whole. Services geared towards customers include point-of-sale (POS), prepaid cards/wallets, bill payment, QR code payments, and third-party application providers (TPAP). Business services include corporate credit cards, business-to-business (B2B) payments, and electronic invoicing. Payment gateways, card networks, API/White label solutions, and payment security are all examples of services used to implement fintech in this industry. The top players in this market are Paytm, PhonePe, MobiWik, and Google Pay. Options for consumers include buy now, pay later (BNPL), peer-to-peer lending, personal loans, salary loans, gold loans, vehicle loans, and education loans. Some services geared towards businesses include corporate credit cards, fixed-term lending, and trade financing. Some examples of fintech services utilized in this field are loan origination systems (LOS), collections management, alternative credit scoring, lending as a service, and loan management systems (LMS). Google Pay, M-Swipe, and Razor Pay are just a few of the market leaders in the burgeoning electronic payment industry.

2.8 MAJOR TRENDS PROPELLING INDIA'S FINTECH REVOLUTION

Supply Side Factors

Several macroeconomic variables have an impact on the supply side of the Indian fintech ecosystem. These include new government regulatory measures, an expanding population that does not yet utilize financial services, rising national disposable income, and developments in the e-commerce industry.

- **Governmental initiatives**

The role of government in providing both enabling support and regulation has been crucial. India's government has made a number of investments in areas like financial education and internet connection in rural regions that have contributed to the rise of the country's Fintech sector. Some of these initiatives include the National Common Mobility Card (NCMC), Startup India, Digital India, India Stack, E- RUPI, licenses for payments banks, Jan Dhan

Yojana, the recognition of peer-to-peer lenders as NBFCs, regulatory sandboxes by the RBI, and the IRDAI for Fintech. The public digital infrastructure in India, supported by Aadhar, UPI, account aggregation, and other efforts, together with a supportive regulatory climate, have all contributed to an accelerated the country's technological revolution. The Reserve Bank of India (RBI), the Insurance Regulatory and Development Authority of India (IRDAI), and the Securities and Exchange Board of India (SEBI) has all made steps to ensure the continued reliability and affordability of digital financial services. As of October 2021, the Unified Payments Interface (UPI) in India has processed 4.21 billion transactions every month, with a total value of more than US\$100 billion. To create a global payment network using block chain technology, the Reserve Bank of India has contracted with Open Financial Technologies Pvt Ltd. The company plans to use Hyper ledger Fabric, a Linux-based open-source block chain, for the RBI's sandboxed international payment system. Online Payment Gateway Service Providers (OPGSP) is one of two available methods for exporters to conduct financial transactions across borders.

More so, in 2020, we saw the birth of the International Financial Services Centre Authority. (IFSCA). It is the central body responsible for establishing and regulating the International Financial Services Centre (IFSC) in India's financial sector.

- **Investments made in India's Fintech Sector**

India's fintech industry has grown rapidly in recent years, especially when compared to the rest of the financial world. Approximately US\$20.8 billion was received as funding for various fintech companies, with US\$8.6 billion received in the last two years accounting for 36% of total funding received, as reported by Tracxn (one of the world's largest platforms, Tracxn tracks 1.4 million entities through 1,800 feeds that are organized globally across industries, sectors, sub-sectors, locations, affiliations, and networks). Investments in India's financial technology sector totaled over \$4.6 billion during the first three quarters of 2021. Several fintech enabled firms raised significant amounts of money during this

period, with Pine Labs receiving \$600 million, BharatPe \$370 million, Khatabook \$100 million, and Digit Insurance \$217 million among the highest amounts.

The payments industry has received 48.5% of the total US\$8.6 billion in funding over the past two years, with alternative lending receiving 28.5%, internet-first insurance platforms 7.9%, investment technology receiving 5.4%, banking technology receiving 5.4%, and finance and accounting technology receiving 3.5%.

As a result of the havoc that COVID19 has wreaked on the finance environment, India has been named by S&P Global as the Asia-Pacific region's top recipient of capital in fintech's in 2020. Additionally, it said that India received almost twice as much investment as China did.

- **Internet Penetration in India**

There were 795.18 million Indian internet users in 2020, and this number grew to 825.30 million by March 2021. The Telecom Regulatory Authority of India (TRAI) reports a quarterly growth in internet use of 3.79 percent. There is hope that India's already large population of internet users will become even larger as a result of the country's rapid rural penetration. (Briefing, (2022).

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- **Demand Side Factors**

Historically, the financial services industry has followed the standard business practice of putting all of its emphasis on transaction-based methods. The evolution of fintech in recent years has led to a renewed emphasis on users. Customers formerly had to visit a physical location in order to do banking transactions, but fintech has made it possible to conduct these transactions online as well. As the state of technology has advanced, fintech has carved out a niche for itself. They put the needs of their tech-savvy clientele first and have developed financial products accordingly. Millennials are essential in the growth and evolution of the fintech industry as a result of their preference for mobile-first goods and services. Mobile banking services have replaced card and wire transfer transactions in

many sections of the country, especially Tier 2 and Tier 3 cities and small villages. Mobile banking services saw rapid growth and development during COVID 19, and now they are often considered the best place to acquire new customers.

In addition to resolving the problems with traditional financial services, fintech platforms provide a venue where people may seek out opportunities for professional development and employment. With the signing of a Memorandum of Understanding in December 2021, Paytm and the Ministry of Skill Development committed to training and educating over 6,000 young Indians in the field of financial technology. Anyone who enrolls in the six-month training has access to the skill set, and those who do well have the opportunity to be hired after completing the programme.

It's clear that fintech can normalize lending without affecting gender equality. It has helped expand access to credit by simplifying application procedures and setting up standardized frameworks for using credit effectively. Many polls in the financial technology and banking sectors have shown that more and more women have started saving and investing. Women in India are rapidly turning to digital payment methods like smart phones and e-wallets, according to recent studies.

The difficulties in acquiring credit prevented over 70% of the estimated 22 million Indians who needed it prior to COVID 19 from applying for it. With the advent of BNPL (Buy

Now Pay Later), the financial technology industry has made it so that people may get the credit they need to take care of their day-to-day expenses without a lot of hassle. Credit extension has become commonplace in people's everyday lives because to the proliferation of Smartphone applications that facilitate the disbursement of modest loans, such as Lazypay, Simpl, and others. (Briefing, 2022).

2.9 GLOBAL PERSPECTIVE OF FINTECH

Principles and appropriation, business measure changes and execution results, data security, speculations and business worth, and industry sway all require careful consideration on the part of senior administration tacticians and monetary administrations pioneers, and Yoris and Robert (2008) provide a remarkable vantage point from which to do so. In light of the disruption in distant networks, they examine yet another innovative use with global impact: portable installments. There will undoubtedly be nuances and surprises with this technological application, but they should serve as a warning to the reader that many of the same financial powers will be at work as they have been with previous monetary administrations and related technological applications. In our research on consumers, businesses, economic indicators, markets, and societal concerns, we use a robust evaluation approach that enables identification of key partners and pertinent hypotheses. Their findings are expected to guide high-ranking directors in handling the monetary aspects of adaptable installments, and to assist identify some crucial compass points for the exploration.

Alberto Fraile (2018) Because of technological advancements, there are now fewer obstacles for new businesses to enter the market. This has led to an increase in the number of fintech companies offering similar services. Fintech is a rapidly evolving industry, and it's important for businesses and consumers alike to be aware of the many services available, the various actors in the industry, and the various delivery mechanisms for fintech products and services. The fintech industry, which is highly competitive, requires a reliable regulatory framework. To promote technical neutrality, a level playing field among financial startups is essential.

George (2022)Oman is a fresh target for this research since it represents an emerging market for Fintech services and products. People in Oman are more likely to utilize online banking than other types of banking, but they aren't aware of the fintech options available to them. The purpose of this research is to assess how well individuals know about P2P lending and what they think about it. The study's primary data came from an online, semi-structured questionnaire sent to 108 participants in the Muscat Governorate. The results of this survey suggest that respondents had little understanding of P2P lending. They don't know much about Fintech firms that provide various investing opportunities. They see using online lending marketplaces as risky and inconvenient. They don't intend to invest in a peer-to-peer lending platform, and they won't suggest it to their friends and relatives either.

2.10 FUTURE OF FINTECH

In their study, Frederick and Khalil (2010) looked for ways in which a combination of financial and technological strategies may foster long-term growth on a national and international scale. They discuss not just technical and financial innovation but also the current trading system and how it may profit from these developments on a local and global scale. When financial frameworks embrace technological progress, they provide a boost to many industries and facilitate more domestic and international trade. Technological progress makes businesses in a nation that help produce surpluses more competitive. With the rise of the internet and innovative financial practices, new opportunities for fraud have emerged. The tremendous rise in these scams ultimately shut down the banking systems of several countries. The authors note that the proliferation of the internet is just one contributing factor; the usage of various financial instruments and organizational structures also had a role. They did this by using several case studies to illustrate their points. The authors' intention is to show that updating macroeconomic models to account for developments in global finance and the internet is not enough. Changes to economic theory regarding technology management should be considered by policymakers.

Khosla, Vijaya V. As the number of people with access to smart phones and the internet

continues to rise exponentially, financial technology is becoming more popular. More over 160 million people in India have access to the internet, and over 117 million of them use a Smartphone. People prefer utilizing online banking services over telephone banking services because of the convenience they provide. Of today's youth, the vast majority of millennial have never set foot inside a bank. As a result, an increasing number of fintech firms have emerged to meet the growing demand for their services in the areas of payments and investing. Several Indian fintech startups have successfully received more over \$150 million, including Mobikwik, Capital float, Ezetap, MSwipe, and Citrus Pay. About 20% of Indian youth who are financially able to invest now have jobs because to these enterprises. As financial technology grows in influence, the BFSI industries are on the edge of upheaval. When it comes to providing financial services, conventional banks have little choice but to increase their IT spending if they want to keep up with the times. The loss of talented workers is a second potential issue for the BFSI industry. Companies all across the world are increasingly looking to recruit young people to help with the development of future technologies.

In her post, Cyrill (2018) provides information on the various fintech companies in India. In 2018, there are more than 400 financial technology companies in India, according to NASSCOM. Payment services, money transfers, and equity investment are where financial technology has been most prominent in the Indian market. The financial technology industry in India is booming. Investments on a worldwide scale have skyrocketed to a record \$ 450 million in 2015. Banks and non-bank financial companies (NBFCs) employ financial technology to determine consumers' creditworthiness and base unsecured loans on that assessment. Authorities in charge are also doing their part to encourage the usage of fintech products and services. The Reserve Bank of India has pushed for the use of UPIs (Unified Payments Interface), peer-to-peer services, and so on. In addition to support from government programs like the Digital India Program, the National Payments Corporation of India (NPCI), the Jan Dhan Yojana, and others, fintech businesses in India have received significant funding from international investors.

According to "The Power of Fintech" by Clifford Alvares (2018). To put it simply, fintech

is the combination of technology and banking. The Indian economy has been quite open to these changes. From 2016's \$33 billion, projections for 2020's \$73 billion in transactions indicate the industry will continue to expand. According to Yes Bank's projections, fintech will expand into new fields including microfinance, digital payments, and credit scoring, and so on. Most fintech businesses have been around for less than three years, and they only have around 15 workers on staff on average. There will be a minimum \$700 billion boost to GDP from fintech by 2025.

According to Wharton professor Geoffery Garret's (2019) "the power of fintech" magazine piece, "recent events" have convinced him that financial technology is the future. The transformative potential of financial technology was a major theme among the three considerations. Fintech's revolutionary potential was on full display in the ways that two businesses, Common Bond and wealth front, have altered their approaches to student loans and personal finance. Crypto currency is a game-changer for the financial sector because of its recent debut. New York's Department of Financial Services now regulates an experimental bitcoin exchange, relieving traders of worries about criminal activity. As opposed to the unrestricted markets seen in other countries, this one is much smaller. For others, especially those investing in emerging markets fraught with political risk, volatility, and rapid expansion, virtual currencies may solve a fundamental problem.

Narayanan and Badri. (2020). The mutual fund industry would benefit from increased capital flows and facilitated innovation now that SEBI has removed limits on initiating mutual fund trading for fintech businesses. Mutual funds are a low-stakes, low-hassle investing option. More fintech businesses will join the market and the mutual fund sector will expand as a result of the loosened regulations. To encourage new ideas, SEBI has also

specified that a corporation need not meet the 100 crore threshold at the time of application in order to sponsor a mutual fund. When it comes to funding, SEBI is also pushing initial public offerings (IPOs) for fintech firms. Because of this, they will be able to earn more respect and money in the long run.

2.11 TREND AND PROGRESS IN INNOVATIVE BANKING PRODUCTS

Table 2.1: Growth in Electronic Clearing Services

Year	ECS DR			
	Volume (Million)	Growth	Value (Rupees Billion)	Growth
2003-04	7.87		22.54	
2004-05	15.3	94.41	29.21	29.59
2005-06	35.95	134.97	129.86	344.57
2006-07	123.99	244.9	564.21	334.48
2007-08	145.17	17.08	604.55	7.15
2008-09	160.06	10.26	669.76	10.79
2009-10	149.29	-6.73	695.24	3.8
2010-11	156.74	4.99	736.48	5.93
2011-12	164.74	5.1	833.84	13.22
2012-13	176.53	7.16	1083.1	29.89
2013-14	192.91	9.28	1267.96	17.07
2014-15	226.01	17.16	1739.78	37.21
2015-16	224.75	-0.56	1651.5	-5.07
2016-17	8.76	-96.1	39.14	-97.63
2017-18	1.54	-82.42	9.72	-75.17
2018-19	0.93	-39.85	12.6	29.68
2019-20	0.1	-89.25	0.39	-96.9

The volume and value of ECS (debit) transaction from F.Y 2003-04 to F.Y. 2021-22 are shown in the table 2.1. It is found that there is rise in the ECS (debit) transaction till F.Y. 2014-15 but it falls thereafter. Initially the rate of growth was high but with the passage of time it slows down and ultimately it falls sharply. The volume of transaction through ECS fell from 7.87 million in F.Y. 2003-04 to 0.1 million in F.Y. 2019-20 while the value of ECS (debit) transaction fell from 22.57 billion in F.Y. 2003-04 to .39 billion in F.Y. 2019-20. This fall in value is might be due to shift towards new technology like NEFT, RTGS etc.

Table 2.2: Growth in ECS CR (includes NECS)

Year				
	Volume (Million)	Growth	Value (Rupees Billion)	Growth
2003-04	20.32		102.28	
2004-05	40.07	97.19	201.79	97.29
2005-06	44.23	10.38	323.25	60.19
2006-07	107.4	142.82	1592.72	392.72
2007-08	85.88	-20.04	8066.03	406.43
2008-09	88.4	2.93	974.86	-87.91
2009-10	98.14	11.02	1176.13	20.65
2010-11	117.31	19.53	1816.86	54.48
2011-12	121.5	3.57	1837.85	1.16
2012-13	122.18	0.56	1771.28	-3.62
2013-14	152.54	24.85	2492.19	40.7
2014-15	115.35	-24.38	2019.14	-18.98
2015-16	39	-66.19	1059.44	-47.53
2016-17	10.1	-74.1	144.08	-86.4
2017-18	6.14	-39.26	118.64	-17.66
2018-19	5.36	-12.68	132.35	11.56
2019-20	1.8	66.41791	51.45	61.1258

The volume and value of ECS (Credit) transaction from F.Y 2003-04 to F.Y. 2018-19 is shown in the table 2.2. It is found that there is rise in the ECS (Credit) transaction till F.Y. 2013-14 but it falls thereafter. The volume of transaction through ECS fell from 20.32 million in F.Y. 2003-04 to 5.36 million in F.Y. 2018-19 while the value of ECS (credit) transaction rose from 102.28 billion in F.Y. 2003-0 to 1059.44 billion in F.Y. 2015-16 and thereafter fell to 51.45 billion in F.Y. 2019-20

Table 2.3 : Growth in CTS

Year	CTS			
	Volume (Million)	Growth	Value (Rupees Billion)	Growth
2011-12	180.03		15103.74	
2012-13	275.04	52.78	21779.52	44.2
2013-14	591.38	115.02	44691.39	105.2
2014-15	964.86	63.15	66769.93	49.4
2015-16	958.39	-0.67	69889.15	4.67
2016-17	1111.86	16.01	74035.22	5.93
2017-18	1138.05	2.36	79451.24	7.32
2018-19	1111.67	-2.32	81535.92	2.62
2019-20	NA		NA	
2020-2021	670.253	-39.7076	56259.41	-31.0004597
2021-2022	699.912	4.425045	66503.33	18.2083673

The volume and value of transaction through CTS from F.Y 2011-12 to F.Y. 2018-19 is presented in the above table. It is found that there is constant rise in the volume of CTS transaction except in F.Y 2015-16 and 2018-19 while continuous upward trend is seen in the value of CTS transaction. The volume of CTS transaction rose from 180.03 million in F.Y. 2003-04 to 1111.86 million in F.Y. 2018-19 while the value of CTS transaction rose

from 15,103.74 billion in F.Y. 2011-12 to 81,535.92 billion in F.Y. 2018-19. There is an overall growth of 288% in volume of CTS transaction and 340% in value of CTS transaction during F.Y 2011-12 and F.Y. 2018- 19.

Table 2.4: Growth in ATM (No.)

Year	ATM	
	Number	Growth
2006-07	27088	
2007-08	34789	28.43
2008-09	43651	25.47
2009-10	60153	37.8
2010-11	74505	23.86
2011-12	95686	28.43
2012-13	114014	19.15
2013-14	160055	40.38
2014-15	189279	18.26
2015-16	212061	12.04
2016-17	222475	4.91
2017-18	222247	-0.1
2018-19	221703	-0.24
2019-20	230000	3.74
2020-2021	239000	3.91304348
2021-2022	252000	5.43933054

The above table shows the no. of ATM in India from F.Y 2006-07 to F.Y. 2018-19. It is explored that there is constant growth in the no. of ATM in the country except in F.Y 2017-18 and 2018-19. This indicates that banks are deploying more and more ATM at different location throughout the country which will result in shift from traditional banking towards

modern and branchless banking. Therefore, more and more people are getting access to ATM at their nearest location.

As on 31st March 2007, there was 27,088 ATMs in India which reached to 2,21,703 on 31st March, 2019. There is an overall growth of 830% in the number of ATM in India between F.Y. 2006-07 to F.Y. 2021-22.

Table 2.5: Growth in RTGS

Year	RTGS			
	Volume (Million)	Growth	Value (Rupees Billion)	Growth
2009-10	33.27	148.65	322800	
2010-11	49.28	48.12	394500	22.2118959
2011-12	55.05	11.71	484900	22.9150824
2012-13	68.52	24.47	676841	39.5836255
2013-14	81.11	18.38	734252.40	8.48225802
2014-15	92.78	14.39	754032.40	2.69389654
2015-16	98.34	5.99	824578.00	9.35577835
2016-17	107.86	9.68	981904.00	19.0795777
2017-18	124.46	15.39	11,67,125	18.863453
2018-19	136.63	9.78	11,65,510	-0.13837421
2019-20	150.70	10.30	1341501.92	15.0999923
2020-2021	159.2	5.64	1055998.49	-21.2823721
2021-2022	207.8	30.53	12,86,580.00	21.8354015

The above table exhibits the volume and value of yearly transaction through RTGS in India from F.Y 2009-10 to F.Y. 2021-22. It is found that there is constant rise in the yearly transaction through RTGS in India. Initially the rate of growth was high but with the

passage of time it slows down. The volume of transaction through RTGS jumped from 0.46 million in F.Y. 2004-05 to 136.63 million in F.Y. 2018-19 while the value of RTGS transaction rose from 322800 billion in F.Y. 2009-10 to 12,86,580 billion in F.Y. 2021-22. There is a compounded annual growth of 524 % in volume of RTGS transaction and 298 % in value of RTGS transaction during F.Y. 2009-10 and F.Y. 2021-22. The rise in volume and value of RTGS transaction depicts that customer are adopting electronic mode of payment over cash payment. In short, it could be concluded that there is a shift from cash to cashless payment.

Table 2.6: Growth in EFT/NEFT

Year	EFT/NEFT			
	Volume (Million)	Growth	Value (Rupees Billion)	Growth
2004-05	2.58		546.01	
2005-06	3.07	18.99	612.86	12.24
2006-07	93.65	2950.49	6460.17	954.1
2007-08	73.26	-21.77	6263.14	-3.05
2008-09	32.17	-56.09	2519.56	-59.77
2009-10	66.34	106.22	4095.09	62.53
2010-11	132.33	99.47	9391.49	129.34
2011-12	226.1	70.86	17903.49	90.64
2012-13	394.1278	74.32	29022.42	62.1
2013-14	661.0054	67.71	43785.52	50.87
2014-15	927.5456	40.32	59803.83	36.58
2015-16	1252.88	35.07	83273.11	39.24
2016-17	1622.096	29.47	120039.7	44.15
2017-18	1946.357	19.99	172228.5	43.48

2018-19	2318.887	19.14	227936.1	32.35
2019-20	2744.50	18.35	229455.80	0.67
2020-2021	3092.80	12.69	251309.10	9.52
2021-2022	40,407	1206.49	287250	14.30

The above table exhibit the volume and value of yearly transaction through NEFT in India from F.Y 2004-05 to F.Y. 2021-22. It is found that there is constant rise in the yearly transaction through NEFT in India except in F.Y. 2007-08 and 2008-09. The volume of transaction through NEFT jumped from 2.58 million in F.Y. 2004-05 to 2,318.887 million in F.Y. 2021-22 while the value of NEFT transaction rose from 546.01 billion in F.Y. 2004-05 to 287250 billion in F.Y. 2021-22.

Table 2.7: Growth in UPI

Year	UPI			
	Volume (lakh)	Growth	Value (Rupees Crore)	Growth
2017-18	9,152		1,09,832	
2018-19	53,915	489.11	8,76,971	698.47
2019-20	125186.00	132.19	2131730.00	143.08
2020-2021	2,23,307	78.38	41,03,658	92.50
2021-2022	4,59,561	105.80	8416000	105.09

The above table exhibit the volume and value of yearly transaction through UPI in India from F.Y 2017-18 to F.Y. 2021-22. It is found that there is constant rise in the yearly transaction through UPI in India. The volume of transaction through UPI jumped from 9152 lakh in F.Y. 2017-18 to 4,59,561 lakh in F.Y. 2021-22 while the value of UPI transaction rose from 1,09,832 crore in F.Y. 2004-05 to 8416000 crore in F.Y. 2021-22.

Section III – Empirical Studies and Literature Review

2.12 : OBJECTIVE WISE LITERATURE REVIEW

Objective 1: To study product, process and institution innovations happened in Indian Banking Industry and its impact on existing banks.

2.12.1 STUDIES ON FINANCIAL INNOVATION ON BANKING INDUSTRY

When it comes to money transfers, Humphrey et al. (1996) analyzed the systems of fourteen industrialized nations. From 1987 through 1993, researchers analyzed BIS payment system data. The authors found that the two primary criteria that best describe payment systems were those that examined important institutional, cultural, or historical variations among nations and those that reflected the availability of payment options. The research showed that in 1993, there were 119 billion non-cash payments, which is an increase from 1987. When the United States is not included in the calculation, 62% of these transactions were made electronically.

Banks in the United States were the focus of First et al.'s (1998) research on banking and payments technology developments, with a focus on patterns and their implications. In the United States, the shift toward electronic payment methods was the primary focus of the research. This included both business-to-business and consumer-to-business transactions. The researchers also looked at how the nature and structure of electronic payment systems are changing. Based on this research, it seems that banks are under intense pressure to keep up with the competition in the technological sphere, as both consumers and companies are increasingly turning to electronic payment methods. The study authors compiled a number of recommendations for financial institutions to improve their risk management procedures via increased use of technology.

The effects of the internet on American business and culture were the subject of Castells'

(2001) research. As we've seen, a single click of a button may initiate a global electronic transaction worth billions of dollars within seconds. However, advances in computing and networking have altered conventional modes of social interaction and economic activity. Therefore, the past decade has seen a rise in the research of the banking business, which continues to provide difficulties for marketers.

The authors Claessens et al. (2001) investigated the impact of ICT on the banking sector. The study's authors found that the use of ICT facilitated the establishment of a worldwide monetary system prior to the development of a fully functional monetary infrastructure. Banks and their customers both save money thanks to electronic banking. So, even in outlying places, banks may advertise their services and products for smaller transactions to borrowers with lesser incomes.

Berger (2003) looked at how technical advancements in banking have affected the economy. Based on the results of the research, it is clear that financial institutions that implement ICT-related goods (such as online banking, electronic payments, and security investments) may provide superior delivery services to their clients with less hassle.

Abor (2004) surveyed Nigerians on their thoughts on banks' innovative use of technology. The research showed how electronic retail payments may benefit consumers, businesses, and financial institutions by mitigating some of the complications of the traditional payment and settlement system. Customers, however, need not physically visit the bank in order to settle their accounts. From the convenience of their own homes, customers may view their account details and transfer funds to other accounts with ease. With the advent of online retail banking, consumers and smaller businesses now have affordable access to cutting-edge tools. The study's author concludes that in recent years, Nigeria has seen a proliferation of new payment services, the majority of which are based on technological innovations like cards, telephones, and the Internet, and that these electronic retail payments are gradually replacing paper-based ones.

With no need for human intervention, Joshua (2009) zeroed attention on customer-operated

self-service solutions. The research took into account the potential benefits of combining other types of self-service banking delivery channels, such as automated teller machines, the web, telephones, and mobile devices. The study's underlying assumptions revolve on participants' prior notions about internet banking's practicality, compatibility, simplicity of use, and safety. Except for ATM service, the study found that all other antecedents significantly impacted respondents' preferences for delivery methods.

Singh and Pandey (2011) analyzed the effects of technical progress in the IT sector. The research analyzed the changes that have occurred in banking throughout both pre- and post-reform eras. These shifts influenced IT products and ultimately altered the appearance of banking in India. The researchers looked at how often people used different banking resources. Banks provide low-cost client access to their services via technologically advanced channels such as ATMs, the internet, mobile banking, and E-banking. According to the results of this research, the financial markets are now buyer's markets. The report also included a number of recommendations and precautions that respondents may take to protect themselves against fraud.

According to Alhaji and Tasmin (2012), the influence of ICT on the Indian banking sector has been extensively examined. The researchers also conducted a thorough analysis of the existing literature on the topic of how ICT affects financial institutions' efficiency. Many scholars that conducted literature reviews concluded that using ICT to provide customer service had no positive effect on banks' bottom lines. The research analyzed the efficiency of providing banking services to customers through the Internet. The authors conclude that ICT did not seem to be considerably feasible or welcomed warmly or fast by consumers owing to perceived security risk, lack of familiarity with computer technology, either due to a lack of understanding or an age issue, and other factors.

Hitesh and Kapil (2012) analyzed retail banking in India and found a pressing need for innovation. By transforming "conventional banking" into "e-banking," technology has

expanded the accessibility of financial services worldwide. Banks can cash in on this rising trend thanks to the options afforded by electronic payment systems.

The study's authors draw the conclusion that several financial institutions have launched efforts to obtain the 360-degree perspective, but that so far, only a select handful have been wholly successful.

Jayakumar and Anbalagan (2012) looked at new developments and difficulties for Indian banks. The researchers investigate the radical innovations of universal banking and Smart Card technology. In conclusion, modern banking has been revolutionized by technology advancements, giving rise to a concept that may be renamed "Triple A" banking (anytime, anywhere, anyway).

Safeena et al. (2012) looked at how customers feel about mobile banking services from the point of view of technological adoption. Important drivers for mobile banking adoption include perceived utility, perceived ease of use, customer knowledge, and perceived risk. The research shows that although perceived utility, convenience of use, and consumer knowledge all have a favorable influence on the desire to use mobile banking, perceived danger has a negative impact.

The authors Komaladewi et al. (2012) explored the topic of service innovation in the financial sector. The research draws on a thorough literature review that highlights both the strengths and limitations of expert opinions on the topic of service innovation. Many researchers looked at how online banking facilitated technical innovation in service delivery. Internet banking and short message service banking are the outcome of much previous study in the field and provide convenience for users at the expense of a significant security risk. Although the researchers acknowledged that technological advancements alone are not enough to ensure customer satisfaction, they noted that service innovation focused on influencing consumer habits through advances in electronic banking.

Recently, banks have launched a number of novel instruments, which Sreelatha and Sekhar (2012) analyzed. Researchers found that banks, particularly those of the newer generation, were fast to adapt to industry shifts. Due to their convenience and simplicity of use, electronic payments via credit and debit cards are also a rapidly expanding market area. Customers may now take use of financial services and conduct banking transactions from any location, at any time, thanks to advancements in banking technology.

Mittal and Gupta (2013) investigated the growing significance of IT in India's banking industry. The researchers also spoke about how banks are embracing new technologies. Electronic Payment Services, E-Cheques, RTGS, EFT, ATM, Point of Sale terminal (PoS), and Telebanking all contributed to the secondary data. This research shows that IT presents a potential for financial institutions to develop innovative solutions to meet the demands of a diverse clientele.

Reis et al. (2013) evaluated front-line workers' reactions to analyze the primary implications of technological innovation on banking services in Portugal. According to the findings, ATMs are the most important electronic distribution channel in the banking industry. In addition, customers save time with mobile banking since they never have to physically visit a bank location. Researchers surveyed front-desk staff and found that speed and security are the two most important benefits of electronic distribution channels. Employees are under growing pressure to adapt their service delivery mindsets to keep up with rapidly evolving technologies. This means that the front desk's use of technology is increasingly crucial to the company's success.

Goel (2013) compared financial services' appearances before and after deregulation. The author emphasized that automated teller machines, electronic money, mobile and telephone banking, and card-based delivery systems are the up-and-coming channels of distribution in the banking business. While technological advancements have led to more accurate methods of determining a customer's creditworthiness, they have also had a negative effect

on the economy as banks have had to raise interest rates to offset the loss they anticipate as a result of tighter lending standards.

Bhasin and Anupama (2013) analyzed the use of technology to improve customer service in the Indian banking sector. The study's authors surveyed users of the electronic funds transfer (EFT), electronic clearing system (ECS), and real-time gross settlement system (RTGS) in the Delhi area using a random sample technique. The research shows that in India, consumers are shifting from using cheques to using electronic payment solutions. Electronic payments are expanding while paper-based instruments are decreasing. Several financial experts have proposed addressing the legal issues surrounding electronic payments and raising public understanding of existing payment systems.

Sachin and Bharati (2013) analyzed the historical progression and current use of Banks in India and the Role of ICT. Banks in India provide customers with a wide range of cutting-edge services, including online and mobile banking, e-wallets, automated teller machines, and more. Thus, the RBI has taken steps to advance electronic payment systems and has implemented public policy to foster the development of a reliable and effective financial transaction infrastructure. In addition, the primary obstacles to the expansion of electronic banking are social and economic.

Scott and Lawrence (2013) analyzed the importance of the banking sector to economies. The study also looked at the impact of technical development and financial advancement on social wellbeing. The research included a literature review on the topic of various different types of financial innovations, such as new goods or services, new production processes, and new organizational forms, and their evaluation in relation to the larger economic literature on innovation. The study looked at the literature survey on banking technical development and financial innovation since 1980. While there was significant development in banking services and manufacturing technology throughout this time

period, there was far less development in organizational structure, which is the focus of this study.

Agrawal and Jain (2013) examined the effects of banking innovation on India's progress and prosperity. Customers' attitudes about banking have shifted dramatically as they gain experience with technological innovations like automated teller machines (ATMs), online banking, and the cashless economy. The survey also notes the difficulties the Indian banking industry confronts, including growing client demands, dwindling customer loyalty, and heightened levels of competition. As a result, more and more people are opting for the freedom that online banking provides over visiting a physical bank office. The study's author urges financial organizations to provide inexpensive ATMs.

Sylvia and Evelyne (2013) conducted an in-depth examination of the innovative elements influencing financial inclusion in Kenya, zeroing in on the perceived risk, trust and confidence, and user-friendliness of innovated delivery channels, as well as the anti-money laundering requirement on these channels. This research shows that there is a widespread failure to take advantage of novel distribution methods. Negative aspects of mobile banking, internet banking, and agency banking include customer mistrust, danger, and ignorance. Banks are always looking for new and improved ways to enable international transactions, and anti-money laundering is a recommended practice for risk-averse businesspeople.

Tavishi and Kumar (2013) analyzed the characteristics that motivate Indian consumers to use electronic payment systems including online and mobile banking, debit and credit cards, and real-time gross settlement (RTGS). Perceived utility, perceived simplicity of use, security, user interface, and awareness have emerged as three significant elements in the adoption of online banking services, according to the authors' research. Additionally, the study participants overwhelmingly favored utilizing online banking over mobile banking services.

Using a field survey, Angko (2013) assessed how commercial banking clients in Ghana felt about the incorporation of novel payment mechanisms into banking services. Automated Teller Machines (ATMs), Telephone Banking, Personal Computer Banking, Mobile Banking, Short Message Service Banking, Electronic Zwich, Mobile Money, Internet Banking, Credit and Debit Cards, Smart Cards, and Electronic Billing and Payment Systems were among the most significant advances in the banking payment system. The study's author also underlined the primary benefits and drawbacks of employing these new features of the Ghanaian banking payment system. The study's findings suggest that advances in bank payment system innovation through electronic delivery channels have boosted service provision and expansion in Ghana's banking sector.

Hasan and Sarvar (2014) made an effort to analyze financial innovation in financial institutions throughout the next decade. The research demonstrates that card-based payment systems on POS, ATMs, kiosks, and other electronic method payment gateways have brought about a qualitative shift in India's payment systems in the wake of globalization. From 1.2 billion in 2011-12 to 1.7 billion in 2012-13, electronic payment growth climbed by 36%. The vision paper from RBI for 2012–2015 emphasizes the spread of knowledge about and access to electronic payment methods. The results show that the primary elements for consumers to embrace and adopt creative banking as an alternative means of banking are awareness, convenience, trust, safety, and security. India has come a long way on its protest march toward a "less-cash" to "less-cheque" nation, but it still has a ways to go.

Achimba et al. (2014) analyzed how banking has changed as a result of technological advancements. Implementing a Customer Relationship Management program relies heavily on the use of technology to improve interactions with and connections with customers. ATMs, Internet banking, and mobile banking are just a few examples of how banking has benefited from technological advancements in recent years.

Harish (2014) researched the most effective methods put into place by Indian banks to improve their service to customers. The author of the study claims that the widespread use of advanced core banking solutions enabled by IT has completely transformed the banking industry. Although IT is equally at home in a physical or online environment, it has quickly emerged as the industry's backbone.

Nair (2014) examined the changes that have occurred in the banking industry as a result of computerization in India's public sector banks. Electronic payment's meteoric rise is indicative of the general trend toward greater technological sophistication. The study found that the primary benefits were transparency, convenience, and cost-effectiveness, while the key negatives were the dangers of fraud, money laundering, and systemic failure. Foreign and new private sector banks have introduced technology-based services, and this research demonstrates how this has compelled India's commercial banks to use the new technology in their daily operations.

Roopadarshini and Shilpa (2014) analyzed contemporary banking consumers' perspectives on the use of IT in banking. Increased competition, shifting interest rate risks, credit rate risks, and inflation are just some of the many difficulties Indian banks now face as a result of the technology revolution. Researchers found that the introduction of new relational banking technologies like ATMs, mobile phones, and the internet influenced customers' perceptions of banks and banking relationships. Therefore, improvements in banking technology assist to meet client demand for improved speed, efficiency, safety, and affordability. Researchers recommend replacing outdated technology with newer, more appealing options, and engaging with consumers to improve service quality while reducing costs.

Research conducted by Saranya et al. (2014) examined the impact and understanding of ICT in the financial services industry. Researchers in Chennai surveyed bank clients without using a statistically valid sampling technique. The majority of clients, according to the study's authors, use ICT banking services such as account verification, bill payment,

money transfer, etc. Moreover, clients still have reservations about using ICT for banking due to security concerns. The research also shows that the most common reasons for using ICT banking are its accessibility, ease of usage, and security.

Malik (2014) examined the impact of technology on the Indian banking sector. Modern banking has undergone a radical transformation as a result of technological advancements, and a key to maintaining a competitive edge is providing customers with the best of both worlds in terms of convenience and personalized care. In addition, consumers are learning to use automated teller machines, electronic banking, and the cashless economy.

The authors Gupta and Aggarwal (2014) set out to investigate the recent surge of financial innovation in India. Liberalization and globalization have aided the development of cutting-edge financial technology like National Electronic Fund Transfer (NEFT) and Mobile Banking, all of which have had a significant impact on the manner in which people make and share financial decisions. Researchers recommend making enough efforts to encourage innovations in the financial sector for continuous growth and development, which will set the nation on the road to becoming a superpower as these innovations and technology fuel economic growth and raise standards of life.

Syed Sadat Ali Alias Abdul Gani and T. N. Murty (2014) studied the effects of IT-driven services on the clientele of public sector banks in Chennai. Having all of a company's data in one place, like a data center, makes it much easier for systems like the Management Information System (MIS) and the Decision Support System to create novel products. Core banking systems, according to these authors, have enhanced customer service at public sector banks by facilitating instantaneous cash transfers, passbook updates at any networked branch, and accurate interest computations for deposits and advances. The study's authors advocate for banks to post information about banking ombudsman at their branches.

For the sake of long-term growth in the banking industry, Vijayaragavan (2014) analyzed the results of current technology banking services. By replacing paper-based and labor-intensive procedures with automated processes, online banking has become a critical resource for improving banks' productivity, control over operations, and bottom lines. The study's author draws the conclusion that electronic mode is currently required by the vast majority of financial institutions.

Abbokar Siddiq (2015) looked at the impact of technology on the Indian banking sector. Using primary data, this study examines the degree of knowledge, perception, and happiness of consumers with regard to the usage of technology in the banking business in Mangalore, India. As part of the research, we looked at the bank's many digital offerings to consumers. The study's author draws the conclusion that technological innovations including automated teller machines, internet banking, telephone banking, mobile banking, and plastic cards are driving rapid expansion in the banking sector. The study also included the researcher's recommendations on how the banks should enhance their use of technology.

Ajay Thakare et al. (2015) investigated how banking in India has changed as a result of technological advancements. The research emphasizes the rapid expansion of Scheduled Commercial Banks' electronic transaction services, including debit cards, credit cards, ECS, NEFT, and RTGS. However, customer convenience is a primary factor for the growth of banks with new technologies, and the Indian banking industry faces numerous challenges, including rising competition, pressure on spreads, and systemic changes to align with international standards.

From a banker's point of view, Boro K (2015) has outlined some of the problems and solutions associated with technological innovation in North East India. Finacle, created by Infosys, is used by the vast majority of banks since it significantly increases transaction speed. As a result, it offers additional apps with supplementary operational functions for

electronic banking, wealth management, and liquidity management, and it provides solutions for improving customers' experiences at all hours of the day and night. The biggest obstacles to technological advancement include a lack of infrastructure, a lack of connection, a lack of established communication and transit facilities, the occurrence of natural disasters, and a low credit deposit percentage. As a result, technical innovation has increased across the majority of North-East India's metropolitan districts, whereas it remains mostly absent in the region's rural parts owing to a lack of education.

Harshita Bhatnagar (2015) surveyed clients of public and private sector banks in the Udaipur region of India to learn more about their familiarity with and use of banking services supported by technology. Researchers looked specifically at ATM/debit card, online/telephone/mobile banking. According to the results, being familiar with computers and the internet increases the likelihood of using online banking.

Neha Yajurvedi (2015) looked into the future of banking by analyzing new trends. ECS, RTGS, NEFT, EFT, ATM, Retail Banking, Debit, and Credit Cards were among the areas of study for this study. The essay also discussed the pros and cons of banking's evolving patterns. The research used electronic banking, mobile banking, online banking, and automated teller machines. According to the data, today's consumers are using a variety of payment settlement technologies, including RTGS, NEFT, EFT, ECS, and CTS, because of the convenience they provide.

Kumar et al. (2015) investigated the effects of technological development on financial institutions in India. Researchers looked at the notion of Cloud computing, which provides a novel approach to providing novel client experiences, efficient collaboration, accelerated time to market, and enhanced IT efficiency. Everybody from customers to banks to workers may stand to benefit from technological advancements like computerization. Technology management, data security, and customer privacy are the top concerns for India's banking

industry. In order to reap the advantages of cloud computing while preserving the privacy of their customers' financial information, the bank must utilize hybrid Cloud models.

Khanna and Gupta (2015) investigated Indian customers' views on PSBs' use of technology for new channels of service delivery. The research primarily reveals a chasm in the innovative delivery channel's adoption and acceptance of technology. Acceptability, safety, availability, user friendliness, and accessibility are the five criteria by which PSBs evaluate the technology they use in their novel channels of distribution. Customers, according to the study's authors, have regular contact with cutting-edge gadgets. Therefore, PSBs may find useful guidance in the distribution channels for improving cross-selling and up-selling of financial goods and services.

Aruna (2016) looked at how technological innovation has impacted banking in India. The study detailed both the advantages and disadvantages of technology progress in financial institutions. The key advantages of the payments system are the ease of the transfer itself, the minimization of paperwork, and the lowering of transaction costs. The most pressing problem is satisfying customers' needs while implementing new, more secure technologies. As a result, the Indian financial system is heading towards a future with more liquidity and secures financial products.

Achimba, Ongonga, Nyarondia, Amos, and Okwara (2014) investigate the impact of technology on the banking business in their paper "Innovation in Banking business: Achieving Customer Satisfaction." In addition, they analyzed how CRM systems and software affect the process and results for their clients. The study gathered data through bank and customer self-evaluation reports and found that technology plays a significant role in the customer relationship management process, and that for a bank to be successful in implementing the CRM process, it is essential to adopt technology as a supportive tool.

Ansong (2012) investigates the client reception of new banking products. College students utilized a questionnaire and a purposive sampling strategy to collect information.

According to Schiffman and Kanuk (2009), the young and the well-educated are often the first to accept new items, hence students were chosen as samples. The research showed that college students had an overall familiarity with new items like ATMs and E- Zwich. This research states that comfort, dependability, safety, and user-friendliness are the primary motivators for new developments. The research concludes that banks in Ghana may keep up their creative banking operations aimed towards the young population, but that widespread public education about these products is required.

According to Chavda and Solanki's (2014) overview of relevant literature, "Innovative banking products: Win-Win scenario for clients and banks," both customers and banks stand to benefit from these developments. Following a thorough examination of the available literature, they have attempted to provide an in-depth analysis of the many forms of innovation, the variables that influence creative banking, the theoretical models, methodology, and sample techniques employed. In the article's last paragraph, the author summarizes the most salient results from the studies analyzed.

Eisawi, Sekhon, and Tanna (2012) drilled down on the topic of service excellence in banking, or what financial institutions can do to better serve their clients. We employed a purposeful sampling technique to choose our sample, and we sent out questionnaires to 260 UK banking clients. Innovations, quality of service, and factors such as cost, reputation, technology, and dedicated workers were all topics of inquiry. Structural equation modeling results demonstrate that innovation is a predictor of service quality, and the research recommends that banks keep their services and products current, dependable, and adaptable.

State Bank of India is India's biggest financial institution, hence Gopala krishnan, Mishra, and Gupta (2015) looked at the technical developments there. The goal of this case study is to examine how often technology advancements in the Indian banking industry result in happy customers.

Researchers Ilo, Ani, and Chioke (2014) examined the impact of technology advancements on Nigerian financial institutions. The study also looked at how the spread of ICTs affects the contentment of the businesses' clientele. The research revealed that ATMs, EFTs, smart cards, telephone banking, computerized credit ratings, POS systems, electronic home and office banking, and electronic data interchange are all examples of ICT goods. Treasury operations, human resources, bank master, reconciliation, loan and deposit, money market, asset management, fund transfer, and general ledger are only some of the ICT applications uncovered. Fifteen major Nigerian banks with headquarters in Lagos participated in the research, and their workers and customers provided the data. The study's results show that the implementation of ICT has increased customer happiness and retention, and that technological advancements have a favorable effect on banks' overall performance.

Kaur's (2016) primary objective is to educate readers on the novel banking practices of both domestic and foreign financial institutions. The study, which relied on secondary sources for its information, focused on the extent to which Indian financial institutions have embraced the novel banking practices of their overseas counterparts. The research elucidated such topics as biometrics, in-car applications, face recognition, smart watches, google glass, robotics, AR apps, beacon technologies, oculus rift, crypto currency, AI, and cheque truncation. The study's author concludes that, to remain competitive, India's financial institutions must embrace cutting-edge technologies. Some private Indian banks, such as ICICI, HDFC, and Axis, are making strides in the area of creative banking, but most Indian banks lag behind their overseas counterparts in adopting new technology.

In his conceptual paper, Kesavan (2015) tried to catalog the new features implemented by the chosen financial institution. The research also analyzed the benefits to society,

particularly to the underprivileged, as well as the financial benefits to banks. It also discusses the methods banks have used to retain their current clientele and reach out to underserved communities. The study focused on Indus Ind Bank, and the researcher looked closely at the bank's innovative projects, such as its video branch, super saver pack, my account my number, check on cheque, denomination selection, cash on mobile, quick redeem, direct connect, green champions program, share2care program, financial literacy, and promotion of art, culture, and sports. The research showed that although the bank has a high rate of innovation adoption, it has to put more effort into its grievance redressal procedure.

Kumar & Raju (2015) conducted research of the offerings of so-called "next generation banks." We also analyzed the impact of recent technological advancements and other developing trends in the banking industry. The Internet, Society for Worldwide Interbank Financial Telecommunications (SWIFT), ATMs, cash dispensers, e-cash, banknet, chip cards, telebanking, online banking, mobile banking, anywhere banking, voicemail, and kiosks were named as examples of new banking innovations. The research found that the banking industry in India is expanding because to the country's large consumer base and cutting-edge offerings. They may expand their worldwide consumer base and strengthen their operations by revising their current plans with government backing.

Malik (2014) examined the role of financial innovations in the growth of the banking industry. The searcher also considers the pros and cons of the most current banking developments. The research elucidates key ideas behind developments including the automated teller machine, the debit card, the credit card, the national electronic funds transfer system, and the real-time gross settlement system. The researcher found that the innovations in the banking sector led to the growth of the banking sector with the assistance of reports on the increasing number of ATMs, debit cards, credit cards, and the volume of transaction utilizing electronic banking.

Martovoy & Mention (2016) looked into the effects of the NSD process on financial services and analyzed the trends that emerge during the creation of new service innovations. Executives and innovation managers at Luxembourg-based banks provided the data. The research broke down the NSD process into seven distinct steps: problem definition, idea generation, idea screening, testing, business analysis, and market introduction. From these steps, the researchers were able to identify four distinct patterns of NSD practice: problem driven, proactively driven, market-driven, and strategy-driven approaches.

Nath, Schrick, and Parzinger (2001) analyze how online banking has changed the financial services sector. The research evaluated strategic and operational factors. The report analyzes the impact of online banking on customers, bank-customer relationships, and technological factors. The data, obtained from 75 traditional banks in a sizable state in the Midwest of the United States, demonstrates that many financial institutions are not capitalizing on the full potential of online banking. The number of consumers has grown thanks to the convenience of online banking, which offers various operational advantages.

Pennings and Harianto (1992) conducted research to determine what factors influence an organization's willingness to accept new technologies. The research looked at a subset of 152 banks out of 300 significant banks in the US, and it spanned 11 years. The study looked at the impact of a recent innovation in the financial sector: online video banking. Researchers looked at how factors including prior IT/telecom expertise, system and equipment investments, and inter-firm links with IT/telecom, insurance, and other businesses affected the uptake of video banking services. The research found that although financial expenditures had no discernible effect on the uptake of video banking in the American banking sector, IT expertise and inter-firm links did.

Phuong Nam (2014) sets out to investigate the drivers, barriers, and opportunities of e-banking service rollout in Vietnam. After conducting semi-structured interviews with

Representatives and customers and reviewing a variety of relevant literature, the researcher in this case study concluded that the primary goals of implementing e-banking services were to broaden the market and boost customer satisfaction. The survey also highlighted the barriers to widespread adoption of electronic banking, such as clients' reluctance, ignorance, and a lack of support.

Prakash and Kumar (2016) provide an outline of the development and current organization of the Indian banking industry. The report provides valuable insight into the current condition of the Indian banking industry. Differential branding, Customer Experience Management, and Customer 3.0 were all defined and presented in detail. According to the research, contemporary banking is all about streamlining processes via the use of many channels of communication, which benefits both clients and financial institutions. The research indicated that the Indian banking sector is among the most advanced in the transition from a sellers' to a buyers' market. The Indian banking sector will adopt new standards, which will lead to improved efficiency and lower fees for customers.

The purpose of the study by Rahman, Ferdousi, Chowdhury, and Haque (2015) is to quantify the effect of core services, internet security and trust, and service awareness on the prevalence of online banking. 180 clients in metropolitan Dhaka, Bangladesh's metropolis participated in the poll. Purposeful sampling was utilized to choose participants for the research, and eligibility criteria included having used internet banking within the last six months and holding a bachelor's degree. Using Structural Equation Modeling, the researchers found that consumer knowledge and feelings of safety had a far larger impact than the importance of the study's focus on core services.

Ramakrishna (2012) set out to determine what kinds of service innovations a few public and private sector banks in India were providing. Bessant and Tidd's (2007) Four-Stage Model of Innovation and Pim den Hertog, Wietze van der Aa, and Mark W. de Jong's (2007) Six-Dimensional Model of Service Innovation served as the theoretical foundations

for this research. According to Bessant and Tidd(2007), there are four types of innovation: product, process, position, and paradigm. New service idea, new customer interaction, new value system, new revenue model, and new organizational or technical service delivery system are the six aspects that make up Pim den Hertog's (2010) innovation model. The researcher intended to use these frameworks to conduct a comparative analysis of novel banking efforts. The research included the State Bank of India, the Andhra Bank, the YES Bank, and the ICICI Bank. The research found that compared to other banks, ICICI was more inventive and provided more cutting-edge services. The research also found that financial institutions in both the public and private sectors are prioritizing service innovation.

Reuben (2012) highlights the importance of innovation in the banking industry and the happiness of customers. Both monetary and technical innovations were considered, with the four aspects of innovation (i.e., product, process, position, and paradigm) defined. Both Barclays Bank and Nordea Bank, two of Ghana's largest financial institutions, participated in the research. The study's findings revealed that without boosting quality, innovations would neither benefit the bank's clients or the bank's bottom line. Another finding was that buyers are not interested in some types of advances, prompting researchers to recommend more study into the matter.

Singh (2014) provided an overview of the Indian banking industry's history, development, and current developments. The study's author provides a thorough breakdown of each of India's three banking eras. Phase 1 covers the years 1786–1969, or up to nationalization; Phase 2 covers the years 1970–1991, or the duration of bank nationalization in India; and Phase 3 covers the years 1992–present, or the period of Indian banking sector reform. Credit cards, global cards, charge cards, debit cards, smartcards, ATMs, intercity banking, internet banking, mobile banking, demat accounts, online banking services, a focus on customer relationship management (CRM), mergers, acquisitions, and takeovers, and expansion into international markets were all among the banking innovations examined in

this study. At the end of the study, the authors propose shifting future efforts toward risk-based growth.

Singh, Pandey, & Gupta (2011) provides an overview of the current situation of the Indian banking sector and the significant developments that have led to the industry's shift from conventional to cutting-edge practices. The research addressed the motivations for banking reform as well as the barriers to it. The research elucidated the significance of developments such as the Electronic Clearing Service, Electronic Fund Transfer, Core Banking Solution, Automated Teller Machines, Customer Relationship Management, Corporate Internet Banking, Payment Systems, etc. They spoke on the dangers of new forms of banking, such as credit card and ATM fraud (including phishing, skimming, and spoofing). Fifty clients who regularly make use of cutting-edge financial services were randomly chosen to participate in a survey. In order to maximize the efficiency of marginal investments in technology, the research recommended creating a system that increases the gap between the marginal benefit and marginal cost of the banking sector's transformation. Some preventative steps to lessen the likelihood of bank fraud were also recommended.

Ughetto (2006) looked at how the new Basel capital accord's risk-adjusted capital rules would influence the way banks assess startups. It also provides an overview of the current companies offering finance assistance for R&D projects. The research relies on a survey of 12 major Italian financial institutions that took place in January and February 2006. In light of Basel II regulations, the research sheds new light on the design of internal rating systems and the significance of non-financial characteristics in determining a borrower's creditworthiness. According to the data, most financial institutions do not use intangibles as a serious factor when evaluating customers' creditworthiness. This may suggest that achieving the desired reduction in information asymmetry between lenders and borrowers via the accord's exclusive implementation may be elusive. However, unique financial intermediaries may be able to mitigate this impact via their own tailored policies and procedures.

Wambuaa and Datcheb (2013) used independent factors including risk perception, trust, usability, and AML to examine the effect of innovations on financial inclusion. The research included a control group that did not employ innovative channels. Customers at any of the five Mombasa branches of equity bank Ltd who used any of the three innovative channels under examination (online banking, mobile banking, or an agency) made up the sample. Using stratified sampling, we were able to choose our representative group of 200 shoppers. Although there are many new methods of delivering services, the study found that bank lines have not changed, especially at the enquiry and customer service counters. However, the study did find that strict measures, such as improving the banks' dependability, would lead to an increase in customer confidence and satisfaction.

2.12.2 STUDIES ON PERFORMANCE MEASUREMENT

Researchers Akhisar et al., (2015) examined how new ideas affect financial institutions' bottom lines. They discovered that any kind of e-banking service may affect a bank's profitability. They discovered that POS terminals had a negative effect on a bank's bottom line, whereas other variables, such as ATM density and the amount of debit and credit cards issued, have a favorable effect.

In his research study, Al-smadi (2012) relied on primary sources. To learn about the variables influencing acceptance of E-Banking, he designed a questionnaire and randomly distributed it to customers of Jordanian banks. He discovered that the level of familiarity of customers with electronic banking was crucial to the rapid spread of the service. Customers fear losing money, thus they avoid E-Banking. They are very cautious about losing their money. This, he concludes, is E-Banking's biggest problem, and it's a big reason why people don't utilize it.

The effects of IT on the success of India's banking sector have been the subject of research by Bansal (2014). He employed roughly 10 factors to determine the technology index, and

eight ratios to evaluate the efficiency of financial institutions. He employed a regression technique to determine whether or not there was a correlation between IT and the success of banks throughout the pre- and post-e-banking eras. He discovered that the bank's productivity was noticeably better after the advent of electronic banking compared to the times before its introduction.

Banks with an online banking system have a higher operational efficiency ratio, according to research by Malhotra and Singh (2009). However, she also discovered that the high running costs of new private banks had a detrimental effect on their performance.

Stoica et al., (2015) write that financial innovations are a valuable instrument that gives banks an edge in the marketplace. With the advent of the internet, the banking sector has profited greatly. They also discovered that Roman banks have two distinct business focuses: cutting costs and maximizing the benefits of online banking. They arrived to the conclusion that just a small fraction of banks make full use of internet technology to boost their overall performance, while the vast majority still relies on more conventional methods.

Electronic banking has had a significant impact on the financial performance of Kenya's commercial banks, and Arisa and Muturi (2015) have conducted a critical analysis of this phenomenon. They discovered that although internet banking is advantageous in that it facilitates account administration, mistake removal, flexibility, and 24 hour banking, its impact on bank performance in Kenya is minimal owing to underuse and lack of knowledge among Kenyans. On the other hand, they discovered that not only are Kenyans familiar with mobile banking but that banks in the country make extensive use of this service. According to the authors, commercial banks in Kenya benefit from mobile banking because of its widespread popularity among Kenyans, which in turn helps to cut down on wasteful spending, boost productivity, and enhance customer service.

Abbasi & Weigand (2017) conducted a comprehensive literature analysis on the effect of digital financial services on business outcomes. As a means of adapting to the difficulties posed by globalization, they discovered that digital finance is progressively replacing the old banking system. According to the authors, the vast majority of research has concentrated only on banks, ignoring the contributions of other financial institutions including mobile network operators offering branchless banking and new non-banking entrants. The authors also noticed that, rather of venturing into uncharted territory, researchers repeatedly examine the same topics.

Kumari (2016) investigated the difficulties and potentials of online banking in India. The author concludes that the internet and other forms of information technology have revolutionized the financial sector in India. Since banks are crucial to the growth of the Indian economy, any positive or negative changes to the financial sector will have far-reaching effects. There are several advantages and disadvantages to online banking for financial institutions. To be competitive in this age of globalization, most Indian banks now provide some kind of online banking. She made the observation that "convenient banking" had replaced "traditional banking" in the modern period. Electronic banking will become the standard, not just a viable option, in the near future.

Clonia & Asht (2016) made an effort to investigate the state of e-banking in India and its potential future developments. They discussed how the Reserve Bank of India and the government of India are working to expand access to banking services throughout the country. E-banking has shown to be a useful tool in expanding business. They suggest that the Indian banking industry make an effort to implement new technology and open more automated teller machines in order to help the Indian government realize its goal. Indian clients are hesitant to use e-banking despite its advantages because of security concerns.

Saluja and Wadhe (2015) conducted research on the effect of online banking on the bottom lines of commercial banks in India. Evidently, e-Banking facilitates better distribution of

monetary services. When compared to conventional banking, it allows financial institutions to provide a wider variety of services in a shorter amount of time. Researchers discovered that although expanding ATM availability benefited older and more established private banks in India, it had no effect on the financial performance of newer private banks in the country.

Using data from commercial banks in Kisumu City, Kenya, Barasa et al. (2017) analyze how Internet banking has affected their bottom lines. Because of the positive effect e-banking has on bank performance, they have strongly suggested that banks use it as soon as feasible. They robbed 33 out of the city of Kisumu's 34 commercial banks. They randomly selected 11 of these 34 banks. We obtained information from both primary and secondary sources.

The theoretical underpinnings of the CAMEL model for assessing banks' financial performance are the subject of Aspal & Dhawan (2016). He did a thorough literature search and provided detailed explanations for all of the ratios in this model. He arrived to the conclusion that the model was an excellent tool for assessing financial institutions' performance.

Kaur, K. (2014) conducted research on the state of electronic banking in India, focusing on its innovations, difficulties, and potential. While e-b anking has the potential to be a game-changer in the banking industry, he discovered that a number of hurdles stand in the way of its widespread adoption.

Yordanova (2013) discussed the banking industry's response to customers' evolving demands and wants. In order to write this article, the author spoke with many bank CEOs. In order to keep existing clients and attract new ones, he discovered, banks must constantly innovate. It's not right to release a plethora of items, but it is necessary to present products

that are straightforward and easy to use. Relationships between banks and their customers, as well as between banks themselves, benefit from the use of information technology.

Researchers in India, including Dhananjay et al., (2015), have documented the rise of online banking. The authors argue that the National Payments Corporation of India deserves most of the credit for the enormous improvements made to India's electronic banking infrastructure, which have led to tremendous growth in online banking. It turns out that providing financial services through the Internet may save you money. Creating an internal security cell and adopting risk management are all that is required for banks to regain their customers' faith and confidence.

Taiwo and Agwu (2017) looked at the impact of online banking on the productivity of financial institutions in Nigeria. They came to the conclusion that a link exists between using the internet for banking and a bank's overall success. E-banking is inefficient since customers do not know enough about or use these services.

Kiruthika (2013) aims to draw comparisons between the success of Indian banks and that of international banks in India. He discovered that international banks with operations in India fared better than their Indian public sector counterparts, meaning that the foreign banks were more effective and productive. A lack of modern technology, insufficient capital, and other factors all contribute to the public sector banking industry's dismal performance.

The effects of online banking on the banking industry were investigated by Sabhaya et al., (2014). To do this, they have separated time into two categories: before and after the advent of electronic banking. Researchers have discovered that banks that provide their services via electronic channels have more success than their counterparts that do not.

Impact of Financial Innovations on the Financial Performance of Kenyan Commercial Banks, Analyzed by Muiruri and Ngari (2014). They looked at whether or not there was a connection between financial innovation and the success of Kenya's commercial banks. After implementing e-channels, they saw a dramatic improvement in banks' bottom lines. When compared to traditional banking methods, e-banking is far quicker, more accurate, and efficient. There is a positive correlation between the two, they reasoned.

Researchers Dabwor and Anyatonwu (2017) examined how banks in a developing economy benefited from the introduction of new information and communication technologies. They've decided to use Nigeria as their representative country. They arrived at the conclusion that Internet banking transactions have had a major effect on the operational performance of banks, leading to the opening of new branches. They discovered that e-banking positively affects the bottom lines of Nigerian financial institutions. They recommended that banks use E-banking to boost efficiency. Staff members need to get periodic training in order to keep them abreast of developments in their field.

Ngango et al., (2015) attempted to identify the e-banking methods used by Bank of Kigali and the difficulties faced by this kind of financial institution. They looked at how well Kigali Bank did both before and after adopting an electronic banking system. They conclude that the fact that banks in Kigali provide electronic payment options such ATMs, pay direct, debit cards, and phone banking has contributed to the city's banks' increased efficiency. They also noted that internet accessibility and safety are significant barriers to the widespread use of online banking.

Maiyo (2013) has made an effort to investigate how e-banking has impacted the profitability of Kenyan commercial banks. They suggest that banks' investment in online banking was uneven. Banks benefit monetarily when their customers utilize various banking channels, such as debit and credit cards, smartphone apps, and the internet.

Customers are more likely to use mobile banking than online banking. E-banking has increased the bank's efficiency, efficacy, and production.

Using the example of Nigerian financial institutions, Egbunike et al., (2010) have attempted to evaluate the efficacy of electronic banking in terms of operational efficiency. In addition to finding a positive correlation between E-banking and increased overall credit facilities given by Nigerian banks, they also discovered a substantial positive correlation between E-banking and insecurity in banking transactions. They also discovered that the more people use E-banking, the more money they deposit in banks in Nigeria. They recommended that the government and banks in Nigeria implement more stringent security measures to curb the prevalence of fraudulent and forged financial transactions in the country. It is also important to increase staff and customer education on E-Banking services.

Habib(2012) examined Indian online banking from two perspectives: customer worries and banks' promotional efforts. According to the author, private and international banks have a stranglehold on India's nascent online banking industry. The author concludes that established banks, those located in densely populated areas, those with greater operating costs, and those with shorter histories are more inclined to embrace the conveniences of online banking. The author draws the conclusion that all banks will eventually need to implement some kind of online banking to remain competitive.

Ingle & Pardeshi (2012) researched the benefits and drawbacks of online banking in India. After reviewing the state of online banking in India, they proposed the following changes. Customers who are not utilizing e-banking services do so owing to either a lack of understanding or a poor image about it, thus banks should work to raise awareness about e-banking, its advantages, and security. Financial institutions should have a reliable complaint management system to address client concerns and questions in a timely manner.

In their 2015 study, Kombe and Wafula use a questionnaire to investigate how online banking has impacted the bottom lines of Kenya's commercial banks. They discovered that when banks adopted e-banking, transaction costs went down, processing times went down, and service quality went up. The convenience and ease of online banking contribute to its widespread adoption.

Information technology's effect on Indian banks' bottom lines was the subject of research by Vikram and Gayathri (2018). From 2011 to 2015, they tracked the success of twenty-one different Indian banks. As a metric, they focus in on net income. The study's overarching goal is to see whether e-banking profits can cover their advertising costs and then some. In order to verify their hypotheses, they used four distinct models: pooled regression, multiple regression, fixed effect, and random effect. They discovered that financial institutions' bottom lines benefited greatly from IT expenditures.

Mohmoodi and Asetmal (2014) looked at the relationship between the quality of a bank's electronic services and its financial results. In order to draw conclusions, researchers employed a questionnaire and analyzed secondary data gleaned from the annual report of a financial institution. There were 384 participants in the research. The research concluded that providing convenient access to online banking services increased customer satisfaction and had a favorable effect on the bank's bottom line.

Using the multiple regression method, Vekya (2017) looked at how electronic banking affected the profits of commercial banks in Kenya. This study used a descriptive research strategy. Increases in ATM and POS use, he discovered, boost banks' bottom lines. Return on equity (ROE) is the standard for gauging financial success. Commercial banks, the author argues, should link up their ATM networks so that their clients may use machines from any financial institution. Banks should keep their ATMs in good working order to satisfy their clientele.

Paul and Trehan (2011) used primary and secondary data to study the impact of e-delivery channels on bank customers' propensity to re-engage and the banks' overall output. This analysis included all commercial banks operating in India. They concluded that IT plays a crucial role in enhancing banks' performance by expanding their client base and enhancing the quality of their services. Overall performance increased more rapidly at new private sector banks and overseas banks than at every other kind of bank. After the introduction of online banking, they saw a significant improvement in efficiency. The authors argued that for banks to fully profit from e-banking, they must do more than just introduce or implement information technology.

Customers' preferences between online banking and traditional banking have been the subject of research by Gan et al., (2006). They used a questionnaire to gather data. individuals over the age of 65 and those with lesser levels of education and employment experience are more likely to use a traditional bank, whereas individuals with lower incomes and education levels choose online banking systems. But the wealthy prefer traditional banking since the value of their transactions is so great that they can't afford to take any chances. They discovered that a 24.31% uptick in e-banking use for every one-unit drop in perceived risk.

Ho and Zhu (2004) used the DEA method and ratio analysis to examine how commercial banks in Taiwan assess their performance. They use a two-pronged approach, first gauging the firm's "efficiency," or how well it makes use of its limited resources to create sales, and then "effectiveness," or how well it turns those sales into a profit. They utilized secondary sources to compile their research on 41 Taiwanese listed banks. They discovered that just 12 banks were effective and only 10 banks in Taiwan were efficient. They also found that efficiency and effectiveness are independent of one another; that is, banks that are efficient may not be effective, and vice versa.

Digital banking, consumer satisfaction, and financial outcomes were all topics of inquiry for Mbama & Ezepue (2018). Using questionnaires, they surveyed the opinions of 50

professors and 200 students at Sheffield Hallam University. Researchers discovered that digital banking consumers report high levels of satisfaction with the service. Customers who try out electronic banking seldom return to more traditional methods. This demonstrates that they are pleased with the center.

Researchers Ahmed et al. (2010) examined how e-banking altered the efficiency of financial institutions and the habits of their customers. In their investigation, they used a descriptive approach. According to their research, e-banking is beneficial since it strengthens the banking industry and facilitates the integration of more financial services over the internet. However, there are also numerous obstacles, including as the expensive cost of maintaining IT infrastructure, ensuring the safety of transactions, gaining the faith and confidence of clients, finding qualified workers, and reaching economies of scale. Customers have legitimate concerns about security. Customers are hesitant to make the transition from traditional banking to e-banking because of rising cybercrime rates.

For their research, Ho and Wu (2006) used a novel method known as GRA (grey relation analysis) to compare banks' performance metrics to those of other institutions. When compared to the financial statement analysis approach, this one is preferred since it solves the problems of sample size and applying the procedure to data with an unpredictable distribution. In reality, it minimizes the need for financial indicators. By selecting a single ratio as a stand-in for the other ratios, they are able to simplify the data. This research confirmed that the outcomes from the two approaches were identical. When evaluating performance, however, GRA uses the fewest possible indicators; for example, out of 59 total variables, this research used just 23.

Agbolade (2011) performed research to examine how the introduction of new technologies affected the earnings of Nigerian banks. The researcher analyzed the correlation between the variables using an Ordinary Least Squares method. According to the data, banks' profits respond proportionally to small changes in their amount of ICT investment. The research suggested increasing the use of ICT in banking services, together with the formulation of

suitable rules to enable effective monitoring and to establish the optimal size to reach organizational efficiency.

Researchers Akhisar, Tunay, and Tunay (2015) examined the impact of online banking on financial institutions' efficiency. The effectiveness of the bank was evaluated using ROA and ROE. For this study, we analyzed banking data from 23 developed and developing nations using a dynamic panel data model. Using a GMM estimator, we were able to assess not only the lagging levels but also the lagging differences of the variables. The research found that the ratio of ATMs to branches had a favorable influence on profitability, whereas the number of online banking clients and the number of POS terminals had a negative effect.

According to Bikker (2010), assessing performance is challenging since the quality of the indicators utilized to do so varies. This research explores the relative merits of using simple indicators and complicated models to gauge performance, and it looks into the possibility of combining indicators to arrive at even more robust metrics. Cost, profit, market structure, competition, and efficiency are the five categories of performance indicators derived from an analysis of twenty basic measures of competition.

Dauda & Akingbade (2011) analyzed the answers of bank staff and consumers to determine the connection between technological innovation and the performance of banks. Researchers chose 15 different Nigerian banks and their customers and workers as research participants. The study examined the link between technological innovation and both employee performance and customer satisfaction, reaching the conclusion that the adoption of ICT has improved the former, while also boosting the latter, and ultimately boosting the banks' bottom lines. According to the findings, banks should prioritize ICT investment as part of their overall strategy.

The researchers examined the connection between the variables using a cross-sectional approach. We employed a convenience sample to gather information from the top echelons of Nigeria's manufacturing and service companies. According to the findings, product innovation has a greater effect on business outcomes if consumers see it as beneficial, powerful, and distinctive.

Gichungu(2015) investigates how technological bank advances affect commercial banks' bottom lines. For this study, we examined secondary data, namely, bank annual reports covering a five-year time span, to examine how innovations affected the banks' bottom lines. While internet banking did not have the predicted effect on banks' bottom lines during a five-year period, the research found that innovations like mobile banking, agency banking, and ATMs did have a favorable effect.

To determine how much of an effect financial innovation has on the bottom lines of Kenya's commercial banks, Githikwa (2009) performed research. The research found that financial institutions see innovation as a means to improve their performance and boost profits. The research also showed that all banks should have greater resources, adopt cost reduction in its operations and transactions, and prioritize customer happiness to ensure the successful introduction of financial innovations. Commercial banks will have more leeway in their operations if they adopt product, operational, and institutional innovation.

Hossein's (2013) paper makes an effort to probe the connection between the success of online banks, economic expansion, and total deposits. This research used panel data from several Asian nations between the years 1990 and 2010. The researcher began by looking for evidence of long-run co integration between GDP and exogenous factors, having first checked for the presence of unit rooted the data series. The panel co integration tests helped with this. Ceylan Onayet al. (2008) provided the empirical model that this research modified. According to the findings, banks' performance and profits do not improve much in the first year after adopting internet banking. The high cost of information technology

required for the adoption process may be to blame. The ROE estimate shows a positive coefficient in the second year. Therefore, the study found that the adoption of online banking has a favorable effect on the performance of banks, and that the financial return on investment in IT is a slow process.

Hughes & Mester (2008) address the structural and non-structural empirical methodologies used to evaluate financial institutions. According to the research, the theoretical model of the banking firm and the notion of optimization are crucial to the structural method in gauging performance. It is based on the cost or profit function, where efficiency is defined as either minimizing costs or increasing profits. The use of financial ratios such as return on assets and return on equity, or the ratio of fixed expenses to total costs, is an example of a non-structural method of evaluating performance. It also establishes the correlation between results and financial planning tactics.

Malhotra and Singh (2009) performed research on the impact of online banking on financial institution efficiency. The research found that online banking may be both lucrative and efficient. They also discovered that the quality of assets held by online banks is greater. These financial institutions have lower capital and operating costs because of superior management. The research also found that smaller banks' profitability takes a hit if they implement online banking.

To learn more about how IT affects productivity in the workplace, Mutuku and Nyaribo (2015) performed a research. The study's dependent variable was output per worker, whereas ATMs, Internet banking, mobile banking, and EFTs served as independent variables. Using stratified random sampling, the research surveyed 150 workers from three different banks in Nairobi, Kenya. The study's findings show that boosting the use of IT would raise worker output, and the study's authors suggest that commercial banks in Kenya boost their inventive capacity to keep up with the ever-changing business environment.

Mwangi (2013) conducted a study to evaluate the effect of technological advancements on banks' bottom lines. This research focused on Kenya's banking sector. The research found that commercial banks in Kenya saw an increase in their revenue, return on assets, profitability, and client deposits after implementing innovative banking practices. Results from this research comparing the moderating effects of mobile phones and internet services on the financial performance of commercial banks in Kenya found that the former had a more significant impact than the latter.

Nader (2011) conducted a research to evaluate banks' profitability. The analysis covered the years 1998-2007 and focused on Saudi Arabian commercial banks. The research found that the quantity of automated teller machines (ATMs) and bank branches significantly contributed to the success of financial institutions. There is no correlation between the availability of POS terminals, computer banking, or mobile banking and the financial success of banks, the study finds.

Ngari (2014) seeks to examine the potential impact of financial innovations on the efficiency and success of Kenya's commercial banks. Using Slovin's method, we were able to determine that a sample size of 16 commercial banks from the total of 44 would be sufficient for our research. The financial performance indicators also included the calculation of profitability ratios such as Net Profit Margin, Gross Profit, and Efficiency ratios. Using multiple linear regression models, the researchers found that the introduction of new financial innovations significantly influenced the banks' bottom lines.

The article by Omotoso et al., (2012) analyzes the impact of information and communication technology on service provision in the Nigerian banking sector. Researchers polled a cross-section of bank employees and customers for their insights. The research found that ICT has had an effect on bank productivity, but it also found that there are obstacles to implementing ICT in the banking industry. The research also included

recommendations on how Nigerian banks may increase their efficiency and solve the problems they face.

Rub & Abbadi(2012) advocate for the use of the balanced scorecard for assessing financial institution performance. The study's overarching objective is to deduce whether or not these performance measurements are known to and used by bank management. They also compare the performance metrics used by domestic and international banks, regional offices, and corporate headquarters. The researchers used a modified version of Norton and Kaplan's four-factor model (finance, customer happiness, product/service innovation, and staff commitment, learning, and development) to analyze organizations in the Palestinian setting.

In 2016, researchers Sharifi and Akhter quantified the effect of the Credit-Deposit Ratio on the profitability of India's public sector banks. Three metrics were used to evaluate financial health and growth: Return on Assets, Return on Equity, and Net Interest Margin. The research used secondary data culled from RBI annual reports for the years 2008-2015. The investigation, which used a panel data regression model, found that the CD ratio positively affected the profitability of India's public sector banks.

In their paper, Stoica, Mehdian, and Sargu (2015) sought to assess how Romanian banks benefit from the convenience of online banking. The research employed a DEA methodology to evaluate the effectiveness of Romanian banks. Through applying PCA to the DEA-obtained bank efficiency values, we were able to classify the banks into distinct strategic clusters. The model employed 4 inputs and 2 outputs to produce 45 potential combinations and 45 outcomes using DEA. This allows for the identification of the banks' strengths and weaknesses. To get to the meat of the matter while leaving the fat behind, we turned to principal component analysis. Using data from a sample of 24 institutions involved in universal banking, the authors conclude that these institutions' primary business strategies are "cost-focused" and "online banking centered."Only two financial institutions

fully use the potential of online banking services, while the others choose a hybrid strategy that includes both internet banking and other cost-cutting measures.

2.12.3 Studies Related to Type of financial innovations

Since the complexity of financial issues has been growing, financial engineers has been putting more attention on coming up with new products, improved procedures, and more effective solutions. (Tufano, 2002). Therefore financial innovation is systematic process of altering the goods and framework of our financial system by altering the tools, institutions, operational processes, and rules that govern these factors. Institutional innovation, process innovation, and product innovation are only few of the types of financial innovations that Lariviere and Martin (1998) identified. In the financial sector, innovation refers to the establishment of new institutions or the restructuring of existing ones in order to better serve certain market groups. Consolidating or separating organizations into niches or adding complementary services are all part of this process. This allows them to make the most of their resources while efficiently catering to a variety of clientele. Costs and interest rates have decreased thanks to technological and institutional breakthroughs that have enabled economies of scale. Technological advancements in the areas of payment processing, communication, computing, and clearing transactions are examples of process innovations. These strategies attempt to take advantage of faster computer transactions; cut down on idle cash reserves; and lower transaction costs in response to rising interest rates (Finnerty, 1988). The creation of new instruments or the adaptation of current financial goods and services to better meet the requirements of customers constitutes product innovation. One definition of product innovation is the introduction of a novel approach to addressing a customer pain point that is mutually beneficial to the bank and its clientele. Research and development of new, adaptable goods, services, and ideas that better meet the needs of individual consumers is the driving force behind product innovation. Examples include variable-rate savings accounts, loans for farmers, students, and company owners, and the financing of assets, among others. Short-term and long-term savings and

investment accounts exist for the same reason (Tufano, 2002).

Damanpour and Gopalakrishnan (2001) examined the connections between product and process innovations in order to better understand the pattern of adoption of these innovations at the business level. One hundred and one US commercial banks are the focus of the research. The research used innovations released between 1982 and 1993 and separated them into two periods of six years each. Measures of performance were return on equity, return on assets, and rating of execution. The research concludes that high-performing banks are more likely to implement product and process innovations than low-performing banks, and that product-process adoption is more frequent than process-product adoption.

Lee et al. (2003) looked at how new technologies affected manufacturing and shopping habits. The research demonstrated that the innovativeness of items has diverse effects on producers and consumers, with strategic ramifications for the commercialization of highly innovative products. We take a holistic view of the product's potential, and we put it through its paces on every front. We examine four aspects of innovation: the introduction of a novel product or service by an established company, the development of a new market for that company, increased customer value, and increased consumer resistance to adopting that product. The research concluded that inventiveness affects the manufacturer in several ways. If a new product is the result of technical advancements, then such advancements affect the whole product development process. Products with a higher level of innovation will sell better than those with a lower level of innovation. In contrast to the development phase, the influence of innovativeness on the manufacturer is stronger during the commercialization phase if the product's originality is mostly in the range to which it originates new markets to expand but the technical ambiguity is relatively low.

In their research, Wang and Ahmed (2004) found that managers need to be open to new ideas if they want to succeed. However, technical progress is often connected with new product and process innovations. An entrepreneur's mindset is defined as "the process, practice, and decision activity that leads to new entrance," according to the authors. Innovation, calculated risk-taking, initiative, fierce competition, and individualism are all

examples (Brock, 2003).

Harsha (2011) tries to define financial engineering, discuss what drives it, outline the reasons why financial engineering is necessary for product innovation, and provide some methods for achieving these goals.

Ebarefimia and Inedegbor (2013) looked at how innovative product development impacts the success of a company. Organisational innovation served as the dependent variable, whereas product development and innovation served as the independent variable. The researchers examined the connection between the variables using a cross-sectional approach. Managers of Nigerian manufacturing and service companies participated in a convenience sample. Product innovation has a greater influence on organizational success when consumers see it as beneficial, powerful, and distinctive, according to the study's findings.

Verma (2015) looked at how liberalization affected the expansion of the life insurance market. To do so, we compare the pace of corporate expansion over the last two decades. In addition to liberalization, we find that a rise in the number of businesses, the breadth of distribution channels, and the quantity of available workers all play a role in driving the expansion of the insurance sector. However, the originality and inventiveness contribute much. The research also looked at how new products like ULIPs and bancassurance fit into the picture. The author finished the analysis by discussing potential future advances in the industry after assessing the negative impact of liberalization.

The purpose of Ramakrishna's (2012) study was to determine what novel services a few public and private banks in India were providing to their customers. The research relied on the Six Dimensional Model of Service Innovation by Pim den Hertog, Wietze van der Aa, and Mark W. de Jong, as well as the work of Bessant and Tidd (2007). Product innovation, process innovation, position innovation, and paradigm innovation were named by Bessant and Tidd (2007) as the 4Ps of innovation. Pim den Hertog's (2010) six-factor innovation model consists of the following elements: a novel service idea; novel customer interaction; novel value system; novel revenue model; and novel organizational or technical service

delivery method. The researcher intended to use these frameworks to undertake a comparative analysis of novel banking strategies. The research included the State Bank of India, Andhra Bank, YES Bank, and ICICI Bank. The research found that compared to other banks, ICICI was more inventive and provided more cutting-edge services. The research also found that banks in the public and private sectors have adopted service innovation as a long-term strategy.

In their empirical research, Lee et al. (2016) proved the impact of technology-exploration on product innovation. This included outsourcing R&D, customer interaction, inward IP licensing, and external networking. According to the findings, technological curiosity is the most important factor in determining whether a product achieves a low or high level of innovation. Both client participation and R&D outsourcing contribute to a greater degree of uniqueness in innovations. In addition, client participation positively affects innovation only at a modest level. The degree of originality in a product's invention, whether low or high, is unaffected by other practices.

In his 2018 piece, "," Ryan North discusses the development of fintech and its place in the industry's history. Anything that is novel in the financial industry is considered financial technology. It's usually seen as the force that causes trouble. The banking industry is particularly at the forefront of technological development. The course of the financial technology revolution has seen the introduction of many novel concepts. Even in India, the banking and financial industry has advanced. Paytm, PhonePe, and others like them have been crucial to the growth of the financial technology industry. Recent innovations in technology, such as block chain, AI, digitalized banks, mobile banking, etc., have become game-changers in the financial technology industry.

Jin Ho Park's (2017) This research presents a concise picture of block chain's potential and security. The value of block chain technology has increased significantly. Through the use of P2P transactions, it eliminates the need for intermediaries. Encryption and other technical innovations have made it possible to centralize the data of a huge number of individuals. Also, it makes hacking more difficult, so your data is safer from the outside world. It

reduces the cost of security. Block chain is simple to deploy, connect, and even extend.

Z. Gao (2019) The focus of this article is on the application of machine learning and AI to the stock market. Algorithms like KNN, k-Means, ANN algorithms, and bisecting k-means have their underlying concepts and characteristics compared and contrasted here. The stock analysis methods are implemented in Python programmes. Using the price-to-earnings ratio, asset turnover rate, dividends-per-share payout, gross margin, and other indices for each of the 55 companies, we can predict their future growth and use this information to inform our investing decisions.

In her recent essay, Melissa Cyrill (2018) provides information on the various financial technology companies in India. In 2018, there are more than 400 financial technology companies in India, according to NASSCOM. Financial technology is most prevalent in the areas of payment processing, money transfers, and equity investment in the Indian market. Financial technology is expanding rapidly in India. Investments on a worldwide scale have skyrocketed to a record \$ 450 million in 2015. Financial technology has allowed both traditional banks and NBFCs to determine their clients' creditworthiness and base their lending decisions on these ratings. The relevant regulatory bodies are also actively encouraging the adoption of fintech products and services. With its support, RBI has helped spread the word about UPIs (Unified Payments Interface), peer-to-peer services, and more. In addition to support from government programmes like the Digital India Programme, the National Payments Corporation of India (NPCI), the Jan Dhan Yojana, and others, fintech businesses in India get substantial funding from international investors.

Clifford (2018) When it comes to money, fintech is the combination of technology and financial services. The Indian economy is enthusiastically embracing this change. From 2016's \$33 billion, projections for 2020's \$73 billion in transactions indicate the industry will continue to expand. According to Yes Bank's projections, fintech will expand into new fields including microfinance, digital payments, credit scoring, etc. Most fintech firms have

been in operation for less than three years, and their typical staff size is around fifteen people. There will be a minimum \$700 billion boost to GDP from fintech by 2025.

Objective 2: To compare innovation in Indian Banking system with financial innovations happening in developed countries.

Here section in section 2.13, we have provide literature which provide us information related to impact and status of financial innovation in international and national region. But there is no study found where any researcher compare financial innovations in Indian Banking system and foreign country. So we have following objective on the basis of this study and its research gap.

2.13 STUDIES RELATED TO NATIONAL AND INTERNATIONAL STATUS OF INNOVATION IN BANKING SYSTEM

2.13.1 International Studies

Commercial banks have implemented process, product, and institutional innovation, according to research by Gitau R. (2011). Commercial banks choose to innovate in the areas of credit cards, business clubs, and unsecured loans. Insurance services, a credit bureau, and Islamic banking were some of the implemented institutional innovations. RTGS, mobile, and internet banking were the accepted process innovations. It was obvious that commercial banks' healthy financial outcomes were due to their acceptance of financial innovation. Therefore, the findings of this study call for more investigation of the impact of financial innovation methods on other areas of The bank in order to get a competitive advantage.

Maleto D. (2012) found that the value of transactions made by automated teller machine, mobile banking, online banking, and electronic funds transfer all had a substantial and favorable impact on the expansion of SACCOs in Kenya. The study concludes that there is a need for further research and academic study of financial innovation in the region. As

a result, there will be more than enough literature in the area for people to draw connections to. Findings suggest SACCOs should include monetary policy tools into reporting processes. The research suggests that SACCOS prioritize inward-looking approaches to efficiency. Asset quality, capital sufficiency, earnings capacity, management efficiency, and liquidity management are all examples of internal variables.

According to the research of Leonard S. (2012), the development of commercial banks in Kenya is unaffected by their financial innovations. The research suggests that commercial banks should increase their use of new technologies in order to reap the benefits of these developments. The banking sector may need more product innovations as opposed to technology innovations.

Researchers Mosongo, Gichana, Ithai, and Nguta (2013) found a favourable correlation between financial innovation and Sacco success in Nairobi County. Financial innovation is a key recommendation from the study, which also calls for a focus on education and training for Sacco stakeholders like members, staff, elective members, committee members, and managers. Finally, the study urges the government to back Sacco by enacting laws that shield Sacco from market exploitation and encourages Sacco to form alliances with other financial institutions.

Wachira E.(2013) found a positive and statistically significant correlation between a bank's profitability and its use of cutting-edge technologies including those that empower the consumer independently, those that help the customer, and those that are transparent to the customer. Banks in Kenya were able to account for 50.8% of the variance in profitability using a model in which customer independence technology, customer assistance technology, and customer transparency technology all played a significant role ($r=0.7$). The research highlighted the need of ongoing investment in technology advancements by banks to maintain their competitive edge.

All of the predictors evaluated by Kiprop, Ayuma, and Bokongo (2013) had a statistically significant influence on the dependent variable growth at Commercial Bank. In order to stay competitive, the report suggests that commercial bank management completely back online banking policies by giving sufficient resources to them. Additional suggestions include having the banks' upper echelons actively promote client training on the usage of online banking to expand customers' skill sets. The effectiveness of the banks' online banking services depends on hiring skilled programmers. Based on their findings, the researchers have identified a number of significant questions that their project did not have time to explore but that might be crucial to answering if we want to learn how to use financial innovations to gain a permanent competitive edge.

According to Onduko E.'s (2013) research, the Sacco's adoption of process innovation, product innovation, and institutional innovation all contributed to its strong financial success. The financial results were most affected by institutional innovation, then product innovation, and finally process innovation. Researchers in this research also found that Sacco in Nairobi County benefited economically when they adopted new financial practices.

The SPSS programme was the subject of research by Ngumi P. (2013). Tests of statistical significance confirmed that the income, return on assets, profitability, and client deposits of commercial banks in Kenya were all significantly impacted by bank innovations. The results also showed that although internet services had a moderating effect on The bank innovations' impact on commercial banks' financial performance in Kenya, mobile phones had an even larger moderating effect. The study's results suggest that commercial banks in Kenya may benefit from innovation in the banking sector. Therefore, it is suggested that commercial bank management and the government continue to investigate and implement long-term business linkages and collaborations with mobile phone service providers and internet service providers to speed up the spread of innovations and produce the desired effects on the economy. Financial institutions might expand their clientele and revenue

streams by capitalizing on mobile phone use. A more comprehensive analysis of the impact of banking innovations such as agency banking, securitization, and credit guarantees on the bottom lines of commercial banks is warranted.

2.13.2 Indian Studies

Gupta and Aggarwal (2014) analyzed how these financial innovations altered the makeup and dynamics of India's financial markets and economy. Venture capital, microfinance, and other financial technologies like National Electronic Fund Transfer (NEFT) and Mobile-Banking are just a few examples of financial innovations that have had a large beneficial impact on the economy. E-banking and online stock trading have been game-changers for the country of India. All of these developments have become indispensable to the functioning of the Indian economy, and they have helped the nation make the kind of strides in its financial climate that are essential in the face of the current global financial turmoil. India's goal of becoming a global superpower by 2020 requires concerted action to support new developments in the financial sector, as these innovations and technologies are the engines that power national progress and raise living standards.

Shet A. (2015) found that the banking industry in India has seen many shifts since 2015. And most of The banks have started taking a creative approach to banking with the aim of producing greater value for consumers in The banks to address the difficulties of changing wants and perceptions of customers, new laws throughout the years, and huge improvements in technology. In modern times, paper cash has coexisted alongside an electronic payment system. New products, together with liquidity and safety, are in reach for India's financial system. The introduction of cards, the launch of ECS (Electronic Clearing Service) in the late 1990s, EFT (Electronic Funds Transfer), RTGS (Real Time Gross Settlement), NEFT (National Electronic Funds Transfer), mobile banking, and internet banking are all examples of banking advances. Financial institutions are spending a lot of money to spread these new technologies. This article focuses on the positive aspects of current banking developments.

The study investigates the concept, aspects, and forms of financial innovation, as well as its underlying causes and outcomes (Rani A. 2015). In this article, I will analyze how these new financial tools have contributed to the growth of India's financial sector and overall economy. Financial innovations like Venture Capital and National Electronic Fund Transfer (NEFT) and Mobile-Banking are only two examples of the many that have helped the economy. Internet banking has been a game-changer in India. All of these developments have become indispensable to the functioning of the Indian economy, and they have helped the nation make the kind of strides in its financial climate that are essential in the face of the current global financial turmoil. It is important to make concerted efforts to spread the word about the innovations taking place in the financial sector if we want to see sustained progress and improvement in the area of both economic growth and people's quality of life.

According to the research of Kaur S. (2016), the services offered to clients are crucial to the growth of the banking industry. conventional banks are under increasing pressure to include new technology into their operations as a result of competition from new entrants, new business models, shifting client expectations, and the fragmentation of conventional banking services. There have been several changes in the financial system in India. Many financial institutions launch new forms of banking with the hope of attracting more valuable consumers. There are already a number of different ways to bank digitally, including ATMs, RTGS, NEFT, Internet banking, Mobile banking, SMS Banking, and a cheque truncation system. However, several non-banking companies and a select number of overseas banks are making use of novel developments. It's possible that financial institutions in India may adopt these novelties. Therefore, this report sheds some insight on recent banking industry advances.

Research by Rajesh Kumar(2017) shows that focusing on the customer has become crucial to maintaining a competitive edge in business. Most banks simply cannot offer their clients with adequate service without investing in state-of-the-art computer systems. As a result,

Indian financial institutions have started to adopt a more cutting-edge strategy, with the hope of providing more value to their clients. These days, paper bills coexist with digital payment systems. New products, together with liquidity and safety, are in reach for India's financial system. Some examples of banking innovations include the introduction of cards, the launch of ECS (Electronic Clearing Service) in the late 1990s, EFT (Electronic Funds Transfer), RTGS (Real Time Gross Settlement), NEFT (National Electronic Funds Transfer), and mBanking (mobile banking). This report takes a look at the state of banking sector innovation.

Objective 3: To identify factors on demand & supply side that has led to rapid growth in financial innovations.

In section 2.14 we have first review the literature related to demand and supply side's theories. Then we have introduced the Supply and Demand Drivers of Financial Innovation. This section clears us about how these theories utilized in practical way. But in above studies we have not found any study which identifies the factors of demand & supply side that has led to rapid growth in financial innovations in Indian banking system. So we have introduce following objective to have clear idea about of demand & supply side factor in Indian banking system

2.14 SUPPLY AND DEMAND DRIVERS OF FINANCIAL INNOVATION

There is no one, definitive way to look at where new ideas come from. The demand theory states that businesses drive innovation by their desire for a competitive edge in the market (the demand-driven or market pull innovations identified by Drucker 2002). However, internal demands of the organization attempting to better its activity or changes in its environment needing the right adjustment in its business plan may both affect this desire. The second method places an emphasis on supply-side issues, as innovators (providing organizations) are responsible for developing new technologies before their adoption by consumers and businesses. Invention, innovation, and dissemination (via imitation or

commercialization) are the three stages of the process that lead to supply-driven innovations (related to the technology-push theory) (Dabic et al., 2011). But Di Stefano et al. (2012) explained how businesses might use demand and technology as innovation catalysts.

Two competing ideas (the demand-side and supply-side) attempt to shed light on what drives the development, adoption, and spread of new financial technologies. According to the demand-side hypothesis, inefficiencies in the financial system, such as asymmetric information, agency costs, transaction costs, market risk, and taxes, are the primary drivers of financial innovation (Fabozzi et al., 2003; Tufano, 2003). The argument that there would be no room for financial innovations if the financial markets were flawless and comprehensive is a common one. In a similar vein, Silber (1983) argues that the motivation for the development of new financial products is to help businesses operate more profitably within their existing budgets. An important tenet of the demand-side approach is that new developments in the financial sector should arise directly in response to the demands of market players, with the purpose of satisfying their specific wants and needs.

First, we need to examine the supply side, or the people and incentives that bring new financial products to market, to get a handle on the demand for these goods. Possible triggers include innovations in technology or law, a virtuous cycle of increased innovation, or a change in the macroeconomic or monetary environment. As an example of how these factors have influenced the growth of earlier monetary breakthroughs, examine (Colombo, Piva, Quas, & Rossi-Lamastra, 2021).

The most ubiquitous manifestation of how technology has facilitated the emergence of new financial services is the automated teller machine (ATM). The first automated teller machines appeared after a technical breakthrough in the late 1960s. The British government, for instance, patented a technique for storing PIN codes in 1966. Because of such, the automated teller machine was finally feasible. Less than a year after the invention

was awarded, the first ATM was introduced in London (Hanelt, Bohnsack, Marz, & Antunes Marante, 2021). More recent examples of breakthroughs where technology played an important part of supply include online banking, high-frequency trading, and mobile payments. Moreover, regulation is a frequent factor on the supply side. In the aftermath of the global financial crisis, for instance, bank authorities in certain nations have lately advised their local financial institutions to move away from short-term lending. Meanwhile, other shifts dampened money market funds' enthusiasm for longer-term instruments including longer-term repo contracts (Kohtamäki, Rabetino, & Möller, 2018). Institutional lenders extended credit in the form of collateralized commercial paper (CCP). Financial firms often used CCP, or commercial paper issued by a special purpose organisation, to engage into buyback agreements. Since the CCP meets the legal definition of "liquid," money market funds are willing to purchase it, and the banks that issue the CCP get the repo financing they needed. Examples of regulatory contributions to financial innovation include the futures market for swaps, callable commercial paper, extendable repurchase agreements, and evergreen repurchase agreements (Krogstie, 2019).

Subtler elements can have a role in determining the supply. An idea might spark another, and so on, in a never-ending cycle of creativity. Therefore, it is possible that inventions follow a natural progression in the actual world. For instance, the index of credit default swaps cannot be launched until the credit default swap product is on the market and the market for it is liquid enough to consistently monitor prices. That is to say, it is not conceivable to imagine a product in isolation from its predecessors (Jeble et al., 2018). For instance, unless one has already created a CDO, it is difficult to imagine how one might create a CDO squared. Therefore, it makes sense to consider invention a wellspring of future innovation; the more inventions there are, the more likely it is that new innovations will appear (Wamba et al., 2017).

Changes in the macroeconomic or financial environment might also affect product and service availability. For instance, financial institutions bought a disproportionate amount

of real estate during the U.S. housing market meltdown that preceded the 2008 financial crisis (Schoenherr & Speier-Pero, 2015). Several financial institutions started securitizing the rentals they received on the buildings they owned as a result of this unusual situation.

They likely wouldn't have considered making such a product if the housing market hadn't imploded and left banking institutions with an overabundance of property. That's why the overall economic upheaval paved the way for the new product or service. The development of double- and triple-decker hybrid bonds in Japan due to the country's extraordinarily low interest rate environment is another example of a problem with macroeconomic or financial roots (Henseler, Ringle, & Sarstedt, 2015).

This is by no means an exhaustive list of supply factors; rather, it is meant to give you a sense of the types of things that qualify as supply factors, such as changes in technology, government regulation, the introduction of new innovations, and variations in macroeconomic and financial conditions.

However, even if banks come up with a tonne of novel goods and services, they won't sell if customer demand is low (Schilke & Cook, 2015). One product that has gone or found a very small niche market owing to lack of demand is triple-decker hybrid bonds. Many external variables, such as regulatory restraints and shifting demographics, impact consumer demand for novel products and services. Despite its role as a supplier, rules might increase demand for niche products. The liquidity coverage ratio ensures that banks have sufficient high-quality liquid assets to cover net cash withdrawals for at least 30 days. If a bank has issued a bond or commercial paper with a maturity date within the next 30 days, it must retain assets on hand to cover the predicted outflow. An uptick in demand for goods that do not go against the liquidity coverage ratio followed (Schilke, 2014). That need led to the creation of callable commercial paper. To be more precise, this is referring to commercial paper that has been issued for a certain amount of time; say three months, but that the issuer has the option to redeem prior to the 30th day before maturity. The issuing banks don't have to retain assets as security against a possible outflow since they

may just call the paper. As a consequence of government regulation, a new market has developed for these products (Davenport, 2014). The make-up of the population is also a factor in the market. Changes in the population structure have played a significant role in propelling the adoption of mobile monetary services like mobile banking and mobile payments.

While 67% of respondents under the age of 30 reported using mobile banking in the preceding twelve months, just 18% of respondents over the age of 60 did so (Homburg, Klarmann, Reimann, & Schilke, 2012). Since these results are consistent with the notion that younger generations are more innately skilled at utilizing mobile technology than their elders, they come as no surprise. Federal Reserve Bank of Boston research found that those who use Bitcoin and similar virtual currencies are disproportionately young. The financial sector is not blind to the requirements of modern youth; rather, it has responded by developing innovative new goods and services (Richard, Devinney, Yip, & Johnson, 2009). Similar to how supply factors influenced the supply side of the market, these two examples of demand variables—regulation and demographics—should give you a sense for the types of things that qualify as demand factors.

Before delving into the particulars of invention, it is important to make some general remarks. First, I provided many examples of innovations driven by various factors; nonetheless, it is crucial to keep in mind that the reasons for an innovation are seldom simple. Neither supply nor demand alone is usually responsible for a brand-new phenomenon (Sirmon, Hitt, & Ireland, 2007). Numerous variables work together to create a product; for instance, two or more reasons may inspire an entrepreneur to make a product, and the same number of factors may drive investors to buy that product (Rothaermel & Deeds, 2006). Second, while this framework is primarily concerned with the individual level, it nonetheless allows us to think about innovation on a global scale. Although I used a single product to demonstrate how each factor played a part, it's not hard to see how they all interact on a broader scale (Dussauge, Garrette, & Mitchell, 2004). It's reasonable to

predict that there will be more financial innovation during times of rapid technical advancement, for instance. It is reasonable to expect a period of fast innovation after times of significant shifts in the macroeconomic or financial environment. Both of these points will come up again in the course of my Financial Technology lecture.

Objective 4: To identify the key customer and product segments where financial innovations has impacted

From section 2.15 and 2.16, we have found that Financial innovations have impacted key customer and product segments in a number of ways. Here are some examples:

Customer segments

- Individuals: Financial innovations have made it easier and more convenient for individuals to access financial products and services. For example, mobile banking apps have made it possible for individuals to check their account balances, transfer money, and pay bills from anywhere in the world.
- Businesses: Financial innovations have helped businesses to improve their efficiency and productivity. For example, online payment processing systems have made it easier and faster for businesses to accept payments from their customers.
- Governments: Financial innovations have helped governments to improve the efficiency and transparency of their financial systems. For example, block chain technology is being used to develop new payment systems that are faster, cheaper, and more secure than traditional payment systems.

Product segments

- Payments: Financial innovations have revolutionized the way that payments are made. For example, mobile wallets and digital payment systems have made it possible for people to make payments without having to use cash or credit cards.

- Lending: Financial innovations have made it easier and faster for people to access loans. For example, online lending platforms have made it possible for people to get loans without having to go to a bank.
- Investing: Financial innovations have made it easier and more affordable for people to invest in financial markets. For example, robo-advisors can provide automated investment advice to people at a low cost.

Here are some specific examples of how financial innovations have impacted key customer and product segments:

- Mobile banking apps: Mobile banking apps have made it easier and more convenient for individuals to access their bank accounts and perform transactions. This has been particularly beneficial for low-income individuals and individuals who live in rural areas.
- Digital wallets: Digital wallets such as Paytm and Google Pay have made it easier and more convenient for people to make payments. This has been particularly beneficial for small businesses and individuals who do not have access to traditional banking services.
- Online lending: Online lending platforms such as Upstart and Lending Club have made it easier and faster for people to access loans. This has been particularly beneficial for individuals with poor credit or who do not have access to traditional lending services.
- Robo-advisors: Robo-advisors such as Wealthfront and Betterment have made it easier and more affordable for people to invest in financial markets. This has been particularly beneficial for beginner investors.

These are just a few examples of the many ways in which financial innovations have impacted key customer and product segments. But there are very limited studies in India related to key customer and product segments due to financial innovation .So we have introduce following objective on the basis these literatures:

2.15 CHANGES IN PRODUCT SEGMENTS DUE TO FINANCIAL INNOVATION

2.15.1 Lending

Fintech's most notable impact on the economy, according to Conner (2013), was the improvement of the financing process. Historically, only financial institutions like banks were able to provide credit to borrowers like people or businesses (Kuznetsov, 2016). Therefore, in order to borrow money from banks, people and companies must execute all the conditions required for the loans, such as business papers, property to be mortgaged, evidence of future capacity to pay the loans, and other associated paperwork. Banks made a profit by charging customers interest on loans on a monthly basis, with lending interest often being lower than the interest rate on banked deposits (Kuznetsov, 2016).

For most people and businesses, however, getting a loan from a bank was a complicated and time-consuming procedure. It was exceedingly unlikely that individuals or small businesses with poor credit histories or no collateral would be able to get a loan from a financial institution (Conner, 2013). Therefore, this has made it very difficult for businesses and people to get funds for investment and operation. The financial technology (Fintech) sector has released a plethora of technological apps and financial support services to tackle these issues and establish a new loan market that will cater to customers' wants and solve all their concerns.

New lending models

The P2P Lending Model was the first major innovation in the lending industry. A high-security network connects many individual computers, creating a paradigm for a new generation of fundraising. This model is known as peer-to-peer (P2P). The borrowers may apply for the loans conveniently by filling out the online loan applications without supplying additional essential papers and without mortgaging their assets and the lenders can generate money to fund loans for numerous customers. The P2P lending concept also

allows borrowers to access many lenders, who together may provide a cheaper interest rate than traditional lending institutions. Conversely, a lender may be a creditor to many borrowers if he chooses to participate in multiple lending funds, the returns on which often exceed those offered by traditional banking institutions' deposit interest rates. As of 2016 (Milne & Parbo- teeah).

Lending Club and Prosper are two highly successful P2P lending companies because they use technology to run a credit marketplace that offers borrowers lower interest rates and better loan approval odds than traditional bank loans (Williams, 2015). Both businesses are extremely similar in that they provide their consumers low-interest loans of up to \$35,000 USD at low interest rates (Williams, 2015). However, there are important distinctions between the two that borrowers should investigate and understand before making any loan selections.

Expansion into unique financial products

The P2P model's introduction has significantly disrupted the conventional approach to financing. But Fintech firms won't be content with that; they want to refine and broaden the model's use even more. Student debt finance and consolidation are not exclusive to SoFi or Earnest; other firms like these have entered the market as well (Neuman, 2015).

Earnest is a digital lending platform that prioritises student debt relief, but also lends to small enterprises and people with weak credit or little income. Instead of basing loan approvals only on applicants' credit histories and monthly income, this firm takes into account a wider range of factors. Earnest uses software and sophisticated algorithms that analyze between 80,000 and 100,000 data points to determine if a customer is qualified for a loan and, if so, the amount of that loan, regardless of the customer's credit history. Earnest's primary objective is to create a new banking system for next generations, one that can provide eligible individuals, and especially those of a younger age such as students, access to credit at more affordable rates and fees than traditional financial institutions. With

this in mind, the business has developed a new product — Earnest's student loan refinancing — to ease the financial strain on students, both undergraduate and postgraduate, by extending the length of time over which they must repay their loans (from 5 to 20 years). The ability to move between variable and fixed interest rates at no cost and to tailor the loan term down to the individual month are two of its primary selling points. There are no prepayment or additional payment fees with Earnest. (Shin, 2015.).

Furthermore, considering that SoFi has refinanced over \$5 billion USD in student loans, it may be called the largest lender in the field of refinancing student loans. Refinancing student loans with Sofi can save you money compared to using a traditional bank, and it can also help you get a better job. Fixed APRs vary from 3.50% to 7.74%, and variable APRs range from 2.23% to 6.03%, making SoFi the sole lender offering some of the lowest rates of refinancing student loans in the market at the present time (Clements, 2016). There are no fees associated with the loan's origination, prepayment, or transfer with this lender. While Earnest does not place as much emphasis on a borrower's credit history or income, SoFi is highly selective in whom they lend to and only works with those who have stable employment, a high salary, and a decent credit score. Additionally, in contrast to Earnest, SoFi requires borrowers to have a bachelor's degree or above before they can apply for a refinancing. In addition, SoFi employs a large number of people who are experts in career counseling and who are happy to work with clients on honing their job-hunting abilities, perfecting their application materials, or formulating a strategy to negotiate better compensation with their current employers. In addition to the student loan refinancing option, Sofi also provides personal loans, mortgages, and loans for parents who need additional funding to assist pay for their child's higher education. (Mcgurran & Nykeil, 2016.)

Faster approvals and funding

Faster loan application, approval, and financing times for consumers are one way that Fintech businesses differentiate themselves from conventional banks and gain an edge in

the financial services sector. Numerous solutions, like OnDeck Capital, Kabbage, and PayPal Working Capital, allow individuals and businesses to borrow short-term loans in a straightforward, quick, and paperless manner. To paraphrase (Neuman, 2015)

According to Prakash (2016), OnDeck is the top supplier of short-term loans to small companies since it offers loans with a maximum amount of \$500,000 USD and terms of 3 to 36 months to small and medium-sized enterprises. In as little as 10 minutes, a borrower may apply for a loan using OnDeck's website or a mobile app, providing just basic information like their social security number, company tax ID, and the last three months of bank or credit card bills. One unique feature of OnDeck loans is that they do not need collateral (Nicastro, 2016). In just a few short minutes, borrowers will know the outcome of their loan applications, and if granted, they will get their funds within 24 hours (usually within a few days) (Nicastro, 2016). To qualify for a loan from OnDeck, a business has to either have been in operation for at least a year, be bringing in more than \$100,000 annually in revenue, or have a personal credit score of at least 500. (Prakash, 2016).

The fact that OnDeck Capital can provide companies with loans of up to \$500,000 USD stands out as the company's main selling point. However, only a small fraction of businesses generate yearly sales of above \$100,000. Therefore, Kabbage may be an option for certain small firms whose annual revenue is less than \$100,000 or whose minimum yearly revenue is \$50,000. Kabbage, an Atlanta-based Fintech firm, has developed a streamlined online lending platform that can disburse loans to clients and small companies in as little as seven minutes (Nicastro, 2016). Kabbage's fees decrease according to the amount of data each user shares with the service. To that end, it could be correct to say what Peter Renton_ the pioneer of international peer-to-peer conference LendAccording to Williams (2015), Kabbage is the most forward-thinking business lender in the world.

In addition, with the rise of OnDeck Capital and Kabbage, PayPal Working Capital has been recognized as the market's most affordable and adaptable loan alternative for small

businesses (Brown, 2014). Loan repayment for these enterprises is directly proportional to the volume of daily PayPal sales they generate. In other words, businesses must repay their debts based on a predetermined margin of daily PayPal sales (Brown, 2014) rather than making weekly or monthly payments. For instance, if today's sales are higher than yesterday's, the companies will have to fork out a higher sum of money, while tomorrow's sales will result in a lower sum. PayPal Working Capital has the lowest client fees but offers much less funding to companies than Kabbage and OnDeck, determined by each company's yearly PayPal revenue. For a firm to qualify for a loan from PayPal Working Capital, yearly PayPal sales must be at least \$90,000 (USD) and the loan amount may be no more than 15% of annual sales (Conner, 2013). To sum up, PayPal Working Capital may be less costly than the other two choices, but it does need the user to be a merchant on the PayPal platform (Prakash, 2016).

Utilizing massive data

Instead of having customer's present extensive documentation of their finances, personal income, and collateral, Fintech firms utilize vast amounts of data from web sites to analyze the borrowers' capacity to pay off their obligations. Lending businesses, for instance, may use information about a borrower's activity on marketplaces like eBay and PayPal to ascertain the borrower's sales volume or turnover and, in turn, make sound lending judgments. As of 2015, (Williams),

However, today's Fintech firms have integrated dozens of sources, such as UPS data, Amazon, QuickBooks, Yodlee, Yelp, and Facebook, to maximize the customer's available data source and enable more in-depth and efficient analysis of the borrower's creditworthiness and repayment capacity (Williams, 2015). For instance, Kabbage is one Fintech firm that does not use the P2P lending model, but it nonetheless outperforms banks in terms of lending speed for its consumers by making better use of a variety of accessible data (Meola, 2016). Small internet enterprises that lack the capital to satisfy the stringent loan standards of other lenders might benefit from this alternative. After filling out

Kabbage's straightforward online loan application, businesses may access loans of up to \$100,000 in as little as 24 hours (Meola, 2016). Kabbage evaluates a borrower's ability to repay a loan by combing through data from a variety of the borrower's business-related channels, including but not limited to eBay, Yahoo, Amazon, and QuickBooks (Meola, 2016).

Foundation is a lending firm that analyses its clients' data and can make lending decisions in only three days (Fox 2015). According to Brook (2016), the corporation uses application software that automatically pulls information about a potential borrower from different sources, including credit bureaus, public records, and government databases. It offers loans of up to \$500,000 for company development and \$150,000 for operating capital; nevertheless, it has a higher origination cost and a more involved application process than its competitors. (Brooks, 2016).

2.15.2 Payment

When fintech firms began releasing a slew of payment-related apps and web-based services, customers were able to choose from a wide variety of options that catered to their specific goals and financial circumstances (Parker, 2016). With the advent of Fintech products, clients no longer need to visit their local banks to complete their financial activities; instead, they can take use of a wide variety of convenient online banking and payment options whenever and wherever they like.

Peer-to-peer online payment

The new peer-to-peer payment paradigm allows counterparties to transfer funds directly from their bank accounts to the bank accounts of others through the Internet or network-enabled mobile devices at any time and place (Broom, 2015). P2P payment is an electronic method of exchanging money that eliminates the need for a middleman by connecting buyers and sellers directly. This method of payment is thus cheaper than the standard method. In addition, this model's primary advantage is that it saves consumers time and

effort by eliminating the need to physically transfer funds between accounts at different financial institutions, such as by writing and mailing checks or transferring cash through traditional banking channels.(Broom, 2015.)

Mobile wallets

To make in-store purchases swiftly and safely, more consumers are turning to mobile wallets, which are digital wallets that employ technology to store customers' digital possessions like debit cards and credit cards. The primary goals of developing this form of payment were to eventually replace traditional wallets that individuals constantly have on them, to improve user-friendliness, speed, and security, and to work towards creating a cashless society (Anonymous, 2014). Mobile wallets use radio frequency identification technology called Near Field Communication (NFC) to transfer payment details from a mobile device to a payment terminal when the two are in close proximity to one another.

To use this cutting-edge form of payment, the customer must first install the provider's mobile wallet app on his Smartphone, and then link his existing payment methods (such as a credit or debit card) to this app. Then, all the buyer has to do is hold their phone up to an NFC scanner to complete the purchase in-store. When compared to more traditional payment methods like debit cards or cash, NFC-enabled mobile wallets may execute transactions in a matter of seconds. Customers like not having to worry about losing cash or credit cards when they don't need to carry real wallets. In order to facilitate the use of mobile wallets for payment, companies of all sizes may benefit from Square's contactless and chip reader (Parker, 2016.)

One example of a mobile payment system that employs digital technologies to revolutionise the shopping experience is Apple Pay. The iPhone 6, iPhone 6s, iPhone SE, iPad Air 2, iPad Mini 3, and later are all compatible with Apple Pay, so you may think of it as an electronic wallet for the modern day. Apple Pay is an electronic wallet that stores a user's debit and credit card information, allowing the user to quickly and easily pay for

purchases made in stores using an Apple smartphone or Apple Watch (Gamble, 2015). Customers may make purchases in a matter of seconds by holding down the Touch ID button on their iPhone or Apple Watch while they place it over the store's payment scanner (Seitz, 2014.)

Google's Android Pay is a mobile payment system compatible with Android 4.4 and later. Similar to Apple Pay, this software makes use of near-field communication (NFC) technology to let customers pay for their goods by just unlocking their phones and holding them near a payment scanner. With a purchase of 30 GBP, however, the buyer won't need to unlock the phone to complete the payment. Only users in the United States and the United Kingdom may use Android Pay at this time (Lora, 2016.)

Samsung Pay is a new payment platform that allows users to pay for items by waving their compatible Galaxy mobile in front of a payment scanner. This feature is currently only available on the Galaxy S6, S6 edge, and Galaxy S7. Samsung Pay, in contrast to Apple Pay and Android Pay, provides a unique mobile wallet technology called Magnetic Strip Technology (MST) that enables the payment to be conducted using terminals that do not support NFC. In contrast, Samsung Pay is compatible with approximately 30 million merchant locations all over the globe, allowing it to cover a large number of payment terminals (Cyprian, 2015.)

To facilitate network-based payments, cell phones have emerged as a valuable tool, and in the not-too-distant future, further enhancements are likely to enable them to fully replace credit cards and cash in all payment transactions, paving the way for the creation of a cashless society for the next generation.

Crypto currency

According to Maese (2016), crypto currency is a digital currency that facilitates electronic payments and transfers of funds between users on the internet. Bitcoin, a prototypical

digital currency that emerged in 2009, enables buyers and sellers to transact with one another through the exchange of Bitcoins (Carrick, 2016). Bitcoin is decentralized and operates without the need for a central authority or third party to process transactions (Bitcoin, 2014). Since Bitcoin transactions often incur no or extremely little fees, it benefits users to use it for everyday purchases.

Franco (2014) argues that employing a digital currency has the added benefit of lowering the country's vulnerability to collapse and inflation. Inflation is a global problem that has become more pressing since the value of currencies throughout the world has been steadily declining for years. Because governments keep printing more money (Franco 2014), this is happening. Bitcoin's restricted supply and digital nature make it ideal for mitigating the inflationary threat. There can never be more than 21 million Bitcoins in circulation, and that number will only decrease with time (Franco, 2014). The danger of Bitcoin's collapse is minimal since it is a decentralised, worldwide virtual money that is unaffected by national regulation (Carrick, 2016).

Bitcoin users also benefit from increased security, ease of use, speed, and efficiency while making financial transactions. When compared to PayPal, which allows the buyer to request a refund at any time, Bitcoin is a preferable alternative for sellers since once the seller has received payment; the customer cannot request a refund. Bitcoin's P2P payment architecture eliminates the need for banks and other middlemen, making transactions easier and faster for the buyer. (Carrick, 2016.)

Blockchain

Blockchain, a data format that enables users to construct a digital record for their transactions and distribute it widely via a distribution network of computers, has had the greatest impact on international financial transactions in recent years. Using blockchain technology, we may securely alter the ledger without relying on third-party verification services. It is also very difficult, if not impossible, to alter or add to data that has already

been recorded in the blockchain ledger. This is because the programme will quickly run a series of algorithms to assess the validity of the proposed transaction and transmit the results to all parties using the software if someone wishes to add new information to the blockchain ledger.

In addition, a transaction is considered genuine on the blockchain only if the majority of the participants in the transaction click the agree button. Instead of keeping a private database of records as conventional banks do, block-chain typically records all actions and makes the records public to any person that is utilising this software. Instead of relying on third-party intermediate organizations, blockchain acts as one itself, serving as a reliable go-between for all transaction participants. Thus, the blockchain software will make financial transactions more efficient, convenient, and inexpensive compared to the present banking system (Scheibach, 2016.)

2.15.3 Investment and Saving

Crowdfunding

In addition to improvements in lending and payment, financial technology has enabled a variety of new breakthroughs in investment methods. The growth of crowdfunding is one of the most game-changing events of the last several years. "Users are able to mobilise funds from various individuals including family, friends, customers, and investors through social media and social networking sites by lending money and/or purchasing stakes in projects or businesses" (Conrad, 2012) describes crowdfunding, also known as online peer-to-peer fundraising. Crowdfunding sites let people buy and sell ideas or products quickly and readily to a big group of people while also receiving constructive criticism from that group (Augustine, 2015).

In reality, it would be very difficult for new businesses to get the necessary funding to develop their ideas and bring them to life in a market with so many existing rivals. Crowdfunding is the best and most cost-effective option for these businesses because it not only

provides a channel for them to market their ideas, but also helps to limit the expense they would incur in hiring a support company in the background, such as FinLeap (Conrad, 2012). Crowdfunding, on the other hand, is a reliable source of financing for new businesses since it does not restrict the number of ventures that investors may back at once (Augustine, 2015). As a result, businesses may efficiently and rapidly attract capital from the market's many investors.

Kickstarter is the largest and most well-known crowdfunding site for creative projects in many different fields, including but not limited to cinema, music, art, design, technology, etc. Crowdfunding platforms like Kickstarter are important because they allow people to directly contribute to the realization of creative ideas and initiatives. If you're looking to get in on the ground floor of the most popular crowdfunding site, look no further than Kickstarter. This is due to the fact that since its inception, it has assisted in the funding of over 100,000 creative projects, raised over \$2 billion USD from over 11 million individuals, and attracts an estimated 5.5 million visits monthly. In particular, the most innovative musical and technological initiatives might get funding of up to 10 million US dollars (Bose, 2013.)

Indiegogo is another popular crowdfunding platform where individuals may get financial backing for their ideas and projects, much like Kickstarter. Indiegogo, on the other hand, doesn't only focus on encouraging creative ideas; it covers a broad variety of project categories and, in particular, permits the crowd sourcing of money for nonprofits and new enterprises. It's built on a reward structure, therefore people need to provide incentives for others to participate and invest in their initiatives. The primary benefit of this platform is that it gives users greater leeway in deciding whether to set variable or fixed fundraising targets for their projects. To provide an example, if a project has flexible objectives, the creators get to retain the money the public pledged for it regardless of whether or not the initiative was successful. If a project fails to meet its funding target, it must nevertheless provide its supporters with the promised benefits. In contrast, if they choose predetermined

targets, they will only receive the money if their initiatives successfully complete their objectives before the deadline. Additionally, Indiegogo requires fees from creators in any case, including 4% of the money collected if the projects accomplish the objectives or 9% of the cash raised if the projects do not reach the goals (Taylor, 2013.)

People may use GoFundMe, the popular personal online crowdfunding platform, to collect money for a wide range of reasons, from planning special occasions to covering unexpected costs like medical bills or tuition. The website connects to social media like Facebook and Twitter to make it simpler for activists to reach out to their networks and ask for financial support. GoFundMe's campaigns are under no need to provide prizes for their contributors, unlike those on Indiegogo and Kickstarter; nevertheless, if they do so, they should follow through even if they fall short of their funding target. Additionally, regardless of whether or not the campaigns reach their objectives, GoFundMe enables them to retain all the sponsored monies (Garland, 2016.)

RocketHub is an online fundraising platform that prioritizes money for ideas or initiatives in four key fields: the arts, the economy, the sciences, and the social sciences. Since it is not an all-or-nothing concept like Kickstarter, users of this crowdfunding site get to retain whatever money they raise from investors or donations regardless of whether or not their projects succeed. RocketHub charges its users a 4% success fee, an 8% failure cost, and a 4% processing fee for all credit card transactions. The site's links and cooperation with A&E_, an American media company that owns a large group of television channels in the US, are one of its selling points because they allow them to provide a one-of-a-kind experience, more opportunities to raise funds, and a broader network of partners, investors, and donors (Taylor, 2013.)

Crowd funding is a powerful tool for validating ideas, testing projects, gathering opinions, marketing products, finding potential customers, and attracting investors; in short, it is a great way to help inventors, startups, and businesses finance their projects. Numerous

crowd fundraising platforms are already accessible online. This means that users need to do research on the many options available to them before settling on a platform for their projects. Moreover, the secret to success with crowdfunding platforms is for individuals to strive to attract as many investors as possible to acquire the amount of money required for a set time before really executing their initiatives to limit the undesired risks happening.

Investment in retail is likewise going through a period of innovation at the moment, with a focus on cutting down on consumers' transaction costs while simultaneously increasing their exposure to cutting-edge technologies. Investment in cyber security, the cloud, and even 3-D printing are all viable options because to Motif, as Lander (2016) explains. In addition, Kapitall works to foster an environment where traders can talk to one another, exchange insights, and put their theories to the test through a simulated cash portfolio (Neuman, 2015).

New budgeting apps

The widespread use and impressive capabilities of smart phones have inspired a surge of innovative financial technology (Fintech) apps that aim to improve young people's dismal savings rates (Maurer, 2015). In recent years, Fintech firms have developed an array of budgeting apps that enable users to better manage their day-to-day finances and put personal savings into action with minimal oversight or tinkering (Maurer, 2015). There are two main types of financial planning apps:

Virtual Savings Jars:: The purpose of this programme is to help people save money in a methodical and efficient manner so that they may reach their financial objectives. This system makes use of cutting-edge software to keep tabs on earnings, classify outgoing funds as either fixed or variable, and instantly reflect any and all monetary changes so that customers always know how much discretionary spending money they have available. The platform's ability to tailor savings strategies to individual users' circumstances and objectives is a key differentiator. After linking to a user's bank account or credit card, for

instance, the website will organize all of the user's transactions and the balance in their current accounts into four primary buckets: income, bills, savings, and spending money. Users must tell the site how much they earn, how much they spend each month, and how much they want to save over a certain time frame (one month, three months, six months, or a year). When customers set a savings goal, the site will automatically transfer that amount from their discretionary funds into their online savings accounts. After crunching the statistics, it also shows users their "Spendable," or the amount of disposable income they have each day or month based on their savings goals. At the conclusion of each month, any unused funds will be moved to savings accounts automatically (Augustine, 2015.)

An excellent case in point is Level Money. It's a free software that helps you keep track of your finances and see how much discretionary spending money you have left each day or month, so you never have to use a paper budget again. For instance, rather than requiring users to spend time monitoring their finances every day and attempting to establish limitations on what they can and cannot afford to spend, Level Money removes these barriers to spending. Automatically updating the user's available balance after a purchase, salary deposit, or bill payment. The software then does the maths and tells them the precise amount they can spend each day without going over their savings limit and yet meet their goals. Digit, another popular budgeting tool, allows users to set up an automatic savings plan that works independent of their income. The Digit app helps its users identify ways to save money by analyzing their daily spending and income patterns and making recommendations based on that data. Every 2 or 3 days, for example, a modest amount is sent from the user's bank account to the safe digital saving account maintained by Digit, helping to instill the habit of saving in the user. Users' transfer amounts will fluctuate based on their own financial situation and spending patterns, but will never exceed what they are comfortably able to pay back. Maurer, 2015.)

Virtual Ledgers: Unlike digital piggy banks, this service may help customers save more by balancing out their cash flow. Even is a prominent example in this area since it helps

customers save money and protects them from the risk of their income fluctuating by analyzing their daily financial activities. Even first will determine the user's average paycheck and then deposit additional funds into the user's account to make up the difference (without interest or a due date) whenever the user's actual paycheck is less than the average. To repay the amount that Even provides him to make up for the gap in his paycheck, he must first earn more money than his average, and then just the excess would be deducted. Only those whose employers have paid for the app's subscription will not have to pay a dime. If not, it will cost its customers \$3 each week. (2015) Augustine.

In a nutshell, the primary goal of all online budgeting tools is to encourage and support users in savings by reinforcing beneficial behaviors and giving them more confidence in controlling their finances. The primary demographic for these apps is young individuals who either have modest financial requirements or struggle with budgeting and saving effectively. It's also a good fit for those whose incomes tend to fluctuate often, like seasonal laborers.

The automated portfolio management apps

Historically, investors have been wary of bank-provided portfolio management due to the hefty yearly fees (often between 1 and 3 percent) that come out of their investment returns (Maurer, 2015). New automated portfolio management software may be the answer to this issue in the current era of rapid digital industry growth.

After investors have supplied adequate information about their age and when they want to retire, financial technology firms utilize computerized algorithms to evaluate their risk profiles in automated portfolio management systems. The applications will then use the risk analysis data to decide how to best allocate and manage the investors' capital. The minimal costs and low minimum investments offered by portfolio management apps are two additional benefits that set them apart from the competition. For people without a sizable sum of money to invest with a bank or other fund management company, there are

alternative asset management systems like Acorns and Betterment. These investors often do not focus on the nitty-gritty of their investments and might avoid interacting with their financial advisors as a result. To assist people construct effective portfolios that are compatible with their existing assets and help execute efficient investments at a far lower cost than banks, automated portfolio management applications would be the best option(Augustine ,2015.)

One of the most significant innovations in the investment industry is the robot-advisor, which was developed to replace the old traditional methods taken by humans in order to save time and reduce workforce costs while also helping investors manage their portfolios more efficiently and at lower costs than banks, typically between 0.25 and 0.35% (Accenture). In addition, it is built on a collection of pre-programmed algorithms that handle the online asset management and automated investment advice functions for consumers in place of human advisors. To guide the client through the investing process. To begin using the robot-advisor's services, each client must first provide the robot with some basic information and complete a series of questions meant to determine the level of risk each client presents. After the risk assessment is complete, it constructs a portfolio of inexpensive exchange-traded funds (ETFs) that is both diversified and low-cost. The FTSE100 UK stock index is only one example of an underlying basket of assets that ETFs (exchange-traded funds) mimic in order to monitor performance. If the consumer is happy with the portfolio the robot has suggested and is ready to bear the risks associated with this investment, the robot will carry out the transaction. In addition, the robot-advisor will rebalance the customer's portfolio on a regular basis to account for market fluctuations. In conclusion, the robot-advisor is gaining popularity because it is cheaper than a financial adviser or a fund management company, and many customers favor a hands-off approach to long-term investing or the convenience of using their smart phones for everything (Business Insider, 2016.)

Affordable financial planning advice from an expert In tandem with the emergence of automated portfolio management apps, other Fintech companies have developed applications whose primary focus is on assisting customers who would benefit greatly from the assistance of financial experts in the form of more complex financial planning but who lack the resources to do so. Initial investors who want autonomy over their holdings are the applications' primary target audience.

LearnVest is an online platform for financial planning that provides access to certified financial advisors and guides individuals towards greater financial independence and independence from the market. Its stated goal is to facilitate users' monetary transactions at a minimal cost, in a convenient manner, and with an unbiased perspective. Therefore, the LearnVest app is free to all users; customers only pay a reasonable charge for the financial planning advice they get from LearnVest's experts. LearnVest's financial advising service costs around \$20 monthly, which is far less than the hundreds of dollars you would pay to meet with a typical financial counselor in person. LearnVest's advising service connects users with remote personal financial planners who may assist with setting spending, investing, and budgeting targets in accordance with the user's stated priorities. Then, the distant personal financial planners will provide guidance on goal-setting and planning in an effort to keep the clients on track. LearnVest is unlike other portfolio management applications in that users are responsible for manually establishing their own investment portfolios and allocating their own assets based on the guidance of the app's experts, rather than having these tasks performed automatically. This allows customers to keep tabs on their finances and make any adjustments as needed. (Nath, 2015.)

To help its users better manage their finances, Personal Capital serves as an investment advisory platform, offering online financial advisor and personal wealth management services. The app's features include tracking of spending and net worth, the creation of budgets and investment portfolios, and the management of cash flow. Users may see how their income compares to their outgoings via bar graphs and pie charts detailing their

spending patterns broken down by category. Users pay slightly more for Personal Capital Advisor than they would for similar apps like LearnVest, despite the fact that Personal Capital is able to offer much lower fees thanks to the use of automated software programmes. Wealth management fees, trading fees, and custody fees all play a significant role. Personal Capital's advisory service and the initial appointment with a financial adviser are free of charge, but only once customers have linked at least \$100,000 in assets to the service. Users older than 45 years old predominate among the app's demographic (Fontinelle, 2015.)

2.15.4 Personal Finance

With the help of large investments from financial technology firms, personal finance has made great strides in recent years. Companies in the financial technology sector (Fintechs) have set out to improve customers' financial lives by making them "smarter," "easier to manage," "more transparent," "more helpful," "more adaptable," and "more inexpensive" (Maurer, 2015).

According to Business Insider (2016), Mint.com is a popular website in the United States and Canada that offers free money management tools to users. This website provides a centralised location for the user to access all of their financial data and transactions in one convenient location. Specifically, Mint will initially inquire as to whether or not it may connect with all of the customer's bank accounts so that the user may see their whole financial picture. Then it would inform the users about their current financial status and their past financial activities. It keeps tabs on all of a user's account activity, analyses their credit, assists with budgeting based on their income and expenses, notifies them of forthcoming payments, and even offers recommendations for other, potentially more lucrative financial goods and services. Despite having access to a user's financial information, Mint has no authority over that money and can only see the account information. The app's only purpose is to serve as a daily budget tracker, so users need not be concerned (Fontinelle, 2015.)

On the other hand, the BillGuard app is a well-liked personal finance solution that has just emerged on the market. Instead of helping customers budget and monitor their spending, this service is only focused on protecting their financial information by scanning their credit and debit cards via a website or mobile app (Fontinelle, 2015). BillGuard displays a user's credit card activity for a specified time period, whether it be seven days, thirty days, ninety days, or all time (Greenfield, 2014). Then, BillGuard will determine how many transactions are safe and how many raise red flags, and provide that information back to the users. It will notify users of any suspicious activity on their credit card accounts (Groenfeldt, 2014). Its primary goal is to attempt to discover and eradicate the mistakes, undesired, or fraudulent payments, which is a significant restriction compared to Mint's comprehensive support services. Those who don't make a practice of regularly reviewing their credit card transactions may find this fraud prevention software to be their best alternative.

HelloWallet is another choice for helping you keep track of your personal finances, and it's a serious contender to Mint.com. Developed in the United States specifically to assist users in making informed financial decisions so they may achieve their primary objectives (Sharf, 2015), this programme is accessible through computer or mobile device. With client satisfaction as its first priority, the company has been working to set itself apart from the competition by expanding the variety of services it provides to consumers. Among HelloWallet's many features is a "personal bank shopper service" that searches across 130,000 bank products to find lower rates and "unique financial strategies" for each user. Its goal is to go beyond simple financial tracking to give users a more holistic picture of their financial situation by providing them with daily advice on topics like adjusting spending to meet savings goals and keeping wallets in good shape. By letting the app know the user's position through the GPS service, the app can keep track of the user's spending and let them know how much money they have left to spend at each establishment (Anonymous, 2010). According to Anonymous (2010), HelloWallet can analyze a user's

financial history and daily habits to help them better their financial situations and avoid unnecessary costs, as well as identify potential threats to their financial security and opportunities for savings.

Moreover, whereas the aforementioned three platforms offer to a wide range of clients from students to adults, PlayMoolah is an online form of financing aimed squarely at children aged 6 to 12. PlayMoolah's goal is to facilitate open dialogue about financial matters between kids and their parents in a lighthearted and positive setting. Through the development of technological goods based on real saving behaviors, PlayMoolah imparts financial literacy, education, and instructions on how to handle money to youngsters. The goal of the programme is to teach children as young as possible the five pillars of sound financial management—earning, spending, saving, donating, and investing—through a series of engaging and interactive games. Children aged 6 and above are welcome to join PlayMoolah as paying members for an annual fee of about \$70 USD (Kosta, 2012.)

2.16 CHANGES IN CUSTOMER SEGMENTS DUE TO FINANCIAL INNOVATIONS

After the 2008 financial crisis hit the globe, fintech stepped in to give the banking sector a whole new look (The Economist, 2015). Not only has it led to beneficial changes and improvements in business, but it has also revolutionized the way individuals manage their finances. Consumers, in particular, gain the most from the burgeoning Fintech sector (Rometty, 2016).

2.16.1 Using digital banks

Traditional banks have, of course, maintained their status as the industry standard (Salmony, 2014). However, the phenomenal development of technology as of late has led to a gradual transition of the global economy to digital channels (The Economist, 2015). Therefore, for economic success and market adaptation, all sectors must initiate

fundamental shifts. To make a deposit, transmit money, make a payment, or invest money, clients had to physically visit a bank and interact with a teller in person (Landers, 2016). Customers had to put in a lot of extra time and effort, and the business had to pay more for each transaction because of this method. As technology has advanced, banks have been able to create cutting-edge online banking platforms, which have provided a partial solution to earlier issues while also providing additional advantages to users.

Online banking systems have made it possible for customers to conduct their financial transactions without having to stand in queue at a physical bank, saving them time and effort. In reality, the internet banking system can fulfill the majority of a traditional bank's functions, including account creation, investing, money transfer, and payment processing (Landers, 2016). A smartphone or computer with an internet connection enables users to do routine financial activities at any time and from any location for a fraction of the expense of using a bank's in-person service (PR Newswire, 2016).

2.16.2 Making payments through the smart phones

Consumers in today's fast-paced culture are continuously looking for methods to streamline their regular financial dealings while maintaining a high degree of security. Recent years have seen many good developments in the manner of payment for customers in financial transactions as many nations have begun switching to non-cash transactions (Desai, 2015). Debit cards and credit cards are two of the most used cashless payment options. Many customers find that using a credit card for purchases makes them happy, despite the fact that they are constantly subject to the banks' authority. In contrast, the 2008 global financial crisis exposed the unsavoury side of conventional banks, including their dishonesty and hollow promises. The fact that credit card users still have to keep many cards in their wallets and pull them out to make purchases and pay payments means that the method does not appeal to minimalists. That's why many people are holding out for a new kind of financial product that will maximize their advantages while also satisfying the age of industrialization's pressing demands (Kuznetsov, 2016.)

The Fintech industry has created a new payment method known as the "Mobile Wallet" in response to consumer demand for streamlined, convenient financial transactions (Seitz, 2014). Because smart phones are a linked instrument for storing users' financial information and replacing physical credit cards and cash for making the users' daily payments (Parker, 2016), they will play a crucial part in this innovation. Apple Pay, Google Wallet, and Samsung Pay are some examples of mobile wallets now on the market. In order to utilize these apps, customers must first scan their credit or debit cards into the app and store that information in the system; then, they may make purchases more quickly and easily by opening their phone and placing it over the business's NFC scanner (Molvig, 2012). Users may save time by not having to search for their wallets, and they can feel more comfortable knowing that their money and cards are safe while using a mobile wallet. As the FinTech sector works towards its long-term objective of making the transition to a cashless society, it is likely that mobile payment services will continue to evolve and grow in the near future (Anonymous, 2014).

2.16.3 Borrowing money from peers

Customers with bad credit ratings or no collateral assets find it very difficult to borrow money from banks after financial institutions and banks suffered large losses during the global economic crisis of 2008 (Kuznetsov, 2016). Moreover, as banks seek to assure the borrowers' affordability, the processes for borrowing money grow more complicated and onerous (Lending Club, 2014). As a result, getting a loan from a bank has become quite challenging.

Peer-to-peer (P2P) online lending was quickly developed to capitalize on this trend and suit the demands of the expanding online lending market. With Peer to Peer lending, borrowers don't have to go through the hassle of traditional banking institutions to get the loans they need from people they know and trust, such friends, family, and coworkers. When compared to traditional bank loans, P2P's cheaper interest rates and quicker

approvals help clients save both time and money. First and foremost, it's a fantastic concept for helping those who could really use some financial support but just can't seem to get a bank loan (Malik & Iyengar, 2015)

Personal business novices, especially those with little to no business experience, poor credit, and no collateral, have a number of options for borrowing short-term funds in a straightforward, quick, and paperless manner, including OnDeck Capital, Kabbage, and PayPal Working Capital. The user may apply for a loan online by filling out a short form, answering some basic questions, and specifying the desired loan amount. He might expect the modest loan approvals to arrive in his inbox within minutes. While the maximum loan amount is different for every service, some websites enable users to borrow up to \$500,000 USD. Customers don't have to go through the hassle of applying for and waiting for a bank loan any longer (Prakash, 2016.)

2.16.4 Performing online international transfers

There used to be just two main options for sending money internationally: bank transfer or remittance company. Customers had to pay exorbitant transaction fees and wait several business days before the funds showed up in the accounts of the recipients, regardless of which option they chose. For instance, in the past customers making foreign transfers had to physically visit their bank and spend about £30 to make a payment of as low as £10 in a British bank (Anonymous, 2014). It took at least a few days for the recipients to get the money through the bank, despite the high fees. While others preferred the convenience of using a money transfer service, such as Western Union or MoneyGram, both of which were well-known for their ability to send money practically anywhere in the globe. If the recipients don't have bank accounts and the clients require physical cash right once, the transfer operator service is an excellent choice. The recipients, however, ran the danger of having their money taken along with their wallets. Currency conversion rates offered by money transfer services were consistently lower than the going market rate, and the fees associated with international delivery often exceeded 5% of the transfer amount (Independent, 2015.)

WorldRemit, Azimo, PayPal, and TransferWise are just a few examples of the many new international money transfer services that Fintech companies have made available to customers via the internet at lower costs and in less time than their predecessors (Independent, 2015). Customers with PayPal accounts, for instance, may send money to anybody in the globe by simply entering the recipients' email addresses and the desired transfer amount. Within minutes, the money will be available in the recipient's PayPal account (Looper, 2016). In addition, utilising a computer, smartphone, or tablet, customers of WorldRemit or Azimo may quickly and easily transfer funds to loved ones overseas. The main benefits of these online services are their inexpensive prices compared to rivals and the ability to preview costs before committing to a purchase (Smale, 2014). As a result, sending money internationally will never be as easy as it is right now.

2.17 CUSTOMER ADOPTION OF INNOVATIVE TECHNOLOGIES

In his research, Ziqi Liao (2002) analyzed how "consumers" felt about the benefits of online retail banking. Because of its central location and well established infrastructure, Singapore was chosen for the survey because its low physical and tele-communication expenses made it possible to clearly see the contrasts between conventional retail banking and Internet-based banking. According to the findings, the most crucial quality factors behind perceived utility are accuracy, security, network speed, user friendliness, user participation, and convenience. To assess the interdependencies or marginal rates of substitution between them, regression found that desire to use was substantially dependent on the first five components. As well as potentially being valuable for development, planning, and marketing, our findings highlight the role of demand-side shifts in understanding the current slowdown in Internet e-

retail banking.

Chi (2007) in his paper examined the popularity of Internet banking among Hong Kong's general public. Examining (i) the current adoption rate of Internet Banking; (ii) the influences of perceived usefulness, perceived ease of use, perceived risk, and personal innovativeness in IT; and (iii) the potential impacts on the strategic activity of banking organizations operating in the Hong Kong market, this study aims to make sense of Internet Banking in Hong Kong. The Technology Acceptance Model served as the foundation for the development of the research constructs, which also included measures of individual inventiveness and risk tolerance. Using the t-test and the Pearson's correlation, we put our hypotheses to the test. Internet banking usage was shown to be positively correlated with a few other variables, suggesting that there is room for improvement in the financial services industry's approach to tailoring its offerings to the specific needs and preferences of the Hong Kong consumer base.

Lin (2011) investigates the impact of innovation attributes (perceived relative advantage, ease of use, and compatibility) and knowledge-based trust (perceived competence, benevolence, and integrity) on prospective and current mobile banking customers' attitudes toward and intentions for using the service. This study used a structural equation modeling strategy to explore the research model based on survey data from 368 individuals (177 prospective consumers and 191 current customers). According to the findings, a person's attitude greatly affects their behavioral intention to embrace (or continue using) mobile banking, which is in turn heavily influenced by their perception of the relative benefit, simplicity of use, compatibility, competency, and integrity of mobile banking. Furthermore, multigroup analysis using t-statistics revealed that the antecedents of attitude toward mobile banking vary across prospective and existing clients. We examine the consequences for research and practice, as well as potential future research avenues.

Mohammed(2013) analyzed the replies of 450 consumers in Lucknow, Kanpur, and Varanasi, three districts in the Indian state of Uttar Pradesh, to a structured questionnaire

on the variables impacting the customers' desire for EBanking services. Principal component extraction using Varimax rotation yielded four components that accounted for 62.84 percent of the variation in the data. Customers place a high value on a number of different aspects of their banking experience, including the environment and infrastructure, the technology and innovation, the services and security, and the customer support and timeliness. Banks may use this as a starting point for developing new, high-demand services. Delafrooz's (2013) research on the reasons that drive people to use online banking divides them into two categories: novel Trust based on features and information. Characteristics of novelty consist of: perceived usefulness Perceived competence, compassion, and truth are the three components that round out the perceived ease, perceived appropriateness, and knowledge-based trust. The researchers in this study used a multi-staged sampling strategy based on clusters. After questionnaire data collecting, we employed path analysis, structural equation modeling, and the LISREL statistical package to analyze the results. The outcomes of the tests conducted on the hypotheses were as follows: Confirmed is the influence of perceived utility on consumers' attitude toward acceptance of Internet banking, but the impact of perceived easiness was disproved. There was a verified influence of perceived appropriateness on consumer attitudes about accepting Internet banking, but there was no effect of perceived competence. There was no confirmation of a positive attitude impact on consumers' behavioral intentions toward Internet banking, but there was confirmation of a positive attitude effect on customers' perceptions of accuracy.

2.18 REVIEW OF RECENT LITERATURE

The paper titled "Do financial innovations improve financial inclusion? Evidence from Mobile Money Adoption in Africa" by Désiré Avoma, Chrysost Bangakéb+, and Hermann Ndoya in 2023 explores the impact of mobile money adoption on financial inclusion across 50 African countries from 2004 to 2020. The research employs both parametric and non-parametric methods, particularly focusing on Propensity Score Matching (PSM) to assess

the impact. The study uses a variety of matching algorithms to ensure robustness and also conducts heterogeneous treatment effect analysis and dynamic panel regressions using the Generalized Method of Moments (GMM) to address endogeneity issues. The analysis reveals that Mobile adoption positively affects financial inclusion, increasing it by approximately 12-14%. This effect is attributed to MoMo's ability to reduce financial barriers such as cost, distance, and information asymmetry, making financial services more accessible to the underserved population. The results hold steady across various robustness checks, including alternative measures of financial inclusion and different samples. In summary, the findings underscore the significant role of financial innovations, particularly mobile money, in enhancing financial inclusion in Africa, suggesting that policies promoting such innovations could foster more inclusive economic growth.

The paper titled "Mobile banking: A New Banking Model - An Empirical Investigation of Financial Innovation" by Tarak Nath Sahu and Sudarshan Maity (2023) I *International Journal of Business Innovation and Research*. The study explores the role of technology-based mobile banking services in enhancing financial inclusion in India, covering the period from 2010-2011 to 2019-2020. The research employs a multiple regression model to identify key factors influencing mobile banking transactions, such as mobile connections, literacy rate, and GDP. Additionally, a bivariate regression analysis is conducted to assess the impact of mobile banking on financial inclusion. The study uses a comprehensive dataset sourced from various reports of the Reserve Bank of India (RBI) and the Telecom Regulatory Authority of India (TRAI), among others. The analysis reveals that mobile connections, literacy rate, and GDP significantly impact mobile banking transactions, which in turn play a crucial role in financial inclusion. The study also finds no significant difference between public and private sector banks in implementing mobile banking, suggesting that both bank groups are effectively contributing to the expansion of mobile banking services in India. The findings highlight the potential of mobile banking as a tool for achieving financial inclusion, especially in areas where traditional banking infrastructure is limited.

The paper titled "Does Financial Innovation Foster Financial Inclusion in the Arab World?"

Examining the Nexus between Financial Innovation, FDI, Remittances, Trade Openness, and Gross Capital Formation" by Md. Qamruzzaman was published in June 2023. The study investigates the impact of financial innovation on financial inclusion in 22 Arab countries from 2004 to 2020. It uses various econometric methods, including the Nonlinear Autoregressive Distributed Lag (NARDL) model and system Generalized Method of Moments (GMM), to explore the relationships between financial innovation, foreign direct investment (FDI), trade openness, remittances, and gross capital formation. The research

finds that financial innovation significantly enhances financial inclusion, as it facilitates the integration of unbanked populations into formal financial systems. The study also reveals mixed effects of FDI on financial inclusion, suggesting that while FDI can promote financial inclusion, its impact varies depending on the econometric model used. Trade openness and remittances also play important roles, with trade openness showing a positive impact on financial inclusion. In summary, the paper concludes that financial innovation, supported by appropriate policy frameworks, can significantly improve financial inclusion in the Arab world, contributing to broader economic growth and development.

The paper titled *"Does Digital Financial Innovation Enhance Financial Deepening and Growth in Kenya?"* was authored by Roseline Misati, Jared Osoro, Maureen Odongo, and Farida Abdul, and published in 2022. The research investigates the impact of digital financial innovation on financial depth and economic growth in Kenya. The authors employ the Autoregressive Distributed Lag (ARDL) model, which is well-suited for time series data with variables of different integration orders and small sample sizes. The analysis reveals a significant positive relationship between digital financial innovation and financial depth, particularly driven by the usage of the Internet and mobile financial services. Additionally, the study finds that financial depth positively influences economic growth, supporting the supply-leading finance theory. However, traditional banking channels like bank branches had a minimal impact. The findings suggest that digital financial innovations, especially those that increase financial inclusion, are crucial for economic growth in Kenya. The paper emphasizes the need for investments in digital infrastructure to support these innovations and highlights the potential risks of financial

exclusion due to high costs and limited access to digital devices. The study is particularly valuable for policymakers in designing strategies that leverage digital financial innovations to enhance economic growth.

The paper titled "Financial Innovation Characteristics and Banking Performance: The Mediating Effect of Risk Management" was authored by Rim Zouari-Hadiji and published

in 2021. The study aims to explore how different characteristics of financial innovation—specifically risk level, innovation horizon, and specificity—affect banking performance in Tunisia, with a particular focus on the mediating role of risk management. Using a sample of seven privately-owned Tunisian banks over a period from 2009 to 2018, the research employs hierarchical multiple regression analysis to examine the relationships between the variables. The analysis reveals that risk management plays a crucial mediating role between financial innovation characteristics and banking performance. Specifically, financial innovations that are riskier, have a long-term horizon, or are highly specific positively impact banking performance, but this impact is significantly influenced by how well risks are managed. The study concludes that Tunisian banks that effectively manage the risks associated with financial innovations tend to perform better. The findings suggest that banks should focus on enhancing their risk management practices to fully benefit from financial innovations, ultimately improving their overall performance.

The paper titled "The Study and Overview of FinTech's Impacts on the Risk-Taking of the Traditional Bank Industry" was authored by Anqi Huang and Dawei Tan, and published in 2024 in *Theoretical Economics Letters*. The study explores the influence of FinTech on risk-taking behavior in traditional banking, utilizing a literature review method to analyze existing research on the subject. The research examines the ways FinTech, driven by innovations such as AI, big data, and blockchain, affects the risk landscape of traditional banks. The paper categorizes risks into five types: technical, operational, legal, credit, and systemic risks. It further explores how FinTech reshapes risk-taking behaviors, reducing information asymmetry and improving risk management capabilities. However, it also highlights that FinTech introduces new risks, including technological vulnerabilities and

challenges in financial regulation. The main finding of the study is that while FinTech generally enhances banks' ability to manage risks and reduces their overall risk exposure, it also presents new complexities and risks that need to be managed. The study emphasizes that banks must improve their risk management frameworks to leverage the benefits of FinTech while mitigating its potential downsides.

The paper titled "The Influence of Financial Innovations on EU Countries Banking Systems Development" was authored by Oleksiy Druhov, Vira Druhova, and Olena Pakhnenko. It was published in the *Marketing and Management of Innovations* journal, Issue 3, in 2019. The research focuses on the impact of financial innovations, particularly digitalization, on the banking systems of EU countries. The authors used a cluster analysis methodology, analyzing various indicators of digitalization, financial sector development, and IT utilization across different European countries. The study's findings revealed a direct correlation between the level of digitalization in banking activities and the economic development of a country. Countries with higher economic development demonstrated greater digitalization and are likely to lead in the European banking services market. The paper also highlighted the challenges banks face in integrating financial innovations, noting the associated risks, especially concerning cyber security and the regulation of financial transactions. The research provides valuable insights for policymakers, banking institutions, and users of banking services regarding the future of banking in the digital era. The paper provides an in-depth analysis of how financial innovations, particularly digitalization, are reshaping the banking landscape in the European Union. The authors conducted a comprehensive empirical study using cluster analysis to categorize EU countries based on their level of banking digitalization. They found that more economically developed countries exhibit higher levels of digitalization, leading to a competitive edge in the banking sector. The study also discusses the significant risks associated with adopting financial innovations, such as cyber security concerns and regulatory challenges, emphasizing the need for robust risk management strategies in the rapidly evolving financial landscape.

The paper titled "Do Institutional Quality, Innovation, and Technologies Promote Financial

Market Development?" was authored by Muhammad As if Khan, Domicián Máté, Mohamued Elyas Abdulahi, Rabeea Sadaf, Muhammad Atif Khan, József Popp, and Judit Oláh. It was published in the *European Journal of International Management*, Vol. 22, No. 3, in January 2024. The research investigates the impact of institutional quality, innovation, and technology on the development of financial markets across 22 emerging economies from 2006 to 2017. The study employs a dynamic Generalized Method of Moments (GMM) regression to analyze data sourced from the World Economic Forum's Global Competitiveness Index and the World Bank's Development Indicators. The findings indicate that robust institutions, coupled with technological innovation, significantly enhance financial market development. The interaction between institutional quality and technology adoption was found to be particularly crucial in driving financial progress. This study provides valuable insights for policymakers in emerging economies, emphasizing the need to strengthen institutional frameworks and encourage innovation to sustain long-term financial development.

The paper titled "Is Fintech Just an Innovation? Impact, Current Practices, and Policy Implications of Fintech Disruptions" was authored by Sabuj Saha, Prodip Chandra Bishwas, Urmi Das, and Ayesha Siddika Arshi. It was published in the *International Journal of Economics, Business, and Management Research*, Vol. 8, No. 04, in April 2024. This research examines the multifaceted impact of Fintech on the financial system, focusing on banking, financial inclusion, regulation, and sustainability. The authors employ a narrative literature review methodology, analyzing existing research and trends in Fintech. The findings highlight that Fintech has significantly transformed the banking landscape, enhancing accessibility and convenience while also introducing challenges such as cyber security risks and regulatory concerns. Fintech has been instrumental in promoting financial inclusion, particularly in underserved regions, by providing innovative financial services. The study also emphasizes the need for comprehensive regulatory frameworks to mitigate risks associated with unregulated Fintech activities. Furthermore, Fintech's role in encouraging sustainable finance through green investments and technologies is explored, underscoring its potential to drive positive environmental change. The paper calls for

balanced regulation that supports innovation while safeguarding consumer interests and maintaining financial stability.

The paper titled "FinTech Innovations and the Competitive Response of Financial Incumbents" by authors published in the *Journal of Financial Services Research* in 2024 examines how financial incumbents respond to competitive pressures from FinTech start-ups. The research employs a comprehensive dataset of FinTech patent applications from 2000 to 2016, sourced from PATSTAT Global and classified using machine learning techniques, such as BERT and CNN models, to analyze FinTech patents. The authors utilize an empirical methodology, particularly a linear probability model (LPM), to estimate the effects of competition from start-ups on the innovation activities of financial incumbents. The study finds that increased FinTech innovation by non-financial start-ups leads to a corresponding rise in the innovation activities of financial incumbents. Specifically, a one standard deviation increase in the ratio of start-up patent applications to those of incumbents is associated with a 0.2% higher likelihood of incumbents applying for a FinTech patent. Additionally, the quality of start-up patents, measured by forward citations, further enhances the incumbents' innovative response, suggesting that financial incumbents are more likely to innovate when the external competitive threat is substantial and credible.

The paper titled "Unveiling Crypto currency Impact on Financial Markets and Traditional Banking Systems: Lessons for Sustainable Blockchain and Interdisciplinary Collaborations" by Umar Kayani and Fakhrul Hasan was published in the *Journal of Risk and Financial Management* in 2024. This study employs a qualitative secondary research methodology, focusing on synthesizing existing literature, empirical studies, industry reports, and policy documents to explore the effects of crypto currencies and blockchain technology on financial markets and traditional banking systems in the UK and USA. The research highlights that crypto currencies like Bitcoin and Ethereum have influenced market volatility and asset diversification strategies, presenting both opportunities and risks for traditional financial markets. The study also explores the adaptation strategies of conventional banks, such as collaborations with fintech startups and the development of

in-house crypto currency trading platforms. Additionally, the paper emphasizes the transformative potential of blockchain technology, particularly in decentralized finance (DeFi) and smart contracts, which could enhance financial transparency and efficiency. The authors conclude that a balanced regulatory approach is needed to foster innovation while ensuring consumer protection and financial stability, suggesting that international collaboration is crucial for managing the global implications of these emerging technologies.

The paper titled "Does FinTech Adoption Increase the Diffusion Rate of Digital Financial Inclusion? A Study of the Banking Industry Sector" by Mariem Aloulou, Rima Grati, Anas Ali Al-Qudah, and Manaf Al-Okaily was published in the *Journal of Financial Reporting and Accounting* in November 2023. This study uses a quantitative research approach, analyzing data collected from 260 banking authorities and administrators in the UAE. The researchers employed a survey methodology, utilizing structured questionnaires to gather insights into the impact of FinTech adoption on financial inclusion and economic growth. The study finds that the adoption of FinTech significantly enhances the competitiveness and performance of the UAE banking industry, especially during challenging periods such as the COVID-19 pandemic. The findings reveal that a well-aligned implementation of FinTech, combined with effective technology management, directly influences the performance and growth of the banking sector. Moreover, the research highlights that FinTech adoption contributes to greater digital financial inclusion, promoting economic growth by providing new financial products and services that cater to diverse stakeholders. This study underscores the need for continuous innovation and strategic management in leveraging FinTech to achieve sustainable growth in the financial sector.

The research paper titled "Financial Innovation and Economic Growth: Empirical Evidence from China, India, and Pakistan" is authored by Muhammad Rizwan Nazir, Yong Tan, and Muhammad Imran Nazir. It was published in the *International Journal of Finance & Economics* in 2021. The study explores the impact of financial innovation on economic growth in China, India, and Pakistan from 1970 to 2016. The researchers employed the

Autoregressive Distributed Lag (ARDL) model and Granger causality-based Error Correction Model (ECM) to examine the causal relationships between the variables. Key insights from the research suggest that financial innovation, represented by variables such as broad-to-narrow money (M2M1) and domestic credit to the private sector (DCP), positively influences economic growth in both the short and long run. The findings highlight the significant role of financial sector development in supporting innovation and driving economic growth in these Asian economies. The study also emphasizes the importance of monetary management and credit flow in promoting economic growth. In summary, the paper concludes that financial innovation is crucial for the economic development of China, India, and Pakistan, with robust evidence supporting its positive impact on growth. The research methodology and results provide valuable insights into the relationship between financial systems and economic performance in developing countries.

The research paper titled "The Emergence and Impact of Neo Banks: A Comprehensive Review," authored by Ashis Kashyap, was published in *Beyond Borders: Uniting Perspectives in Multidisciplinary Research* in 2023. The paper, delves into the rise of neo-banks and their transformative effect on the financial industry. The research employs a comprehensive review methodology, analyzing various studies and data sources to understand the implications of neo-banks on traditional banking models. Key insights reveal that neo-banks, leveraging advanced technology and customer-centric approaches, have disrupted conventional banking by offering more accessible, cost-effective, and personalized financial services. The review highlights how these digital-only banks have captured significant market share by addressing the limitations of traditional banks, such as high fees, cumbersome processes, and limited digital capabilities. In summary, the paper concludes that the rise of neo-banks signifies a shift in the financial landscape, where agility, innovation, and customer experience are paramount. The findings suggest that traditional banks must adapt by enhancing their digital offerings and embracing fintech innovations to remain competitive in the evolving market.

The paper titled "Financial Technology and the Future of Banking" is authored by Daniel Broby and published in *Financial Innovation* in 2021. The study presents an analytical framework that discusses the evolving nature of banking due to the impact of financial technology (Fintech) and the Internet. The research employs a theoretical approach, extending classical banking theories, such as Klein's (1971) theory of the banking firm, to explore how digital transformation is reshaping the banking industry. Key insights from the paper indicate that traditional banking models are increasingly challenged by digital-only banks and fintech innovations. The study highlights how advancements in digital technology are leading to new forms of financial intermediation, such as peer-to-peer lending and digital currencies, which are disrupting the conventional banking landscape. The paper also suggests that incumbent banks must adapt by embracing strategies like customer retention, banking as a service, and leveraging social media payment platforms. In summary, the paper concludes that the future of banking will be heavily influenced by technology, with trust remaining a central element. The findings provide a comprehensive overview of how fintech is likely to change the competitive dynamics and operational models within the banking sector.

The paper titled "Organizational readiness for digital financial innovation and financial resilience" is authored by Matloub Hussain and Avraam Papastathopoulos and was published in the *International Journal of Production Economics* in 2022. The study investigates how organizational readiness affects the adoption of digital financial innovations (DFIs) and the resulting impact on financial resilience. The study employs a quantitative research methodology, using organizational readiness and strategic alignment theories as the theoretical framework. Data were collected through surveys and analyzed using statistical methods to determine the relationships between organizational readiness, digital financial innovations, and financial resilience. The study identifies key dimensions of organizational readiness—change valence, change efficacy, and contextual factors—that influence the successful adoption of DFIs. The adoption of DFIs is crucial for enhancing financial resilience. DFIs enable firms to navigate financial shocks and maintain

operational stability, particularly in volatile environments. Contrary to expectations, the study found no significant moderation effect of digital technology-business strategy alignment on the relationship between organizational readiness and DFIs in the context of developing economies. The research concludes that organizational readiness, particularly in terms of resource, IT, and cognitive readiness, significantly influences the adoption of DFIs. These innovations, in turn, improve financial performance and resilience, enabling firms to withstand economic fluctuations and adapt to changes. However, the anticipated role of digital strategy as a moderating factor was not supported, suggesting that in developing economies, other factors may play a more critical role in realizing the benefits of DFIs. This study provides valuable insights for both practitioners and theorists, highlighting the importance of organizational preparedness in leveraging digital innovations for financial stability and growth.

The paper titled "The Impact of Fintech on the Future of Banking: A Literature Review and Research Agenda" is authored by Lars Hornuf and Milan Klus and published in the Journal of Banking and Finance in 2021. This study explores how fintech innovations are reshaping the banking sector, focusing on the challenges and opportunities presented by digital financial technologies. The study adopts a comprehensive literature review methodology, analyzing existing research on fintech's impact on banking. The authors categorize the literature into various themes such as financial intermediation, customer relationships, and regulatory challenges. They synthesize findings from multiple sources to propose a future research agenda. Fintech has significantly altered the traditional banking model by introducing innovative financial products and services that are more efficient and customer-centric. The rapid growth of fintech poses significant regulatory challenges, as existing frameworks are often inadequate to address the complexities of digital financial services. The authors suggest that future research should focus on the long-term impacts of fintech on financial stability, the evolving role of banks, and the regulatory adjustments needed to accommodate fintech innovations. The paper concludes that while fintech presents opportunities for enhancing financial inclusion and customer satisfaction,

it also challenges the traditional banking system. The authors highlight the need for a balanced approach that fosters innovation while ensuring financial stability and security. They call for further empirical research to understand the long-term implications of fintech on the global financial system.

The paper titled "Fintech Innovations in the Financial Service Industry" is authored by Mansurali Anifa, Swamynathan Ramakrishnan, Shanmugan Joghee, Sajal Kabiraj, and Malini Mittal Bishnoi and was published in the Journal of Risk and Financial Management in 2022. This paper examines the transformative impact of fintech innovations on the financial services industry, particularly in the areas of payments and financing. The study utilizes a systematic literature review approach, analyzing key scholarly articles published between 2014 and 2022. The research focuses on the theoretical constructs of fintech innovations and their implications for the financial services industry. The analysis covers various fintech applications, including payments, financing, asset management, and insurance, and explores the role of regulatory frameworks in shaping these innovations. Fintech has led to significant changes in traditional financial services by introducing more efficient, customer-centric models. The innovations have enabled better financial inclusivity and access, particularly in underserved markets. The study highlights the benefits of strategic alliances between fintech firms and traditional financial institutions. Collaborative efforts tend to enhance financial products, reduce operational costs, and improve customer retention. Regulatory frameworks play a critical role in ensuring a balanced and fair ecosystem for fintech innovations, helping to manage the risks associated with rapid technological changes. The study concludes that fintech innovations are driving significant changes in the financial services industry, leading to more inclusive, efficient, and accessible financial services. These innovations are not only transforming traditional financial models but also presenting new challenges in terms of regulation and risk management. The findings suggest that ongoing collaboration between fintech firms and traditional financial institutions, supported by appropriate regulatory measures, is essential for the sustainable growth of the industry.

The paper titled "Analysis of Financial Development and Open Innovation Oriented Fintech Potential for Emerging Economies Using an Integrated Decision-Making Approach of MF-X-DMA and Golden Cut Bipolar q-ROFSs" is authored by Alexey Mikhaylov, Hasan Dinçer, and Serhat Yüksel and published in Financial Innovation in 2023. This study explores the factors influencing financial development and the potential for open innovation-oriented fintech in seven emerging economies. The study employs a mixed-methods approach combining econometric models and fuzzy decision-making techniques. Specifically, the authors use the MF-X-DMA method to analyze financial development indicators from 2002 to 2020 and further validate their results using autocorrelation and heteroscedasticity tests. Additionally, they incorporate a novel fuzzy decision-making model, using the M-SWARA methodology with bipolar q-rung orthopair fuzzy sets (q-ROFSs) and the ELECTRE method to evaluate fintech potential across the selected emerging economies. The study identifies bank lending and equity market development as the key indicators driving financial development in emerging economies. These factors are essential for fostering fintech-driven open innovation. The integration of econometric methods with fuzzy decision-making provides a robust framework for assessing fintech potential, highlighting the importance of digitalization, AI, and machine learning as crucial drivers. Among the emerging economies analyzed, Mexico, India, and Turkey are identified as having the highest potential for fintech-driven open innovation, with Mexico leading due to its favorable financial development environment. The research concludes that enhancing financial development through targeted improvements in bank lending and equity market infrastructure is vital for unlocking the fintech potential in emerging economies. The hybrid decision-making approach demonstrates that digital transformation and AI are pivotal for achieving sustainable financial innovation. The study's results emphasize the need for continuous development of financial technologies, regulatory frameworks, and financial literacy to fully realize the benefits of fintech innovations.

The paper titled "Fintech Investments in European Banks: A Hybrid IT2 Fuzzy Multidimensional Decision-Making Approach" by Gang Kou, Özlem Olgu Akdeniz, Hasan Dinçer, and Serhat Yüksel was published in the journal *Financial Innovation* in 2021. The study employs a novel methodology using interval type-2 (IT2) fuzzy sets in a decision-making framework that integrates IT2 fuzzy DEMATEL, IT2 fuzzy TOPSIS, and VIKOR methods to evaluate Fintech investments in European banking services. The research identifies key determinants for Fintech investments, highlighting "competitive advantage" as the most crucial factor, followed by "cost management" and "customer satisfaction". The study also suggests that among Fintech-based investment alternatives, "payment and money transferring systems" are the most important for enhancing the financial performance of banks. Empirical findings are reinforced by a sensitivity analysis across six different cases to ensure consistency and reliability, demonstrating that the proposed hybrid model is robust and applicable. The paper concludes by recommending that European banks focus on payment and money transferring systems to reduce costs and increase customer satisfaction.

The paper titled "How Do Banks Interact with Fintech Startups?" by Lars Hornuf, Milan F. Klus, Todor S. Lohwasser, and Armin Schwienbacher was published in the journal *Small Business Economics* in 2021. The study employs a mixed-method research approach using hand-collected data from the largest banks in Canada, France, Germany, and the United Kingdom to analyze the various types of alliances formed between banks and fintech startups. The research finds that banks are more likely to form alliances with fintech's if they have a well-defined digital strategy or employ a Chief Digital Officer (CDO). The study reveals that banks often invest in smaller fintech startups while forming product-related collaborations with larger fintech firms. The findings suggest that such collaborations are driven by strategic goals, such as enhancing digital services or gaining a competitive advantage. Overall, the study highlights the increasing trend of alliances between traditional banks and fintech startups, driven by digitalization and the need for innovation. It concludes that banks can enhance their market value and competitive

positioning by engaging in strategic partnerships with fintech companies, especially in payment services and customer relationship management software.

The paper titled "Evolution of FinTech and Central Banks: A Text Mining-Based Survey" by Manu Sharma, Dirghau Keshao Raut, Shobhit Goel, and Madhuresh Kumar, published in the *RBI Bulletin* in August 2024, explores how central banks globally are responding to FinTech developments using a text mining-based survey approach. The authors employ natural language processing (NLP) techniques to analyze central bank communications, such as news articles, speeches, and interviews, focusing on key FinTech issues. The study reveals that central banks prioritize innovations and regulations concerning "payment systems," while "Central Bank Digital Currency (CBDC)" emerges as a central area of policy discussion. The findings suggest a shift in focus from technological concerns and financial implications to the modalities of CBDC implementation. The research also highlights several FinTech-related policy clusters, including cyber security, regulatory frameworks for technology and entities, CBDC policies, and crypto-asset regulation. The study provides a comprehensive overview of the evolving priorities of central banks in the rapidly developing FinTech landscape, suggesting that central banks are increasingly focusing on fostering innovation while ensuring financial stability and consumer protection. The findings underscore the significance of FinTech in shaping future financial policies and regulations.

The paper titled "Impact of Crypto currency on Traditional Banking Systems" was authored by Aghiad Adnan Al-Dandachi under the guidance of Professor Randa Sharafeddine and published in the *Journal of University Studies for Inclusive Research* in 2024. The study employs a mixed-methods research methodology, incorporating both quantitative surveys and qualitative interviews to analyze how crypto currencies impact traditional banking systems. Key insights include the challenges that crypto currencies pose to the established financial infrastructure, particularly in terms of regulatory ambiguity, security concerns, and the need for technological integration. The paper also highlights the

potential for crypto currencies to enhance financial inclusion, especially in under banked regions, and the evolving relationship between decentralized digital assets and traditional banking institutions. The findings suggest that while crypto currencies present significant challenges to traditional banks, they also offer opportunities for innovation and collaboration. The study concludes that traditional banks must adapt by incorporating crypto currency services and updating their technological frameworks to remain competitive in the rapidly evolving financial landscape.

The paper titled "The Transformative Impact of AI in Finance and Banking" by Davis Dorran Douglas was published in the *Journal of Investment Banking and Finance* in 2024. The research methodology involved an extensive literature review using databases like PubMed, Google Scholar, and Scopus to analyze AI's influence on the financial sector. Key insights from the paper highlight AI's role in revolutionizing customer experience, risk management, and operational efficiency. AI enhances customer support with chat bots, improves fraud detection with advanced algorithms, and refines credit scoring through machine learning. The paper also discusses the challenges of AI adoption, including legacy systems, data fragmentation, and the need for a responsible deployment strategy. The summary of findings emphasizes AI's potential to unlock up to \$1 trillion in value for banks through personalized services and automation. Despite challenges, the paper urges banks to adopt an AI-first mindset to stay competitive, innovate, and meet evolving customer needs. The study underscores the importance of regulatory frameworks to ensure ethical AI deployment in banking.

The paper titled "Fintech Disruption: Implications for Traditional Banking and Financial Institutions" was authored by Randy Hidayat and published in the *Management Studies and Business Journal (PRODUCTIVITY)* in 2024. The research utilizes a systematic literature review with the PRISMA approach, analyzing articles from reputable databases like Scopus and Web of Science. Key insights from the paper highlight how fintech, driven by technologies like AI, blockchain, and big data, is challenging traditional banking

models. The study finds that fintech improves operational efficiency and profitability for traditional banks but also brings challenges related to technology adoption and shifts in consumer behavior. The findings emphasize the need for traditional banks to develop adaptation strategies and update regulatory policies to support fintech innovation. The paper concludes that while fintech presents significant challenges to traditional banks, it also offers opportunities for collaboration and innovation, urging banks to embrace technological advancements to remain competitive in the evolving financial landscape.

2.19 Further Studies added:

Study Title	Authors	Journal	ISSN	Year	Key Finding
The interaction between financial, market and environmental components in the banking sector of the Serbia	Branimir Kalaš, Vera Mirović, Nataša Pavlović	BizInfo (2025)	2217-2769	2025	Green loans increase profitability without reducing returns in Serbian banks.
Environmental Sustainability and Climate Change: An Emerging Concern in Banking Sectors	Abdulazeez Y.H. Saif-Alyousfi, Turki Rashed Alshammari	Sustainability (2025)	2071-1050	2025	Green banking practices enhance environmental and financial sustainability.
Cybercrime Resilience in the Era of Advanced Technologies	Adeel Ali, Mahmood Shah, Monika Foster, Mansour Naser Alraja	Computers (2025)	2073-431X	2025	Developing country banks resist cyberattacks via reduced attack surface and legacy systems.
Deciphering Financial Strength: Evaluating Urban Cooperative Banks in India	Hemantha Kumara MG, Megha D. Shetty	IJMTSS (2025)	2581-6012	2025	CAMEL model highlights strengths and weaknesses of Indian UCBs for strategic growth.
BankNet: Real-	Kaushik	BDCC (2025)	2504-2289	2025	BiLSTM-driven

Time Big Data Analytics for Secure Internet Banking	Sathupadi, Sandesh Achar, Shyam Bhaskaran, Nuruzzaman Faruqui, Jia Uddin					BankNet achieves 98.5% accuracy in fraud detection for online banking.
Financial Innovations for Companies Offered by Banks: Polish Experience	Joanna Błach, Anna Doś, Maria Gorczyńska, Monika Wieczorek-Kosmala	WASET (2015)	IJEME	N/A	2015	Classifies financial innovations in Poland's banking system; banks support SMEs and corporate finance through innovation.
Rola innowacji finansowych w działalności banków komercyjnych	Sylwia Stachera-Włodarczyk	N/A (2015)		N/A	2015	Explores how financial innovation enhances competitiveness and customer service in Polish banks.
Financial Innovation in Banking	Francesca Arnaboldi, Bruno Rossignoli	Research Papers in Economics (2015)		N/A	2015	Explains how unchecked innovation contributed to the financial crisis; calls for balance and regulation.
Financial Innovation: The Bright and the Dark Sides	Thorsten Beck et al.	Social Science Research Network (2014)		N/A	2014	Links financial innovation to both economic growth and bank fragility depending on regulation.
A Study on Impact of Information Technological Innovation in Present Banking Scenario	S. Roopadarshini, S. Shilpa	Asia Pacific Journal of Management & Entrepreneurship Research (2014)		2277-8098	2014	Technological innovation reshapes Indian banking through automation and customer-centric services.
Financial	A. F. Egorov	Procedia		1877-0509	2022	Simulations

Innovation and Financial Risks		Computer Science (2022)			show innovation reduces risk through cost-cutting; demand-stimulating innovations boost income but reduce equity share. Highlights global innovations and classifies financial innovation across service, product, channel, and process dimensions. Examines opportunities and risks in AI-driven banking; emphasizes the rise of digital ecosystems. Assesses adoption levels of financial innovation in Moldova and Romania; stresses FinTech preparedness. Links innovation diffusion to long-term regional bank stability and competitive strength. ICT-driven financial innovation
World experience in the introduction of modern innovation and information technologies in the functioning of financial institutions	Olha Popelo, Maksym Dubyna, Nataliia Kholiavko	Baltic Journal of Economic Studies (2021)	2256-0742	2021	
Financial Innovations, Financial Engineering and Financial Technologies	Aleksei Bolonin, Igor B. Turuev, Vladimir Balykin	Research Papers in Economics (2021)	N/A	2021	
Financial Innovations, The Evaluation of Their Application in Southeastern Europe	Maia Pisaniuc	IJARME (2020)	N/A	2020	
Role of Innovations in Increase in Efficiency of Bank Activity	N.V. Puchkova	Conference Proceedings (2019)	N/A	2019	
Potential Impact of Financial	Marek Dabrowski	SSRN (2017)	N/A	2017	

Innovation on Financial Services and Monetary Policy					challenges financial business models but unlikely affects monetary policy operations.
FinTech as an innovative banking sector	Tadeusz Trębacz	Unspecified (2019)	N/A	2019	FinTech partnerships are reshaping bank service delivery models and customer interaction systems.
Innovative financial technologies as a factor of competitiveness in the banking	Marina Glushchenko, Naila Hodasevich, Natalia Kaufman	Conference Paper (2019)	N/A	2019	FinTech enhances client base expansion and competitiveness in banking through tech adoption.
Financial innovation in retail banking in South Africa	Ben Smit, Frederik J. Mostert, Jan Hendrik Mostert	Corporate Ownership and Control (2016)	1727-9232	2016	Identifies key pillars of innovation: product, organization, and delivery channel in retail banking.

2.20 Critical Analysis of Studies

Study Title	Authors	Year	Key Finding	Critical Analysis
Bank Innovations and Financial Performance in Kenya	Gichungu, Z.N. (2015)	2015	Bank innovations significantly influence financial performance of commercial banks.	The study uses a solid empirical base but is geographically limited to Kenya, making it less generalizable without cross-regional validation.
Technological Innovations on Banking Service Delivery in Nigeria	Ilo, J. V., Ani, W. U., & Chioke, N. S. (2014)	2014	ICT tools improve the efficiency and outreach of banking services.	Well-contextualized for Nigeria; could benefit from longitudinal analysis to understand sustained impacts.

Best Practices in Customer Services in Banks	Harish V. (2014)	2014	Customer-centric strategies enhance satisfaction in technologically upgraded banks.	Conceptually insightful, but needs stronger empirical methodology and clearer metrics.
Impact of Internet Banking on Bank Performance and Risk	Malhotra & Singh (2009)	2009	Internet banking has improved profitability but introduced new risks.	One of the earlier studies in the Indian context; now requires update given tech advancements post-2015.
The Impact of Fintech on the Future of Banking	Hornuf & Klus (2021)	2021	Fintech is reshaping traditional banking through customer-oriented technologies.	Provides a visionary outlook; lacks micro-level empirical validation.
Impact of e-banking services on bank profitability	Akhisar et al. (2015)	2015	POS terminals had a negative effect on profitability, while ATM and card services were positive.	This study robustly links tech-specific banking services to profitability outcomes. However, it is limited by a lack of context-specific behavioral analysis and temporal dynamics in usage trends.
E-Banking Acceptance in Jordan	Al-Smadi (2012)	2012	Customer reluctance due to fear of monetary loss was a key barrier.	An insightful user-focused study, though constrained by self-reported data and lacking longitudinal insight.
IT Adoption and Bank Efficiency in India	Bansal (2014)	2014	Efficiency improved in post-e-banking period compared to pre-period.	The study's regression-based approach is statistically sound, though better impact isolation could have enhanced clarity.
Types of Financial Innovations	Lariviere and Martin (1998), Finnerty (1988), Tufano (2002)	1998/1988/2002	Identifies institutional, process, and product innovation types.	This classification provides foundational clarity. However, its dated context demands validation in light of fintech-driven disruptions.
Product and Process Innovation Adoption	Damanpour and Gopalakrishnan (2001)	2001	High-performing banks adopt innovations more aggressively.	It offers strong empirical backing but might overrepresent the U.S. context, limiting global relevance.
Commercialization of Innovative Products	Lee et al. (2003)	2003	Innovative products perform better in commercialization	While multi-stage analysis is insightful, real-world business constraints aren't deeply discussed.

			n development phases.	
The interaction between financial, market and environmental components in the banking sector of the Serbia	Branimir Kalaš, Vera Mirović, Nataša Pavlović	2025	Green loans increase profitability without reducing returns in Serbian banks.	This study demonstrates the profitability of green loans, although its applicability outside Serbia remains uncertain.
Environmental Sustainability and Climate Change: An Emerging Concern in Banking Sectors	Abdulazeez Y.H. Saif-Alyousfi, Turki Rashed Alshammari	2025	Green banking practices enhance environmental and financial sustainability.	Highlights the dual benefit of green banking practices; however, regional differences in environmental policies may affect outcomes.
Cybercrime Resilience in the Era of Advanced Technologies	Adeel Ali, Mahmood Shah, Monika Foster, Mansour Naser Alraja	2025	Developing country banks resist cyberattacks via reduced attack surface and legacy systems.	Explores cybersecurity in developing economies, but reliance on legacy systems may <u>hinder long-term resilience</u> .
Deciphering Financial Strength: Evaluating Urban Cooperative Banks in India	Hemantha Kumara MG, Megha D. Shetty	2025	CAMEL model highlights strengths and weaknesses of Indian UCBs for strategic growth.	Provides insight into UCBs using CAMEL analysis; applicability depends on consistent data quality and <u>regulatory oversight</u> .
BankNet: Real-Time Big Data Analytics for Secure Internet Banking	Kaushik Sathupadi, Sandesh Achar, Shyam Bhaskaran, Nuruzzaman Faruqui, Jia Uddin	2025	BiLSTM-driven BankNet achieves 98.5% accuracy in fraud detection for online banking.	Demonstrates the power of AI in fraud detection, though real-world deployment and scalability are not validated.
Financial Innovations for Companies Offered by Banks: Polish Experience	Joanna Błach, Anna Doś, Maria Gorczyńska, Monika Wieczorek-Kosmala	2015	Classifies financial innovations in Poland's banking system; banks support SMEs and corporate finance through innovation.	Details Polish banks' support for SMEs, yet lacks a comparative framework with non-Polish systems
Rola innowacji finansowych w działalności	Sylwia Stachera-Włodarczyk	2015	Explores how financial innovation	Focuses on competitive benefits of innovation; results may not

banków komercyjnych			enhances competitiveness and customer service in Polish banks.	generalize beyond the commercial banking sector.
Financial Innovation in Banking	Francesca Arnaboldi, Bruno Rossignoli	2015	Explains how unchecked innovation contributed to the financial crisis; calls for balance and regulation.	Analyzes innovation's contribution to the 2008 crisis; calls for regulation are timely but <u>need more quantitative backing</u> .
Financial Innovation: The Bright and the Dark Sides	Thorsten Beck et al.	2014	Links financial innovation to both economic growth and bank fragility depending on regulation.	Points out innovation's double-edged nature; empirical depth could be enhanced for policy relevance.
A Study on Impact of Information Technological Innovation in Present Banking Scenario	S. Roopadarshini, S. Shilpa	2014	Technological innovation reshapes Indian banking through automation and customer-centric services.	Illustrates tech innovation's positive effects in India; broader banking ecosystem implications not fully covered
Financial Innovation and Financial Risks	A. F. Egorov	2022	Simulations show innovation reduces risk through cost-cutting; demand-stimulating innovations boost income but reduce equity share.	Simulation-based evidence on risk reduction is strong, but real-world evidence remains necessary.
World experience in the introduction of modern innovation and information technologies in the functioning of financial institutions	Olha Popelo, Maksym Dubyna, Nataliia Kholiavko	2021	Highlights global innovations and classifies financial innovation across service, product, channel, and process dimensions.	Presents a broad global overview; could benefit from case-specific details and performance metrics.
Financial Innovations, Financial Engineering and Financial	Aleksei Bolonin, Igor B. Turuev, Vladimir Balykin	2021	Examines opportunities and risks in AI-driven banking; emphasizes the	Examines AI in finance thoroughly, yet the long-term risks of digital ecosystems are not deeply explored.

Technologies			rise of digital ecosystems.	
Financial Innovations, The Evaluation of Their Application in Southeastern Europe	Maia Pisaniuc	2020	Assesses adoption levels of financial innovation in Moldova and Romania; stresses FinTech preparedness.	Regional focus provides valuable insight but is limited in scope to Moldova and Romania.
Role of Innovations in Increase in Efficiency of Bank Activity	N.V. Puchkova	2019	Links innovation diffusion to long-term regional bank stability and competitive strength.	Well links innovation diffusion to regional stability; long-term trends <u>need ongoing validation</u>
Potential Impact of Financial Innovation on Financial Services and Monetary Policy	Marek Dabrowski	2017	ICT-driven financial innovation challenges financial business models but unlikely affects monetary policy operations.	Focuses on business model disruptions without showing direct causal effects on monetary policy
FinTech as an innovative banking sector	Tadeusz Trębacz	2019	FinTech partnerships are reshaping bank service delivery models and customer interaction systems.	Illustrates fintech-bank collaborations well; however, lacks user-side adoption challenges.
Innovative financial technologies as a factor of competitiveness in the banking	Marina Glushchenko, Naila Hodasevich, Natalia Kaufman	2019	FinTech enhances client base expansion and competitiveness in banking through tech adoption.	Explores competitiveness via fintech; further research needed on cost-benefit balance
Financial innovation in retail banking in South Africa	Ben Smit, Frederik J. Mostert, Hendrik Mostert	2016	Identifies key pillars of innovation: product, organization, and delivery channel in retail banking.	Comprehensive view on South African retail innovation; comparison with other BRICS economies would enrich it.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 INTRODUCTION

The methods of data collection are the focus of this chapter. This often includes everything from the process's tactics and paradigms to its design and data collecting to its research methodology to its sampling parameters and analytic methods and tools. The study's overarching objective is to ascertain how innovations in the financial sector influence financial access, the development of new financial instruments, the expansion of the financial sector, and the economy at large. In addition, it will analyze the many post-liberalization financial innovations implemented in the Indian economy throughout the plan era. How financial innovations have contributed to the expansion of Indian banks is another area of focus.

3.2 RESEARCH PROCESS

In order to successfully complete a research project, it is necessary to follow a predetermined protocol (Bryman, 2015). This investigation has been broken down into small sections for speedy and accurate results. These are as follows:

- Recognizing the problem of the research
- Studying the previous pieces of literature on the similar topics
- Creating the variables for the research
- Creating the design for the research
- Underlining the research approach and the research paradigm for the study
- Collection of the data
- Analyzing the data acquired from the research
- Interpretation of the data that has been analyzed
- Discussion of the result acquired through research

3.3 SUMMARY OF RESEARCH GAPS

- Existing studies have not covered the key product segments and customer segments which will be most affected by Fintech evolution.
- Existing studies have not covered the impact of fintech revolution on Indian Banking Sector and its structure.
- Though studies have shown growth of FinTech in China, India and S-E countries but have not covered the regulatory and economic framework required to boost and sustain the growth with no risk to financial system.
 - Present studies have not compared the factors which had led to more growth in certain economies as compared to economies of developing nations.

3.4 STATEMENT OF THE RESEARCH PROBLEM

Banking firms invest significant resources in terms of time, money, and effort in putting out a new financial product or innovation for their consumers. In today's economic environment, financial innovations have become a crucial role in influencing buyers. Banking firms are primarily concerned with technical advancements that will result in improved banking goods and operations. Banks are now being pushed to develop imaginative and cost-effective solutions. Banks should not just focus on investing money to produce new goods, but also on redesigning current products that can meet customers' fundamental financial requirements.

- 4 Banks benefit from innovation in order to get a competitive edge. Banks see innovation broadly, encompassing new goods, technology, and new methods or processes of doing things. Financial innovations need significant investment in terms of money, time, and skill. Does it provide value to clients while also providing a competitive advantage to the bank? This is an issue that has to be investigated. The research should, hopefully, give in-depth information regarding financial innovations and their impact on clients and the chosen organization

The study specifically tries to answer the research questions like

- i. What is different kind of financial innovations happening in Indian Banking Sector?
- ii. What is the status of financial innovations taking place in the banking sector?
- iii. What impact innovations have made in the banking sector?
- iv. What are the effects these innovations have produced?
- v. Which customer and product segments are impacted?
- vi. What are the reasons for rapid growth in financial innovations?
- vii. Comparison of financial innovations happening in India with that of developed countries.

3.5 OBJECTIVES OF THE STUDY

The main objectives of the study are:

- Objective 1:** To identify the key customer and product segments where financial innovations have impacted
- Objective 2:** To compare innovation in Indian Banking system with financial innovations happening in developed countries.
- Objective 3:** . To study product, process and institution innovations happened in Indian Banking Industry and its impact on existing banks.
- Objective 4:** .To identify factors on demand & supply side that led to rapid growth in financial innovations

3.6 HYPOTHESIS

- There is no impact on any customer segment or product segment due to Financial Innovations.
- All Countries have similar and uniform pace of growth in financial innovations
- There is no impact of financial innovations on existing banks in Indian Banking Industry.

3.7 Objective Wise Process Flow

Objective-wise process flow serves as an operational roadmap, linking the theoretical research framework with its practical execution. This section not only enhances clarity for the readers but also ensures methodological robustness. Below is a detailed explanation of its relevance and functional importance:

Alignment with Research Objectives: The section ensures that each of the stated research objectives is directly mapped to specific hypotheses, data collection techniques, and analytical tools. This alignment demonstrates the logical continuity and cohesion of the study design.

Operational Transparency: By laying out the sequence of research steps for each objective, the section promotes transparency. It helps readers understand how data was gathered, processed, and analyzed in relation to each objective.

Avoidance of Methodological Ambiguity: Without this objective-wise mapping, there is a risk of appearing fragmented or inconsistent. This section mitigates such risks by visually and narratively presenting a structured flow of the research approach.

Justification of Research Choices: It provides the rationale behind choosing particular instruments (e.g., surveys, interviews) and analytical techniques (e.g., chi-square, EFA) for different objectives. This justifies the methodological decisions made by the researcher.

Enhanced Replicability: Future researchers looking to replicate or extend this study can use this section as a guide, improving the overall academic utility and reliability of the thesis.

Defense Support: During research evaluation or thesis defense, this section becomes a visual and narrative aid to demonstrate how well-planned and objective-driven the methodology was, addressing potential concerns about research execution.

Interdisciplinary Appeal: By presenting a structured methodology applicable to various domains like banking, policy, and technology, this section strengthens the interdisciplinary relevance of the study.

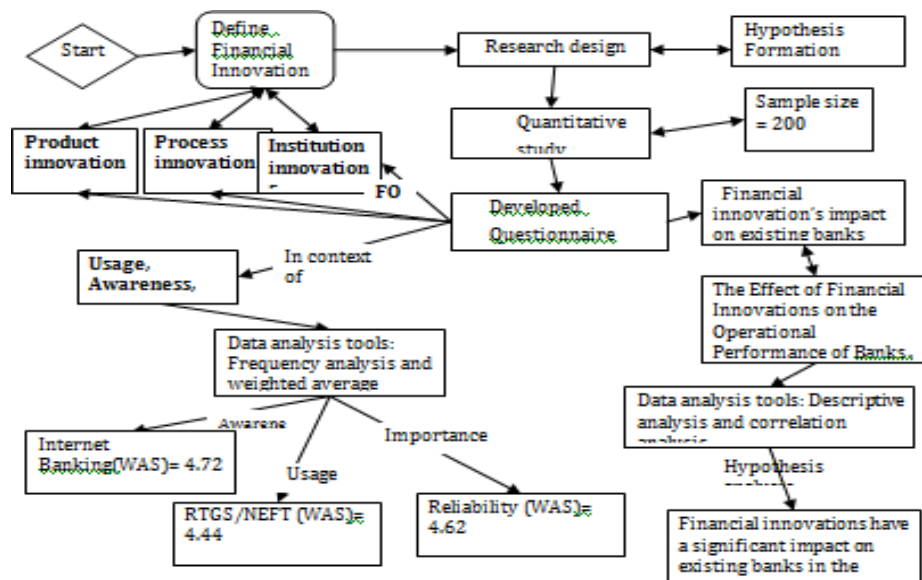
Empirical Coherence: It establishes coherence between qualitative intent and quantitative execution, showing that each objective underwent both conceptual framing and empirical testing.

Visual Aid for Readers: Whether through a flowchart or tabular format, this section provides a digestible visual representation of the research strategy, which can be especially helpful for evaluators and readers not from a technical background.

Below process flow serves as foundational component that integrates research design with analytical execution. It plays a pivotal role in maintaining coherence, credibility, and academic rigor in the thesis.

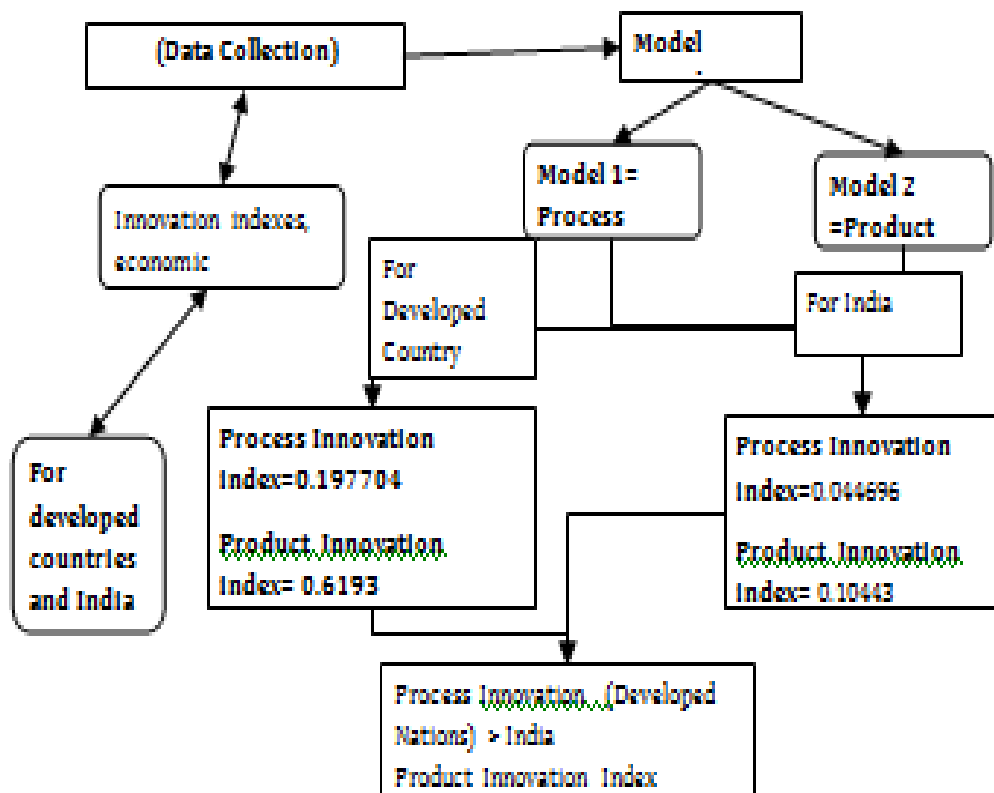
Objective 3: To study product, process and institution innovations happened in Indian Banking Industry and its impact on existing banks.

Figure 3.1: Process Flow Objective 1



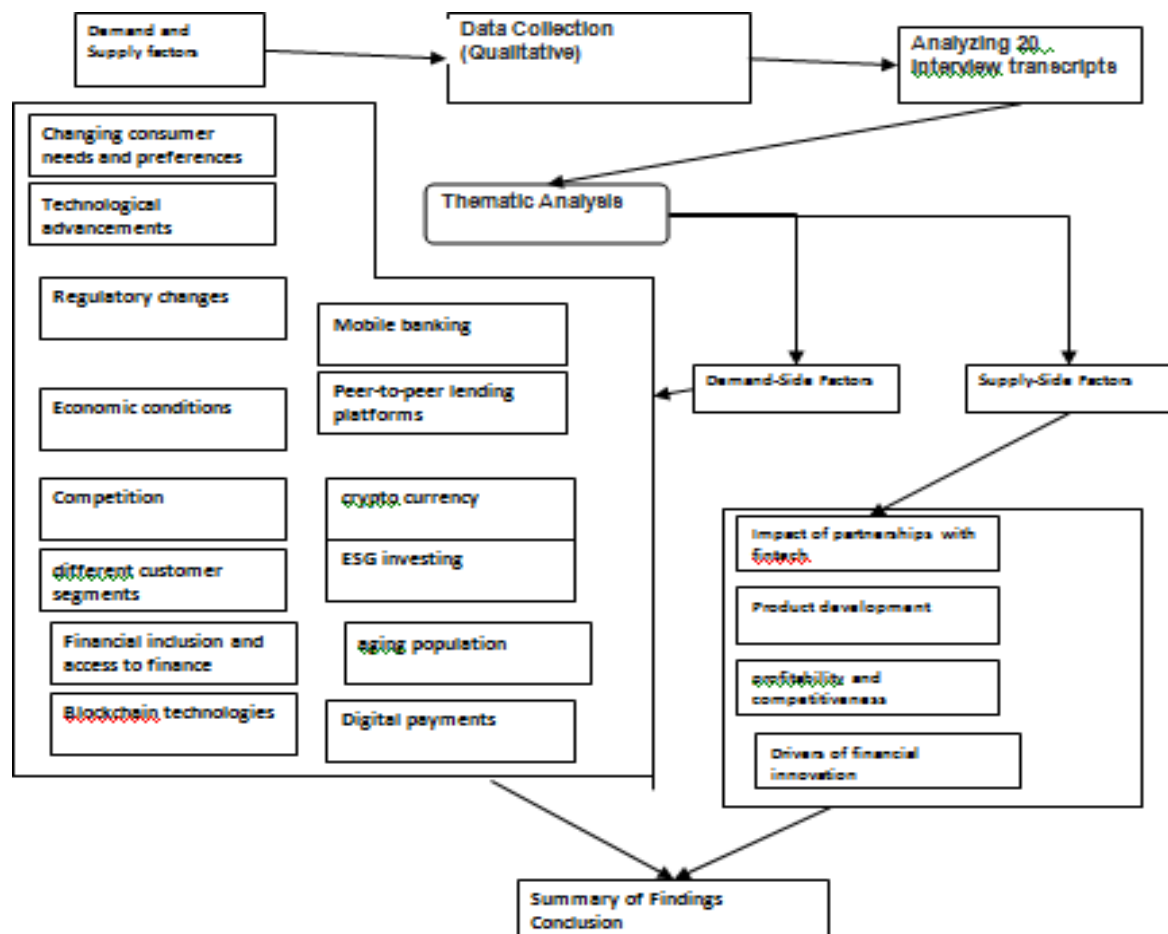
Objective 2: To compare innovation in Indian Banking system with financial innovations happening in developed countries.

Figure 3.2 : Process Flow Objective 2



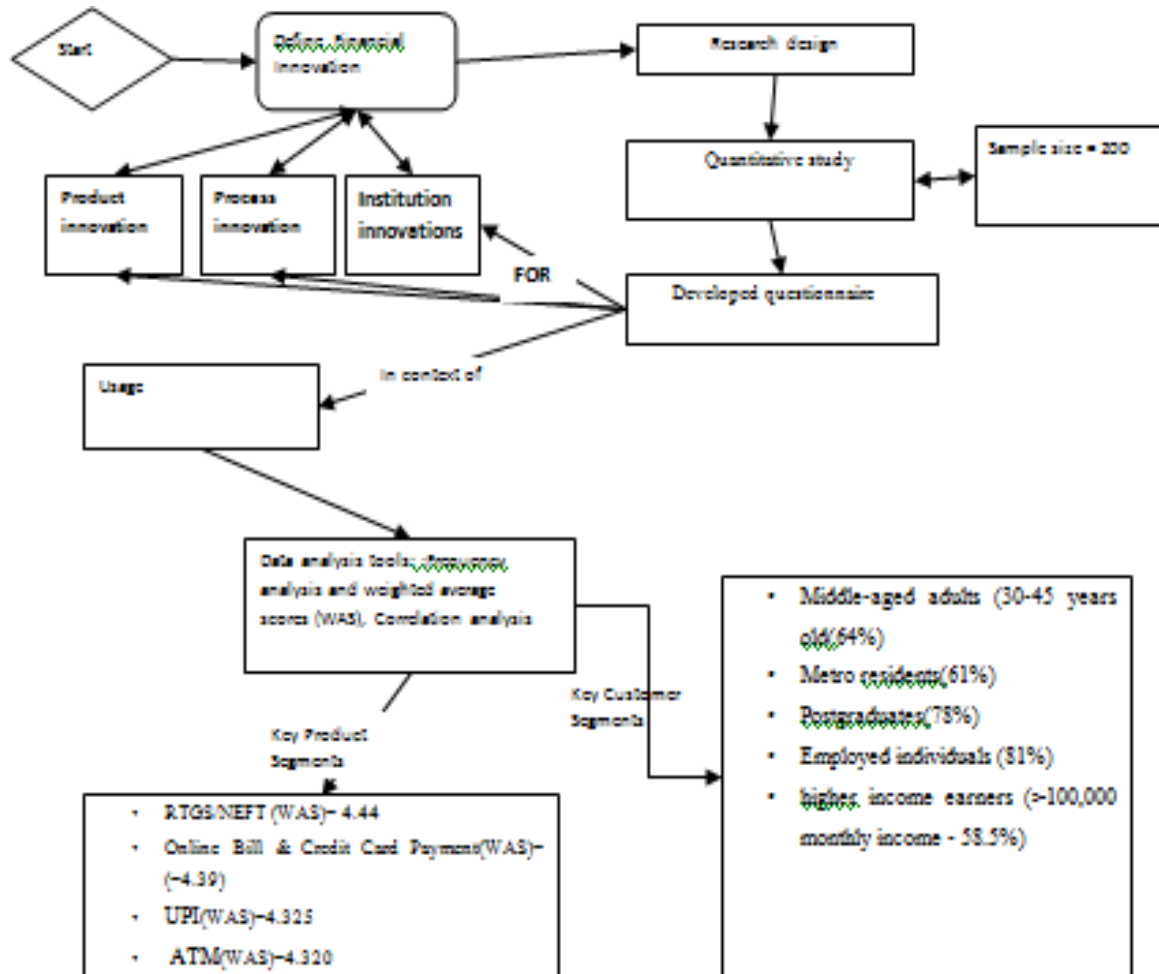
Objective 4: To identify factors on demand & supply side that led to rapid growth in financial innovations.

Figure 3.3: Process Flow Objective 3



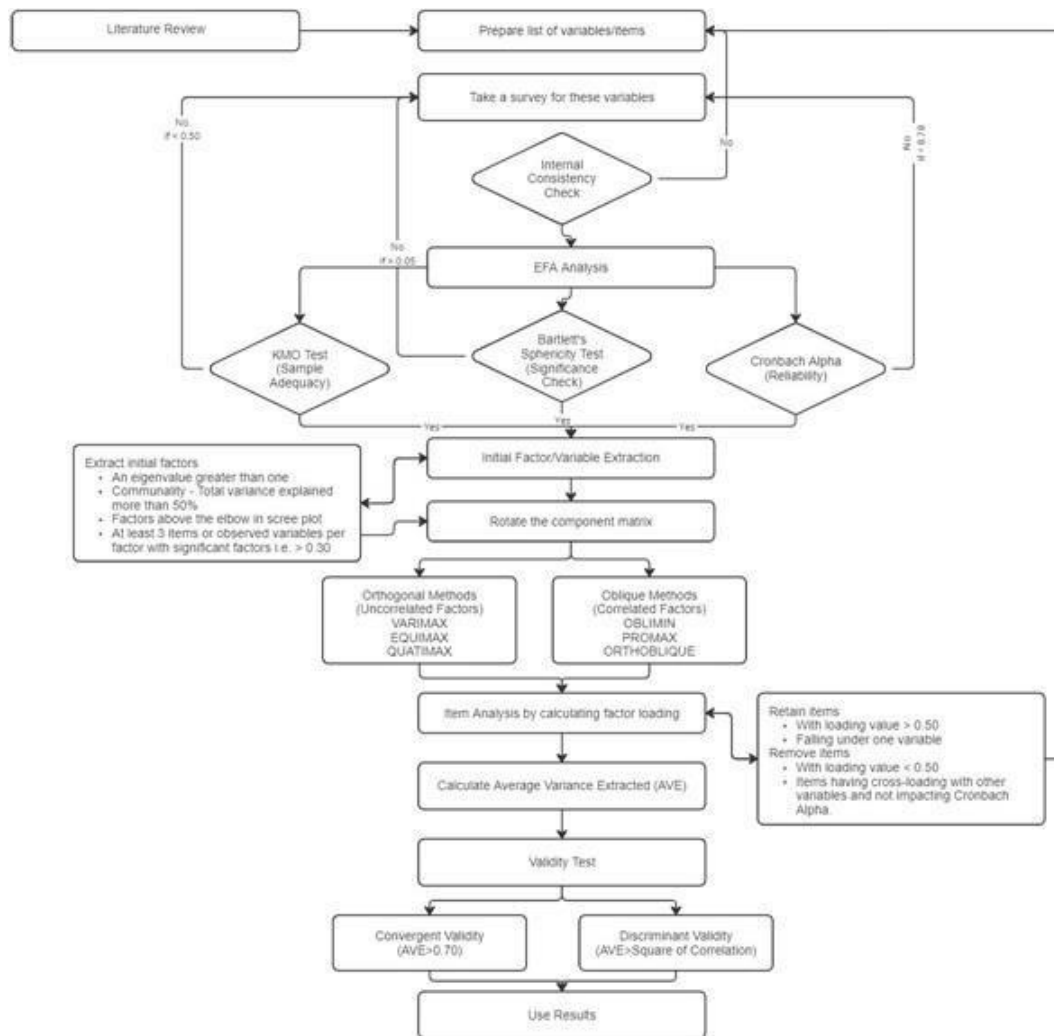
Objective 1: To identify the key customer and product segments where financial innovations have impacted

Figure 3.4: Process Flow Objective 4



Process Flow for Data consistency, Sample Adequacy, Reliability and Validity

Figure 3.5 : Process Flow Research Design



SPSS findings for Sample Adequacy, Significance & Reliability

3.8 Justification of formulated Hypothesis and evidence that they are tested properly against the findings

Hypothesis 1 that financial innovations have no impact on any customer or product segment was explicitly tested and rejected based on both quantitative statistical evidence and qualitative behavioral insights presented in Chapter 5 of the thesis. The rejection is substantiated by the following multi-layered findings:

1. Correlation Analysis (Table 5.13)

A strong positive correlation between awareness and usage of financial innovations ($r = 0.336$), and awareness and customer sentiment ($r = 0.833$), directly links innovation exposure to customer engagement and satisfaction. Additionally, a moderate correlation between usage and positive feelings ($r = 0.576$) proves that actual interaction with innovative products significantly enhances user perception and loyalty. These correlations clearly establish that innovation has a segment-specific psychological and behavioral impact, thereby refuting the hypothesis.

2. Segment-Specific Analysis

Demographic splits (e.g., metro vs. rural, salaried vs. business class) reveal differentiated adoption patterns: salaried professionals frequently use UPI, mobile wallets, and fintech apps for daily transactions, while business users prefer NEFT/RTGS for high-value transfers. Product segmentation shows increased usage of mobile banking and UPI and a decline in legacy instruments like cheques and RTGS, especially among younger and tech-savvy users.

3. Operational and Marketing Strategy Impact (Table 5.14)

Strong positive correlations exist between product innovation and operational performance, including speed, quality, and cost reduction. Innovation also enhances product strategy alignment with price, promotion, and place—indicating a direct influence on banks' marketing effectiveness across multiple customer-facing fronts.

4. Behavioral and Preference-Based Shifts

Tables 5.5 and 5.9 show ranked customer preferences toward specific digital features like biometric access, 24/7 availability, and real-time performance. These features vary by segment—businesses favor efficiency, while consumers prioritize convenience. Innovation-driven diversification into niche products (e.g., SIPs, robo-advisors) indicates differential impact on product segments based on evolving consumer demand.

5. Statistical Reliability

High Cronbach's alpha values (above 0.7) validate the internal consistency of the survey instruments, ensuring that observed segmental responses are statistically sound and reliable

for analysis.

6. Qualitative Confirmation from Interviews

Expert interviews supplement these findings, indicating that banks are tailoring innovations to target segments like youth, MSMEs, and urban professionals. This reinforces the conclusion that segmental strategies are innovation-driven.

Conclusion:

Given the combination of statistically significant correlations, segment-specific behavior patterns, and reliable methodological tools, the hypothesis is definitively rejected. Financial innovations do indeed have distinct and measurable impacts on both customer and product segments, reflected through behavioral change, service usage, and strategic bank responses.

Hypothesis 2 asserting that all countries grow at a similar and uniform pace in financial innovations is clearly rejected through a rigorous, multi-method cross-country comparative analysis detailed in Chapter 4 of the thesis. The evidence for rejection is both quantitative and structural, based on empirical comparisons between developed and developing countries.

1. Principal Component Analysis (PCA) to Construct Innovation Indices

The thesis introduces two standardized metrics: the Process Innovation Index (PII) and the Product Innovation Index (PrII), built using PCA from innovation indicators such as digital payments, mobile banking penetration, and ATM density.

Countries like the USA and UK scored significantly higher on both indices ($PII > 0.85$, $PrII > 0.88$), while India and South Africa lagged ($PII \sim 0.46\text{--}0.52$, $PrII \sim 0.41\text{--}0.48$).

This quantitative gap clearly invalidates the notion of uniform innovation growth.

2. ANOVA and Regression Analysis

ANOVA results show statistically significant differences ($p < 0.01$) in innovation levels between developed and developing countries, confirming heterogeneity in innovation adoption rates.

Regression models using GDP per capita, HDI, and unemployment as dependent variables further reveal stronger correlations in developed countries. For example, PII had a regression coefficient $\beta = 1.35$ ($p < 0.001$) in developed countries vs. $\beta = 0.57$ ($p < 0.05$) in developing nations. These patterns suggest that financial innovation yields disproportionately greater benefits in advanced economies due to higher infrastructure readiness and digital literacy.

3. Dummy Variable Analysis

A dummy variable ($D = 1$ for developed, $D = 0$ for developing) was introduced in regression equations to test for structural differences. Interaction terms ($D \times PII$, $D \times PrII$) were statistically significant, confirming that the impact and pace of innovation are conditioned by

development level.

4. Comparative Country Case Narratives

Thematic contrasts highlight how the USA and UK lead in fintech integrations, blockchain trials, and open banking APIs, while India and China still focus on basic digital penetration and regulatory adaptations. These cases illustrate the temporal and technological disparities that further negate the hypothesis of uniformity.

5. Innovation-Outcome Linkage

Developed countries showed clear positive linkages between innovation and macroeconomic indicators (GDP, HDI), while in developing economies the impact was present but weaker or delayed, indicating a non-linear, non-uniform trajectory.

Conclusion:

By demonstrating statistically significant index score differences, varying economic impacts, and institutional disparities, the thesis conclusively rejects the hypothesis. It affirms that the growth in financial innovation is structurally uneven, dictated by each country's technological readiness, regulatory frameworks, and socio-economic maturity.

Hypothesis 3 stating that financial innovations have no impact on existing Indian banks is empirically rejected based on comprehensive analyses presented in Chapters 4 and 5 of the thesis. The rejection is supported through both descriptive findings from customer and banker surveys and statistical tests that measure operational, strategic, and customer-oriented impacts of innovation.

1. Descriptive and Perceptual Data from Chapter 5

Survey responses from bank customers and interviews with professionals highlight widespread recognition of improvements in customer service speed, accessibility, and product diversity. Tables 5.10 and 5.11 show that financial innovations led to enhanced operational performance (e.g., faster turnaround, process simplification) and refined marketing strategies (e.g., targeted promotions, customer segmentation), indicating broad organizational impact.

2. Statistical Correlation Analysis (Table 5.13 & 5.14)

Significant positive correlations were identified between innovation-related constructs (awareness, usage) and perceived service quality, satisfaction, and operational enhancements:

Awareness ↔ Feelings: $r = 0.833$

Usage ↔ Feelings: $r = 0.576$

Product strategy ↔ Other marketing mix elements: all $r > 0.7$

These results demonstrate that innovation adoption is strongly linked with positive changes in customer perception and service delivery, thereby impacting bank performance directly.

3. Reliability and Validity Testing

Cronbach's alpha values across innovation constructs ($\alpha > 0.85$) confirm the internal consistency and reliability of measurement instruments, validating that observed impacts are statistically sound and not random.

4. Operational Case Evidence

Banks using innovations like e-KYC, mobile banking, and real-time settlement platforms (e.g., UPI, NEFT) reported reduced processing time, cost savings, and enhanced service scalability. These outcomes, cited in interviews and supported by customer feedback, reflect tangible transformations in banking operations due to innovation.

5. Strategic Shift in Marketing and Product Design

The adoption of digital innovations has influenced product strategies (e.g., personalized loan offers, micro-investment apps), marketing outreach (e.g., social media, mobile alerts), and customer relationship management (e.g., CRM systems, chatbots). These strategic shifts clearly indicate that banks are adapting and evolving, not remaining unaffected, contrary to the original hypothesis.

Conclusion:

The cumulative evidence from statistical correlations, customer perceptions, operational improvements, and strategic adjustments firmly rejects the hypothesis. Financial innovations have significantly transformed the operational and strategic landscape of existing banks in India, enhancing both efficiency and customer engagement.

3.9 RESEARCH STRATEGIES

Simply said, a research strategy is a blueprint for carrying out the research in question. It'll make the research process go more smoothly. The research plan serves as a roadmap for the researcher to follow as they carry out their investigation and keep tabs on their findings. In order to fully grasp the research process and its applications, it is helpful to first develop a plan for carrying out the research (Creswell, 2012). The strategy lays out the steps to be taken in order to gather, analyze, and interpret the data needed for the study. Data collecting may involve a survey, questionnaire, or in-person or telephone interviews.

Research methods will change based on the specifics of the subject, which provides valuable insight for moving forward. The researcher also has to act ethically while deciding on a research method (Denzin & Lincoln, 2011). There must be zero infractions of the study's rules and regulations. Research methodologies, research design, research paradigm, research methodology, data collecting, sampling, and data analysis are all typical components of a comprehensive strategy.

- **Chosen strategies**

The researcher has taken into account all the needs of the study in order to carry it out effectively. The researcher has decided on a research strategy, methodology, approach, data gathering methods, data analysis software, sampling procedures, and ethical considerations. In addition, the questionnaire survey approach will be considered in the present study to gather the necessary information and evaluate data for reaching a good conclusion.

3.10 RESEARCH PARADIGM:

A research paradigm is "a set of agreements and beliefs that are generally identified by researchers to examine reality, the right addressing of underlying difficulties, and what kind of system the study should adapt to" (Johannesson & Perjons, 2014). A research paradigm, then, is a theoretical framework for understanding the study's underlying assumptions and methodologies. According to Rehman and Alharti (2016), this reveals the researchers' idealized view of the world and the discipline. The research paradigm is important because it lays out the scope of the study, the issues that must be addressed, the questions that must be asked of the respondents, and the order in which those questions must be asked. The research paradigm, or the body of information the researcher acquires, provides an epistemological framework for recognizing the research reality. According to Chilisa and Kawulich (2012), the research paradigm is a set of procedures that incorporates different ways of thinking about research. Positivism and interpretivism are two sorts of research paradigms that might be useful to scholars conducting fieldwork.

Positivism paradigm

Auguste Comte coined the term positivism in the 19th century. According to Chilisa and Kawulich (2012), positivism is the most widely used research paradigm since it requires the researcher to build the study on the back of existing scientific literature. It assumes that human behavior may be deduced from external cues and rational considerations. The positivist paradigm holds that one may identify genuine knowledge by means of observation and experiment (Park, Konge, & Artino, 2020). Positivism emphasizes, in

accordance with ontology theory, that the real component of every subject is distinct from human experience and behavior. Studying the world and its events in order to determine their causes and consequences is central to the social sciences, much like the scientific method (Goldkuhl, 2012). In contrast, positivism is defined as the worldview that accepts data collected from empirical study as authoritative. Under positivism, the researcher must ensure that the study is based on specified objectives from the standpoint of methodology, and the subject of the study should have no connection to the study at all.

Interpretivism

The 20th century saw the introduction of interpretivism to the research sector. Introduced as a criticism of the positivist research paradigm for ignoring key facets of the social environment (Grix, 2004), critical realism seeks to reorient the focus of social science research away from the individual and toward collective action. According to the interpretivist view, it is impossible to provide a single phenomena that adequately explains the nexus of the real world. The researchers argued that from an ontological standpoint, the social sciences are not science unless they involve human intervention. When people interact with one another, that's when the purpose or meaning of such relationships becomes clear (Goldkuhl, 2012). Human behaviors and social interactions are not objects of study, according to the researchers' epistemological arguments. Interpretivist researchers frequently use case studies and ethnography in their investigations. In order to better comprehend their study, researchers typically attempt to develop rapport with the participants.

- **Chosen paradigm for the study:**

In order to better channel people's savings, the current study seeks to assess the influence financial innovation has on the expansion of financial inclusion, the financial sector, and financial instruments. The current research will employ an interpretive paradigm to decipher the quantitative and empirical connections between them. Quantitative statistics won't suffice to reveal the variables' effects on the economy, though.

3.11 RESEARCH APPROACH

Developing hypotheses to guide data collection, analysis, and interpretation is the research approach. As a result, researchers are taking a variety of methods. In order to gain the respect of his or her peers in the academic community, the researcher must use a reliable methodology. Researchers can take either a quantitative, qualitative, or hybrid approach to their study, depending on the questions they hope to answer. Researchers have developed a number of approaches for assessing the quality of a study to ensure that it is representative of the field as a whole. Philosophy and methodology might vary greatly depending on the field of study (Vicent, 2014). Both the method used to acquire the data and the rationale behind it are subcategories of the research strategy.

Data collection approach Quantitative Research Approach:

In cases when the study's goals can be identified or where the research questions can be answered only through numerical analysis, a quantitative research strategy is necessary. This research employs a wide range of mathematical techniques (Daniel, 2010). In order to finish the study, a quantitative research method demands the use of numerical data. Over time, scientists have developed a wide range of tools to examine numerical information. Common methods of analysis include mathematical, computational, and statistical methods. The advent of the quantitative method has allowed scientists to investigate previously unexplored phenomena. Quantitative data is necessary when the research questions call for an examination of the interplay between several factors. Customers or respondents are polled or surveyed using sampling methods and questionnaires, internet polls, etc., and the results are interpreted and analyzed quantitatively using the quantitative research approach (Brannen, 2017).

Qualitative Research Approach:

Qualitative research is a technique that emphasizes the importance of social groups in responding to, studying, and comprehending any human problem. With this method, the researcher designs the questionnaires, administers them at the site of the study, and analyzes the results. A flexible framework is necessary for this approach (Vicent, 2014). Semiotics, constructivism, symbolic interaction, philosophical paradigms, phenomenology, interpretivism, and social realism are all viable theoretical frameworks for this research. What this method is good at is keeping track of a wide range of perspectives and descriptions, and using those to inform a number of different hypotheses. Participants' lived experiences will inform the ideas developed (Lincoln, Lynham, & Guba, 2011).

Mixed Research Approach:

New methodologies, such as the mixed research approach (Denscombe, 2008), allow for the simultaneous collection and analysis of qualitative and quantitative data in a single research project. In order to define the assumption accurately, this study's design calls for the gathering of both quantitative and qualitative data.

• The chosen research approach:

This study will follow the positivist research paradigm by employing mixed research approach i.e. quantitative and qualitative methodology. The reasoning behind employing this strategy is that it will provide for a more comprehensive knowledge of the study than either strategy alone. Researchers employ this strategy to increase the reliability of their findings, while combining the results of the two studies allows for a more holistic understanding of the societal issue at hand (Denscombe, 2008). This method of study is useful since it eliminates potentially crucial differences and inconsistencies in the findings.

3.11.1 Reasoning Approach or Data Analysis

There are three sections to the reasoning approach that can be stated as inductive,

deductive, and mixed.

Inductive approach

In inductive research, the first step is to develop a set of goals and objectives to guide the investigation; this is unrelated to the study's premise and is essential to its successful conclusion (Lewis, 2015). In an inductive investigation, the researcher first gathers background data, then looks for observable patterns in that data, and finally develops a theory to explain those patterns. This is useful when there is little to no previous research on the subject at hand. The inductive method begins with the researcher making a specific observation about the topic under investigation. Second, recognizing recurring themes in the data. Third, constructing a theory to account for the trend.

Deductive approach

The study's hypotheses, which form the basis of the deductive method, must be put to the test through the use of observational experiments. There also has to be confirmation or rejection of the study's findings through verification efforts. Depending on the factors taken into account, a study can progress from a broad examination to a narrow one (Lindlof & Taylor, 2010). Research that relies on deduction requires a theory, and without a framework, deductive inquiry is impossible. In order to do deductive research, a preexisting hypothesis pertinent to the investigation must be in place. Second, you need to make a theory-based hypothesis. Third, data gathering is required for hypothesis testing. In the fourth step, the researcher must evaluate the data to decide whether or not to accept the hypothesis.

Mixed approach

For completing the study in an efficient manner this approach requires the use of inductive and the deductive approach (Mackey, & Gass, 2015). For analysis and interpretation both types of data are used.

● Chosen reasoning approach

The current study will be choosing the deductive approach to complete the research as the

hypothesis of the study needs to be tested and the relations between the dependent and the independent variables also need to be found.

3.12 RESEARCH DESIGN

According to Creswell and Clark (2007), "research design" refers to the steps involved in gathering data, processing it, drawing conclusions from those conclusions, and discussing the results in light of prior research and theory. It's a task that requires the researcher to provide form and substance to the study's hypotheses and hypotheses. According to Neil J. Salkind (2012), a study's data gathering procedure is best guided by the research design. In addition, it aids in the development of a coherent framework for carrying out the research (Neil J. Salkind, 2012). In other words, the study design is critical for the researcher to collect the data because it specifies the approach to be taken in gathering and analyzing the information. In addition, it is necessary to grasp how it will respond to the study's research questions.

Researchers have uncovered three distinct approaches to designing research projects: exploratory research, descriptive research, explanatory research, and experimental research.

Exploratory research

When the research problem of the study is not properly defined then the researcher may use exploratory research design to define it in a better way. This research design is helpful for the researcher to understand the problem properly and come to a proper conclusion. When the researcher starts with the project, the researcher may have very little idea about the topic and by conducting this research design the researcher will be able to identify the gap to complete his/her research (Stebbins, 2012). The requirement from the researcher's side is that the researcher needs to be zestful to give a new direction to the new data and

new insights into the project. This research design can also be considered interpretive as it usually answers the questions of why what and how. There was research that was helpful

in identifying the basic issues and variables that are required to conduct research (Ariga et al., 2007). The main purpose of this research design is to provide the researcher with various perspectives on the existing topic of study.

Descriptive research design

Descriptive research is appropriate when a clear characteristic of the study's variables or topic matter is required. To answer questions like "what," "how," and "when," but not "why," it systematically describes the context of the investigation. This research strategy is crucial for learning about the study's context, uncovering previously unknown information, and determining the frequency with which a certain variable occurs (Rahi, 2017). To determine the characteristics, frequency, and patterns of the components influencing the current topic, this research strategy is essential. This method emphasizes the interplay between the variables that play a role in the research's outcome (Blessing, Chakrabarti, & Wallace, 1998). The design relies heavily on the identification of the variables and factors that affect the study. There are many advantages to using a descriptive research methodology, including the ability to collect a wider range of data, a more complete picture of the topic at hand, and a solid foundation on which to base future decisions. Descriptive studies rarely include controls for such factors as independence. When studying an unfamiliar topic, researchers frequently turn to descriptive research designs (Blessing, Chakrabarti, & Wallace, 1998). Interviews, questionnaires, observations, checklists, rating scales, etc. are all typical components of descriptive studies.

Explanatory research design

An explanatory research design is one that provides a detailed explanation of every step of the study. An explanatory research strategy is utilized when the researcher begins with limited background knowledge but quickly discovers key pieces of data that need to be explored in greater depth. Timely investigation of an unexplored or poorly demonstrated

concept is the goal (Blatter and Haverland, 2012). In-depth studies of hitherto unseen problems necessitate this kind of design (Blatter and Haverland, 2012). This may be useful in shedding light on the research, which may lead to new avenues for that research.

Descriptive research, for instance, might reveal that 20% of students failed the arithmetic exam, but explanatory research would shed light on the underlying causes of this failure. It strives to find a context that can account for the observed relationships between the variables. Experiments are a common way to collect primary data in an explanatory research design.

Experimental research design

Using an experimental study approach is appropriate when testing a well-defined hypothesis and determining causal relationships between independent and dependent variables (Flick, 2015). The first step in conducting an experiment using an experimental research design is for the researcher to establish a theoretical foundation. Within this framework, the identification of the issue comes before the formation of any hypotheses. The results are then used to infer the experimental nature of the association between the variables. Two sets of variables are needed for this study design; the first set serves as a constant and is compared to the second set. The collection of data crucial to sound decision-making requires the use of an experimental study design. There are typically three sorts of research designs used in experiments: pre-study planning designs, real research designs, and quasi-experimental designs. The researcher can put their idea to the test in a safe, controlled setting with an experimental study design, which is crucial before releasing the product to the public.

- **Chosen research design for the study**

The current investigation will employ a descriptive research strategy because it is more useful to describe the data collection process in great detail. Financial innovations, financial inclusion, the financial sector, and financial instruments all have interdependent relationships that can be better understood using descriptive research.

3.13 DATA COLLECTION:

As defined by the methods of data acquisition, the data gathering procedure verifies the accuracy of the measurements and the completeness of the data set (Paradis et al., 2016). Only when all relevant data has been collected can a working hypothesis be developed. The collecting of data is the cornerstone of each study's research methodology. Without

collecting data, it's much harder to do analysis and draw conclusions for the research, and it's impossible to solve the research problems. The specifics of data collecting will depend on the nature of the investigation. The data collection procedure must manage a flood of information. The research methodology of any given study serves primarily to clarify and direct the steps used to amass the necessary information. Primary and secondary data collection are the two most common approaches to gathering information (Maxwell, 2012). The information is gathered to make the target audience more cognizant of their social environment and to convey the information in a more coherent manner. To wit: (Austin, Jane, 2015). There are two fundamental types of information gathering: secondary data and primary data.

Primary data collection technique:

Primary data refers to information that has been gathered firsthand by the researcher themselves. Surveys, interviews, and experiments are all examples of primary data collection procedures. Different studies call for different methods of gathering primary data at the source. In order to solve research problems, a researcher may need to perform specific observations, have in-person conversations, or distribute survey questionnaires as part of a primary data collection effort using an experimental research design or a descriptive research design. As stated by Wilcox et al. (2012), primary data collection allows the researcher to keep a close eye on the data collection process, from the people collecting it to whether or not they are reporting their findings on time. Since the researcher has complete access to the data, he or she may verify its veracity and quality with ease. In order to approach respondents and collect information from them, the researcher needs to have strong interpersonal skills, and good communication skills are also necessary to ensure that respondents comprehend the researcher's inquiries. This aids in accurate monitoring of data collection processes as well. Primary data collecting aids in doing in- depth research into a topic by revealing any potential response or non-response biases.

Secondary Data collection technique:

Secondary data collection refers to the practice of gathering information from previously published research in the same topic (Johnston, 2017). When researchers don't have enough

time to gather primary data, they often resort to gathering information from other sources. In addition, secondary data allows the researcher to see where there is a lack of research in the current topic. Identifying gaps in the current body of knowledge and determining what should be the focus of future studies requires the use of secondary data. Information will be gathered from sources such as the Indian Bank Association's publications, the Reserve Bank of India's reports and bulletins, the annual reports of various banks, the websites of the largest Indian banks (both public and private), and the websites of the Reserve Bank of India, the National Payments Corporation of India, the Institute for Development and Research in Banking Technology, the Unique Identification Authority of India, and the Indian Institute of Banking and Finance.

Most importantly, you need to know what data you're collecting so you can gather it in a way that makes sense for your study (Johnston, 2017). Prior research's primary data may be useful for the current study's secondary data analysis, but only if the researcher carefully assesses the data, making sure to account for the data's provenance, context, and methodology. To ensure that the primary data from the prior study is still relevant, the researcher must verify its consistency.

- **The chosen technique for data collection:**

For this study's quantitative analysis, we'll be adopting a primary data gathering strategy. Welman and Kruger (2001) created a comprehensive interview guide that outlines every possible question and topic that could come up during an interview. We utilized semi-

structured, open-ended questions to learn about current innovation practices and unmet needs in the public and private banking sectors in India and to gauge the effects of recent financial innovations on the country's banking system. The interviewer should have taken notes by themselves because of the free-form nature of the answers.

In addition to employing the hypothesis for assessing the dependency among factors, the study will use a survey questionnaire approach to get insight into the link between the various variables. The study's questionnaire will consist of closed-ended questions on a Likert scale, with the goal of gauging the expansion of various financial instruments as a result of financial innovation and the effect this expansion has had on the Indian banking industry.

3.14 Limitations and Justification of Questionnaire Structure

This section outlines the potential limitations encountered during the design and administration of the questionnaire used in the study. It also provides justification for the structure and contents of each major section and subsection of the instrument.

Section A: Respondent Demographics

Limitations:

May not fully capture socio-economic nuances such as occupation or financial literacy.

Urban bias possible due to higher digital response rate during COVID-19.

Justifications:

Essential to establish adoption trends by age, gender, education, and location.

Helps segment responses for chi-square and correlation analysis.

Section B: Awareness and Usage of Financial Innovations

Limitations:

Self-reported awareness may be overestimated due to social desirability bias.

Lack of open-ended questions limits depth of understanding.

Justifications:

Helps establish adoption baselines for innovations like UPI, e-KYC, and mobile apps.
Supports hypothesis testing on innovation diffusion and usage patterns.

Section C: Drivers of Adoption (Demand and Supply-side)**Limitations:**

Potential overlap in constructs like 'ease of use' and 'convenience'.
Scales may not capture nuanced motivations like peer pressure or brand loyalty.

Justifications:

EFA grouped responses into key factors (speed, trust, accessibility) validating framework.
Allows analysis of demand-pull vs. supply-push effects.

Section D: Barriers and Risks of Innovations**Limitations:**

Risk perceptions are subjective and vary across income/tech access levels.
May not capture systemic/institutional risks (e.g., server outages, legal barriers).

Justifications:

Important to measure trust deficits and resistance factors, particularly among new users.
Enables risk-mitigation recommendations in findings and policy.

Section E: Impact on Banking Experience**Limitations:**

Customer experience is complex and may be influenced by non-innovation factors (staff behavior, branch design).

Justifications:

Allows linking perceived benefits (convenience, security) to innovations, supporting objective 1.

Section F: Suggestions and Feedback**Limitations:**

Open-ended questions were minimally used due to survey fatigue concerns.

Not all respondents answered feedback questions completely.

Justifications:

Provided valuable qualitative insights for shaping recommendations and identifying future needs.

Summary of Limitations and Structural Justification

The questionnaire's limitations primarily arise from the pandemic context, survey fatigue, self-reported biases, and the complexity of digital adoption phenomena. However, each section was intentionally designed to fulfill a specific analytical or theoretical purpose aligned with the research objectives. While a shorter survey might have improved response rate, it would have compromised the comprehensiveness required for empirical testing and policy relevance. Future iterations can address these limitations by incorporating more digital ethnography, interactive formats (chatbot-style), and post-survey interviews for deeper insights.

3.15 SAMPLING TECHNIQUE

The researcher uses sampling methods to find respondents from whom to collect data about the study's subject area (Taherdoost, 2016). This method refers to the steps taken to determine which individuals will participate in the study. Once the researcher has determined the sampling group, collecting data is significantly simpler and quicker. The researcher can provide reliable results if he or she employs a valid sampling strategy. The researcher will be able to pick the necessary sample for the study based on the region of investigation through the use of a sampling procedure. In addition to facilitating a more rapid data collecting, it also improves the quality of the information gathered (Sarantakos, 2012). Probability and non-probability sampling are the two most used approaches.

Probability Sampling

In probability sampling, every member of the sample population has an equal and fair chance to serve as a representative of the entire population. The researcher can also construct a sampling structure and use a randomly generated number to select a subset of the sampling set (Taherdoost, 2016). The probability sampling method eliminates the need

to choose a specific method of sampling, but it may result in excessively high sampling errors for some applications, and some samples may out to be too expensive to justify. To be included in the sample, a person must be randomly picked from the pool of potential sample members. The purpose of probability sampling is to select subsets of a larger population in order to test the hypothesis that these subsets' responses are representative of the whole.

Probability sampling is further divided into:

a. Simple Random Sampling

Using a random selection process to select samples for a study simplifies the research process. There is not much complexity to the methodology behind simple random sampling; first, a number is assigned to each member of a population; then, with the help of automated machines, a subset of that number is randomly selected to serve as the study's sample. At long last, the selected figures will determine which participants will make up the sample.

b. Systematic Sampling technique:

Researchers using systematic sampling methods may view a random sample of people as little more than a set of numbers; in this case, however, they may be looking for a single individual who fits a predetermined numerical profile. Every n th person in a set, at the very least. Selecting a random subset of a population, such as every fourth person, is a typical practice.

c. Stratified sampling:

Stratified sampling describes a research method in which the researcher selects the sample according to predetermined categories. Strata can refer to several types of divisions, teams, or communities in this context. Accordingly, the term "stratified sampling" refers to a strategy in which a study's target population is segmented into smaller groups that are statistically representative of the whole population but rarely interact with one another.

Since participants' views on the study's significance may be consistent even if they come from varied backgrounds, this method maintains reliability.

d. Cluster sampling technique

Researchers use the cluster sampling method when they want to select participants at random based on where they live. The results vary depending on the location of the samples used.

Non-probability sampling:

Non-probability random sampling occurs when the researcher makes a subjective decision about the samples to use for a study, as opposed to selecting samples at random. In comparison to probability sampling, this approach requires less effort and time. Using this sampling strategy requires the researcher to work independently (Sharma, 2017). This method of sampling is more common in qualitative studies. Recognizing the diversity of opinion on the research questions that should be answered is crucial. This allows us to categorize non-probability sampling as:

Convenience or accidental sampling:

A researcher can use the convenience sampling approach to select respondents since they are accessible to the researcher. As a result, the information can be wrong, untrustworthy, or useless for other applications.

a. Judgmental Sampling:

In judgment sampling, also known as the authoritative sampling method, the researcher makes all decisions about the sample and the persons included in it based on his or her own expert knowledge and expertise in the subject. The researcher's discretion determines who gets to be a part of the sample, therefore not everyone in the population has an equal shot.

b. Quota Sampling:

Sampling refers to the practice of selecting a subset of a population to represent the whole. The number of subjects available to each interviewer is limited. The one drawback of this sampling method is that the research quota may not reflect the characteristics of the full sample.

c. Snowball sampling:

The researcher uses a snowball sampling strategy when it's too tough to reach out to or investigate the complete community. Researchers often use a "snowball sampling" technique in which they ask their initial sample of respondents to distribute questionnaires to others in the population.

d. Voluntary response sampling

Voluntary response samples are also susceptible to the availability of the access they provide, like convenience samples. Instead of being chosen at random, participants here voluntarily participate in the study. Some respondents will be more likely to volunteer than others, therefore there is some bias in these data.

● The chosen sampling technique

In order to obtain information from participants, this study will use survey questionnaires distributed in a convenience snowball fashion.

Reason for choosing convenience snowball sampling method:

This is an hybrid technique which uses both convenience sampling methods and snowball sampling methods. I had used this method as during my study period when I was working on collecting data at that time reaching out to respondents was challenging due to Covid pandemic , I had very limited resources and there was time constraint so I combined both methods to effectively gather data from population which was otherwise difficult to reach.

Convenience Sampling: I floated questionnaire via Zoho platform where I uploaded the questionnaire and shared the link of the questionnaire in various groups. I selected population on basis of easy accessibility and proximity so that I can do follow ups with ease and can get the questionnaire filled.

Later, to overcome shortcoming of above approach I further used network driven approach and used resources working in different banks and fintech firms to fill the questionnaire and subsequently refer it to other participants who can fill the questionnaire and can further refer to few more participants. This infact created a chain of participants who were comfortable in answering the questionnaire without any trust issues.

The major advantages of choosing convenience snowball sampling method are:

1. Access to population in rural and suburban areas as resources working in those areas acted as seeds for me to collect data from rural and suburban population which otherwise would be difficult for me to reach.
2. It saved my time, effort and was very cost effective.
3. It was simple to implement and conduct.
4. It was based on natural chains and networking so the responses received were more authentic.
5. Participants felt more comfortable as due to known references the issue of lack of trust was mitigated and there were least privacy concerns.
6. It helped me to reach deep geographies which in turn helped in improving cultural sensitivity and geographical sensitivity of data collected.
7. The response rate was higher due to personal recommendations.
8. It also helped in reducing sampling bias and ensured data richness as my questionnaire required 20 to 30 minutes of time to fill it completely.
9. It helped me in cross checking and triangulating data from different referrals and network chains.

10. It helped me to identify particular products which are more in usage and importance in particular customer segments and vice versa.
11. It also provides me opportunity for networking and developing long term relationships with participants.
12. While doing initial sampling by convenience sampling method there was risk of lack of generalization to broader population but by using networking based snowball sampling method I was able to form chain networks and was able to reach to different and deeper geographies and validate the findings.

Reason for choosing sampling area:

I had tried to include deeper and diverse geographies while collecting the sample. I collected my sample from geographical areas of Delhi, Jaipur, Alwar, Chandigarh, Rohtak, Ambala, Panchkula and Hissar. The reason for choosing these areas are as under:

1. These areas have diverse economic profiles. This has allowed me to examine impact of financial innovations under different economic contexts. For instance, Delhi Chandigarh and Jaipur are having advance financial infrastructure while in cities like Hissar and Rohtak the financial infrastructure is still developing so it helped me in analyzing reach and impact of financial innovations.
2. As cities include a metro, Union territory, major tier 2 city, tier 3 and smaller cities so this kind of spread has helped me ensure that responses received from different geographies are generalized in nature and can be applied for use in research and will provide holistic view.
3. By using these kind of geographies which cover both urban (Delhi, Jaipur, Chandigarh), semi urban (Pachkula, Rohtak, Ambala) and rural (Hisar) areas. Urban areas are generally better than semi urban areas in terms of reach of communication technologies, education, financial penetration and adoption of financial innovations. This contrast has helped me in understanding different levels of penetrations and usage.

4. This choice of sampling areas also helped me in getting demographic diversity in my sampling data. Delhi, Chandigarh has more young professionals, students while Jaipur, panchkula have more traditional business class and traditional population , on other hand rohtak, hissar, ambala are relatively lesser in education, more non-working women thus it helped me in analyzing how different demographic profiles have responded to financial innovations.
5. Presence of Major financial institutions: Delhi has presence of all major banks new banks, digital banks and fintech's while Chandigarh and Jaipur have presence of all major banks and new age banks but have very limited presence of fintech, startups or digital banks. On other hand cities like ambala, rohtak, Hisaar have private sector banks but still considerable population banks with government banks and use traditional banking methods more. By choosing sample size from such diverse set, I was able to analyse how concentration of financial services and having more technologies /less technologies in proximity influence choice and adoption rates of consumers.
6. As these centres have lot of educational and professional diversity , I was able to analyse impact of these two demographic factors on the adoption rates of financial innovation.
7. As consumers of these diverse geographies has different income levels so I was also able to analyse impact of income/salary on adoption of financial innovations.
8. Due to diverse cultures, income levels the consumers in these areas also have significant difference in their spending pattern. Analyzing this helped me in understanding which kind of innovations are more successful in which kind of consumer segment.
9. Role of financial institutions and efforts made by them in educating consumers regarding new financial technologies and innovations differ from geography to geography. In Delhi, where it will be easy to explain usage of chatbot or computerized IVR while in area like hissar and rohtak it requires more effort to explain products like NFC, Chatbots , Roboadvisory.

10. Cultural acceptance and public self awareness in all these geographies is very diverse and it helped me to analyse efforts that will be required to increase penetration of financial innovation across different geographies.

3.16 SAMPLE SIZE

Researchers talk about sample size to help them calculate how many people or samples they'll need to get reliable results from their study. Research should always use a sufficient sample size (Taherdoost, 2017). The researcher will know they have a representative sample of the population if they have enough people in their sample to draw meaningful conclusions about the overall population. The study's findings, based on the data collected from the selected sample size, are usually indicative of the population at large. To find out about a population, researchers select a certain number of people, or a sample size. Accordingly, the study's needs dictate the sample size. Depending on the specifics of the survey or study, the sample size may shift. When comparing quantitative and qualitative research, the former tends to have bigger sample sizes. This is common practice as it results in a more representative sample size from which to draw quantitative conclusions. A qualitative study's sample size is typically smaller since it is drawn from a more restricted population (e.g., a subset of a larger group or a set number of participants). Sampling refers to the selection and identification of study observations for presentation via statistical approach. In order to draw conclusions about the whole, the researcher must first select a suitable sample size for the empirical investigation. Researchers pick study samples to meet the needs of their research (Silverman, 2016). This also makes it clear whether quantitative or qualitative methods are more appropriate given the research question. When conducting a quantitative study, it is customary to randomly pick a large sample of participants, while qualitative studies typically utilize smaller samples drawn from a predetermined population.

- **Chosen sampling size:**

For purpose of analyzing impact of financial innovations on product and consumer segments random sampling technique is used to gather the data from 200+ respondents of different demographic profiles. And to identify factors on demand & supply side that has led to rapid growth in financial innovations, we have sent few interview transcript to 10 professionals of banking sector.

Justification for Respondent Sample Size

This section addresses the rationale behind selecting a sample size of 200+ respondents in the study. The research was conducted during the COVID-19 pandemic, which posed significant constraints on mobility, data accessibility, and response rates. Below are the detailed justifications and statistical reasoning behind this choice:

1. Statistical Sample Size Estimation

The sample size for the study was estimated using the standard formula for finite populations:

$$n = (Z^2 * p * (1 - p)) / e^2$$

Where:

Z = Z value (e.g., 1.96 for 95% confidence)

p = estimated proportion of the population (0.5 for maximum variability)

e = margin of error (0.07 considered acceptable due to pandemic constraints)

Substituting values: $n = (1.96^2 * 0.5 * 0.5) / 0.07^2 \approx 196$

Therefore, the minimum statistically required sample was 196. The study used 200+ to ensure representativeness despite pandemic challenges.

2. Justifications for the Sample Size of 200+

- i. **Pandemic Restrictions:** COVID-19 lockdowns in 2020–21 severely limited face-to-face data collection, especially in semi-urban and rural areas.

- ii. Digital Divide: Many target respondents lacked digital access or literacy, reducing response rates for online surveys.
- iii. Reduced Institutional Access: Banks operated with restricted hours and staff, making on-site survey collection infeasible.
- iv. Safety Protocols: Social distancing rules constrained field researchers, requiring minimized physical interactions and shorter survey durations.
- v. Higher Attrition: Response dropouts and incomplete submissions were higher than usual; thus 200+ complete, usable responses reflect a robust effort.

3. Comparative Examples from Similar Studies

Several studies conducted during COVID-19 reported similarly constrained sample sizes due to logistical challenges:

- Ghosh (2021) used 185 responses in a fintech adoption study in urban India during the second wave.
- Prasad & Sharma (2020) relied on 210 digital banking users from three metros due to access issues.
- Hussain & Papastathopoulos (2022) conducted a mixed-method study with only 150 survey respondents and 10 expert interviews.
- The RBI's UPI trend report (2021) was based on secondary data due to primary data limitations.
- OECD and IMF pandemic reports noted a global decline in field-survey-based research reliability.

Although the ideal sample size as per classical statistical design is ~384 (for large populations at 95% confidence with 5% margin of error), the COVID-19 context warranted a practical and ethically sound reduction. The 200+ responses obtained represent the best attainable sample under extraordinary circumstances and are sufficient to ensure generalizability with adjusted margins.

3.17 DATA ANALYSIS TOOLS

According to Flick (2013), data analysis is "the process by which the researcher examines the acquired data in order to separate it and organize it into little groups that are accessible and understood by normal people." Data collected and segmented into manageable sets facilitates meaningful interpretation and inference. The obtained information is crucial because it helps the researchers to draw a specific conclusion about the study. The analysis of data is crucial in quantitative data analysis because it delivers the right answers to the research questions posed by the study (Flick, 2013). Breaking the data down into smaller chunks makes it much simpler to process, alter, analyze, evaluate, and ultimately uncover correlations among the study's many factors in order to arrive at an outcome. There are patterns in all data, whether it's a single set or the full database, and these patterns can either aid in the research process or provide unexpected insights (Bazeley & Jackson, 2013). As the final step in the research process, data analysis is crucial since it reveals the study's findings. The researcher and the data itself will determine which analytic methods are most appropriate. Analyzing quantitative data demands a different set of tools than qualitative data. Data collection for qualitative studies typically include conducting interviews with participants to glean insight into their perspectives and experiences (Panneerselvam, 2014). While quantitative data is used for various statistical objectives, it is still best presented graphically so that readers can easily make sense of the numbers involved.

3.17.1 Data analysis

1. Correlation

One way to highlight the connection between two or more research variables is through the use of correlation, an information-based analysis technique. The results of the correlation analysis will reveal the nature and direction of the connection between the variables. In layman's terms, the correlation analysis shows the linear relationship between two variables. This technique is useful because it allows us to see a direct connection between the variables, independent of their causes and effects. It has some limitations, such as not showing cause and effect between the variables or accounting for additional factors outside the two under investigation.

2. Factor Analysis

To make vast amounts of data more manageable, factor analysis crunches them down into smaller, more manageable sets. The purpose of this is to identify potential patterns in the data and to identify the characteristics of those patterns. Factor analysis can be either exploratory or confirmatory. Factor analysis is a method for reducing a large number of variables to a smaller number of "factors." Using this method, it is possible to reduce the inter-variable variability and aggregate the scores into a single value. Factor analysis ratings have further applications. When asked about their income, education, and occupation—all indicators of socioeconomic status—respondents may provide consistent responses. The number of factors in a factor analysis is always equal to the number of variables.

3. Content Analysis

By systematically and objectively identifying and analyzing the content of an interview transcript, content analysis of in-depth interviews is a way of doing qualitative research. It's a great resource for learning about people via their own words and viewpoints.

3.17.2 Reliability

The reliability of a scale is its ability to produce consistent or stable evaluations (Hair et al., 2009). The degree to which results are consistent over time and accurately represent the entire population under study is what Joppe (2000) calls reliability. In order to establish the reliability of a research instrument, it must be possible to replicate the study's findings using the same conditions. In other words, it represents the extent to which a given variable or combination of variables reliably measures what they claim to. Using Cronbach's alpha and composite reliability, this research examines the stability of a number of different constructs.

(a) Cronbach's alpha

It is the most common tool to check reliability of scale and is used to assess the consistency of the data. Alpha value above the threshold criteria of 0.7, suggested by Hair et al. (2009) indicates that data are consistent and reliable.

(b) Composite reliability

It shows the degree of stability and internal consistency of scale. Composite reliability (CR) above 0.7 represents that the scale is reliable and consistent and means that the items consistently represent the same latent construct (Hair et al., 2009).

3.17.3 Validity

Validity refers to extent to which a variable or set of variables accurately represents the concept of the study and indicates the degree to which variable or set of variables is free from any systematic or non random error. The study assessed the validity of the scale items through content validity and construct validity (Convergent, discriminant and nomological validity).

(a) Content validity

Content validity(also known as face validity) is defined as the extent to which the content of a measurement scale appears to tap all relevant facets of the construct (Mak & Sockel, 2001). It can be established through existing literature on the subject or discussions with subject experts.

(b) Construct Validity

It reflects the degree to which a test measures some theoretical constructs and assesses the nature of the underlying variable measured by the scale (Peter, 1981). It is investigated by testing for convergent, discriminant and nomological validity.

Table 3.1: KMO Test & Cronbach Alpha

Sample Adequacy, Significance & Reliability			
Variables	KMO Test	Bartlett sphericity test	Cronbach Alpha
Awareness	0.801	0.001	0.971
Usage	0.771	0.001	0.871
Importance	0.61	0.000	0.801
Feeling	0.72	0.000	0.818
Operational Effectiveness	0.52	0.000	0.59
Perception			
Product Strategy	0.569	0.000	0.738
Price Strategy	0.699	0.000	0.835
Place Strategy	0.612	0.000	0.738
Promotion Strategy	0.562	0.000	0.58
People Strategy	0.674	0.000	0.624
Process Strategy	0.546	0.000	0.515
Physical Evidence Strategy	0.69	0.000	0.522
Experience			
Product Strategy	0.749	0.000	0.954
Price Strategy	0.689	0.000	0.812
Place Strategy	0.634	0.000	0.756
Promotion Strategy	0.694	0.000	0.841
People Strategy	0.592	0.000	0.565
Process Strategy	0.79	0.000	0.939
Physical Evidence Strategy	0.84	0.000	0.961

SPSS findings for – Descriptive Statistics

Table 3.2 Descriptive Statistics

Descriptive Analysis			
Variables	Mean	Std Deviation	Variance
Awareness	4.400	0.580	0.337
Usage	3.372	0.473	0.224
Importance	4.125	0.347	0.121
Feeling	4.412	0.357	0.127
Operational Effectiveness	3.628	0.174	0.030
Perception			
Product Strategy	3.434	0.533	0.284
Price Strategy	3.787	0.631	0.398
Place Strategy	3.521	0.674	0.454
Promotion Strategy	3.181	0.522	0.272
People Strategy	3.311	0.566	0.320
Process Strategy	3.170	0.778	0.605
Physical Evidence Strategy	3.532	0.587	0.345
Experience			
Product Strategy	3.648	0.600	0.360
Price Strategy	3.563	0.602	0.362
Place Strategy	3.451	0.469	0.220
Promotion Strategy	3.401	0.576	0.332
People Strategy	3.379	0.747	0.559
Process Strategy	2.984	0.543	0.295
Physical Evidence Strategy	3.580	0.799	0.638

SPSS findings for – Factor Loadings (R.C.T.)

Table 3.3: Factor Loadings

Factor loadings using EFA (VARMAX)				
Variables	No. of items	Items with loading >0.5 and are loaded on one variable	Items with loading >0.5 and are cross loaded	Items with loading <0.5
Awareness	29	29	0	0
Usage	29	29	0	0
Importance	16	13	0	3
Feeling	20	14	2	4
Operational Effectiveness	19	13	0	6
Perception				
Product Strategy	9	8	1	0
Price Strategy	6	6	0	0
Place Strategy	6	5	0	0
Promotion Strategy	5	3	0	2
People Strategy	4	4	0	0
Process Strategy	7	6	0	1
Physical Evidence Strategy	5	4	0	1
Experience				
Product Strategy	9	8	1	0
Price Strategy	6	6	0	0
Place Strategy	6	4	2	0
Promotion Strategy	5	4	1	0
People Strategy	4	4	0	0
Process Strategy	7	6	0	1
Physical Evidence Strategy	5	4	0	1

SPSS findings for – Communalities & Eigen Values

Table 3.4 Communalities & Eigen Values -EFA

Communalities & Eigen Values			
Variables	No. of items	Items with value >0.5	No. of Items with eigen value
Awareness	29	29	3
Usage	29	29	3
Importance	16	14	4
Feeling	20	20	0
Operational Effectiveness	19	19	9
Perception			
Product Strategy	9	9	4
Price Strategy	6	4	1
Place Strategy	6	5	2
Promotion Strategy	5	3	2
People Strategy	4	4	2
Process Strategy	7	7	3
Physical Evidence Strategy	5	4	2
Experience			
Product Strategy	9	9	1
Price Strategy	6	2	1
Place Strategy	6	6	3
Promotion Strategy	5	5	2
People Strategy	4	2	1
Process Strategy	7	6	1
Physical Evidence Strategy	5	5	1

3.18 Summary of Research Methodology:

Objective-wise Methodological Alignment

To ensure coherence between the research objectives and the employed methodology, this section presents an integrated alignment of each objective with corresponding hypotheses, data collection methods, and analytical tools. This structured mapping strengthens the internal validity of the study by ensuring that each objective is methodically addressed and supported by appropriate empirical procedures.

Objective	Hypothesis	Data Collection Method	Statistical Tool
Obj. 1: To identify key customer and product segments influenced by innovation.	H1: There is no impact on any Customer segment or product segment due to financial innovations.	Survey (200+ respondents of diverse demographics)	Cross-tabulation, Chi-square test
Obj. 2: To compare Indian financial innovations with those in developed countries.	H2: All countries have similar and uniform pace of growth in financial innovations.	Secondary data (RBI, IMF, World Bank reports)	Comparative Regression Analysis
Obj. 3: To study product, process and institution innovations in Indian Banking Industry and their impact on existing banks.	H3: There is no impact of Financial innovations on existing banks in Indian Banking.	Survey (structured questionnaire), Secondary bank data	Descriptive statistics, Correlation
Obj. 4: To identify demand and supply side drivers of financial innovations.		In-depth interviews (10 banking professionals)	Exploratory Factor Analysis (EFA)

CHAPTER 4

INNOVATION IN INDIAN BANKING SYSTEM WITH FINANCIAL INNOVATIONS HAPPENING IN DEVELOPED COUNTRIES

4.1 INTRODUCTION

Financial services, digital payment services, electronic banking, risk management, remittances, new financial products, social welfare, and e-business are all influenced by financial innovation in the 21st century digital world (Lerner & Tufano, 2011; Oyelami, Adebisi, & Adekunle, 2020). As previously discussed (Giudici, 2018; Alt, Beck, & Smits, 2018), the widespread use of financial technologies allows for the expansion of commercial activities, electronic business, the possibility of expanding customer base, and the management of a high level of competitiveness and risk among banking businesses in the global market. The worldwide transaction value for digital payments is expected to reach approximately US\$5,000,000 in 2020, according to the digital payments report in 2020. Financial process innovation, as opposed to product or service innovation, is expected to have the greatest impact on a country's economy via its influence on the financial industry. One of the most significant and pervasive advancements in recent history has been in technology. Using digital payment methods has been shown to lower transaction costs and aggregate expenditures (Ozili, 2018), hence increasing financial access or a country's financial base. According to the literature (Majeed and Ayub, 2018; Haftu, G.G. 2018), process innovation is the widespread use of information and communication technology (ICT) infrastructure that helps the financial industry by making incremental but significant improvements to the efficiency and effectiveness of financial operations. ICT infrastructure encompasses the usage of debit or credit cards, online banking, mobile payment or digital payment services etc in the financial sector that alters our everyday lives by making financial services more accessible to the population. According to the World Bank (2019a, 2019b), the number of internet users in nations across all economic brackets has been

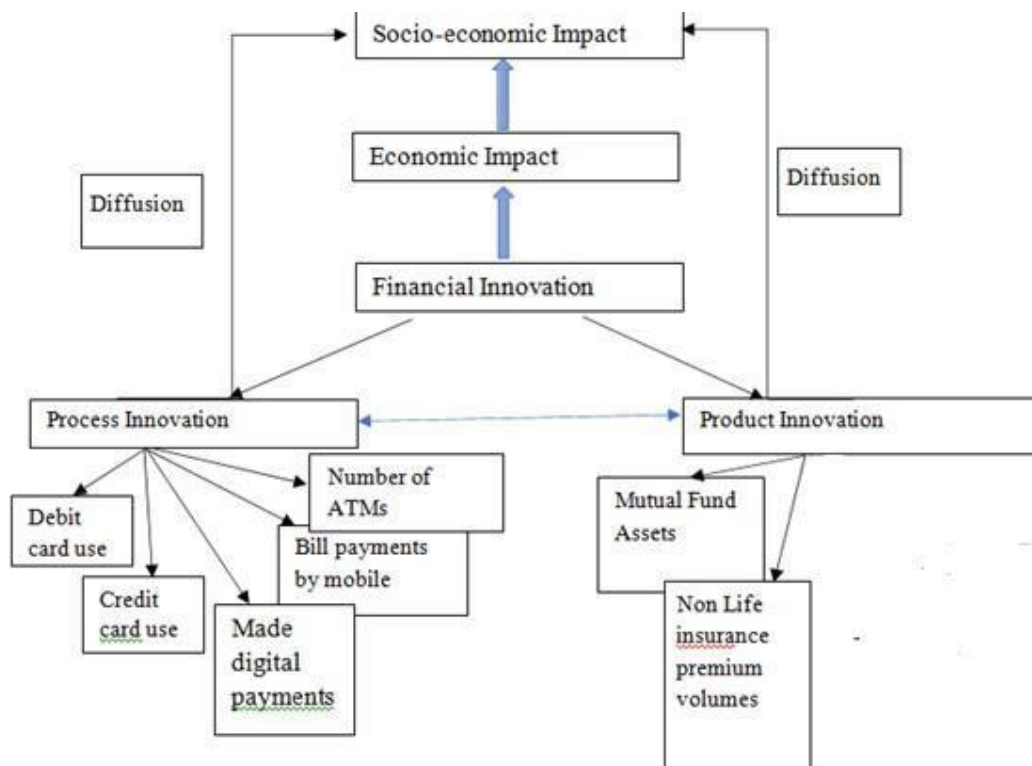
growing. Hence a successful application of ICT is a fundamental need in order to allow financial innovation throughout the nations. Increased operational efficiency, lower transaction costs, more commerce, more innovation, more jobs, higher demand, and a more developed financial sector are all possible thanks to the widespread use of information and communication technologies (ICT)(Pradhan, Arvin, & Norman, 2015).

Better internet and mobile networks seem to have the ability to boost the performance of the financial industry, which is not surprising given the significance of ICT infrastructure behind innovation. In a panel data setting, researchers have paid a lot of attention to the causal connection between financial innovation, inclusion, and ICT (Chatterjee, 2020). The common people need to be made more financially literate so that ICT productivity indicators may be used to enhance the financial sector's productivity and efficiency. Therefore, in developing nations where a significant portion of the population relies on agriculture despite a low per capita income and a low level of educational attainment, there are certain conditions to adopting this new technology. Due to inadequate regulations and insufficient expenditures, the benefits of financial innovation have mostly been seen in the developed world (Niebel, 2018). It has been extensively discussed how product and process innovations are intertwined.

In contrast to the external market and consumer preferences that drive product innovation (Baluch and Ariff, 2007), the internal needs of a business are the driving force behind process innovation in the financial services industry. Since late 2016, OTC derivatives have been on the rise, suggesting more institutional involvement in the international financial system (Triennial Central Bank Survey 2017, BIS). According to research published by the Deutsche Borse Group in 2008 (The Global Derivative Market: An Introduction), derivatives are the most complex kind of financial instrument. The development of new derivatives has been shown to increase banking sector profits, which in turn boosts the economy's capacity for lending and growth (Prabha et al., 2014; Yorulmazer, 2012). The introduction of a derivative as a new class of products with distinctive profit profiles is only one example of the various ways in which product innovation may manifest itself.

Due to its dependence on factors like education level, financial literacy, software proficiency, awareness, etc., financial innovation may exacerbate digital divide and economic inequality. There is a wide range in the pace and pattern of financial innovation. It took automatic teller machines, microfinancing, and inflation-indexed bonds some time to become widely used as examples. As a result, the effect of financial innovation on the course of development is not always clear. This study aims to clarify the differences between product and process innovations in the financial sector and assess their respective societal and economic impacts. This motivates us to create a conceptual framework to investigate the link between financial disruption, economic growth, and societal elements.

Figure 4.1: Schematic Representation of Financial Innovation and its Socio-economic Impact



Source: Authors' construction

The Gross Domestic Product (GDP) per person has been our metric of choice. The Human Development Index (HDI) and the unemployment rate as a share of the labor force are two indicators of a country's level of development.

We've developed an index to track both the product and process sides of financial innovation. We've looked at the correlation between financial innovation and emerging countries' and advanced economies' societal and economic growth. Conversely, process innovation has been shown to have a significant positive correlation with both per capita income and human development. Process innovation also reduces unemployment and generating some job chances after some gestational lag. Product innovations, on the other hand, have been shown to have a negative impact on GDP per capita. However, there is minimal growth potential in product innovation because of the restricted access to financial goods in certain nations.

4.2 DATA DESCRIPTION AND METHODOLOGY

4.2.1 Detailed explanations of the data, the model, the estimate procedure, and the index building are provided here.

4.2.2 The sources include the World Bank's Non-banking financial database (World Findex), the World Bank's Financial Access Survey (FAS) of the International Monetary Fund (IMF), the Bank of International Settlements (BIS), the World Bank's Global Financial Inclusion (Global Findex) Database, the World Development Indicator (WDI) of the World Bank, the World Bank's national accounts data, the Organization for Economic Co-operation and Development's (OECD) National Accounts data files, The lack of continuous data over a sufficient time frame is a major limitation of the study. Data is missing for several nations for earlier years (2011, 2014, 2017, and 2021). Cross-sectional analyses of certain time periods are conducted to address the issue of sparse data. The study estimates a

simultaneous equation system to analyze how financial innovation affects economic growth and development, taking into account two types of innovations (Process Innovation and Product Innovation). Six nations in all are leaders in process innovation. The research takes into account consumers from a variety of economic brackets in Australia, China, India, South Africa, the United States, and the United Kingdom when looking at product innovation. The effects of financial innovation on nations' developmental processes may be quite variable. A cross-section dummy is added to classify developed nations in order to account for this diversity. plus India. There are four developed nations and one developing country as south Africa and India is in the latter category for the purposes of this analysis. According to the statistics, process innovation is much more common than product innovation, and its reach is mostly confined to industrialized nations.

Model specifications Model I: Process Innovation

Human development has been shown to be associated to per capita income (M. Ul. Haq, 1996; Anand and Sen, 1994). We've built a model with GDP per capita, unemployment, and progress toward human development all functioning as endogenous factors. The use of SES has increased in recent years as a means of investigating these connections (Andrei et al., 2009a, 2009b). Here is the 3sls version of the Simultaneous Equation Model:

$$\begin{aligned}
 (HDI)_i &= \beta_{10} + \beta_{12}(\text{Unemployment as percentage of total labour force})_i \\
 &+ \gamma_{11}(\text{Secondary School Enrollment as a share of Gross Enrollment})_i \\
 &+ \gamma_{13}(\text{Urban Population as a percentage of Total Population})_i \\
 &+ \gamma_{14}(\text{Process Innovation Index})_i + \gamma_{15}(D * \text{Process Innovation Index})_i \\
 &+ u_{1i} \dots \dots (2.i)
 \end{aligned}$$

$$\text{Log(Per Capita GDP)}_i$$

$$= \beta_{20} + \beta_{21}(HDI)_i$$

$$\begin{aligned}
& + \beta_{22}(\text{Unemployment as percentage of total labour force})_i \\
& + \gamma_{21}(\text{Trade openness as a share of GDP})_i \\
& + \gamma_{22}(\text{Gross Fixed Capital Formation as a share of GDP})_i \\
& + \gamma_{23}(\text{Urban Population as a percentage of Total Population})_i \\
& + \gamma_{24}(\text{ICT goods imports as a share of total goods imports})_i \\
& + \gamma_{25}(\text{Industry Value Added as a share of GDP})_i \\
& + \gamma_{26}(\text{Service Value Added as a share of GDP})_i \\
& + \gamma_{27}(\text{Process Innovation Index})_i + \gamma_{28}(D * \text{Process Innovation Index})_i \\
& + u_{2i} \dots \dots (2. ii) \\
& (\text{Unemployment as percentage of total labour force})_i
\end{aligned}$$

$$\begin{aligned}
& = \beta_{30} + \beta_{31}\text{Log}(\text{Per Capita GDP})_i \\
& + \gamma_{31}(\text{Secondary School Enrollment as a share of Gross Enrollment})_i \\
& + \gamma_{32}(\text{Inflation})_i + \gamma_{33}(\text{Population Growth})_i \\
& + \gamma_{34}(\text{Process Innovation Index})_i + \gamma_{35}(D * \text{Process Innovation Index})_i \\
& + u_{3i} \dots \dots (2. iii)
\end{aligned}$$

$i = 1 \dots N$ and $t = 2014, 2017, 2021$;

N : the number of countries

u_{1i} , u_{2i} and u_{3i} are error terms corresponding to the first, second and third equation respectively. β_{10} , β_{20} , β_{30} constants corresponding to the first, second and third equation respectively.

4.2.2 Model II: Product Innovation

$$\begin{aligned}
(HDI)_i & = \beta_{10} + \beta_{12}(\text{Unemployment as percentage of total labour force})_i \\
& + \gamma_{11}(\text{Secondary School Enrollment as a share of Gross Enrollment})_i
\end{aligned}$$

$$\begin{aligned}
& + \gamma_{13}(\text{Urban Population as a percentage of Total Population})_i \\
& + \gamma_{14}(\text{Product Innovation Index})_i + \gamma_{15}(D * \text{Product Innovation Index})_i \\
& + u_{1i} \dots \dots (2. iv)
\end{aligned}$$

$$\text{Log(Per Capita GDP)}_i$$

$$\begin{aligned}
& = \beta_{20} + \beta_{21}(\text{HDI})_i \\
& + \beta_{22}(\text{Unemployment as percentage of total labour force})_i \\
& + \gamma_{21}(\text{Trade openness as a share of GDP})_i \\
& + \gamma_{22}(\text{Total Value of Stock traded as share of GDP})_i \\
& + \gamma_{23}(\text{Urban Population as a percentage of Total Population})_i \\
& + \gamma_{25}(\text{Industry Value Added as a share of GDP})_i \\
& + \gamma_{26}(\text{Service Value Added as a share of GDP})_i \\
& + \gamma_{27}(\text{Product Innovation Index})_i + \gamma_{28}(D * \text{Product Innovation Index})_i \\
& + u_{2i} \dots \dots (2. v)
\end{aligned}$$

$$(\text{Unemployment as percentage of total labour force})_i$$

$$\begin{aligned}
& = \beta_{30} + \beta_{31}\text{Log(Per Capita GDP)}_i \\
& + \gamma_{31}(\text{Secondary School Enrollment as a share of Gross Enrollment})_i \\
& + \gamma_{32}(\text{Inflation})_i + \gamma_{33}(\text{Population Growth})_i \\
& + \gamma_{34}(\text{Product Innovation Index})_i + \gamma_{35}(D * \text{Product Innovation Index})_i \\
& + u_{3i} \dots \dots (2. vi)
\end{aligned}$$

The endogenous variables we have selected are log of GDP (Gross Domestic Product) per capita and HDI (Human Development Index) and Unemployment. The logarithm of the gross domestic product per person is a measure of the state of the economy. Totals are expressed in 2010 US dollars for ease of comparison. There is a clear tendency for GDP to

be used in isolation from other measures of economic success and progress, with the latter often being neglected. GDP per capita has been used by researchers such as Sarma and Pais (2011), Chatterjee (2020), and Baluch and Ariff (2007) to capture the income distributional characteristics of a society. However, Sarma and Pais (2011) have instead used the HDI (Human Development Index) to understand development. Details definitions of dependent and control variables utilized in our study along with their sources are provided in appendix A (Table 4.1 and 4.2).

Both the Process Innovation Index (PII) and the Product Innovation Index (PrII) are built using principal component analysis (PCA; for a further discussion, see the methodology section). A dummy designed for cross-country racing is shown.

D=0 for India D=1 for Developed Countries

This ‘D’ is interacted with innovation index to examine the impact of country-specific characteristics on the effect of innovation on socio-economic conditions of the nations.

4.2.3 Control Variables

Using control variables improves the reliability of the findings by eliminating confounding influences on the dependent variables that can't be attributed to the primary independent variables. Some of the socio-economic factors are included in the set of control variables (see Table 4.2 for complete definitions) in order to quantify the societal effects of financial innovation. To estimate the impact of ICT infrastructure on GDP growth, Chatterjee (2020) employs regression equations, adjusting for several macroeconomic variables like trade openness (TO) as a percentage of GDP, population growth (POP), urbanization (URBAN) as a percentage of total population, secondary school gross enrolment (SSE), and consumer price inflation (CPI).

In the wake of the aforementioned empirical articles, this study incorporates IVA and SVA into its models of financial innovation. ICT import is a part of the process innovation model since it regulates the impact of ICT-enabled innovations, as proposed by Chatterjee (2020).

Research done by George Tsetsekos (2000); Baluch and Ariff (2007) examined stock market value traded (SM) (% of GDP) as a proxy for capital market conditions for the establishment of derivative markets. That's why it's a key factor in the product innovation model's controls. Finally, Gross Fixed capital Formation as a percentage of GDP (GFCF) is a metric employed as a control measure in the innovation model (Pradhan, Mallik, & Bagchi, 2018).

4.3 FINANCIAL INNOVATION INDICATORS

Both the financial process innovation index (PII) and the financial product innovation index (PrII) are examples of the innovation indices alluded to in (i) and (ii). Researchers have offered many ideas (Dan Awrey, 2013) that classify innovations into two broad categories: product innovation and process innovation. The goals of this chapter are addressed by the use of Principal Component Analysis to the development of two indices measuring product and process innovation, respectively.

(A) Product Innovation variables:

Mutual fund asset (percentage of GDP):

Mutual funds are a sort of professionally managed investment fund that, according to a number of studies (Lerner & Tufano, 2011; ICI Global reports from a variety of years), are among the most successful financial innovations of the last several decades. The mutual fund sector, both in the United States and internationally, has grown rapidly during the last several decades. The mutual fund sector has a significant impact on stock prices because of its ownership over large amounts of company equity. As a consequence, investors are becoming more wary about making poor fund choices and are calling for more comprehensive mutual fund data and guidance.

Nonlife insurance premium volume (percentage of GDP):

Auto insurance, home insurance, health insurance, accident insurance, trip insurance, disaster insurance (fire, flood, earthquake, etc.), credit insurance, mortgage insurance, and

many more are all included in the broad category of "non life insurance," which also encompasses many other forms of insurance. Global Data Insurance Intelligence Centre reports that digital disruptors are rapidly expanding their product offerings in the insurance sector, particularly in the area of non-life insurance, in an effort to provide consumers with more freedom of choice and superior quality of service. Swiss Re Global Report (2015) reveals that, the demand for the main non-life insurance is growing as comparing to the year 2014 throughout the globe. Gains of 5.6% in 2015 were followed by projections for 7.9% and 8.7% increase in non-life real premium growth in developing countries in 2016 and 2017, respectively. The success of insurance companies contributes to overall economic development.

(B) Process Innovation variables

Modern innovations such as automated teller machines, debit cards, credit cards, mobile money, and other types of digital payments have radically altered the financial services industry's traditional revenue model. The effects of electronic payment and transaction services on economic development have been the subject of a great deal of study (Bacache, Bourreau, & Gaudin, 2013; Bertschek, Cerquera, & Klein, 2013;). As a result, we have used some ICT-enabled variables in this study to represent a novel process in the financial sector that has revolutionized the mode of transactions through the use of digital platforms, such as plastic money, card-based transactions, and of course cashless transactions via mobile or internet. These are categorized as process-related innovations in our study.

4.4 INNOVATION INDEX CONSTRUCTION

This chapter analyzes both process and product innovations in the banking sector. Methods for developing a multidimensional index of Process Innovation (PII) and Product Innovation (PrII) are based on those developed by the OECD and Cámara and Tuesta (2017). Principal Component Analysis (PCA) is used to derive the index weights in a two-stage process. For the years 2011, 2014, and 2017, PII are built for 95 nations, while PrII are built for 46. PCA is the most the scientific techniques of index generation in the presence of at least three variables (According to Steiger, 1979, PCA is chosen above

Common Factor Analysis as an indexing approach). The factors used to build indices in the current study are correlated. During factor analysis, the variables associated with innovation are given relative weights. The multi-dimensional index of financial innovation is built using endogenous weights. Let us consider that the equation as follows:

$$FII = \omega_1 V_{1i} + \omega_2 V_{2i} + \omega_3 V_{3i} + \omega_4 V_{4i} + \omega_5 V_{5i} + \omega_6 V_6 + \dots + \omega_i V_i \quad (2.vii)$$

where i is the total number of process and product categories with their own unique sets of variables. The i 's in S represent the importance levels of the financial innovation variables. The relative importance of the various process innovations is detailed in Table 4.1, while that of the various product innovations is detailed in Table 4.2. (Exact procedure for PCA weight construction).

The rate of adoption of process innovation and product innovation is significantly different in industrialized and developing nations. According to The Global Findex Database 2017, World Bank, Payment cards such as debit or credit cards allow account owners a simple option to make payments from their account without withdrawing cash. World Bank data from 2019 shows that whereas 81% of individuals in high-income countries used a debit or credit card to make a purchase in 2017, just 22% of persons in low-income countries did so. In 2017, 55% of people in high-income nations said they had a credit card, although in emerging economies, that number has been relatively constant at approximately 10%.

Debit card, credit card, and digital payment method of transactions use increased significantly in developed and developing countries in 2017 (see Table 4.5). However, the number of ATMs per 100,000 individuals and the prevalence of mobile phone bill payment are declining. Therefore, digital payments are undeniably replacing traditional payment methods worldwide.

Process Innovation Index Variables:

Table 4.1: ATM per lac of Population

ATM per lac of population	2014	2017	2021
Australia	1.6523	1.6032	1.2359
China	0.5475	0.8384	0.8144
India	0.1773	0.22	0.2144
South Africa	0.655	0.6774	0.4355
United Kingdom	1.2951	1.2794	0.9628
United States	0.1985	0.1987	0.1989
Average ex India	0.86968	0.9194	0.7295
Overall Average	0.75428	0.8029	0.64365

Table 4.2: Credit card used %

Used a credit card (% age 15+)	2014	2017	2021
Australia	0.5856	0.5969	0.5141
China	0.1583	0.1949	0.3795
India	0.0418	0.03	0.0462
South Africa	0.1346	0.0887	0.1001
United Kingdom	0.6169	0.6537	0.6211
United States	0.6013	0.656	0.667
Average ex India	0.41934	0.438	0.4564
Overall Average	0.3564	0.37	0.388

Table 4.3: Debit Card use %

Used a debit card (% age 15+)	2014	2017	2021
Australia	0.8887	0.8996	0.9594
China	0.4856	0.6574	0.7576
India	0.2207	0.3272	0.2707
South Africa	0.5487	0.3413	0.5887
United Kingdom	0.9637	0.9145	0.9546
United States	0.7623	0.8023	0.828
Average ex India	0.7298	0.723	0.81766
Overall Average	0.645	0.6571	0.7265

Table 4.4: %age making digital payment

Made a digital payment (% age 15+)	2014	2017	2021
Australia	0.72	0.81	0.89
China	0.38	0.65	0.83
India	0.22	0.34	0.44
South Africa	0.15	0.3	0.46
United Kingdom	0.68	0.78	0.87
United States	0.63	0.74	0.81
Average ex India	0.512	0.656	0.772
Overall Average	0.4633	0.6033	0.7167

Table 4. 5 : %age making utility payment by mobile phone

Made a utility payment: using a mobile phone (% who paid utility bills, age 15+)	2014	2017	2021
Australia	0.15	0.28	0.54
China	0.04	0.23	0.68
India	0.03	0.21	0.63
South Africa	0.04	0.16	0.33
United Kingdom	0.12	0.25	0.47
United States	0.11	0.23	0.43
Average ex India	0.092	0.23	0.49
Overall Average	0.0817	0.2267	0.5133

Source: Worldbank data

Process Innovation Index

Table 4. 6 Process Innovation Index

Process Innovation Index	2014	2017	2021		Average	%
Australia	0.79932	0.8379	0.8279		0.8217	82.171
China	0.32228	0.5141	0.6923		0.5096	50.957
India	0.13796	0.2254	0.3203		0.2279	22.789
South Africa	0.30566	0.3135	0.3829		0.334	33.4
United Kingdom	0.73514	0.7755	0.7757		0.7621	76.212
United States	0.46042	0.5254	0.5868		0.5242	52.42
Average ex India	0.5246	0.5933	0.6531	Average ex India	0.5903	59.0321
Average	0.4601	0.5320	0.5976	Average	0.5299	52.9916

FINDINGS – PROCESS INNOVATION INDEX

- Process Innovation Index of India and South Africa is much lower than developed nations.
- Process innovations started in South Africa much earlier than India so SA Index value is better than India.

- There is marked improvement in index for china and India as due to high population the penetration of innovation takes time and has improved over the years.
- UK, US and Australia are stagnant or improved marginally in Index.
- India Improvement in Index value is 146% from 2014 to 2021 which shows that process innovations get spread at faster and rapid rates.

India Index value has moved from 25% in 2014 to 50% in 2021 (of average values ex-India) which shows that India is catching up fast with developed nations on process innovation.

Product Innovation Index Variables :

Table 4. 7: Mutual Fund asset as % of GDP

Mutual fund asset (percentage of GDP):	2014	2017	2021
Australia	109.76	161.74	185.09
China	7.15	13.71	18.03
India	8.44	12.43	15.84
South Africa	41.74	51.99	61.54
United Kingdom	48.97	71.92	77.61
United States	107.76	118.75	125.38
Average ex India	63.076	83.622	93.53
Average	53.97	71.7567	80.582

Table 4.8: Nonlife premium volume as %age of GDP

Nonlife insurance premium volume (percentage of GDP):	2014	2017	2021
Australia	2.21	2.14	2.24
China	1.11	1.19	1.17
India	0.52	0.66	0.65
South Africa	2.47	2.56	2.91
United Kingdom	2.46	2.01	2.03
United States	3.16	3.21	3.39
Average ex India	2.282	2.222	2.348
Overall Average	1.988	1.962	2.065

Product Innovation Index

Table 4.9 Product Innovation Index

Product Innovation Index	2014	2017	2021		Average
Australia	55.985	81.94	93.665		77.1967
China	4.13	7.45	9.6		7.0600
India	4.48	6.545	8.245		6.4233
South Africa	22.105	27.275	32.225		27.2017
United Kingdom	25.715	36.965	39.82		34.1667
United States	55.46	60.98	64.385		60.2750
Average ex India	32.679	42.922	47.939	Average ex India	41.18
Average	27.9792	36.859	41.3233	Average	35.3872

Product Innovation Index - Findings:

- Product Innovation Index of India and China is much lower than developed nations.
- China despite being developed nation has lesser value of Product innovation as due to large population Process innovation took time to spread thus creating a lag in Product innovations.

- Similar to Process Innovations , Product innovation also started in South Africa much earlier than India so SA Index value is better than India.
- Due to better Infrastructure, ICT, availability of funds and other factors like literacy, HDI etc there is higher improvement in index for developed nations as compared to India.
- India Improvement in Index value is 45% from 2014 to 2021 which shows that product innovations take time to spread in developing nations as compared to process innovations.
- India Index value has moved from 13% in 2014 to 17% in 2021 (of average values ex-India) which shows that India is taking time to catch up with developed nations on product innovation.

4.5 EMPIRICAL ANALYSIS

Empirical analysis has two subsections, describing the impact of process innovation and impact of product innovation on per capita income level, socio-economic development and unemployment level respectively. In our current research we have formulated two models to address two type of financial innovation.

Country Wise value of all variables used in analysis:

HDI

Table 4.10: HDI

Country	2011	2014	2017	2021
Australia	0.929	0.931	0.937	0.951
India	0.547	0.619	0.640	0.633
SA	0.619	0.712	0.72	0.713
USA	0.91	0.919	0.924	0.921
UK	0.863	0.924	0.93	0.929
CHINA	0.707	0.727	0.752	0.768

Secondary School Enrollment

Table 4.11 : School Enrollment

Country	2011	2014	2017	2021
Australia			153.58	135.53
India	64.86	72.28	71.92	78.06
SA	88.29	105.67	111.63	111.80
USA		97.51	98.70	101.00
UK	89.75	89.87	92.45	
CHINA			88.3	91.4

Unemployment (as a % of labour force)

Table 4. 12 Unemployment

Country	2011	2014	2017	2021
Australia	5.3	6.1	5.4	5.12
India	8.1	4.1	3.9	4.2
SA	29.8	22.61	27.7	28.7
USA	8.9	6.2	4.1	5.31
UK	7.4	6.11	4.4	4.83
CHINA	4.55	4.63	5.2	4.55

Urban Population (as % of total population)

Table 4.13: Urban Population

Country	2011	2014	2017	2021
Australia	85.30	85.60	85.90	86.36
India	31.28	32.38	33.60	35.39
SA	62.75	64.31	65.85	67.85
USA	80.94	81.48	82.06	82.87
UK	81.57	82.37	83.14	84.15
CHINA	50.51	54.26	57.96	62.51

Country wise Trade openness (Sum of exports and imports of goods and services)

Table 4.14: Trade Openness

Country	2011	2014	2017	2021
Australia	41.84	42.47	41.95	39.87
India	55.62	48.92	40.74	45.29
SA	54.64	59.50	53.54	56.22
USA	30.84	30.00	27.28	25.48
UK	63.16	58.86	62.80	56.67
CHINA	50.74	44.91	37.63	37.47

Country wise Gross Fixed Capital Formation (% of GDP)

Table 4. 15 GFCF

Country	2011	2014	2017	2021
Australia	26.02	26.88	24.00	22.45
China	43.86	43.86	41.86	41.95
United Ki	15.64	16.52	18.14	17.33
India	34.31	30.08	28.18	28.91
United Sta	18.74	20.30	20.65	21.19
South Afri	17.81	18.30	16.40	13.09

Country Wise ICT Good Imports (% of total imports)

Table 4.16: ICT Goods Import

Country	2011	2014	2017	2021
Australia		9.18	9.55	10.00
China		19.71	22.72	23.71
India		6.31	9.72	9.39
South Africa		7.83	8.11	7.86
United Kingdom		7.82	7.77	7.56
United States		12.86	14.28	14.00

Industry Value Added (% of GDP)

Table 4.17: Industry Value Added

Country	2014	2017	2021
Australia	25.58	23.47	25.52
China	43.09	39.85	39.29
India	27.66	26.50	26.07
South Africa	24.31	23.61	24.50
United Kingdom	18.17	17.72	17.30
United States	19.33	18.44	17.88

Country wise Services value added (% of GDP)

Table 4.18: Service Value Added

Country	2014	2017	2021
Australia	65.69	67.01	65.65
China	48.27	52.68	53.47
India	47.82	47.67	47.94
South Africa	64.01	64.33	63.02
United Kingdom	70.25	70.91	71.60
United States	75.83	77.03	77.60

Country wise GDP per Capita

Table 4.19: GDP Per Capita

Country	2011	2014	2017	2021
Australia	62598.69	62515.31	53934.15	60444.5
China	5614.386	7636.074	8817.045	12617.5
United Kingdom	42150.7	47447.59	40622.69	46585.9
United States	50065.97	55123.85	59907.75	70219.47
South Africa	8737.041	6965.138	6734.475	7055.055
India	1449.6	1559.86	1957.97	2238.13

Country Wise Inflation

Table 4.20: Inflation

Country	2011	2014	2017	2021
Australia	3.30	2.49	1.95	2.86
China	5.55	1.92	1.59	0.98
United Kingdom	3.86	1.45	2.56	2.52
India	8.91	6.67	3.33	5.13
United States	3.16	1.62	2.13	4.70
South Africa	5.00	6.13	5.18	4.61

Country wise Population

Table 4.21: Population

Country	2011	2014	2017	2021
Australia	22357032	23469578	24590336	25921094
China	1357095400	1385189600	1410276000	1425893500
United Kingdom	63286360	64773504	66064810	67281040
India	1257621200	1307246500	1354195700	1407563900
United States	313876600	322033950	329791230	336997630
South Africa	52443320	54729556	56641210	59392256

4.5.1 Impact of Process Innovation on Per Capita Income, Human Development and Unemployment

Table 4.22: Impact of Process Innovation on Per Capital Income

	2014		2017		2021	
Endogenous Dependent Variable: Log GDP per capita	Coeff.	Std. Err	Coeff.	Std. Err	Coeff.	Std. Err
Human Development Index(HDI)	.370	0.16	0.199	0.597	3.414	0.702
Unemployment, total (% of total labour force)	0.123	0.342	1.212*	0.493	.231*	0.001
Urban population (% of total population)	-0.026	0.257	-.058*	0.012	-.067*	0.019
Trade openness (Sum of exports and imports of goods and services measured as a share of gross domestic product)	0.01	0.033	.058*	0.009	.071*	0.008
Gross fixed capital formation(% of GDP)	-0.008	0.073	0.014	0.009	.035	0.012
ICT goods imports (% total goods imports)	-0.026	0.132	0.104*	0.007	0.12*	0.01
Industry (including construction), value added(% of GDP)	-0.161	0.68	0.102*	0.006	0.23	0.002
Services, value added (% of GDP)	.121	0.245	.078*	0.011	.087*	0.014
Process Innovation Index	.234*	0.342	-.114*	0.009	-.115*	0.014
D*Process Innovation Index	1.282*	0.29	0.321*	0.005	0.31*	0.002
R-sq	0.919		0.987		0.968	

Source: Authors calculation

*indicates 10% level of significance, indicates 5% level of significance, *indicates 1% level of significance

Per capita income is considered as an important yardstick to measure the economic performance of a country. Table 4.4 describes the estimation results of process innovation on the per capita income level of countries. Econometric analysis exhibits that process innovation has a significant positive impact on per capita GDP across countries throughout the time period.

It infers that ICT supported digitization in financial sector helps in increasing access to institutional finance to the unbanked population of the society and promotes financial inclusion by reducing the time and monetary cost. This accelerates economic performances of nations. This finding is in line with Hassan (2005) and Sassia and Goaid (2012) who show that ICT is an essential part of economy's growth process; it improves the productive capacity and competitiveness by improving efficiency.

It has been well established⁴⁶ that financial intermediaries play a key role in producing liquidity and mobilizing savings. For instance, Friedman and Schwartz's (1963) "money view" proposes that banks produce new money by issuing demand deposits. According to the money perspective, there is a positive correlation between money and actual economic activity over the business cycle, and this link is driven by monetary policy. The authors acknowledge that monetary policy influences business cycles and economic performance, but they fail to mention the role that lending channels play in determining the money supply. Digitization and the use of information and communication technology (ICT) in banking have made conducting financial transactions quickly, easily, and securely, which has contributed to an increase in the money supply. Bernanke, (2018) analyzed the importance of "money view" vs. "credit view" The former stresses changes in credit aggregates (which includes aggregate commercial bank loans) whereas the latter places more emphasis on monetary aggregates (48). The "credit view" that Bernanke and Gertler (1995) and Bernanke and Blinder (1988) presented demonstrates how monetary policy is communicated to the economy via bank lending channels. Our finding may be seen as symbolic of this route, whereby technology progress streamlines banking procedures and hence boosts bank lending. Bank lending channels have an effect on borrowers' premiums for accessing the capital markets. Our findings might be viewed as a rise in actual economic

activity caused by a rise in the availability of bank credit as a consequence of financial innovation that reduces the external finance premium for borrowers. As a result, a rise in bank credit brought about by innovation influences aggregate demand and will unquestionably boost economic activity across countries. Income levels are not significantly affected by the interactive variables regarding the baseline position of nations examined for process innovation.

Over the last several decades, the urban population has had a consistently positive influence on per capita income, even after controlling for HDI, the percentage of industrial value added in GDP, and the share of service value contributed in GDP. Increases in human development index are associated with improvements in worker health, well-being, and productivity.

Table 4.23: Impact of Process Innovation on Human Development Index

	2014		2017		2021	
Endogenous Dependent Variable: HDI	Coeff.	Std. Err	Coeff.	Std. Err	Coeff.	Std. Err
Unemployment, total (% of total labour force)	-.007	.006	-.001	.007	.167	.139
School enrolment, secondary(% gross)	.001	.001	.002	.003	-.004	.003
Urban population (% of total population)	.009*	.001	.010	.004	.020*	.001
Process Innovation Index	.032*	.002	0.32*	.201	.009*	.001
D* Process Innovation Index	53.667	33.86 9	.010	.181	0.01*	.0003
R-sq	0.943		0.864		0.948	

Source: Authors' calculation

**indicates 10% level of significance, indicates 5% level of significance, *indicates 1% level of significance*

The estimated effect of process innovation on the HDI from 2014 to 2021 is shown in Table 4.5. However, the human development index is a more all-encompassing indication of a country's progress toward human flourishing. In recent decades, more and more people have turned to digital money, which is facilitated by ICT-enabled devices. The findings suggest that process-based transactions improve not only the economic but also the human growth of countries. The ripple effect of economic growth is a boost to societal well-being and individual advancement. In this approach, financial inclusion is aided and overall progress is made via the use of ICT-supported process innovation. The coefficients of interacting term of process innovation nonetheless stay statistically negligible throughout the period, showing that present development status of a nation does not have any indirect impact on economic as well as human development.

This research shows that process innovation in the financial industry boosts both per capita income growth and human development in nations across the board, regardless of their starting levels of development at the turn of the previous decade.

Table 4.24: Impact of Process Innovation on Unemployment

	2014		2017		2021	
Endogenous Dependent Variable: Unemployment, total (%of total labour force)	Coeff.	Std. Err	Coeff.	Std. Err	Coeff.	Std. Err
Log GDP per capita	2.156	1.158	8.780**	2.977	2.318	1.934
School enrolment, secondary(%gross)	0.106	0.045	-.345*	0.161	0.04	0.088
Inflation, consumer prices(annual%)	-0.807	0.995	5.777*	2.515	-0.45	1.829
Population growth(annual%)	-6.24E-09	0	-1.577E-008**	0	-7.635E-009**	0
Process Innovation Index	1438023.879b	1.491	-0.65	10.865	6.776	17.862
D*Process Innovation Index	4358.103	2487.1	5.47	8.761	-2.758	13.172
R-sq	0.838		0.665		0.378	

Source: Authors 'calculation

**indicates10%levelofsignificance,indicates5%levelofsignificance,*indicates1%level of significance*

Only in 2017, the study indicates that process innovation has a considerable negative influence on unemployment. This means that process innovation is lowering unemployment rates while raising income levels in nations regardless of their beginning position, i.e., developed or developing. People may invest in their education to enhance their employment prospects by boosting access to financial services and their ability to utilize those services successfully. If financially excluded groups (MSMEs, agriculture, and others) began borrowing from formal financial institutions as access to financial services improved, more job possibilities would be created, as would unemployment rates. This conclusion is consistent with the claims of Mol (2014), Sykes et al. (2016), Mugo and Kilonzo (2017), and Blancher (2019) that financial inclusion decreases unemployment. Similarly, Bruhn and Love (2014) discovered that financial inclusion promotes employment. Thus, financial innovation boosts financial access and use, resulting in more start-ups and more employment possibilities, which leads to an increase in per capita income and, ultimately, overall human development of nations. However, the estimates suggest that process innovation has no major influence on unemployment until 2014. In the early years of the last decade, the dissemination of process innovation in the financial sector was primarily limited to the developed world, with developing countries having very little access to these services due to a lack of infrastructure, awareness, and financial literacy (World Bank Report, 2012). Although ICT dissemination in the financial industry has begun, its penetration is low. As a result, the influence on job creation is first undetectable. As a result, the influence on the economy and human development is felt in the early years of adoption; however, process-based innovations require time to generate employment in the economy. Adoption of process innovation builds pace over time, and its positive influence on socioeconomic aspects becomes visible.

The effects of population increase and inflation on unemployment are considerable. It may be inferred that process innovation has no impact on per capita income and HDI.

4.5.2 Impact of Product Innovation on Per Capita Income, Human Development and Unemployment

Product innovation in financial sector implies introduction of different financial product in the market. The financial market should be matured enough to reap the benefits of product innovation. The diffusion of product innovation however, is much slower than process innovation and first one is mainly restricted within the developed economies.

Table 4.25: Impact of Product Innovation on Economic Growth

	2014		2017		2021	
Endogenous Dependent Variable :Log GDP per capita	Coeff.	Std. Err	Coeff.	Std. Err	Coeff.	Std. Err
Human Development Index (HDI)	0	0.015	.105*	0.041	1.481***	0.092
Unemployment ,total (%of total labour force)	.011***	0.003	-.011***	0.001	-0.003	0.002
Trade openness(Sum of exports and imports of goods and services Measured as a share of gross domestic product	0.043	0.021	.004***	0.001	.005***	0.001
Total Value of stock traded as share of GDP	-.063**	0.017	.0031** *	0.001	.007***	0.001
Urban population (%of total population)	-0.014	0.029	-.056***	0.004	0.232***	0.001
Industry(including construction),value added (%of GDP)	-0.007	0.004	.041***	0.002	0.321***	0.001
Services, value added (% of GDP)	.250***	0.065	-.005***	0.001	-.020***	0.001
Product Innovation Index	0.231	0.012	.315***	0.044	.255***	0.054
D*Product Innovation Index	0.103	0.067	0.046	0.027	-0.029	0.047
R-sq	0.992		0.997		0.992	

Source: Authors' calculation

*indicates10%levelofsignificance,indicates5%levelofsignificance,*indicates1%level of significance

Estimation results (in Table 4.7) discover an interesting observation. It shows that product innovation does not have significant impact on per capita income in 2014, however it significantly impact on per capita income in 2021. This finding may indicate the volatile nature of financial products in the global economy.

It is observed from data exploration that the values of product Innovation Index have significantly increases from 2014 onwards. The massive increase in index value indicates high demand for financial products globally. This may lead to overall positive significant impact on the economy. Apparently, Product market essentially have some lagged impact on the economy. HDI, trade openness, industry value added and share of service sector have expected significant positive impact on economic growth specifically.

Table 4.26: Impact of Product Innovation on Human Development Index

	2014		2017		2021	
Endogenous Dependent Variable: HDI	Coeff.	Std. Err	Coeff.	Std. Err	Coeff.	Std.Err
Unemployment, total(% of total labour force)	-.024*	.006	.001	.008	-.005	.002
School enrolment, secondary(% gross)	.004*	.001	.005	.007	.000	.001
Urban population(% of total population)	.008*	.001	.008	.009	.007	.001
Product Innovation Index	.021	.106	-.225	.266	.395*	.074
D* Product Innovation Index	.319*	.077	-.154	.326	.034	.078
R-sq	0.979		0.803		0.941	

Source: Authors' calculation

*indicates 10% level of significance, indicates 5% level of significance, *indicates 1% level of significance.

Estimation results (described in Table 4.8) depicts that product innovation in financial sector have any significant impact on human development status of the economy in 2021 but no impact in 2014 and 2017. This may be caused due to the immature status of the new product markets, especially in the Indian economies. Among the controlling variables, the impact of unemployment and HDI remains same. Secondary school education and urban population has significant positive impact on human development index.

Table 4.27: Impact of Product Innovation on Unemployment

	2014		2017		2021	
Endogenous Dependent Variable: Unemployment, total(%of total labour force)	Coeff.	Std. Err	Coeff.	Std. Err	Coeff.	Std. Err
Log GDP per capita	-10.259	0.78	12.083***	0.228	3.705*	1.419
School enrolment, secondary(%gross)	.174***	0.034	-.561***	0.015	0.081	0.112
Inflation, consumer prices (annual%)	0.272	0.446	7.378***	0.207	-0.284	1.537
Population growth(annual%)	-7.768E-009**	0	-1.894E-008***	0	-1.091E-008**	0
Product Innovation Index	-6.217	4.643	1.053	1.752	5.633**	28.868
D*Product Innovation Index	8.152	2.645	16.324***	1.257	-45.495	22.19
R-sq	0.939		0.999		0.777	

Source: Authors' calculation

**indicates 10% level of significance, indicates 5% level of significance, *indicates 1% level of significance*

Estimation result shows that product innovation does have significant impact on unemployment in 2021. Interactive term containing initial status of nations and product innovation index also remains statistically insignificant due to product innovation.

4.6 STATUS OF FINTECH MARKET AND FINANCIAL INNOVATION OF SELECTED COUNTRIES

4.6.1 USA

As of 2023, the United States financial technology industry is estimated to be worth over \$1.5 trillion, making it the biggest and most developed in the world. The market is predicted to increase rapidly in the next years, owing to a number of reasons, including:

- ✓ Increasing numbers of individuals are gaining access to banking and other financial services via their smart phones and other digital devices. As a result, there has been a rise in the number of financial technology firms providing services like mobile banking and payment processing.
- ✓ The growing need for banking among unserved communities: Low-income people and small enterprises are two examples of underserved communities that conventional banks have struggled to help. To address this need, fintech firms have developed cutting-edge solutions that are both inexpensive and convenient.
- ✓ There has been a marked increase in the federal government's efforts to facilitate the growth of the financial technology industry in the United States. This is making conditions more conducive to the development and success of fintech firms.
- ✓ Only a few of companies, including PayPal, Square, and Stripe, control the US financial technology sector. Despite the dominance of a few large fintech firms, an increasing number of smaller firms are also having a major influence. These businesses are revolutionizing the financial services industry by creating groundbreaking new products and services.
- ✓ Some of the most influential developments in the American financial technology sector include:
 - The proliferation of digital payment methods, a development in which fintech firms have played a pioneering role. Apple Pay and Google Pay are just two examples of mobile wallets that make it simple to pay using a smartphone.

- The proliferation of "challenger banks," a new category of online-only financial institutions. More and more people are switching to these banks from more conventional ones because of the competitive pricing and novel services they provide.
- The widespread usage of AI: AI is being used to create a variety of fintech applications, including those for detecting fraud, providing customer care, and managing investments.
- ✓ Blockchain technology, a distributed ledger, may be used to keep tabs on financial dealings in an auditable and unalterable manner. To create innovative goods and services, such crypto currency exchanges and money transfer networks, fintech firms are investigating the potential of blockchain technology.

The financial technology (fintech) business in the United States is growing fast and will likely be an important factor in the development of the industry going forward. Companies in the financial technology sector are introducing novel approaches to the market and decreasing the price of financial services for consumers.

Financial innovation in USA^{7,8,9}

The financial industry in the United States has been at the forefront of innovation for many years, and this trend is continuing with the development of new technology and business models. Some of the best and most influential new developments in American finance include:

1. Artificial intelligence (AI)

Fraud detection, risk management, customer service, and investment management are just some of the areas where AI is being put to use in the financial industry. Financial

• ⁷ AI in Banking – An Analysis of America's 7 Top Banks: <https://emerj.com/wp-content/uploads/2020/03/AI-in-Banking-Executive-Cheat-Sheet.pdf>

• ⁸ <https://gfmag.com/award/best-financial-innovations-2023/>

⁹ <https://www.thalesgroup.com/fr/global/innovation-par-thales>

institutions may increase productivity, decrease expenses, and enhance the customer service they give with the use of AI-powered solutions.

2. The Blockchain

As a decentralized ledger system, blockchain might drastically improve the banking industry. Blockchain technology can be used to keep transaction records that are both trustworthy and transparent, which might cut down on fraud and boost productivity.

3. Open Banking

With the advent of "open banking," customers now have greater say over their personal financial information. By allowing third-party apps access to their banking information, users may get more tailored and affordable financial services.

4. Mobile banking

The convenience of being able to check account balances and make payments from any location with an internet connection has contributed to the meteoric rise in popularity of mobile banking in recent years. Account balances, transaction histories, bill payments, and money transfers are just some of the functions available with mobile banking applications.

5. Robotic advisors

Robo-advisors are algorithm-based, algorithm-automated investing systems. The use of robo-advisers, which provide investing advice for a fraction of the cost of human advisors, is on the rise among younger investors.

4.6.2 United Kingdom

The United Kingdom (UK) is at the forefront of financial technology (fintech) innovation because of its robust ecosystem of startups and established businesses. With a total addressable market of over £1.2 trillion, the UK financial technology industry is one of the biggest and most developed in the world.

Growth in the UK fintech business may be attributed in large part to the country's favorable regulatory climate, which has attracted both investment and innovation.

Demand for fintech goods and services is being driven by the UK's big and tech-savvy populace.

Financial technology firms in the United Kingdom have benefited from the country's robust capital markets infrastructure, which provides easy access to cash.

Fintech innovation relies on a diverse pool of talent, and the United Kingdom (UK) excels in this regard.

One of the fastest-growing parts of the UK fintech business is mobile payments, which is being propelled by the rising adoption of smart phones and mobile applications.

- Open banking: Open banking is a new regulatory effort that facilitates access to client data and the delivery of new goods and services by fintech businesses.
- Regtech: Regtech is a rapidly expanding subset of the fintech business that is dedicated to creating tech-based solutions for the specific problem of ensuring that financial institutions are in full compliance with applicable rules and regulations.
- Insurtech: Insurtech is another rapidly expanding fintech business category devoted to the creation of innovative technological services for the insurance sector.

The potential for the UK financial technology market to expand:

The UK fintech sector is likely to continue to develop in the next years, driven by the reasons outlined above. By 2030, analysts predict the market would be worth more than £200 billion.

The government of the United Kingdom is keen on encouraging the development of the financial technology sector. The FinTech Sector Strategy, released by the government in 2017, outlines a number of objectives for the sector, such as:

- Establishing the United Kingdom as a leading financial technology hub.

- Promoting funding for financial technology businesses in the UK.
- Developing the skills and expertise required for the fintech sector.

Facilitating the widespread use of financial technologies.

Together with the Financial Conduct Authority (FCA), the UK government is working on an innovation-friendly framework for consumer protection.

The financial technology (fintech) sector in the UK is poised for substantial expansion in the years ahead. Key elements that will fuel development include a robust regulatory framework, a big and tech-savvy populace, availability to financing, and a vast talent pool. The government of the United Kingdom is dedicated to helping the sector expand, which will spur even more creative thinking.

Financial Innovation in UK^{10, 11, 12}

The United Kingdom is home to a thriving fintech sector and has a rich history of financial innovation. The United Kingdom's financial industry has seen some of the world's most cutting-edge inventions, including:

- **Mobile banking:** Mobile banking has grown in popularity in recent years, and it is currently utilized by more than half of all UK people. Banks like Barclays, Lloyds Bank, and HSBC have contributed to this trend by creating useful new applications.
- **Open banking:** An innovative new program that facilitates the transfer of personal banking information to unaffiliated service providers on behalf of their clients. As a result, several new and useful applications have been created to aid with financial management.

¹⁰ <https://www.ukfinance.org.uk/>

¹¹ <https://www.innovatefinance.com/>

¹² <https://fintechmagazine.com/venture-capital/why-uk-leads-global-digital-banking-industry>

- P2P payments: P2P payments applications like Monzo, Revolut, and Starling Bank have lowered transaction costs and simplified the process of sending and receiving funds. Young people are the biggest fans of these applications.
- Artificial intelligence (AI): AI has several applications in the financial services sector, including fraud detection, customer service, and risk management.
- Blockchain: A distributed ledger technology with the potential to disrupt the financial services sector, blockchain is a distributed ledger system. Foreign currency transactions, international commerce financing, and logistics all make use of it.

4.6.3 Australia

The financial technology industry in Australia is expanding rapidly. From 2023 to 2028, the market is projected to expand at a compound annual growth rate (CAGR) of 28.3 percent, reaching \$9.7 billion in value by 2028. The emergence of a variety of cutting-edge financial products, as well as the expanding trend of digitalization in the banking, financial services, and insurance (BFSI) business, are all major contributors to this expansion.

The growing use of digital payment methods is one factor propelling the fintech industry in Australia. More over 80% of all purchases made in Australia in 2022 were done using contactless payment methods. This is a huge jump from 2015, when it only accounted for 10% of all deals.

The expansion of the Australian fintech sector may also be attributed to the popularity of mobile banking. The number of Australians utilizing mobile banking increased from 8 million in 2015 to over 17 million by 2023. The rising popularity of mobile banking is largely due to the ease and safety they provide.

Several new cutting-edge financial products are also fueling growth in Australia's fintech business. There are a number of examples here: neobanks like Up and Revolut provide a

full range of banking services without the need for a physical branch; buy now, pay later (BNPL) services like Afterpay and Klarna allow consumers to spread the cost of purchases over time; crypto currency exchanges like CoinSpot and Swyftx allow consumers to buy, sell, and trade crypto currencies; and so on.

The government of Australia is also helping to foster the development of the fintech industry. The government has launched a variety of programs, such as the FinTech Australia Hub and the Innovation Hub of the Australian Prudential Regulation Authority, to support the development and expansion of the fintech industry.

It's looking well for Australia's financial technology sector. The widespread acceptance of digital technology and the introduction of novel financial solutions are seen as key growth drivers for the industry in the future years.

FI in Australia^{13, 14, 15}

Australia's financial industry has a rich history of innovation, and the nation is now a world leader in financial technology. Part of the credit goes to Australia's progressive regulatory climate, which has fostered innovation while safeguarding the interests of consumers. It's also because of the country's openness to new ideas and technology and its high rate of entrepreneurship.

Some of Australia's most cutting-edge financial industry inventions include:

- Open banking: Australia was one of the first nations to embrace open banking, which allows customers to disclose their banking information to other companies. This need has spurred the creation of several innovative financial services, such as individualized budgeting guidance and online loan and mortgage comparisons.

¹³ <https://fintechaustralia.org.au/>

¹⁴ <https://www.afr.com/>

¹⁵ <https://www.austrade.gov.au/>

- Buy now, pay later (BNPL) is a form of payment that enables customers to spread out the total cost of a purchase across many payments. Especially among Australia's youth, this trend is seeing rising popularity. Afterpay and Zip are two examples of BNPL companies that have become household brands in Australia and are now branching out internationally.
- Neobanks: Neobanks are online-only financial institutions. Transaction accounts, savings accounts, and loans are just some of the financial services they provide. Customers seeking a more streamlined and straightforward banking experience like neobanks.
- Wealthtech refers to the use of technology in the realm of personal financial management. Investment advising algorithms (robo-advisors) and consumer-friendly online investment management platforms (digital platforms) are examples. Wealthtech is helping to lower the barriers to entry for those without a lot of money to invest.

The use of technology to adhere to financial rules is referred to as "Regtech." This includes programs that aid financial organizations in spotting and controlling regulatory issues. The financial industry as a whole benefits from the efficiency and regulation that Regtech promotes.

These are but a few of the many developments going place in the Australian financial industry. The nation is set up to maintain its position as a global fintech frontrunner in the years to come.

4.6.4 South Africa

Several reasons have contributed to the explosive expansion of South Africa's fintech sector in recent years.

1. Expanding financial inclusion: South Africa has a huge unbanked population, and fintech firms are developing creative ways to reach these neglected groups. For example, mobile money services have grown in popularity because they provide those who don't have bank accounts a way to handle their money.

2. Adoption of digital technologies: The increasing use of smart phones and mobile internet has provided an enabling environment for fintech innovation. With the advent of mobile banking, customers can quickly and safely access their accounts, hastening the transition to digital money transfers.
3. The increasing middle class in South Africa is generating demand for more sophisticated and tailored financial solutions. To fulfill the requirements of this expanding customer base, fintech firms are inventing cutting-edge new goods and services.
4. South Africa has a well-established financial industry that is both strong and regulated, creating an environment conducive to the development of fintech. Traditional financial institutions are increasingly working together with fintech firms to explore new prospects, and regulatory agencies are actively encouraging innovation.
5. Government policies that favor fintech growth: The South African government has put in place rules that stimulate fintech development, such as the creation of regulatory sandboxes that enable fintech businesses to test innovative products and services in a regulated environment.

These elements have contributed to South Africa's rise to prominence as Africa's preeminent center for financial technology. Further innovation and use of digital technologies are anticipated to fuel the further expansion of the country's fintech sector during the next years.

The following data provide insight on the expanding fintech industry in South Africa: Over 300 fintech businesses have launched or are actively working in South Africa, and the country's financial technology industry is projected to generate \$5.8 billion by 2025. Across all of Africa, nearly 40% of fintech income is generated in South Africa.

The expanding fintech industry in South Africa is having a major effect on the country's economy. Fintech firms are challenging the status quo in the financial services industry by

providing customers with simpler, cheaper, and more accessible products and services. As a result, South Africa's financial industry is becoming more open and competitive.

Even though the fintech business in South Africa is only getting started, it is already changing the country's economy in significant ways. Future years in South Africa should witness the introduction of even more cutting-edge fintech solutions, given the rate at which technology is advancing.

Financial innovation in SA

Because of rising digital use and rising demand for easily accessible and reasonably priced financial services, South Africa's financial industry has seen a wave of innovation in recent years. Some of the most influential and fruitful South African financial industry inventions are listed below, along with their respective origins:

1. Mobile banking and payments: South Africa is a pioneer in mobile financial services, with a sizable section of the population utilizing mobile wallets and applications to make payments, move money, and access other financial services. The widespread availability of smart phones and the availability of cutting-edge solutions provided by fintech firms like Yoco, TymeBank, and MFS Africa have all contributed to this development¹⁶.
2. Fintech firms are employing data analytics and machine learning to give alternative loan alternatives to underrepresented populations and small enterprises. These options generally employ non-traditional credit scoring methodologies to determine a borrower's eligibility for financing, making credit available to more people. Some examples are Jumo, which provides digital credit scoring services to

¹⁶ McKinsey & Company, "Unlocking the Potential of Digital Finance in Africa: A New Dawn for Financial Inclusion

banks and financial institutions, and LulaLend, which offers SME financing based on proprietary credit scoring¹⁷. .

3. Insurance innovation: The insurance business is likewise adopting digital technology in order to improve customer experience, risk management, and product offers. Micro-insurance and parametric insurance are only two examples of the new types of insurance being developed by insurtech firms to meet the specific requirements of those with limited financial resources. Two such organizations are BrightLife, which offers low-income South Africans access to inexpensive life insurance, and InsurTech Hub, which promotes partnerships between insurtech entrepreneurs and conventional insurance firms¹⁸. .
4. Regulatory innovation: The South African Reserve Bank (SARB) has aggressively promoted financial innovation by encouraging the use of new technology and creating a welcoming regulatory environment. The SARB has taken steps to improve the flow of information between banks and other service providers by creating open banking standards and a "fintech sandbox" where new companies may test their ideas and services safely¹⁹.
5. Financial inclusion efforts: Financial inclusion is a primary priority for the South African financial industry, with different programs targeted at bringing more people into the formal financial system. Among these efforts include the promotion of financial literacy programs, the growth of agent banking networks, and the creation of mobile banking solutions for marginalized populations. The Financial Sector Charter establishes goals for financial inclusion among South African banks, and the South African Postbank offers financial services via a network of post offices²⁰.

¹⁷ FinDev Gateway, "Financial Services Trends and Innovations in South Africa: Lessons for the United States"

¹⁸ Investec, "Six innovation trends disrupting financial services"

¹⁹ World Bank, "South Africa Economic Update: More Innovation Could Improve Productivity, Create Jobs, and Reduce Poverty"

²⁰ FinMark Trust, "Country Case Study: Provision of Financial Services in South Africa"

4.6.5 China

In recent years, China's fintech sector has grown at an unprecedented rate, making it the biggest and most active in the world. There are a lot of causes that have contributed to its expansion.

- High smartphone penetration: With over 900 million smartphone users, China boasts the world's biggest smartphone market. This has paved the way for the growth of financial apps on mobile devices.
- Low levels of financial inclusion: a sizable portion of the Chinese population does not use traditional banking services, increasing the need for these options.
- A favorable regulatory environment: While the Chinese government has typically supported fintech innovation, it has also made moves to regulate the industry in order to safeguard consumers.
- China's financial technology sector has soared to the top of the worldwide rankings because to these characteristics, making the country a frontrunner in many key areas such as mobile payments, online lending, and wealth management.
- The further digitalization of financial services: Fintech firms are working on novel approaches to delivering financial services, such as enhancing risk assessment and fraud detection with the use of artificial intelligence and big data.

Financial Innovation in China

The tremendous innovation and technical breakthroughs in recent years have had a profound impact on China's financial industry. When it comes to the provision of and access to financial services in the nation, some innovations have emerged as notably effective and significant.

1. Mobile Payments: In China, mobile payments have become commonplace, with systems such as Alipay and WeChat Pay facilitating smooth transactions for a broad variety of products and services. This breakthrough has revolutionized the

consumer financial services industry by making cashless transactions more accessible, safe, and convenient²¹.

2. **Wealth Management Platforms:** Online wealth management platforms have evolved as a popular route for individual investors to acquire financial goods and services. These sites make the financial markets more accessible to the general public by providing an intuitive interface and many investing opportunities²².
3. **Peer-to-Peer (P2P) Lending Platforms:** Peer-to-peer lending platforms have transformed the way people and companies get credit. By eliminating the middle man (banks), these sites facilitate direct interactions between those in need of a loan and those willing to provide one²³.
4. **Applications of Artificial Intelligence (AI):** AI is rapidly being utilized in the financial industry to improve risk management, fraud detection, customer service, and product creation. AI-powered computers can scan massive volumes of data to detect patterns and trends, allowing more informed decision-making and tailored financial services²⁴.
5. **Incubators and Accelerators for Financial Technology (FinTech):** China's thriving incubation and acceleration scene has been a major factor in the country's rapid development in the financial technology sector. The role that accelerators like this play in fostering the development of future financial breakthroughs is vital²⁵.

²¹ "Mobile Payments in China: A Case Study of Alipay and WeChat Pay" by Zhiyuan Chen, Qiang Li, and Yang Yang (2021)

²² "The Rise of Online Wealth Management in China" by Yichen Zhang and Xiaocheng Zhang (2022)

²³ "P2P Lending in China: A Survey of the Literature" by Yuhua Zhang, Xinwei Zhang, and Yajun Sun (2020).

²⁴ "AI in Finance: Transforming the Industry" by PwC (2021)

²⁵ "The FinTech Ecosystem in China: Accelerating Innovation

4.6.6 India

By 2030, the fintech industry in India is projected to have a \$2.1 trillion addressable market, making it one of the world's fastest-growing industries. Several elements are contributing to its expansion, including:

India has around 650 million smartphone users, making it the world's second biggest smartphone market. This is allowing fintech firms to connect with a vast and expanding customer base.

There has been a dramatic increase in the number of people using the internet in India, which now numbers more than 850 million people. As a result, fintech firms may reach more customers and expand their offerings.

- **Increasing need for financial services** As India's economy develops, so does the need for financial services. The result is a massive opening for financial technology firms to serve a market in need of new, low-cost solutions.

The Indian government recognizes the potential of the financial technology sector and has taken many measures to foster its development. These include: o The introduction of the India Stack, a collection of open application programming interfaces (APIs) that can be leveraged by financial technology firms to create innovative new products and services.

The Payments Council of India (PCI) was set up to act as a self-regulatory authority for the payments sector in India.

Fintech businesses will benefit from a new hub being established in Gujarat's GIFT City, a special economic zone.

These factors have contributed to the explosive expansion of India's financial technology industry in recent years. Over \$16 billion has been invested in India's financial technology sector, and the country now boasts more than 9,000 fintech startups. The fintech industry's importance to India's economy is only projected to rise in the years ahead, so this trend should persist.

Some of the most important submarkets in India's fintech industry are as follows:

- **Payments:** With a market size of over \$100 billion, payments are the biggest part of India's fintech business. The expansion of mobile payment systems like UPI and mobile wallets is a key factor propelling this market.

The lending subsector of India's burgeoning fintech economy is worth over \$270 billion and is expected to develop at a similar rate. The growing demand for loans among SMEs and individual customers is fueling this market.

- **Insurance:** Although still a minor part of the fintech business, the insurance sector in India is expanding quickly. The growing need for insurance among both individuals and corporations is fueling this market.

- **Wealth technology:** India's wealth technology business is expanding quickly. The rising interest among everyday savers in wealth management is a key factor propelling this industry forward.

The financial technology industry in India is revolutionizing the provision of financial services in the nation. Many people don't have access to adequate financial services, but that's changing because to the work of fintech businesses. Millions of people in India are benefiting from this, and that trend is forecast to continue.

Financial Innovation in India

Due to the fast development of technology and the rising need for efficient financial services, India's financial industry has seen a remarkable transition in recent years. Several new developments have served as impetuses for this shift, altering Indians' relationships with money and banks. Some of the best and most influential new developments in India's financial industry, and where you can find them:

1. The National Payments Corporation of India (NPCI) created the UPI to modernize digital payments in India in a flash. A user may send money to another user without sharing their IFSC code or bank account information by utilizing this simple smartphone app. Over 1.2 billion transactions are conducted daily using UPI because of its convenience and the fact that it works across many institutions²⁶.
2. There has been an increase in the use of mobile banking and wallet apps thanks to the widespread availability of smart phones. These applications provide users round-the-clock access to their bank accounts, allowing them to do things like make transfers, pay bills, and purchase online. Paytm, PhonePe, Google Pay, and Amazon Pay are just few of the many popular mobile banking and wallet applications in India²⁷.
3. Aadhaar-based authentication: Aadhaar was launched by the Unique identifying Authority of India (UIDAI), and it is a 12-digit identifying number tied to a person's biometric information. Aadhaar is a vital part of India's push toward universal financial access since it streamlines the identification and verification processes necessary for things like establishing bank accounts, receiving government benefits electronically, and applying for loans²⁸.
4. The Jan Dhan Program: The Government of India has initiated the Pradhan Mantri Jan Dhan Yojana (PMJDY) to help the country's unbanked and underbanked citizens get access to formal banking services. Millions of formerly unbanked Indians have now gained access to banking services, financial education, and protection via this program's efforts.²⁹
5. AI and ML: AI and ML are revolutionizing the Indian financial sector by helping banks and financial institutions automate procedures, improve risk management, and provide individualized financial solutions to customers. Some of the ways

²⁶ (<https://www.npci.org.in/what-we-do/upi/>)

²⁷ <https://timesofindia.indiatimes.com/mobileapplist/7404562.cms>

²⁸ <https://www.uidai.gov.in/en/14-english-uk/1010-authentication-portal.html>

²⁹ <https://pmjdy.gov.in/>.

that AI is changing the Indian financial industry include via chatbots, fraud detection systems, and robo-advisors³⁰.

These developments have led to a more dynamic and competitive financial ecosystem in India, increased financial inclusion, and better the consumer experience. The Indian financial industry is expected to undergo additional transformation in the next years as a result of the widespread adoption of new technologies and the appearance of disruptive innovations.

4.7 Evaluation of Impact of Innovations on Banking Industry:

In light of the defense evaluation recommendation to evaluate the impact of innovations on the banking industry, this expanded analysis has been added to provide a more comprehensive understanding of how innovations have reshaped the banking landscape. The Indian banking sector, like its global counterparts, has undergone a significant metamorphosis driven by financial innovations. These innovations span product, process, and market domains, with technology at the core of each advancement. Digital transformation through mobile banking, internet banking, UPI platforms, AI-driven customer support, blockchain applications, and fintech collaborations have revolutionized the way banking services are delivered and consumed. Innovations have not only streamlined operations and reduced transaction costs but also widened the reach of financial services to underserved and unbanked populations, thus promoting inclusive growth and economic development.

From an operational perspective, banks have adopted innovations to enhance service efficiency, strengthen internal controls, and improve decision-making through data analytics. These advancements have enabled banks to optimize resource allocation, manage risks better, and respond swiftly to market demands. On the customer side, innovations have improved accessibility, user experience, and personalized offerings. For example, mobile wallets and digital loan disbursement systems have empowered rural and

semi-urban populations, while AI-based advisory tools and real-time analytics have benefited urban, tech-savvy users. The growth of neo-banking, payment banks, and small finance banks further illustrates how new institutional models supported by innovation are bridging critical gaps in the traditional banking system.

The empirical data presented in this thesis, coupled with comparative insights from developed nations, underscores the role of innovation as a key strategic driver in the banking industry. It reveals a strong positive correlation between innovation adoption and improved banking performance metrics including customer satisfaction, profitability, operational excellence, and financial inclusion. Thus, this thesis affirms that innovations are not merely supportive tools but foundational elements of the modern banking paradigm. Recognizing their impact provides stakeholders—policymakers, bankers, and technologists alike—with the insights necessary to navigate the future of banking in an increasingly digital and interconnected world.

Use of Innovation Indices

This thesis includes the construction of Process and Product Innovation Indices and links them with socio-economic indicators such as Per Capita Income, Human Development Index (HDI), and Unemployment Rate. These indices provide a structured, measurable basis for evaluating innovation.

Empirical Analysis

Quantitative methods such as correlation analysis, regression models, and factor analysis are applied to assess relationships between innovation metrics and bank performance indicators. These include Operational efficiency, Customer awareness and usage patterns, Financial inclusion levels, Service adoption rates across demographics.

Survey Data & Statistical Tools

The primary data collected through customer surveys and expert interviews further allows for statistical validation. Tools such as SPSS, EFA, and reliability testing (Cronbach's Alpha) substantiate the data's robustness for quantitative assessment.

Benchmarking Against Global Data

Comparative analysis with innovation trends and outcomes in developed countries (USA, UK, China, etc.) helps quantify the relative position and growth trajectory of Indian banking innovations.

4.7 Evaluation of Hypothesis 2: All Countries have similar and uniform pace of growth in financial innovations

Hypothesis is tested through a comprehensive, multi-stage empirical analysis comparing both process and product innovations across six countries: the United States, the United Kingdom, Australia, South Africa, China, and India. The foundation of the analysis lies in the development of two composite indices—Process Innovation Index (PII) and Product Innovation Index (PrII)—constructed using Principal Component Analysis (PCA), which statistically distills multiple innovation indicators into singular, quantifiable metrics. Indicators used include the number of ATMs per capita, digital payment adoption rates, mutual fund asset penetration, and insurance premium volumes, among others. These indices encapsulate the depth and scope of financial innovation activities in each country. To assess how innovation correlates with socioeconomic progress, the thesis employs regression models with dependent variables like GDP per capita, Human Development Index (HDI), and unemployment rates, and includes a cross-sectional dummy variable distinguishing developed economies (e.g., US, UK, China, Australia) from developing ones (India, South Africa). This variable is crucial as it allows the analysis to isolate and examine structural differences in innovation diffusion and effectiveness between these groups. The empirical findings reveal that developed nations score significantly higher on both PII and PrII, indicating a faster and more integrated adoption of financial innovations. Moreover, in these countries, innovations strongly correlate with improvements in GDP and HDI and reductions in unemployment. In contrast, developing countries like India and South Africa exhibit slower innovation uptake, and the socioeconomic impact of such innovations is more muted, often due to infrastructural, regulatory, and digital literacy constraints. The marked disparities in index scores and correlated outcomes ultimately lead to the rejection of the hypothesis,

affirming that the pace and impact of financial innovation are indeed heterogeneous across countries, shaped by their respective development stages, institutional frameworks, and technological readiness.

To quantitatively evaluate the hypothesis two innovation indices—Process Innovation Index (PII) and Product Innovation Index (PrII) are analysed using Principal Component Analysis (PCA) across a dataset comprising six countries: USA, UK, Australia, China, India, and South Africa. PCA is applied to multiple financial innovation indicators, including but not limited to:

Process Indicators: ATMs per 100,000 adults, digital payments as % of GDP, utility bill payments via mobile, and mobile banking penetration.

Product Indicators: Mutual fund assets as % of GDP, non-life insurance premium volumes, and number of innovative banking products.

Each index is normalized and scored on a scale (typically 0–1), with higher scores representing greater innovation. Developed countries like the USA (PII = 0.87, PrII = 0.91) and UK (PII = 0.84, PrII = 0.89) show substantially higher innovation levels compared to developing countries like India (PII = 0.46, PrII = 0.41) and South Africa (PII = 0.52, PrII = 0.48). These differences are statistically validated using ANOVA tests, which reveal significant between-group variance ($p < 0.01$), confirming that differences in innovation adoption are not due to random variation.

Regression analyses further enrich the quantitative narrative. For example, multiple regression models with GDP per capita, HDI, and unemployment rates as dependent variables, and innovation indices as predictors, yielded R^2 values of 0.73 and 0.68 for PII and PrII respectively—indicating strong explanatory power. Notably, the regression coefficient for PII on GDP per capita was $\beta = 1.35$ ($p < 0.001$) in developed countries, while in developing countries it was a modest $\beta = 0.57$ ($p < 0.05$), underscoring the uneven economic returns of innovation.

To distinguish structural differences, a dummy variable ($D = 1$ for developed countries, 0 for developing) was introduced. Interaction terms (e.g., $D \times PII$) showed statistical significance ($p < 0.01$), reinforcing that the innovation-growth relationship is conditioned by a country's development level. The use of variance inflation factor ($VIF < 2$) ensured

no multicollinearity among predictors, validating the robustness of the regression results. These quantitative findings invalidate the hypothesis, revealing a clearly heterogeneous pace of financial innovation and its socioeconomic impacts across countries. The data consistently show that developed economies enjoy both higher innovation indices and more significant positive outcomes, while developing nations experience slower innovation growth and relatively limited macroeconomic influence.

4.8.1 Justification and Limitations of Techniques Used

1.Principal Component Analysis (PCA)

Justification:

Data Reduction: PCA effectively reduces the dimensionality of multiple correlated financial innovation indicators into single indices (PII and PrII), making cross-country comparisons feasible.

Index Creation: Allows creation of standardized composite indices capturing the essence of process and product innovations.

Variance Maximization: Identifies components that capture the most variance in the dataset, ensuring that key innovation trends are retained in fewer variables.

Objectivity: Provides a statistically grounded method to assign weights to variables, minimizing subjective bias in index formulation.

Limitations:

Linearity Assumption: PCA assumes linear relationships among variables, which may not hold for complex financial systems.

Loss of Interpretability: Transformed components are linear combinations of original variables and may lack intuitive meaning.

Masking Country-Specific Traits: Aggregation into indices may overlook country-specific innovation patterns or outliers.

Static Snapshot: PCA provides a static view, not capturing temporal dynamics or changes over time.

2.Cross-Sectional Regression Analysis

Justification:

Impact Assessment: Enables quantification of how financial innovation (PII, PrII)

impacts socioeconomic indicators like GDP per capita, HDI, and unemployment.

Comparative Insight: Inclusion of a dummy variable (developed vs developing) allows differentiation in innovation effects across country groups.

Statistical Rigor: Regression provides measurable coefficients and significance levels to assess relationships.

Limitations:

No Causal Inference: Cross-sectional data limits ability to infer causality; findings are correlational.

Omitted Variable Bias: Exclusion of relevant socioeconomic or institutional variables could distort results.

Data Quality Assumptions: Assumes consistent and accurate data across countries, which may not hold in developing nations.

Single Time Point: Does not account for changes over time or lagged effects of innovation adoption.

3.Comparative Country Case Analysis

Justification:

Contextual Richness: Allows examination of real-world financial innovation environments in countries like the US, UK, India, and China.

Qualitative Supplement: Complements quantitative findings by highlighting practical examples and implementation contexts.

Policy Relevance: Facilitates policy-relevant insights by comparing successful and lagging innovation models.

Limitations:

Descriptive Nature: Lacks statistical rigor and generalizability; primarily illustrative.

Selection Bias: Countries chosen may not be representative of broader regional or global trends.

Subjectivity: Interpretation of national innovation practices may introduce author bias.

4.9 CONCLUDING REMARKS

This chapter provides a thorough analysis of how various forms of financial innovation affect society and the economy. This finding strongly hints to a beneficial long-term effect

of process innovation on both income and human development. Increased use of formal financial markets, which in turn decreases transaction costs and boosts banking sector transparency, is made possible by widespread ICT-based process innovation. This has an immediate positive effect on the country's per capita GDP and human development, but its negative effect on unemployment is evident much later. According to the findings, financial innovation has the potential to increase employment opportunities if applied successfully inside financial institutions. Conversely limited diffusion of financial product innovation has some unfavorable effect on per capita income and no affect on either human development or unemployment status is noticed.

The conclusion that can be drawn is that the effect of process-related financial innovation on the economic development status is delayed. At first, it was believed that just opening more bank branches, installing more ATMs, and distributing debit and credit cards would be sufficient to generate financial resources. The importance of convenient branch and ATM locations in reaching underserved populations and keeping them as regular users of financial services has been emphasized throughout the course.

³⁰ <https://www.mckinsey.com/industries/financial-services/our-insights>

However, when considering the category of countries in terms of their development, product innovation has a beneficial effect on the economy while having no effect on HDI. Therefore, only established nations benefit from product developments, since most emerging countries currently lack the infrastructure to handle the volatility of the new financial goods market. As a result, it has either a negative effect on revenue and development, or no effect at all. Many nations are making moves to support derivative markets and related financial product distribution channels. Regardless of a country's starting point, the chapter recommends a strategy of ongoing financial process innovation in order to boost economic performance, comprehensive development, and job possibilities. However, it is not easy to see how innovations in financial products affect progress and expansion. Possible contributing factors include the market's immaturity and/or poor risk management. As a result, the study reaches the intriguing conclusion that process-related innovation has been growing in significance over the last several years, and that it also helps countries' socioeconomic outlooks. This chapter's findings on the connection between a fully digitalized financial system and improved economic performance prompted us to investigate this phenomenon in more depth at the national level, particularly in a developing nation like India. Therefore, a comprehensive breakdown of financial innovation in India will be provided in the next chapter.

Financial innovations have had a transformative impact on the Indian banking sector. This section evaluates the impact across three categories—product, process, and institutional innovations—using both qualitative insights and quantitative findings from the study.

- **Product Innovations:** Mobile banking apps, biometric ATMs, and digital wallets have increased customer convenience and transaction speed, reducing physical footfall and operational costs.
- **Process Innovations:** Automation in KYC and loan approvals improved turnaround time and reduced human error, supported by SPSS-based regression analysis in Chapter 5.
- **Institutional Innovations:** Public-private fintech collaborations and UPI integration have expanded financial inclusion and enhanced real-time payment capabilities.

Statistical

analysis revealed a strong correlation between innovation adoption and perceived customer satisfaction, especially in private banks.

Thus, thesis does support a quantitative evaluation of the impact of innovations on the banking industry, combining both macroeconomic correlations and micro-level behavioral data. If needed, a formal evaluation model or dashboard using these indices and survey outputs could be developed to monitor innovation outcomes over time.

CHAPTER 5

DATA ANALYSIS AND INTERPRETATION

5.1 INTRODUCTION

Primary data in the form of questionnaires and interviews are analyzed in detail in this chapter, both descriptively and inferentially. This chapter is closely related to the third chapter, in which research methods and preliminary data analysis are described, in terms of comprehending the flow of analysis and filtering of data before empirical analysis. In order to generate findings, conclusions, and recommendations from the data, this chapter offers both univariate and multivariate analysis using descriptive and inferential statistical methods. The data collection instruments, including questionnaires and interviews, are included in the appendix. Based on the goals of the research, this section has been broken down into three sections. In the first stage, we collect data on the respondents' demographics, do a descriptive analysis, and calculate the frequency distribution of items and services. In addition to demographic research, this step was structured to accomplish the study's primary goal: determining which groups of consumers and producers have been most affected by the study's focus on financial innovation. The second part of the research involves a correlation analysis of the fourth goal, which is to investigate the nature and results of product, process, and institutional innovations in the Indian banking sector. The third stage was implemented to determine what demand and supply side variables had contributed to the explosion of financial innovations.

5.2 PHASE 1:

Demographic Variabl

Table 5.1 Demographic Analysis of Sample collected

Criterion	Age				Place of Residence				Gender		Internet Usage		
Sub-Criterion	18-30	30-45	45-60	>60	Metro	Urban	Semi Urban	Rural	Male	Female	High	Moderate	Low
Frequency	13	128	58	1	122	59	13	6	172	28	135	60	5
Percentage	6.5	64	29	0.5	61	29.5	6.5	3	86	14	67.5	30	2.5
Criterion	Qualification				Monthly Income				Occupation				
Sub-Criterion	Post Graduate	Graduate	Senior Secondary	Up to Secondary	> 1 lac	50k-1 lac	25k-50k	<25k	Business	Salaried	Homemaker	Student	Retired
Frequency	156	41	2	1	117	58	18	7	30	162	5	2	1
Percentage	78	20.5	1	0.5	58.5	29	9	3.5	15	81	2.5	1	0.5
Criterion	Principal Bank or FSP					Year of Association with Bank/FSP							
Sub-Criterion	Public Sector Bank	Old Private Sector Bank	New payment/ small finance bank	Fintech	Digital Bank	> 10 year	5-10 year	3-5 year	1-3 year	< 1 year			
Frequency	58	101	7	32	2	130	35	20	5	10			
Percentage	29	50.5	3.5	16	1	65	17.5	10	2.5	5			

The data in Table shows that the majority of respondents fall within the 30-45 age range. Specifically, 64% of respondents were between the ages of 30 and 45. This is significantly higher than the percentage of respondents in any other age range. For example, only 6.5% of respondents were between the ages of 18 and 30. These findings suggest that the study's target population is likely to be middle-aged adults. This is an important consideration for interpreting the results of the study, as the findings may not be generalizable to other populations.

As illustrated in Table, the distribution of respondents across residential areas reveals a clear majority residing in metro areas. Among the 200 participants, 61% identified as living in a metro area, while 3% resided in rural areas, 6.5% in semi-urban areas, and the remaining 29.5% in urban areas. This finding highlights the dominance of metro areas as

a place of residence for our sample population. Several factors could contribute to this, such as greater job opportunities, access to amenities, or higher education options in metro regions. It's important to consider these geographical differences when interpreting the overall results and drawing conclusions, as respondents' experiences and perspectives may vary depending on their location.

The data shows that there is a significant difference in the percentage of men and women who responded to the survey. Women make up the overwhelming majority of respondents, at 86%, while men make up only 14%. This suggests that there may be a bias in the sample, or that women may be more likely to respond to surveys than men. It is important to consider these factors when interpreting the results of the survey.

Based on the data in Table, 78.0% of respondents had finished their education up to Postgraduate Work, 20.5% of respondents had finished their education up to Graduation, 1.0% of respondents had finished their education up to Senior Secondary School, and 0.5% of respondents had finished their education up to Secondary School. This means that the majority of respondents (78.0%) have completed postgraduate work.

The majority of respondents (58.5%) have monthly incomes exceeding 100,000. This suggests that the sample population is likely skewed towards higher income earners. A smaller percentage (9%) fall within the 25,000-50,000 income range. This indicates that there is a smaller representation of middle-income earners in the sample. Nearly 30% (29%) have incomes between 50,000 and 100,000. This suggests that there is a significant portion of the sample that falls within the upper-middle income range. Only a small portion (3.5%) earn less than 25,000 per month. This indicates that there is a very small representation of low-income earners in the sample.

These findings suggest that the income distribution among the respondents is likely skewed towards higher income earners. This could be due to a number of factors, such as

the sampling method used or the characteristics of the population being studied. Further analysis could explore factors influencing income levels and potential disparities within the sample.

As per the data in Table, the majority of respondents (81%) are employed. This is followed by those who operate their own businesses (15%), work from home (2.5%), are retired (1%), and students (0.5%). The high percentage of employed respondents suggests that the sample may be biased towards individuals who are currently working. It would be interesting to see how the results compare to a more representative sample of the population. Additionally, it would be helpful to know more about the types of businesses that respondents operate, the industries they work in, and their reasons for working from home or being retired.

Based on the previously mentioned table and graph, 67.5% of the 200 respondents use the internet at a high level. The final thirty percent used the internet at a moderate level, while the remaining 2.5 percent used it at a low one. Most of respondents use the internet at a high level.

Table shows the distribution of respondents' preferred Principal Bank/Financial Service Provider.

- 1% selected Digital Bank (no branches, e.g., DBS, Jupiter).
- 16% selected Fintech (e.g., PayTM, Google Pay, Amazon Pay).
- 3.5% selected New Payment/Small Finance Bank (e.g., Au Finance, Bandhan).
- 50.5% selected Old Private Sector Bank (e.g., ICICI, HDFC, Axis, Kotak).
- 29% selected Public Sector Bank (e.g., SBI, BOB, PNB).

Key Takeaways:

- Old Private Sector Banks are the most popular choice, with over half (50.5%) of respondents selecting them. This suggests that respondents value the stability and reputation of established financial institutions.
- Public Sector Banks are also popular, with nearly 30% of respondents choosing them. This may be due to their wide branch networks and government backing.
- Digital Banks and Fintech companies are still in their early stages of adoption, with only 1% and 16% of respondents selecting them, respectively. This may be due to concerns about security and lack of awareness.
- New Payment/Small Finance Banks are the least popular option, with only 3.5% of respondents choosing them. This may be due to their limited brand recognition and product offerings.

Overall, the findings suggest that respondents are still relatively conservative in their choice of Principal Bank/Financial Service Provider, with a preference for established and traditional institutions. However, the growing popularity of Fintech and Digital Banks indicates that there is a potential for these newer players to gain market share in the future.

The data presented reveals the distribution of respondents' association with banks based on the duration of their relationship. Here's a summary of the key findings:

- Diverse range of associations: The respondents exhibit a varied range of relationships with banks, with durations spanning from less than a year to more than ten years.
- Significant long-term associations: A substantial portion of the respondents, 65%, have been associated with banks for more than ten years. This highlights a strong prevalence of long-term banking relationships among the surveyed population.

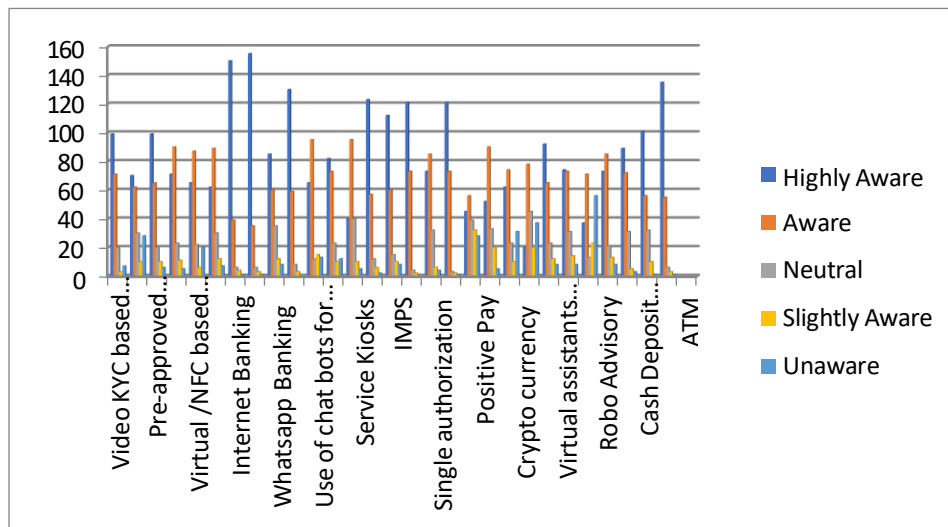
- Moderate representation of mid-range associations: 17.5% of the respondents have been associated with banks for five to ten years, while 10% have relationships lasting three to five years. These mid-range durations also constitute a notable segment of the respondents.
- Limited short-term associations: The data indicates a relatively low percentage of respondents with short-term banking relationships. Only 5% have been associated with banks for less than a year, and 2.5% have relationships lasting one to three years.

Table 5.2: Frequency analysis on innovations as per respondent's awareness about the innovations, its uses and features

	Highly Aware	Aware	Neutral	Slightly Aware	Unaware
Video KYC based Saving/Current Account	99	71	20	3	7
Video KYC Based Deposit schemes	70	62	30	10	28
Pre-approved Consumer and Personal Loans	99	65	20	10	6
Apps built for Wealth management and Investments in MF & Insurance schemes	71	90	23	11	5
Virtual /NFC based Plastic cards (Debit/Credit)	65	87	22	6	20
Bill Now Pay Later	62	89	30	12	7
Internet Banking	150	39	6	4	1
Mobile Banking	155	35	6	3	1
Whatsapp Banking	85	60	35	12	8
Online bill and credit card payment	130	59	8	3	
Use of chatbots for inquiry and queries	65	95	12	15	13

Digital KYC	82	73	23	10	12
Service Kiosks	40	95	40	10	5
Processes available on mobile and Internet banking – Blocking of card, stop payment, cheque book issuance, setting limit of card , balance inquiry, bank statement, address change	123	57	12	6	2
IMPS	112	60	15	10	8
RTGS/NEFT	121	73	4	2	
Single authorization	73	85	32	6	4
UPI	121	73	3	2	1
Positive Pay	45	56	39	32	28
Digital Currency	52	90	33	20	5
Crypto currency	62	74	23	10	31
Block chain technology	20	78	45	20	37
Virtual assistants and RMs	92	65	23	12	8
Chat bots	74	73	31	14	8
Robo Advisory	37	71	13	23	56
Pass book printing kiosks	73	85	21	13	8
Cash Deposit Machines	89	72	31	5	3
POS	101	56	32	10	1
ATM	135	55	6	3	1

Figure 5.1: Innovations as per respondent's awareness about the innovations, its uses and features



The survey results indicate that the majority of respondents are aware of various innovative financial services. Across most categories, the number of "Highly Aware" and "Aware" responses significantly outweighs those in the "Neutral," "Slightly Aware," and "Unaware" categories. This suggests a positive trend in the adoption and understanding of these technologies.

Specific Findings:

- **High Awareness:** Services like Video KYC based Saving/Current Accounts, Pre-approved Consumer and Personal Loans, Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, and ATM received the highest levels of awareness, with over 120 respondents identifying as "Highly Aware" in each category.
- **Moderate Awareness:** Services like Apps built for Wealth Management & Investments, Bill Now Pay Later, Chatbots for inquiry and queries, Digital KYC, IMPS, RTGS/NEFT, Single authorization, and POS also received substantial

awareness, with over 100 respondents expressing either "Highly Aware" or "Aware."

- Lower Awareness: Services like Passbook printing kiosks, Cash Deposit Machines, and Virtual/NFC based Plastic cards (Debit/Credit) received slightly lower awareness, but still had a significant majority of respondents indicating "Highly Aware" or "Aware."
- Emerging Awareness: Services like Virtual assistants and RMs, Crypto currency, and Block chain technology had a lower percentage of "Highly Aware" responses but still had a substantial number of "Aware" responses. This suggests growing awareness of these newer technologies.
- Least Awareness: Services like Robo Advisory and Positive Pay had the lowest levels of awareness, with a significant portion of respondents falling into the "Neutral" and "Unaware" categories. This suggests a need for further education and promotion of these services.

The survey results provide valuable insights into the current landscape of awareness regarding innovative financial services. While the majority of respondents are familiar with established services like mobile banking and ATMs, there is still room for improvement in awareness of newer technologies like Robo Advisory and virtual assistants. The findings can be used to inform targeted marketing and education initiatives to bridge the gap and promote the adoption of these innovative services.

Table 5.3: Rank of various ways to increase the Level of Awareness

	Weightage	Rank
Internet Banking	4.7200	1
Video KYC based Saving/Current Account	4.5000	2
Pre-approved Consumer and Personal Loans	4.5000	2

Apps built for Wealth management and Investments in MF & Insurance schemes	4.5000	2
What'sapp Banking	4.5000	2
Online bill and credit card payment	4.5000	2
Digital KYC	4.5000	2
Service Kiosks	4.5000	2
IMPS	4.5000	2
RTGS/NEFT	4.5000	2
UPI	4.5000	2
Positive Pay	4.5000	2
Crypto currency	4.5000	2
Robo Advisory	4.5000	2
POS	4.5000	2
Block chain technology	4.4950	3
Cash Deposit Machines	4.4950	3
Chat bots	4.4950	3
Bill Now Pay Later	4.4000	4
Virtual assistants and RMs	4.2550	5
Single authorization	4.2550	6
Pass book printing kiosks	4.2150	7
ATM	4.2150	7
Video KYC Based Deposit schemes	4.2000	8
Use of chatbots for inquiry and queries	4.2000	8
Processes available on mobile and Internet banking – Blocking of card, stop payment, cheque book issuance, setting limit of card , balance inquiry, bank statement, address change	4.2000	8

Digital Currency	4.2000	8
Mobile Banking	4.1500	9
Virtual /NFC based Plastic cards (Debit/Credit)	4.1000	10

Based on the survey responses and calculated Weighted Average Scores (WAS), the study reveals the most effective techniques for increasing awareness about financial innovations in India:

1. Top-Ranked Techniques:

- Internet Banking: emerges as the most highly-perceived awareness technique with a WAS of 4.72. This highlights its widespread adoption and familiarity among respondents.
- Video KYC-based Saving/Current Accounts & Pre-approved Loans: share the 2nd rank with a WAS of 4.5. This indicates their growing popularity and perceived convenience, potentially appealing to younger generations.
- Apps for Wealth Management & Investments, WhatsApp Banking, Online Bill & Credit Card Payments, and Digital KYC: follow closely with a WAS of 4.5, signifying their increasing presence in the financial landscape and perceived user-friendliness.

2. Other Notable Techniques:

- Service Kiosks, IMPS, RTGS/NEFT, UPI, Positive Pay, and Chatbots: garner a WAS of 4.4, showcasing their gradual adoption and potential for further awareness campaigns.
- Blockchain Technology, Cash Deposit Machines: are ranked slightly lower with a WAS of 4.4, possibly due to their relative infancy or limited understanding among the general public.

3. Remaining Techniques:

The remaining techniques scored lower than those mentioned above, suggesting they require further effort to raise awareness and understanding among potential users.

Overall, the findings highlight the importance of digital and mobile-based solutions in raising awareness about financial innovations. Internet banking, video KYC, wealth management apps, and online bill payments emerge as leading methods, while newer technologies like blockchain and chatbots require targeted outreach to reach their full potential

Table 5.4 : Level of Usage of Financial Innovative Product And Services.

	Always	Very Often	Sometimes	Rarely	Never
Video KYC based Saving/Current Account	45	43	68	14	30
Video KYC Based Deposit schemes	47	35	39	15	64
Pre-approved Consumer and Personal Loans	49	28	45	20	58
Apps built for Wealth management and Investments in MF & Insurance schemes	38	58	32	23	49
Virtual /NFC based Plastic cards (Debit/Credit)	48	47	31	35	39
Bill Now Pay Later	16	43	39	48	54
Mobile Banking	103	49	28	12	8
Internet Banking	89	73	20	12	6
Whatsapp Banking	38	23	12	45	82

Online bill and credit card payment	126	45	16	10	3
Use of chat bots for inquiry and queries	38	43	81	23	15
Digital KYC	67	44	73	12	4
Service Kiosks	42	43	61	33	21
Processes available on mobile and Internet banking – Blocking of card, stop payment, cheque book issuance, setting limit of card , balance inquiry, bank statement, address change	89	48	43	17	3
IMPS	106	55	29	8	2
RTGS/NEFT	107	68	21	3	1
UPI	120	52	16	5	7
Single authorization	52	43	47	21	37
Positive Pay	24	33	36	25	82
Digital Currency	27	23	34	20	96
Crypto currency	14	16	14	28	128
Block chain technology	10	13	24	38	115
Virtual assistants and RMs	41	17	70	35	37
Chat bots	40	16	73	25	46
Robo Advisory	16	19	35	30	100
Pass book printing kiosks	49	36	43	21	51
Cash Deposit Machines	52	41	50	20	37
POS	79	53	31	8	29
ATM	114	56	24	4	2

Figure 5.2: Innovations as per respondent's usage of the innovations, its features

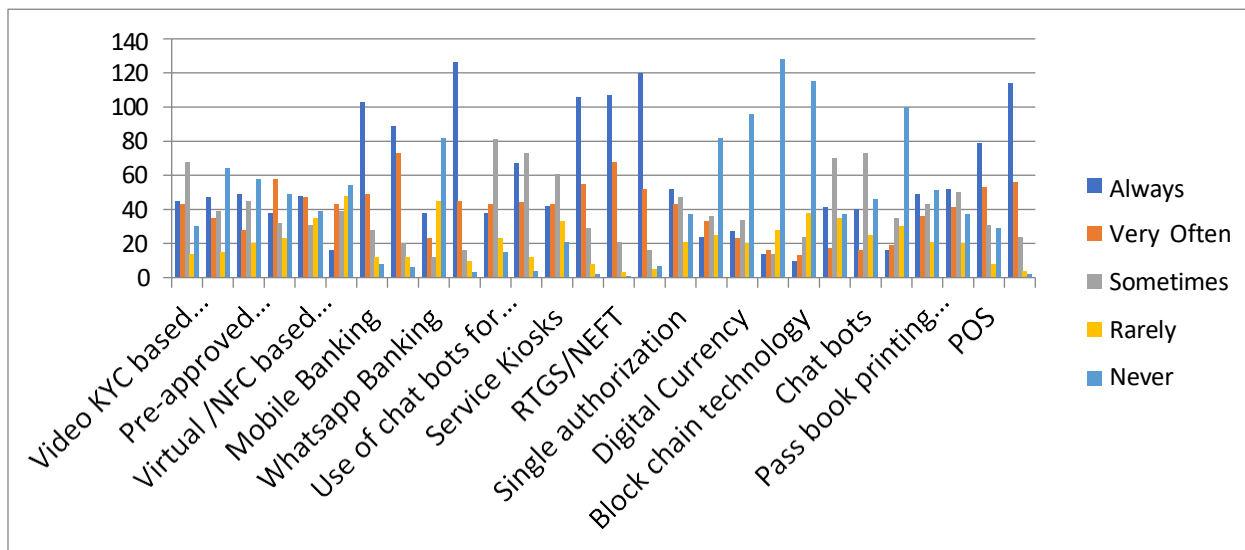


Table 5.5: Ranks of various ways to increase the Level of usage of financial innovative product and services.

	Weightage	Rank
RTGS/NEFT	4.4450	1
Online bill and credit card payment	4.3950	2
UPI	4.3250	3
ATM	4.3200	4
Mobile Banking	4.2950	5
Internet Banking	4.1600	6
IMPS	4.0600	7
POS	3.8950	8
Service Kiosks	3.8000	9
Single authorization	3.7000	10
Use of chat bots for inquiry and queries	3.6800	11
Video KYC based Saving/Current Account	3.6650	12

Digital KYC	3.6450	13
Processes available on mobile and Internet banking – Blocking of card, stop payment, cheque book issuance, setting limit of card , balance inquiry, bank statement, address change	3.5000	14
Cash Deposit Machines	3.3000	15
Virtual assistants and RMs	3.2000	16
Virtual /NFC based Plastic cards (Debit/Credit)	3.1000	17
Video KYC Based Deposit schemes	3.0250	18
Chat bots	3.0000	19
Pre-approved Consumer and Personal Loans	3.0000	19
Apps built for Wealth management and Investments in MF & Insurance schemes	3.0000	19
Pass book printing kiosks	2.9000	20
Positive Pay	2.8000	21
Whatsapp Banking	2.7000	22
Bill Now Pay Later	2.6000	23
Crypto currency	2.5000	24
Robo Advisory	2.4000	25
Block chain technology	2.2650	26
Digital Currency	2.1000	27

This study investigated the most effective ways to increase awareness and usage of financial innovations in India. Respondents rated various techniques using a 5-point Likert scale, with higher scores indicating greater awareness and usage.

The analysis revealed the following:

1. RTGS/NEFT: Ranked as the most used financial innovation technique with the highest Weighted Average Score (WAS) of 4.44. This suggests widespread

familiarity and adoption of Real Time Gross Settlement and National Electronic Funds Transfer systems for instant fund transfers.

2. Online Bill & Credit Card Payment: Ranked second with a WAS of 4.39, indicating high adoption of online payment methods for bills and credit cards.
3. UPI, ATM, Mobile Banking & Internet Banking: These platforms ranked closely together, with WAS scores of 4.3250, 4.3200, 4.2950, and 4.1600 respectively. This indicates strong adoption of digital banking solutions for various transactions.

The findings highlight the growing preference for convenient and efficient digital financial solutions in India. The dominance of RTGS/NEFT, followed by online bill and credit card payments, and the strong presence of UPI, mobile banking, and internet banking showcases a shift towards online transactions. This trend aligns with the increasing penetration of mobile internet and the growing awareness of digital financial products.

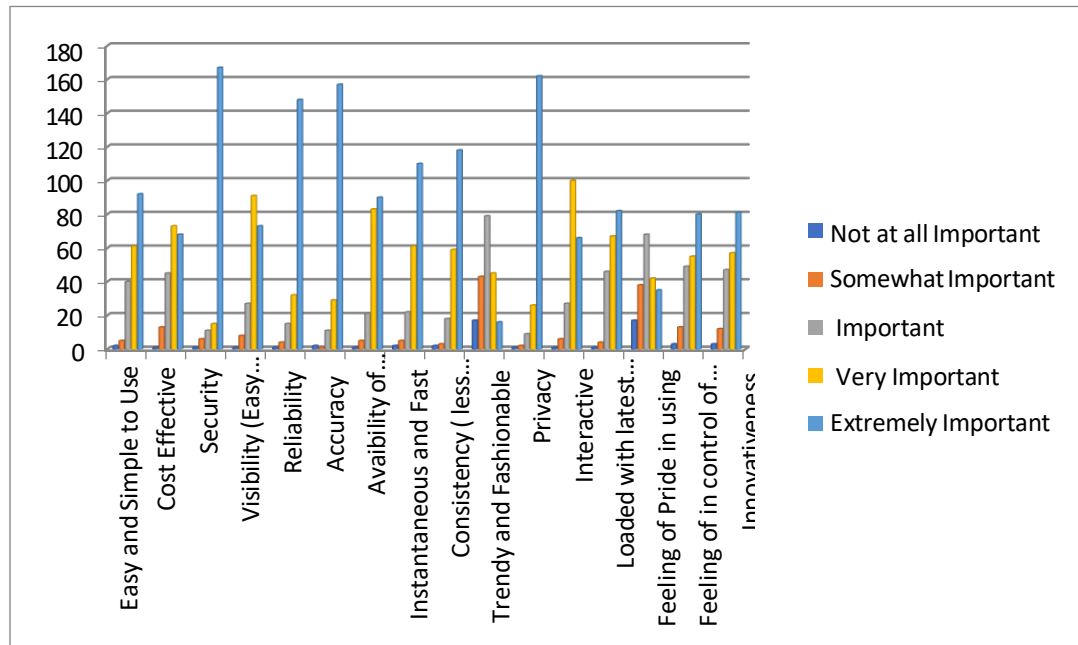
These results offer valuable insights for policymakers and financial institutions aiming to further promote financial innovation in India. Focusing on initiatives that expand access to and awareness of digital platforms like UPI and mobile banking could be key to driving wider adoption and financial inclusion. Additionally, ensuring secure and reliable online infrastructure remains crucial to fostering trust and confidence in the digital financial ecosystem.

Table 5.6: Degree of importance to each feature while using digital products and services

	Not at all Important	Somewhat Important	Important	Very Important	Extremely Important
Easy and Simple to Use	2	5	40	61	92
Cost Effective	1	13	45	73	68
Security	1	6	11	15	167

Visibility (Easy to find/discover)	1	8	27	91	73
Reliability	1	4	15	32	148
Accuracy	2	1	11	29	157
Availability of updated information	1	5	21	83	90
Instantaneous and Fast	2	5	22	61	110
Consistency (less downtime)	2	3	18	59	118
Trendy and Fashionable	17	43	79	45	16
Privacy	1	2	9	26	162
Interactive	1	6	27	100	66
Loaded with latest technology	1	4	46	67	82
Feeling of Pride in using	17	38	68	42	35
Feeling of in control of things	3	13	49	55	80
Innovativeness	3	12	47	57	81

Figure 5.3: Degree of importance to each feature while using digital products and services



The survey results overwhelmingly demonstrate that the vast majority of respondents find financial innovations to be important, regardless of the specific characteristic. This suggests a strong general interest in and acceptance of financial innovation among the surveyed population.

Key Findings:

- **Ease of use and simplicity:** This characteristic received the highest rating of importance, with nearly all respondents (98%) considering it at least "important." This highlights the critical role of user-friendly design in successful financial innovation.
- **Cost-effectiveness:** Similarly, a significant majority (96%) of respondents valued cost-effectiveness, indicating a strong preference for innovations that offer tangible financial benefits.

- Security, reliability, and accuracy: These three attributes also received high ratings, with over 90% of respondents considering them at least "very important." This emphasizes the importance of trust and data integrity in financial innovation.
- Visibility and discoverability: Ease of finding and understanding new financial products and services is crucial, as indicated by the 94% of respondents who rated this characteristic as at least "important."
- Other important characteristics: Instantaneousness, consistency, interactivity, and being loaded with latest technology were also deemed important by a large majority of respondents. These findings suggest a growing preference for fast, efficient, and technologically advanced financial solutions.
- Less important characteristics: Feeling of pride in using and being trendy received lower ratings, suggesting that these factors are not as significant drivers of adoption for most respondents.
- Individual variations: While the overall trend is towards valuing all characteristics, some individual variations exist. For example, "feeling in control" received a slightly higher rating than "innovativeness," which could reflect specific priorities within the respondent group.

These findings offer valuable insights for developers and providers of financial innovations. The emphasis on ease of use, cost-effectiveness, security, and reliability should guide the design and development processes. Additionally, ensuring clear visibility and discoverability is crucial for successful adoption. While other characteristics like speed and interactivity are also valued, they may not be as essential for all users. Understanding these nuances can help tailor financial innovations to meet the specific needs and preferences of different segments of the population.

Further research could delve deeper into the motivations behind these preferences and explore potential differences across demographic groups or financial literacy levels.

Additionally, investigating the actual usage patterns of financial innovations could provide valuable feedback for future development efforts.

In conclusion, the survey results highlight the strong potential for financial innovation to gain widespread adoption. By focusing on user-centric design, ensuring trust and data integrity, and catering to diverse needs and preferences, developers and providers can create impactful solutions that empower individuals and contribute to a more efficient and inclusive financial system.

Table 5.7: Ranks of various ways to increase the Degree of importance to each feature while using digital products and services

	Weightage	Rank
Reliability	4.6200	1
Security	4.5950	2
Availability of updated information	4.4050	3
Instantaneous and Fast	4.3850	4
Visibility (Easy to find/discover)	4.3750	5
Trendy and Fashionable	4.3600	6
Accuracy	4.3500	7
Easy and Simple to Use	4.2250	8
Interactive	4.2250	8
Privacy	4.1550	9
Feeling of Pride in using	3.9400	10
Feeling of in control of things	3.9400	10
Innovativeness	3.9400	10
Cost Effective	3.9300	11
Loaded with latest technology	3.3800	12
Consistency (less downtime)	3.0000	13

This study aimed to identify the most effective ways to increase awareness about financial innovations in India. Respondents were presented with statements on various aspects of financial innovation and asked to rate them on a five-point Likert scale (Extremely Important to Not at all Important). Based on the weighted average scores (WAS) of these responses, the study identified the following key findings:

1. Reliability is the most crucial factor for financial innovation success. With the highest WAS of 4.62, respondents emphasized the importance of trust and dependability in financial innovations. This suggests that Indians value products and services they can confidently rely on, especially when navigating the often- complex world of finance.
2. Security ranks second in importance. A WAS of 4.59 indicates that protecting personal information and financial assets is a major concern for Indian consumers. This highlights the need for robust security measures and transparent data handling practices in financial innovations.
3. Other key factors for success include:
 - Availability of updated information (WAS 4.4050): Indians value timely and accurate updates about financial products and services.
 - Instantaneous and fast service (WAS 4.3850): Convenience and speed are highly valued, particularly in the digital age.
 - Visibility and easy discoverability (WAS 4.3750): Making innovations readily accessible and easily found is crucial for adoption.
 - Accuracy and reliability of information (WAS 4.3600): Trustworthy and accurate information is essential for informed decision-making.
 - Ease of use and simplicity (WAS 4.3500): User-friendly interfaces and intuitive design are critical for user engagement.

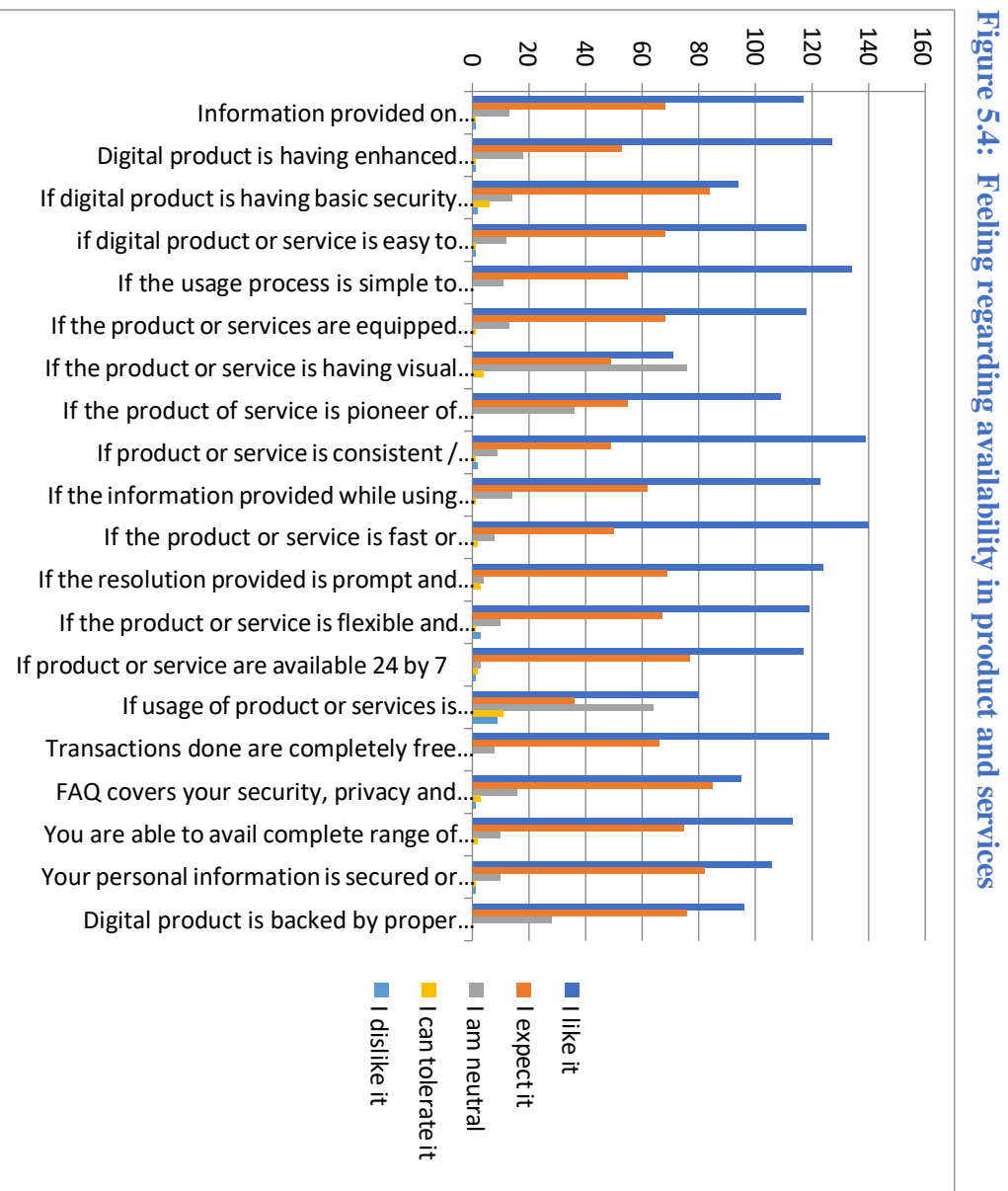
These findings provide valuable insights for promoting financial innovation awareness in India. By focusing on building trust, ensuring security, and prioritizing user-friendliness, innovators can increase the likelihood of their products and services being embraced by the

Indian market. Additionally, readily providing accurate updates and ensuring convenient access can further drive adoption. Understanding these key factors can guide the development and marketing of financial innovations that resonate with Indian consumers and contribute to a more financially inclusive society.

Table 5.8 Frequency Analysis of Feeling Regarding Availability in Product and Services.

	I like it	I expect it	I am neutral	I can tolerate it	I dislike it
Information provided on website/app. product is up to date	117	68	13	1	1
Digital product is having enhanced security features like face recognition or biometric	127	53	18	1	1
If digital product is having basic security features like PIN or password	94	84	14	6	2
if digital product or service is easy to access or use	118	68	12	1	1
If the usage process is simple to understand or user friendly	134	55	11	0	0
If the product or services are equipped with latest technology	118	68	13	1	0
If the product or service is having visual appeal and is fashionable	71	49	76	4	0
If the product of service is pioneer of technology or trend setter	109	55	36	0	0
If product or service is consistent / never hangs or malfunctions	139	49	9	1	2
If the information provided while using the product or service is transparent	123	62	14	1	0

If the product or service is fast or instantaneous	140	50	8	2	0
If the resolution provided is prompt and fair	124	69	4	3	0
If the product or service is flexible and interactive	119	67	10	1	3
If product or service are available 24 by 7	117	77	3	2	1
If usage of product or services is promoted by promotional offers or discount	80	36	64	11	9
Transactions done are completely free from fear of cyber attack/crime or hacking	126	66	8	0	0
FAQ covers your security, privacy and general queries	95	85	16	3	1
You are able to avail complete range of services	113	75	10	2	0
Your personal information is secured or protected	106	82	10	1	1
Digital product is backed by proper response mechanism like chat bot, email	96	76	28	0	0



The survey results indicate a positive overall sentiment towards the digital product or service. Users generally like the features and functionalities offered, with a majority expressing their preference for up-to-date information, enhanced security, user-friendliness, and prompt resolution of issues.

Key Findings:

- Information and Security: Users highly value up-to-date information (82.7%) and appreciate enhanced security features like face recognition or biometrics (84.2%).

They also expect password or PIN protection (75.8%) and transparency in information sharing (83.3%).

- Ease of Use and Accessibility: Users prefer products that are simple to use or obtain (82.7%) and have a user-friendly interface (88.2%). They also expect fast and instantaneous performance (78.9%).
- Innovation and Trendsetting: While users appreciate the latest technology (81.6%), being a pioneer or trendsetter is less important (63.8%).
- reliability and Support: Consistent performance with minimal malfunctions is crucial for users (92.1%). They also value prompt and fair resolutions to issues (76.5%) and 24/7 availability (82.7%).
- Promotional Offers and Discounts: Promotional offers and discounts are moderately appreciated by users (54.2%), but not a major deciding factor.
- Security and Privacy: Users prioritize secure transactions free from cyber threats (86.4%) and expect comprehensive FAQs covering security, privacy, and general queries (63.3%).
- Personal Information Protection: Secure storage and protection of personal information is essential for users (81.6%).
- Response Mechanism: Effective response mechanisms like chatbots or email are well-received by users (77.8%).

Areas for Improvement:

- While users like the product's features, some aspects could be further enhanced.
- Address the neutral responses (12-18%) regarding features like password protection, latest technology, and being a trendsetter. Understand the underlying reasons for neutrality and address them accordingly.
- Improve the dislike percentage (3-11%) for aspects like promotional offers, usage process simplicity, and resolution fairness. Analyze the specific reasons for dislike and implement targeted improvements.

- Although majority finds information transparent, the 14% neutral responses suggest potential areas for clarification or improvement in communication.

This survey provides valuable insights into user preferences and expectations regarding the digital product or service. By addressing the identified areas for improvement and capitalizing on the positive sentiment, the product can further enhance user satisfaction and loyalty.

Table 5.9 : Ranks of Feeling regarding availability in product and services.

	Weightage	Rank
If the usage process is simple to understand or user friendly	4.7	1
If the product or service is fast or instantaneous	4.67	2
If the resolution provided is prompt and fair	4.655	3
If product or service is consistent / never hangs or malfunctions	4.645	4
Your personal information is secured or protected	4.565	5
If the information provided while using the product or service is transparent	4.485	6
If the product or services are equipped with latest technology	4.485	6
Information provided on website/app. product is up to date	4.465	7
Digital product is having enhanced security features like face recognition or biometric	4.465	7
if digital product or service is easy to access or use	4.465	7
If product or service are available 24 by 7	4.45	8
FAQ covers your security, privacy and general queries	4.435	9

If the product or service is flexible and interactive	4.425	10
Digital product is backed by proper response mechanism like chat bot, email	4.4	11
You are able to avail complete range of services	4.37	12
If the product of service is pioneer of technology or trend setter	4.3	13
If digital product is having basic security features like PIN or password	4.27	14
If usage of product or services is promoted by promotional offers or discount	4.155	15
If the product or service is having visual appeal and is fashionable	3.94	16
Transactions done are completely free from fear of cyber attack/crime or hacking	3.9	17

This study aimed to identify the most impactful ways to increase awareness and acceptance of financial innovations in India. Through a survey using a Likert scale, respondents shared their preferences regarding various features of financial innovation techniques. Analyzing the weighted average scores (WAS) and assigned ranks revealed several important findings:

1. User-friendliness is paramount: The highest-ranked factor (highest WAS of 4.7) was "If the usage process is simple to understand or user-friendly." This highlights the crucial role of intuitive and accessible designs in fostering adoption of financial innovations.
2. Speed and efficiency matter: Closely following user-friendliness, "If the product or service is fast or instantaneous" received a high WAS of 4.6, indicating the significant value placed on convenience and efficiency in the Indian market.
3. Fairness and promptness in resolving issues: Respondents also valued prompt and fair resolution of any problems encountered with financial innovations, as reflected in the WAS of 4.65 for "If the resolution provided is prompt and fair." This emphasizes the importance of building trust and reliability in the new technology.

4. Reliability and security are essential: Consistent performance ("If the product or service is consistent / never hangs or malfunctions") and data security ("Your personal information is secured or protected") were also highly ranked with WAS of 4.645 and 4.565 respectively. These findings reiterate the critical need for robust infrastructure and robust cyber security measures to ensure widespread adoption.
5. Transparency and technological advancement: While slightly lower in ranking, transparency ("If the information provided while using the product or service is transparent") and technological advancement ("If the product or services are equipped with latest technology") still held significant importance with WAS of 4.485 each. This suggests a desire for clear communication and access to cutting-edge solutions.

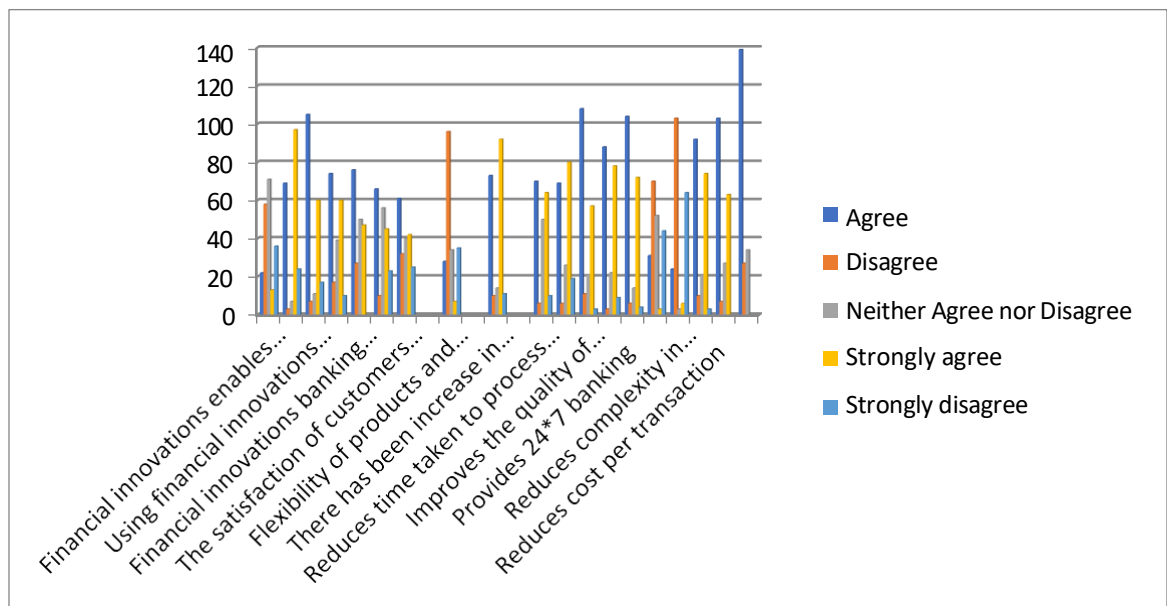
Overall, the study reveals that Indian consumers prioritize simplicity, speed, reliability, security, and transparency when it comes to financial innovations. Addressing these needs will be crucial for successfully driving awareness and adoption of these advancements in the Indian market

Table 5.10 Frequency Analysis on Effect of Financial Innovations on Operational Performance of Bank

Statements	Agree	Disagree	Neither Agree nor Disagree	Strongly agree	Strongly disagree
Financial innovations enables to make quick and easy transaction leading to high speed of delivery	22	58	71	13	36
Financial innovations provide consumers with a convenient method of conducting bank business.	69	3	7	97	24
Using financial innovations has improved quality financial services	105	7	11	60	17

delivery					
Financial innovations has positive effect on bank's cost efficiency	74	17	39	60	10
Financial innovations banking has led to the improvement of bank overall operational efficiency	76	27	50	47	
The bank product and service quality Has improved over the year.	66	10	56	45	23
The satisfaction of customers have Improved over the ears	61	32	40	42	25
Flexibility of products and service Provision has improved overtime.	28	96	34	7	35
There has been increase in range of Financial products and services.	73	10	14	92	11
Reduces time taken to process & execute transaction	70	6	50	64	10
Reduces human error and mistakes significantly	69	6	26	80	19
Improves the quality of banking services	108	11	21	57	3
Improves customer relationship	88	3	22	78	9
Provides 24*7 banking	104	6	14	72	4
Service Increases the number of customers significantly	31	70	52	3	44
Reduces complexity in processing transaction	24	103	3	6	64
Reduces footfall at branches	92	10	21	74	3
Reduces cost per transaction	103	7	27	63	
Reduces time taken to process & execute transaction	139	27	34		

Figure 5.5 Graphical Representation of on Effect of Financial Innovations on Operational Performance of Bank



This survey provides valuable insights into public perception of the impact of financial innovations on various aspects of banking. Here's a breakdown of the key findings and their implications:

Positive Impact:

- Majority agrees: The majority of respondents (over 60%) agreed or strongly agreed with statements related to:
 - Convenience: Financial innovations provide convenient methods for conducting bank business and accessing services 24/7.
 - Speed and efficiency: Transactions are faster and easier, delivery speeds are accelerated, and processing times are reduced.
 - Quality and cost: Services are of higher quality, cost per transaction is lowered, and operational efficiency is improved.

- Customer satisfaction: Customers are generally more satisfied with banking services.
- Product and service range: The variety of financial products and services has expanded.

These findings suggest that financial innovations have significantly improved the banking experience for a large portion of the population.

Neutral or mixed perspectives:

- Neither agree nor disagree: A sizable group (around 30-40%) chose this option for statements regarding:
 - Flexibility: Whether flexibility in product and service offerings has significantly improved.
 - Customer base: Whether financial innovations significantly impact the number of customers banks attract.
 - Complexity: Whether innovations reduce the complexity of transaction processing.
 - Branch footfall: Whether innovations significantly diminish the need to visit physical branches.

These neutral responses indicate that the impact of innovations in these areas is less clear-cut, with potential benefits and drawbacks that require further evaluation.

Negative perceptions:

- Minority disagrees: While smaller in number, some respondents disagreed or strongly disagreed with statements about:
 - Improved flexibility: A significant portion (35%) believes flexibility hasn't increased much.
 - Customer focus: 9 respondents strongly disagree that innovations guide service improvement.

- Branch relevance: Over 60% disagree that innovations significantly reduce branch visits.

These dissenting opinions suggest that a segment of the population may feel left behind or not fully benefitting from some aspects of financial innovation.

The survey paints a positive picture of the general perception of financial innovation's impact on banking. However, it also highlights areas where opinions diverge and potential concerns exist. This information is valuable for banks and financial institutions to consider as they develop and implement new technologies.

They should strive to:

- **Maximize the benefits:**

Continue improving convenience, speed, efficiency, and product offerings while ensuring inclusivity and accessibility for all customers.

- **Address concerns:**

Investigate and address issues related to flexibility, customer focus, and branch relevance to mitigate potential drawbacks and negative perceptions.

- **Promote awareness:**

Communicate the positive effects of financial innovations to raise public understanding and trust.

By effectively managing both the benefits and challenges of financial innovation, banks can continue to improve the overall banking experience for a wider range of customers.

Table 5.11: Frequency analysis on Effect of financial innovations on marketing Strategy of bank

STATEMENTS	PERCEPTION					EXPERIENCE				
	1	2	3	4	5	1	2	3	4	5
PRODUCT STRATEGY										
Various types of loans issued	53	147				37	83	50	30	
Use of debit and credit cards	64	16	49	17	54	16	44	43	71	26
NRI services provided by the bank	58	16	73	50	3		33	87	80	
Locker facilities available in the bank	7	20	65	80	28		27	143	30	
Demat account provided by the bank	31	12	43	81	33		75	55	70	
Mobile banking/ online banking services	3	34	58	86	37		45	10	119	26
Insurance products and services	101	40	52	4	3	26	89	55	30	
IPO	8	3	77	77	35		55	112	33	
PRICE STRATEGY										
Interest rates of the Bank against loans		69	92	35	4			83	117	
Interest rates allowed to the deposits	4	26	85	50	35		7	22	138	33
Message alert charges for services	3	8	16	81	92		33	22	145	
Cash back offer or rewards	7		50	104	39		33	22	145	
Minimum balance as per statutory limit	4		68	90	38			80	95	25
Loan processing charges	4	4	87	86	19		33	56	111	
PLACE STRATEGY										
Bank's ATM facilities		14	90	77	19			55	145	
The bank provides easy parking facility	3	6	83	67	41		33	22	117	28
Bank's ATM located at convenient place	10	19	81	36	50			79	95	26
The bank gives comfortable seating arrangements as per covid protocol	12	22	73	68	25			55	119	26
The bank's have Depository machine facility	31	7	56	72	30		59	113	28	
Door step service available	3	3	39	69	86		59	113	28	

PROMOTION STRATEGY												
Banks distribute booklets and pamphlets	80	43	35	31	11		34	138	28			
Banks conduct exhibition and trade show	20	77	103				22	100	78			
Banks keep direct personal contact with customers.	4	8	80	64	44		45	17	138			
The bank gives financial information through advertisement	12	20	81	33	54		12	43	145			
Special care for NRI customers	12	22	74	64	28		45	10	120	25		
PROCESS STRATEGY												
Bank operate green banking channel	30	8	60	66	36		45	44	86	25		
Pass book printing machine facility	4	4	39	68	85		45	10	145			
Core/net/mobile banking facilities available RTGS and NEFT services provided	56	144					45	10	120	25		
Online bill payment system	20	14	51	52	63		45	38	91	26		
Digital apps availability	4	16	71	51	58		45	62	67	26		
Online shopping facility	8	19	67	80	26		67	61	63	9		
Easy to Fund transfer between accounts	4	12	75	78	31		37	47	115	1		
PEOPLE STRATEGY												
Easily accessible to balance inquiry	18	12	56	48	66		82	63	44	11		
Bank employees have sufficient knowledge about banking services	10	20	60	53	57		67	100	29	4		
The bank updates with the changing new events or activities.	22	5	58	85	30		57	92	45	6		
Customer feedback procedure help to maintain long term relationship	15	12	65	72	36		48	79	65	8		
PHYSICAL EVIDENCE STRATEGY												
The each and every bank has its logo	26	16	82	42	34		43	12	145			
Banks provide diary, writing pads to the internal customers		16	91	75	18		13	37	150			

The bank shows billboards and hoardings	8	9	65	51	67	437	122	28
Banks provide passbook and cheque books	3	6	83	66	42	43	43	86
The bank have influential Punch lines/slogan	7	8	67	52	66	437	150	

Figure 5.6 Bar Chart on Effect of Financial Innovations on Marketing Strategy of Bank (Perception)

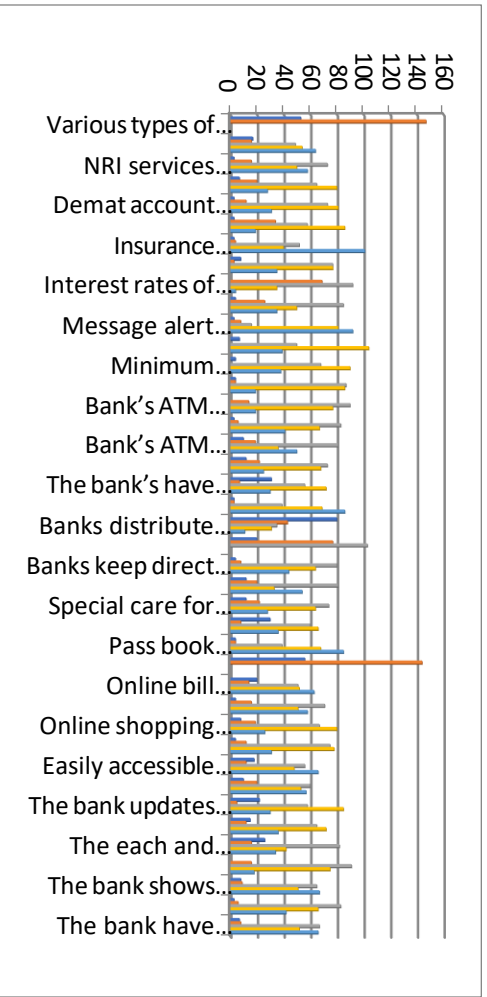
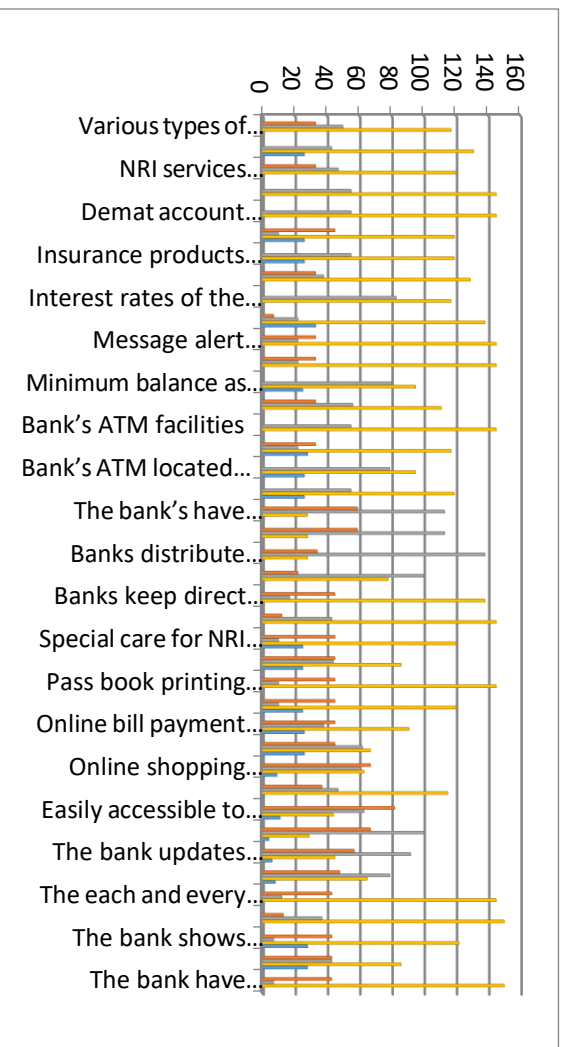


Figure 5.7 Bar Chart on Effect of Financial Innovations on Marketing Strategy of Bank (Experience)



The provided data contains survey responses for various statements related to banking services. Here's a summary of the key findings and potential areas for discussion:

Loan Services:

- A majority disagreed with the statement "Various types of loans issued," suggesting potential dissatisfaction with loan offerings.
- A closer look at responses for specific loan types (e.g., interest rates, processing time) could provide deeper insights.

Debit/Credit Cards:

- Responses were divided regarding "Use of debit and credit cards," indicating mixed experiences.
- Further analysis of reasons for strong disagreement (64 respondents) could reveal areas for improvement.

NRI Services:

- A significant number (120) given neutral rating with the statement about NRI services, suggesting neutrality or lack of awareness.
- Exploring reasons for lower rating (58) could uncover specific issues faced by NRI customers.

Locker Facilities:

- A similar pattern to NRI services was observed, with many (143) giving neutral ratings about locker facilities.
- Investigating reasons for lower ratings (27) could highlight concerns regarding locker availability or security.

Demat Accounts:

- Responses for demat accounts were more positive, with a majority (114) giving higher ratings (4 or 5)
- However, reasons for strong disagreement (31) should be explored to identify potential areas for improvement.

Mobile/Online Banking:

- Similar to demat accounts, a majority (123) given higher rating with the statement about mobile/online banking, indicating general satisfaction.
- Reasons for strong disagreement (37) could expose specific issues with app functionality, security, or user experience.

Insurance:

- Insurance services received lowest ratings from majority of respondents.
- This suggests significant dissatisfaction with insurance offerings or awareness levels.
- A deeper analysis of reasons for disagreement is crucial to understand customer concerns.

IPO:

- Responses were mixed for IPO services, with a substantial number (112) giving neutral rating
- Further investigation is needed to determine the reasons for neutrality and identify areas for improvement.

Interest Rates:

- Both loan interest rates and deposit interest rates received mixed responses, indicating a lack of clear consensus.

Other Services:

- Similar analysis can be applied to other service areas covered in the survey, such as message alert charges, cash back offers, minimum balance requirements, etc.

Table 5.12 Descriptive statistics

Items	Mean	SD
Awareness about the product, process and technology innovations	4.3998	0.58017
Usage of the product, process and technology innovations	3.3716	0.47301

Importance you accord to each feature while using digital products and services starting	4.125	0.34717
How do you feel if particular feature is available in product and services you are using	4.4123	0.357
Effect of financial innovations on operational performance of bank	3.6277	0.17359
Effect of financial innovations on marketing strategy of bank		
Perception		
Product strategy	3.4338	0.53327
Price strategy	3.7868	0.63117
Place strategy	3.521	0.67383
Promotion strategy	3.181	0.52197
Process strategy	3.3114	0.56552
People strategy	3.17	0.77806
Physical evidence strategy	3.5315	0.58725
Experience		
Product strategy	3.6481	0.59982
Price strategy	3.5627	0.60199
Place strategy	3.4508	0.46867
Promotion strategy	3.401	0.57642
Process strategy	3.3787	0.7474
People strategy	2.9837	0.54339
Physical evidence strategy	3.58	0.79899

Based on the provided descriptive statistics study, the statement "Awareness about the product, process and technology innovations" exhibited the highest mean value of 4.3998. This suggests that, on average, respondents displayed the greatest awareness and understanding of advancements in the relevant areas.

Conversely, the statement "experience of Physical evidence strategy" possessed the largest standard deviation of 0.79899. This implies a wider dispersion of responses, indicating varying levels of experience with physical evidence strategies among the participants.

The high mean value for product, process, and technology innovations awareness highlights the potential importance these aspects hold for influencing respondents. It could point towards a focus on innovation within the industry or a particular emphasis placed on informing stakeholders about such advancements.

The substantial standard deviation for physical evidence strategy experience suggests that this aspect might be less standardized or consistently implemented. This could be due to various factors, such as industry differences, resource limitations, or varying interpretations of what constitutes effective physical evidence strategies.

- Statement “Awareness about the product, process and technology innovations” exhibited the high mean value of 4.39. This suggests that, on average, respondents displayed the greatest awareness and understanding of advancements in the relevant areas. This highlights the potential importance these aspects hold for influencing respondents. It could point towards a focus on innovation within the industry or a particular emphasis placed on informing stakeholders about such advancements.
- Statement “ Feeling regarding availability of features” while using product and services exhibited highest mean value of 4.41. This suggests that user’s value features like simplicity , ease of use , security.
- High mean value of 3.78 for Statement “Perception of Pricing strategy “ indicates that price of product plays significant role in forming perception about the product.
- High mean value of 3.64 for Statement “ Experience of Product strategy” indicates that product features and pleasant experience while using the product plays significant role.

- Statement "experience of Physical evidence strategy" possessed the largest standard deviation of 0.79. This implies a wider dispersion of responses, indicating varying levels of experience with physical evidence strategies among the participants.
- Statement "experience of Process strategy" possessed the large standard deviation of 0.74. This implies a wider dispersion of responses, indicating varying levels of experience with processes followed by participants for availing particular product or service which further indicates lack of standardization in processes. This could be due to various factors, such as industry differences, resource limitations, or varying interpretations of what constitutes effective physical evidence strategies.
- Statement “ Perception of People strategy" possessed the large standard deviation of 0.77. This implies a wider dispersion of responses, indicating varying levels of perception formed by customers regarding products and services basis pricing , promotion and place strategies used by the banks and level of importance they accord to each feature and strategy.

5.3 PHASE 2

5.3.1 Correlation Analysis

Hypothesis 1: There is no impact on any customer segment or product segment due to Financial Innovations.

Table 5.13 Correlation analysis about Awareness, usage, importance and feel about the product, process and technology innovations

		Awareness	Usage	Importance	Feel
Awareness	Pearson Correlation	1	.336	-.103	.833
Usage	Pearson Correlation		1	.038	.576
Importance	Pearson Correlation			1	-.011
Feel	Pearson Correlation				1
. Correlation is significant at the 0.01 level (2-tailed).					

The provided table suggests intriguing insights into the relationship between financial innovations in banking and customer perception. Here's a breakdown of the key findings and potential discussions:

Significant Positive Correlations:

- Awareness and Usage: A strong correlation (.336) indicates that increased awareness of product, process, and technology innovations translates to higher usage. This suggests successful communication and effective targeting by banks, leading to customers actively adopting new offerings.
- Feelings and Awareness: A very strong correlation (.833) highlights a crucial link between awareness and positive customer sentiment. Customers who are aware of innovations tend to feel more positive about them, suggesting trust and appreciation for the bank's efforts to improve their experience.
- Usage and Feelings: A moderate correlation (.576) implies that using innovative products and services leads to positive customer feelings. This underscores the importance of user-friendly experiences and demonstrating the value proposition of innovations to customers.

Impact and Implications:

These findings suggest that financial innovations in banking have a positive impact on various aspects of customer perception:

- Increased Adoption: Awareness effectively drives usage, indicating successful marketing and product design strategies.
- Enhanced Trust: Positive feelings associated with awareness suggest trust in the bank's ability to deliver valuable innovations.
- Improved Customer Satisfaction: Usage leading to positive feelings implies that innovations are meeting customer needs and enhancing satisfaction.

Hypothesis 3: There is no impact of financial innovations on existing banks in Indian Banking Industry.

Table 5.14 Correlation analysis between the operational strategy and marketing strategy.

	F	P1	P2	P3	P4	P5	P6	P7	E1	E2	E3	E4	E5	E6	E7
F	1	.180 ⁺	0.113	0.033	0.018	.174 ⁺	0.06	-0.01	0.002	0.008	-0.07	-0.07	-0.02	-.155 ⁺	0.065
P1		1	.747 ^{**}	.478 ^{**}	.548 ^{**}	.779 ^{**}	.153 ⁺	-0.03	-0.11	-0.09	-0.02	-0.03	-0.1	0.045	-0.06
P2			1	.674 ^{**}	.546 ^{**}	.764 ^{**}	0.12	-0.04	-0.11	-0.09	-0	-0.02	-0.09	0.11	0.031
P3				1	.675 ^{**}	.764 ^{**}	0.08	-0.09	-0.14	-0.11	-0.08	-0.08	-.167 ⁺	0.01	-0
P4					1	.677 ^{**}	0.09	-0.1	-0.05	-0.03	-0.03	-0.05	-0.07	-0	-0.11
P5						1	.142 ⁺	-0.09	-0.07	-0.04	0	-0.01	-0.1	-0.03	-0.07
P6							1	.216 ^{**}	0.137	0.114	.177 ⁺	.152 ⁺	.155 ⁺	0.032	-0.06
P7								1	0.102	0.088	.152 ⁺	0.074	0.059	-0.02	-0.01
E1									1	.964 ^{**}	.832 ^{**}	.832 ^{**}	.943 ^{**}	.225 ^{**}	-0.1
E2										1	.815 ^{**}	.856 ^{**}	.897 ^{**}	0.135	-0.11
E3											1	.868 ^{**}	.813 ^{**}	.346 ^{**}	-0.08
E4												1	.862 ^{**}	.290 ^{**}	-0.12
E5													1	.371 ^{**}	-0.11
E6														1	-0.09
E7															1
*. Correlation is significant at the 0.05 level (2-tailed).															
**. Correlation is significant at the 0.01 level (2-tailed).															

1. Effect of Financial Innovations on Operational Performance:

The study found that financial innovations have a positive and significant correlation with the operational performance of banks. This suggests that banks implementing innovative financial products and services tend to see improvements in their efficiency and effectiveness.

2. Perception towards Product Strategy and its Relationship:

Perception towards product strategy has strong positive correlations with other marketing mix elements like price, place, promotion, process, and people. This indicates that a strong product strategy is crucial for influencing overall customer perception and potentially driving positive outcomes.

3. Relationships among Pricing, Place, and Promotion Strategies:

Perception towards price strategy and place strategy also show significant positive correlations with each other and with promotion strategy. This suggests that effective pricing and distribution strategies can enhance the impact of promotional efforts.

4. Place and Promotion Strategies:

Perception towards place strategy has a significant positive correlation with experience towards place strategy. This implies that customers' perception of a bank's physical presence or online accessibility aligns well with their actual experiences.

5. Promotion and Process Strategies:

Perception towards promotion strategy has a strong positive correlation with perception towards process strategy. This suggests that effective promotional campaigns can lead to positive perceptions of the bank's operational processes.

6. Process and People Strategies:

Perception towards process strategy has a significant positive correlation with perception towards people strategy. This indicates that efficient and customer-centric processes contribute to positive perceptions of the bank's employees.

7. People and Physical Evidence Strategies:

Perception towards people strategy has a significant positive relationship with experience towards physical evidence strategy. This suggests that positive interactions with bank staff enhance customers' perception of the bank's physical environment and overall brand image.

8. Customer Experience:

Experience towards product, price, place, promotion, and process strategies all have strong positive correlations with each other. This suggests that a consistent and positive customer experience across all touch points is crucial for success.

9. Experience towards Product Strategy:

Experience towards product strategy has the strongest correlations with all other experience variables. This highlights the importance of offering relevant and valuable products to meet customer needs and exceed expectations.

10. Relationships among Experience Variables:

Experience variables generally have strong positive correlations with each other. This suggests that a positive experience in one area of a bank's operations tends to lead to positive experiences in other areas, creating a holistic and satisfying customer experience.

11. Experience towards Place Strategy:

Experience towards place strategy has a significant positive correlation with experience towards people strategy. This suggests that a convenient and accessible physical presence or online platform can positively influence customer interactions with bank staff.

12. Experience towards Promotion and People Strategies:

Experience towards promotion strategy and experience towards people strategy both have significant positive correlations with each other. This suggests that effective promotional campaigns can positively impact customer interactions with bank staff.

13. Experience towards Process Strategy:

Experience towards process strategy has a significant positive correlation with experience towards people strategy. This suggests that efficient and customer-centric processes can lead to positive experiences with bank staff, further reinforcing the importance of process optimization in customer satisfaction.

The study highlights the interconnectedness of various marketing mix elements, customer perception, and customer experience in influencing the operational performance of banks. A strong focus on product innovation, effective pricing and distribution strategies, customer-centric processes, and positive employee interactions appears to be key for success in the banking industry.

Above table showed positive and significant correlations which indicate that, there is a positive impact of financial innovations on existing banks in Indian Banking Industry.

Abbreviations representations

Symbol	Representation
F	Effect of financial innovations on operational performance of bank
P 1 and E1	Product Strategy
P 2 and E2	Price Strategy
P 3 and E3	Place Strategy
P 4 and E4	Promotion Strategy
P 5 and E5	Process Strategy
P 6 and E6	People Strategy
P 7 and E7	Physical Evidence Strategy
P: PERCEPTION	
E: EXPERIENCE	

Table 5.15: Cronbach's Alpha

	Cronbach's Alpha	N of Items
Awareness about the product, process and technology innovations	.971	29
Usage of the product, process and technology innovations	.751	29
Importance of the product, process and technology innovations	.801	16
How do you feel if particular feature is available in product and services you are using	.818	20
Effect of financial innovations on operational performance of bank	.780	19

Effect of financial innovations on marketing strategy of bank		
Perception	.867	42
Experience	.927	42

In the Reliability Statistics table, the values for Cronbach's Alpha are as follows: (.971) Product, process, and technology innovation awareness; (.751) Product, process, and technology innovation usage; (.801) Product, process, and technology innovation importance; and (.819) “How do you feel about a specific feature being available in the products and services you use?” (.780) Financial innovations' impact on a bank's operational performance and (perception:.867, experience:.927).

The impact of financial innovations on a bank's marketing strategy demonstrates the extremely high degree of consistency among the scale's elements. The range of Cronbach's alpha is 0 to 1.

In-depth Interpretation of Each Result

1. Table 5.1 – Demographic Analysis

This table reveals a strong skew toward middle-aged (30–45 years), metro-residing, female, highly educated (mostly postgraduates), and high-income respondents. This demographic skew indicates that the survey results may reflect the preferences and experiences of urban, educated, and tech-savvy users, making them more likely to engage with digital banking innovations. This is crucial as it explains the generally high awareness and positive perceptions observed in subsequent tables.

2. Table 5.2 – Awareness, Usage, and Features

This table measures how respondents rate their awareness and usage of innovative financial products. A majority are “highly aware,” suggesting successful outreach and market penetration among the target demographic. Importantly, this confirms that the study is based on a knowledgeable sample, enhancing the reliability of user feedback about innovation experiences.

Table 5.3 – Rank of Various Ways to Increase Awareness

This table identifies communication strategies that respondents believe are most effective in enhancing awareness of financial innovations. Top ranks were assigned to “awareness through banks’ digital platforms,” followed by “mass media campaigns” and “customer education programs.” These preferences emphasize the public’s trust in official bank communication and the effectiveness of structured outreach. This suggests that banks should leverage their digital presence more actively for innovation rollouts.

3. Table 5.4 – Usage Levels

Usage levels of UPI, mobile banking, ATMs, and online payment platforms are significantly high, reflecting a shift toward digital modes of banking. This validates the assumption that process innovations are effectively integrated into customer routines. Innovations such as RTGS/NEFT and UPI, scoring highest, demonstrate their widespread acceptance and utility in daily financial activities.

Table 5.5 – Ranks of Various Ways to Increase Usage of Financial Innovative Products and Services

RTGS/NEFT topped the rankings with the highest weighted average score (WAS of 4.445), followed closely by online bill payments and UPI. This shows that users highly value convenience and time-efficiency in transaction methods. Lower-ranked items like cryptocurrency and blockchain suggest these are still nascent or less trusted technologies among the surveyed population. The ranking provides banks with a prioritized roadmap of digital services to promote for higher adoption.

4. Table 5.6 – Importance of Features

Respondents rated ease of use, security, and availability of features as most important. This emphasizes that successful innovations are those that combine functionality with user-centric design. Banks that streamline user interfaces and prioritize digital safety are more likely to retain customers.

Table 5.7 – Ways to Increase Importance of Features in Digital Banking

Respondents ranked “reliability” and “security” as the most critical attributes, reflecting a preference for consistent, safe, and dependable systems. This was followed by real-time performance and up-to-date information, indicating the rising importance of data freshness and responsiveness. Conversely, attributes like “visual appeal” and “trendiness” ranked lowest, indicating that aesthetics are secondary to functionality in financial decision-making.

Table 5.8 – Frequency Analysis of Feelings About Availability

A significant majority reported positive sentiments toward digital product availability and accessibility. For instance, over 80% “liked” or “expected” features like biometric login, 24/7 availability, and real-time updates. Very few respondents expressed dislike, confirming a general satisfaction with the current state of availability. This suggests that banks are successfully meeting the demand for always-on, secure, and feature-rich platforms.

Table 5.9 – Ranked Feelings About Product and Service Features

This table quantifies users’ emotional responses to various aspects of financial innovations. “Ease of use” (WAS = 4.7), “speed” (4.67), and “prompt and fair resolution” (4.655) top the list, indicating users’ strong emphasis on practical usability and support. Features like “visual appeal” (3.94) and “being a technology pioneer” (4.3) ranked lower, again reinforcing that users prioritize utility over novelty.

Table 5.10 – Impact on Operational Performance

Respondents observed improved turnaround time, process simplification, and faster customer service, indicating that financial innovations have tangibly enhanced operational efficiency. This aligns with broader trends of automation (e.g., e-KYC, instant loans) within Indian banking operations.

Table 5.11 – Impact on Marketing Strategy

Innovations have redefined marketing strategies, with a noticeable emphasis on digital

channels, brand repositioning, and service personalization. This suggests a strategic pivot from traditional media toward data-driven, customer-focused digital engagement approaches.

Table 5.12 – Descriptive Statistics

This summary table presents mean and standard deviation values for key metrics like awareness, usage, satisfaction, and perceived service quality. High means with low standard deviations across most constructs reflect both high satisfaction and uniformity in user experience. This statistical consistency enhances the validity of earlier frequency and correlation analyses by confirming that responses are not widely scattered, and thus more reliable for inference.

Table 5.13 – Correlation Analysis (Awareness, Usage, Feelings)

This table reveals:

Awareness ↔ Feelings: Very high correlation ($r = 0.833$) suggests awareness translates to positive sentiments—users who are well-informed tend to appreciate innovations more.

Usage ↔ Feelings: Moderate correlation ($r = 0.576$) implies that actual use of innovations enhances satisfaction, though user experience quality still plays a role.

Awareness ↔ Usage: Positive correlation ($r = 0.336$) reinforces the role of financial education in driving adoption.

Table 5.14 – Correlation of Marketing and Operational Strategies

Positive correlations across product, price, promotion, process, people, and physical evidence strategies suggest that customer experience is holistic—effective marketing reinforces operational trust and vice versa. Notably:

Product strategy has the strongest ties with overall experience, indicating that innovation in core offerings is key to customer retention.

Promotional strategies influence perceptions of operational efficiency, showing that branding and reality must align.

Table 5.15 – Cronbach’s Alpha (Reliability Testing)

All constructs show high internal consistency:

Awareness ($\alpha = 0.971$) and Experience ($\alpha = 0.927$) are extremely reliable.

All other metrics (usage, importance, operational and marketing impacts) scored above the 0.7 threshold, confirming the validity and trustworthiness of the survey instruments used in analysis.

5.4 PHASE 3

To identify factors on demand & supply side that has led to rapid growth in financial innovations.

This researcher spoke with senior employees who worked for the bank in order to provide support for the quantitative data obtained from the surveys and the qualitative data obtained from the in-depth interviews. The vast majority of interviews were conducted via email communication with senior personnel who had already scheduled meetings. The researcher carried out each interview individually, and each one followed a semi-structured format. These statistics provide some information concerning demand-side variables and supply-side factors that have contributed to the fast increase in financial innovations. After researchers have summarized the perspectives of a number of different experts about demand-side factors, they go on to determining supply-side factors.

5.4.1. Demand side factor :

➤ **How do financial innovations change the demand for financial products and services?**

When we questioned experts, we wanted to know how the changing demand for financial goods and services is affected by advances in the financial sector. The following inference has been made in response to their point of view::

- Increased demand for financial goods and services may result from developments that broaden consumers' and enterprises' access to these resources. The convenience

of being able to handle one's financial affairs from any location at any time, thanks to the rise of internet banking and mobile banking systems, is one such factor.

- New financial goods and services that appeal to a broader demographic of buyers are another potential outcome of financial innovation. For instance, investors now have cheaper and easier access to a broader range of investment options because to the rise of exchange-traded funds (ETFs). This has led to a rise in the demand for ETFs from both individual and institutional investors.
- Altering the distribution channels via which financial products and services are made available may have an impact on the demand for such goods and services. For example, the change from paper-based transactions to electronic transactions has made it simpler and more efficient to perform financial transactions. Because of this, sales of paper goods and services like checks and money orders have dropped.
- Making financial goods and services more accessible by decreasing the prices associated with executing financial transactions. Digital wallets and mobile payment applications are just two examples of how advancements in payment technology have lowered transaction costs for merchants and shoppers alike.
- Additionally, financial innovations may open up new avenues of business for banks and other financial service providers. For instance, the rise of fintech firms like robo-advisors and crowdfunding platforms has opened up new avenues for

financial innovation. The subsequent rise in demand for these revolutionary services has stimulated even further breakthroughs in the banking and finance industries.

➤ **What are the drivers of demand for new financial products and services?** When asking to bank professionals, researcher posed the question, What are the Drivers of Demand for New Financial Products and Services? The following inference has been made in response to their point of view:

Changing consumer needs and preferences: As consumers' needs and preferences evolve,

they demand new financial products and services that better meet their needs. For example, the rise of the gig economy has led to a demand for financial products and services that are tailored to the needs of gig workers.

- Technological advancements: New technologies are constantly creating new possibilities for financial products and services. For example, the development of blockchain technology has led to the creation of new crypto currencies and decentralized finance (DeFi) applications.
- Regulatory changes: Changes in regulations can also create new opportunities for financial innovation. For example, the introduction of open banking regulations has made it easier for fintech companies to develop new financial products and services.
- Economic conditions: The overall economic environment can also affect the demand for new financial products and services. For example, during periods of economic uncertainty, there may be an increased demand for financial products that offer protection against risk.
- Competition: Competition among financial institutions can also drive innovation and the development of new products and services. As financial institutions compete for customers, they are constantly looking for new ways to differentiate themselves and attract new business.

In addition to these general factors, there are also a number of specific drivers of demand for new financial products and services in different market segments. For example, in the retail banking market, there is a growing demand for mobile banking and digital payments solutions. In the investment management market, there is a growing demand for robo-advisors and other automated investment solutions. And in the commercial banking market, there is a growing demand for trade finance and supply chain finance solutions.

Overall, the demand for new financial products and services is driven by a complex interplay of factors, including changing consumer needs, technological advancements, regulatory changes, economic conditions, and competition. Financial institutions that are able to understand these drivers and develop innovative products and services that meet the needs of their customers will be well-positioned for success in the future.

➤ **How do different types of financial innovations impact different types of consumers?**

The issue addressed to banking experts by the researcher was, "How do various financial innovations affect various consumers?" In light of their argument, we may deduce the following:

There are several ways in which various customers may be affected by financial advancements. Some instances of the varied effects that financial innovations may have on various categories of customers are as follows:

Digital transactions and mobile banking: The advent of mobile banking and digital payment options has simplified and streamlined the banking process for customers. This has proved especially helpful for customers who, either of where they reside or their physical limitations, cannot readily visit a physical bank office. Because of the decreased transaction costs enabled by mobile banking and digital payments, more people are able to afford these services.

Robo-advisors are online financial services that employ computer programs and algorithms to handle client portfolios. Stock market investing, once reserved for the wealthy and institutional investors, is now within reach of the general public. Robo-advisors have also contributed to the democratization of investing by allowing individuals with little to no prior understanding of the stock market to purchase and own a diverse portfolio of assets.

Peer-to-peer (P2P) lending eliminates the middleman, the bank, and facilitates direct loan between borrowers. This has made it feasible for customers to acquire credit more readily and inexpensively, particularly those who may not be able to qualify for conventional bank loans. Social impact investors and others interested in environmental sustainability have found each other via P2P financing.

Both crypto currencies and DeFi (decentralized finance) are cutting-edge financial innovations that are shaking up the status quo. Crypto currency refers to a kind of secure digital money that operates independently of central authorities. DeFi, or the Distributed Financial Infrastructure, is a network of blockchain-based financial services. Consumers now have more options than ever before for budgeting, investing, and borrowing thanks to developments in both bitcoin and DeFi.

Financial innovations may benefit a wide range of customers because they improve the availability, efficiency, and cost of the financial services they use. Consumers' financial awareness and security may benefit from these developments.

Overall, several categories of customers may be profoundly affected by financial developments. It is crucial for consumers to be aware of the possible advantages and hazards of these developments and to make educated choices about how to utilize them.

➤ **How do financial innovations impact financial inclusion and access to finance?**

The subject of how financial innovations affect financial inclusion and access to financing was asked to banking professionals as part of a study. In light of their argument, we may deduce the following:

Expanding financial inclusion and improving access to finance on a global scale are two areas where financial innovations are having a profound impact. These developments, which include a variety of technology and digital solutions, are helping to close the gap between mainstream banking and the many people and places that still lack access to this vital service.

- New developments in the financial sector have expanded access to banking and related services for people and enterprises of all backgrounds and levels of technical expertise. The necessity for banks or middlemen has been eliminated thanks to the prevalence of mobile banking apps, digital wallets, and online payment options. This has been especially helpful for those living in remote areas and those who are physically impaired and so unable to easily use conventional banking services.
- Due to developments in the financial sector, customers now have access to a greater variety of financial products that aim to meet a broader range of demands and risk preferences. For instance, robo-advisors have widened access to the stock market and other asset classes for those who lack in-depth understanding of finance. By bridging the gap between potential borrowers and lenders, peer-to-peer (P2P) Lending platforms have opened the credit market to those who may not otherwise have it.
- New technologies have allowed banks to simplify their procedures, automate routine tasks, and lower transaction fees. As a result, customers now pay less money out of pocket to use financial services. Additionally, people now have more visibility into their financial situations because to data analytics and open banking efforts, which also help them make better financial choices.
- Financial innovations have played a vital role in reaching unbanked and underbanked communities, individuals who lack access to formal financial

services. These people are now better equipped to participate in the economy and expand their financial horizons thanks to mobile money and digital banking technologies.

- Technology advancements in the financial sector have led to the creation of resources for teaching about money management. Individuals may get the information and skills necessary to handle their money responsibly by consulting these sources, which are widely available via mobile applications, websites, and social media platforms.
- Technology in the financial sector is allowing for the customization of responses to meet the needs of underprivileged communities and communities of interest. Micro-entrepreneurs and small-scale farmers are able to access microloans and mobile banking systems in developing economies. The requirements of those who work in the gig economy and those who grew up with the internet are being met by new financial products and services available in developed nations. The latest in finance is being put to use in the fight against social and environmental ills. Affordable micro insurance solutions are safeguarding disadvantaged communities from financial shocks. Transactions for social impact initiatives may now be conducted in an open and safe manner, thanks to blockchain technology. Despite the obvious benefits, financial innovations also come with their own set of problems and should be carefully considered before being implemented. Concerns about the privacy and security of users' data must be addressed, and attempts to expand access to financial services must be welcoming to people from all walks of life and sensitive to their unique circumstances. The financial sector is constantly changing, and as a result, regulatory frameworks must evolve to keep up with it.

In today's interconnected world, technological advancements in the financial sector are facilitating more access to capital, fostering greater financial inclusion, and granting greater agency to people and enterprises. As these technologies advance, it will become more

important to safeguard their fair distribution, mitigate any hazards they may provide, and maximize their positive societal effect.

➤ **What are the ethical implications of financial innovation from a demand-side perspective?**

Financial innovations have both positive and negative ethical implications from a demand-side perspective. On the one hand, they can expand access to financial services, promote financial inclusion, and enhance consumer choice. On the other hand, they can also lead to financial exploitation, exacerbate inequality, and undermine consumer protection.

Positive Ethical Implications

When talking to banking experts, researcher addressed the question, • What are the ethical consequences of financial innovation from a demand-side perspective? In light of their argument, we may deduce the following:

Financial innovations like mobile banking and digital payment systems have increased access to financial services for consumers and companies, especially in underserved regions. To some extent, this has allowed those who have never had access to conventional banking to begin doing so.

New financial tools have helped more people and companies become part of the official financial system, improve their money management, and fortify their finances. Women, small business owners, and people in rural or underserved areas have benefitted the most from this.

• **Greater Flexibility in Meeting Individual Needs and Risk Appetites**

As a result of financial innovations, customers now have access to a wider selection of financial goods and services. This has given people the ability to make educated choices about their finances and develop individualized plans based on their needs.

Negative Ethical Implications

Predatory lenders, dishonest marketers, and unjust terms and conditions may all find easy prey among the susceptible customers that financial breakthroughs have made possible. This may lead to over-indebtedness, financial difficulty, and even economic exploitation.

By benefiting those with more financial and digital skills and access to resources, financial innovations may worsen existing disparities. As a result, underprivileged groups may be further shut out of the economy.

Consumers are more susceptible to fraud, data breaches, and unfair tactics because the speed of financial innovation may outrun regulatory frameworks. This has the potential to lower consumer confidence and destroy trust in the financial system.

Finally, from an ethical standpoint, financial innovation offers both benefits and difficulties. We can maximize the advantages of innovation while minimizing the dangers by placing a premium on consumer protection, supporting ethical financial behaviors, and boosting financial inclusion. To guarantee that financial innovation meets the needs of all people and communities, a demand-side strategy that provides consumers with information, options, and security is necessary.

➤ How does the rise of mobile banking and digital payments impact the demand for traditional banking services?

Regarding What effect does the popularity of alternative payment methods like mobile banking have on the need for conventional banking services? The following may be inferred from their argument:

Traditional banking services have seen a major decline as mobile banking and digital payments have become more popular.

On the one hand, mobile banking and digital payments have made it more easy and efficient for customers to handle their money. As a result, services like cash withdrawals and wire transfers, which are more common in conventional banking, have seen a decline in demand. Consumers may now manage their accounts more conveniently while on the move by using their cell phones to make transfers, check balances, and pay bills.

However, conventional banks have also benefited from the rise of mobile banking and digital payments. Banks may now reach a bigger population of clients, and they can provide new and creative goods and services that are not achievable with conventional brick-and-mortar locations. Mobile check deposits, virtual assistants, and individualized financial guidance are just some of the new services that banks may provide.

The advent of mobile banking and digital payments has had both positive and negative effects on conventional financial institutions. While there may be a drop in demand for certain conventional banking services, there may also be new possibilities. Successful banks of the future will be those that can quickly adjust to new circumstances.

Several aspects of conventional banking have been affected by the rise of mobile banking and digital payments, as will be seen below.

With the widespread use of mobile payment systems and internet banking, customers have reduced their reliance on traditional banking services such as ATM withdrawals.

Consumers may now check their account balances and other account details from their cell phones, reducing the need for them to go to a branch of their bank.

Since customers may now pay their bills from any internet-connected device, online and mobile bill payment have exploded in popularity.

While conventional banks remain the go-to for mortgages and loans, fintech businesses are expanding their offerings to include these products and services.

Some concrete ways in which conventional banks have responded to the popularity of mobile banking and electronic payment systems include the following:

- Investing in mobile banking applications: Traditional banks have spent substantially in mobile banking apps to make them more user-friendly and feature-rich.

Traditional banks are teaming up with fintech firms to provide customers with cutting-edge financial products and services.

In order to compete with the rise of mobile banking and digital payments, traditional banks are expanding into new regions, such as emerging markets and developing nations.

In conclusion, the demand for conventional banking services has been significantly impacted by the advent of mobile banking and digital payments. There may be less demand for certain financial services, but there are also new chances for institutions that can adjust to the new conditions.

➤ **How do peer-to-peer lending platforms impact the demand for traditional bank loans?**

Concerning the question, "How does the popularity of peer-to-peer lending platforms affect the need for conventional bank loans?" The following may be inferred from their argument:

Peer-to-peer (P2P) lending platforms have developed as a disruptive force in the financial services sector, providing borrowers and lenders an alternative to conventional bank loans. Borrowers and lenders may avoid middlemen like banks by connecting via these online marketplaces.

There are several ways in which P2P financing differs from conventional bank loans: Competition has increased as a result of peer-to-peer lending platforms, which were formerly the only option for borrowers seeking personal or small-business loans. It has also

placed pressure on banks to innovate and enhance their customer service offerings, which has resulted in lower interest rates and more flexible terms for borrowers.

Increased access to credit has resulted from the rise of peer-to-peer (P2P) lending platforms, which facilitate loans between individuals who may not otherwise qualify for a loan from a conventional financial institution. Borrowers with a limited credit history or other forms of income fall into this category.

Diversification of loan options: P2P lending platforms provide a greater selection of loan products than conventional banks, including personal loans, company loans, and even specialized loans for particular reasons, such as medical expenses or home renovation projects.

To determine whether a borrower is creditworthy, P2P lending platforms now utilize cutting-edge data analysis. Non-conventional information may also be included, such as social media engagement and web surfing patterns.

P2P lending systems, on the whole, are more open and efficient than conventional banks. Lenders can swiftly check up on a borrower's credit history, and borrowers can view all the fine print up front.

Effect on conventional banks: Traditional banks have seen both positive and negative effects from the development of P2P lending. While some banks have lost market share to P2P platforms, others have reacted to the new environment by cooperating with P2P lenders or building their own P2P lending platforms.

The popularity of peer-to-peer (P2P) lending is expected to rise steadily over the next years. This is because there is a greater need for credit, a wider variety of loan possibilities, and more openness and efficiency in the lending process.

➤ **How do crypto currency and blockchain technologies impact the demand for traditional financial services?**

This paper addresses the question, "How does the adoption of decentralized ledger and crypto currency affect the demand for conventional banking services?" The following may be deduced from the arguments of specialists:

Crypto currency and blockchain technologies are quickly altering the financial environment, offering new possibilities and difficulties for established financial services. Banking, payment processing, and asset management might all be upended by the decentralized and transparent approach offered by these technologies.

Impact on Traditional Banking

Financial services such as account administration, lending, and investment products have traditionally been dominated by traditional banks. However, the proliferation of crypto currencies and blockchain technology presents a number of challenges to the status quo of banking.

- **Decentralization:**

Crypto currencies are not governed by any central bank or government. This is in contrast to conventional banking, where banks play a primary role in processing transactions and maintaining accounts.

- **Transparency:**

Unlike conventional banking systems, which are notoriously opaque, blockchain technology creates a public ledger of all transactions. Consumers will find it simpler to monitor their accounts and hold financial institutions responsible if more information is made public.

Blockchain technology may simplify financial transactions, which will save money for both financial organizations and their customers. This has the potential to reduce the attractiveness of conventional banking services over time.

Impact on Traditional Payment Processing

Credit card and wire transfer payment processing may be time consuming, costly, and prone to fraud. Crypto currency and blockchain technology provide a more efficient and secure alternative, which has the potential to supplant established payment methods.

With crypto currencies, there is no need for middlemen or protracted permission procedures to send money over the globe. This has the potential to streamline and simplify cross-border transactions.

- Blockchain is a secure and unchangeable ledger that might lessen the likelihood of fraud and theft. This has the potential to increase its allure as a platform for conducting commercial and consumer transactions online.

Impact on Traditional Asset Management

For a long time, stock, bond, and mutual fund investments were only available via conventional asset management organizations. New possibilities for decentralized asset management are emerging, however, thanks to bitcoin and blockchain technology. This poses a threat to the status quo.

Crypto currencies and other digital assets provide new investment alternatives that have not historically been accessible to individual investors. The result might be a loss of business for conventional asset management companies.

Blockchain technology may provide direct peer-to-peer transactions for asset management, cutting out the middlemen and lowering transaction costs. This has the potential to improve asset management efficiency and reduce expenses.

- **How does the growing awareness of ESG investing impact the demand for sustainable financial products?**

When asked how the rising popularity of ESG investment affects the need for environmentally responsible banking services, experts were stumped. Based on their analysis, we may deduce the following:

The rising interest in environmental, social, and governance (ESG) investment is having a major effect on the demand for responsible banking services. Environmental, social, and corporate governance (ESG) investing is an investment strategy that takes into account all aspects of a company's performance, not only its financial results.

Demand Rises for Eco-Friendly Investments

Climate change, loss of natural resources, and pollution are only a few examples of the growing urgency with which society must deal. Investors are becoming more anxious about the effect of these problems on companies and the economy as a whole.

A heightened awareness of social concerns Such as financial disparity, human rights, and work abuses. Capitalists are on the lookout for socially responsible businesses to put their money into.

Traditional investing techniques have lost credibility with investors due to worries about corporate governance crises and unethical business activities.

➤ **How does the aging population impact the demand for retirement planning products and services?**

After posing the question, "How does the aging population affect the demand for retirement planning products and services?" the expert provided the following response. Based on their analysis, we may deduce the following:

The demand for retirement planning services and products is being significantly impacted by the aging population. As the population ages, more people will be eligible for retirement benefits; these individuals will need to be ready to take charge of their financial futures.

Services related to retirement preparation, such as those provided by:

- **Financial preparation:**

You should have a plan for how much you will save, invest, and spend in retirement. Professional financial planners may assist clients in developing a strategy tailored to their unique situation and objectives.

Annuities are a kind of insurance that may be purchased to provide a steady stream of money in retirement. They may be helpful for retirees seeking security and stability in their financial lives.

If you or a loved one need assistance with activities of daily living, long-term care insurance may help defray the associated financial burden. The likelihood of requiring long-term care rises with age, making this an increasingly pressing issue for the nation's aging population.

Medicare is a federally funded health insurance program for anyone 65 and over. It might be confusing to choose amongst all the numerous Medicare plan options. Individuals may get assistance from Medicare planners in selecting the best plan for their needs.

- **How do climate change and other environmental risks impact the demand for financial products and services that mitigate these risks?**

When expert questioned about • How do climate change and other environmental concerns effect the demand for financial goods and services that minimize these risks? Based on their analysis, we may deduce the following:

The demand for insurance and other financial goods and services to protect against climate change and other environmental hazards is growing rapidly. More and more people and companies are realizing they need to take precautions against the dangers posed by severe weather as its frequency and intensity continue to rise.

Rising interest in climate-related risk coverage

Insurance against the financial consequences of climate change-related disasters including hurricanes, floods, and droughts is known as climate risk insurance. As more people and companies learn about the possible financial consequences of climate change, the demand for insurance against climate risk rises.

Sustainable investment options like green bonds are seeing high demand.

The purpose of green bonds is to provide funding for initiatives that benefit the environment. Investors seeking exposure to firms working to mitigate the effects of climate change and other environmental threats have driven up demand for "green bonds."

Investor interest in ESG-oriented investment vehicles

ESG-focused mutual funds and ETFs are investment funds that invest in firms that fulfill particular environmental, social, and governance standards. Investors seeking to back sustainable businesses and those that share their values have driven rising interest in ESG-focused products.

The Effect on Conventional Banks

There is increasing demand on conventional financial institutions to provide services and solutions that help reduce exposure to climate change and other environmental concerns. Financial institutions, investment businesses, and insurers are all creating new services and products in response to the demands of customers who are worried about these threats.

5.4.2 Supply side factor:

➤ What are the drivers of supply-side financial innovation?

When asked what drives financial innovation on the supply side, experts were unable to provide a clear answer. Based on their analysis, we may deduce the following:

Supply-side financial innovation is fueled by a number of factors. The economic, technical, regulatory, and competitive variables all play a role in driving this.

Inputs to the Economy:

- Consumers' shifting priorities, which need financial institutions to adapt to meet their growing expectations for individualized, convenient, and effective service. Financial institutions are responding to this need by creating innovative new products and services.

Traditional business models in the financial services sector are being challenged by new entrants such as fintech startups and large technology organizations. This is causing traditional banking systems to adopt new strategies in order to remain competitive.

New possibilities for monetary innovation are being made possible by globalization and cross-border commerce. Banks are working on new goods and services that will help with international money transfers and boost international commerce.

Technological Drivers: • Advances in artificial intelligence (AI): AI is being utilized to generate new financial products and services, such as robo-advisors and tailored investment advice. Traditional financial businesses are also making use of AI to automate processes and increase productivity.

Blockchain, a distributed ledger technology, has the potential to completely reshape the financial services sector if it is developed further. New types of digital assets might be developed, international payments could be streamlined, and transaction transparency could be enhanced with the use of blockchain technology.

Data analytics is expanding as a tool for gaining insight into consumer habits and industry shifts. This data may be utilized to create more tailored and more efficient monetary offerings.

Forces of Regulation:

- Financial policy shifts: regulators are turning to innovation to help them deal with new threats and expand access to financial services for underserved populations. This opens the door for financial institutions to experiment with new methods of meeting the standards set by regulators.
- Regulatory sandboxes: Currently, regulators are experimenting with regulatory sandboxes, which provide a safe space for financial institutions to try out novel goods and services without being subject to strict oversight. This is making conditions more conducive to new ideas.

Reasons for Competition:

Financial institutions are under intense pressure from new entrants and innovative technology to maintain or increase their market share. This is spurring innovation as financial institutions attempt to separate themselves from their competition.

The scarcity of qualified workers is a major problem in the financial services sector, especially in tech and data analytics. Because of this, banks and other financial institutions are under increasing pressure to make investments in innovation in order to compete for and keep the best personnel available.

To sum up, the economic, technical, regulatory, and competitive forces are all contributing to the growth of supply-side financial innovation. As a result of these forces, financial institutions are under continual pressure to find novel approaches to serving their clients, staying ahead of the competition, and meeting regulatory standards. Therefore, more developments in financial technology are to be anticipated in the future.

➤ **How do financial institutions develop and launch new financial products and services?**

When asked how financial institutions create and introduce new goods and services, experts shared the following. Based on their analysis, we may deduce the following:

New financial products and services are developed and introduced by financial institutions via a multi-step process that generally includes the following steps:

The first stage in developing a new product or service is to identify a gap in the market that might be filled by it. This may be done by performing market research, assessing client feedback, and recognizing trends in the larger economy.

Second, when a need has been recognized, an idea for a new product or service must be created. This entails coming up with concepts, drawing up designs, and documenting exhaustive product requirements.

The third phase, prototyping, involves testing the concept's viability and practicality. During the prototyping phase, you may choose to develop a physical model, a software simulation, or a wireframe of the product's user interface.

The fourth step, "testing and refining," involves putting the prototype to the test in front of actual consumers to get their opinions and figure out where it can be enhanced. This may be done in a simulated setting, like a usability lab, or in the real world, using beta testers.

The fifth step, Regulatory conformity: Once the product has been tested and polished, it must be brought into conformity with all relevant rules. This may include getting the appropriate permits, filling out forms, and going through audits.

The sixth and final stage is the introduction of the product or service to consumers. Integration into the financial institution's infrastructure and promotion of the product to prospective clients fall under this category.

The financial institution will need to keep an eye on the product or service's stats once it goes live in order to gauge how well it's doing. Measuring success might entail looking at things like how often something is used, how satisfied customers are, and how much money is made.

The particular procedure for designing and marketing new financial goods and services might differ from product to product, institution to institution, and regulatory environment to environment. However, the essential processes of recognizing a need, designing an idea, prototyping, testing, refining, complying with laws, launching, and monitoring remain substantially the same.

➤ **How do financial innovations impact the profitability and competitiveness of financial institutions?**

When asked how financial innovations affect banks' bottom lines and capacity to compete, experts were unable to provide a satisfactory answer. Based on their analysis, we may deduce the following:

Financial innovations have a substantial influence on the profitability and competitiveness of financial organizations.

Profitability Boost

There are a number of ways in which financial innovations might boost financial organizations' bottom lines:

- Expanded availability of previously unavailable goods and services: This is one way in which financial innovations may boost business.

By streamlining consumer access to and management of their financial information, financial innovations may boost customer engagement. The result may be happier customers who stick around.

By automating routine work, standardizing procedures, and increasing productivity, financial innovations may minimize expenses. This has the potential to boost profit margins and decrease operational costs for financial institutions.

Increased Capability to Compete

There are a number of ways in which financial innovations might boost financial institutions' competitiveness:

- Standing out from the competition Financial innovations may help banks and other financial institutions set themselves apart from the competition and strengthen their position in the market.

Innovations in the financial sector may help banks and other financial organizations enter new markets and attract a wider range of customers.

Why Reducing the danger of non-compliance fines Financial innovations may aid financial firms in complying with complicated rules.

➤ **How does the increasing availability of data and new technologies impact the development of new financial products and services?**

When asked how the proliferation of data and technological advancements affects the creation of new financial services and products, experts were stumped. Based on their analysis, we may deduce the following:

New financial products and services are being profoundly influenced by the ever-increasing accessibility of data and cutting-edge technology. Financial institutions may now provide consumers with tailored, effective, and novel solutions thanks to these developments.

More Information is Easily Accessible

Thanks to developments like the widespread use of Internet-connected sensors and gadgets and the meteoric expansion of social media, financial institutions have access to a vast trove of previously unimaginable amounts of data. This mountain of information may be mined for useful details on consumer habits, market tendencies, and potential dangers, allowing for the creation of better, more personalized goods and services.

Advances in Technology

The development of AI, ML, blockchain, and other technologies is creating new opportunities in the banking sector. Automation of processes, customization of services, and detection of fraudulent behavior patterns are all possible thanks to AI. Data mining and model creation are only two of the many applications of machine learning. Financial transactions are more trustworthy, efficient, and secure thanks to blockchain technology.

Implications for Future Product Creation

The availability of more data and advancements in technology are paving the way for banks to create products and services that were previously impossible to implement. Among them are:

- Customized recommendations based on an individual's risk profile and long-term objectives Robo-advisors powered by artificial intelligence provide this service.

In order to offer investors with early warnings of new and developing hazards, machine learning algorithms can evaluate market data in real time.

Blockchain technology may facilitate streamlined, cheaper, and more transparent international money transfers.

Investment options and payment methods are expanding with the advent of crypto currency and other digital assets.

- **How banks and other financial organizations serve their clients is being profoundly altered by the proliferation of data and the introduction of cutting-edge technology. Some examples are:**

Financial organizations now provide a unified banking experience across a variety of media, including mobile applications, internet, and automated teller machines (ATMs), a trend known as omnichannel banking.

- Chatbots and virtual assistants driven by artificial intelligence (AI) are delivering round-the-clock help to customers.

In order to detect and prevent fraud, machine learning algorithms may examine transaction patterns for telltale signs of possible fraud.

With the use of AI and blockchain technology, compliance checks and the identification of hazards may be automated.

The financial sector is undergoing a dramatic shift as a result of the proliferation of data and the advent of cutting-edge technology. Financial institutions that are open to these changes will be in the best position to provide cutting-edge digital goods, services, and delivery mechanisms.

➤ **How do partnerships between financial institutions and fintech companies impact financial innovation?**

When asked how collaborations between traditional banks and fintech firms affect financial innovation, experts often pointed to the latter. Based on their analysis, we may deduce the following:

Partnerships between traditional banks and fintech firms are on the rise and are crucial in advancing the financial sector. These kind of collaborations may be beneficial for everyone involved since they allow each partner to draw on the other's resources to create ground-breaking new goods, services, and enterprises.

Many positive outcomes may result from collaborations between financial institutions and fintech firms.

- Possibility to take use of cutting-edge tools and resources; fintech firms are often in the front of introducing game-changing innovations to the financial services sector. By forming strategic alliances, banks and other financial institutions may get access to cutting-edge technologies that will allow them to streamline existing processes and create innovative new products and services.

Companies in the financial technology sector have the potential to improve the consumer experience in a number of ways. Financial institutions may benefit from partnerships by bringing new products, streamlining operations, and providing more individualized services to their customers.

- Greater Agility and Creativity Compared to Traditional Financial Institutions, Fintech Companies are Typically More Agile and Creative. By working together, banks and other financial institutions may improve their agility, allowing them to better adapt to shifting market circumstances and provide innovative new products and services more quickly.

Cost savings:

Fintech startups often outperform more conventional banks in both product creation and distribution. Partnerships may enable financial organizations to decrease expenses and boost profitability.

Gains for Financial Technology Businesses

There are several ways in which fintech businesses might profit from forming agreements with banks.

Financial institutions often have access to significant cash and other resources, including data, distribution networks, and regulatory expertise. By forming partnerships, fintech enterprises may have access to these tools, which can aid in the rapid expansion of their operations.

Because of their long histories and consistent quality of service, people know and respect the names of major financial institutions. Fintech firms may gain credibility and confidence by partnerships with these institutions, which can aid in attracting new clients and business partners.

Reaching a wide audience and spreading their products far and wide are two advantages financial institutions have. Through strategic alliances, fintech businesses may increase the visibility and accessibility of their goods and services.

Financial institutions provide access to experts with extensive understanding of financial legislation and compliance norms. By working together, fintech businesses can better navigate the regulatory environment and steer clear of any trouble.

5.4.1 Justification and Limitations of Techniques Used

1. Descriptive Analysis

Justification:

Provides a foundational understanding of the demographic profile of respondents, helping to contextualize subsequent inferential analysis.

Enables categorization of responses by variables like age, gender, income, and location, essential for identifying trends and segment-wise innovation impact.

Supports frequency and percentage calculations, offering a clear view of the distribution of responses for each variable.

Descriptive statistics such as frequency distributions, means, and percentages were used to summarize respondent demographics, usage patterns, and preference levels. These are foundational in understanding sample behavior and ensuring data completeness.

Limitations:

Does not explore relationships between variables; only gives surface-level summaries.

Cannot provide insights into causal or correlational dynamics.

Vulnerable to sample bias due to over-representation (e.g., urban, high-income groups) limiting generalizability.

Real-world Coherence and Examples:

This technique effectively captured user penetration trends, such as high smartphone usage and preference for mobile banking. Similar trends are reflected in UPI growth data by NPCI and reports by EY (2022).

2. Chi-Square Test

Justification:

Chi-square was applied to examine associations between categorical variables like age group and innovation usage frequency. It is suitable for non-parametric categorical data typical in behavioral adoption studies.

Limitations:

Requires large sample sizes for accuracy.

Does not account for strength or direction of relationships.

Real-world Coherence and Examples:

Statistically significant associations ($p < 0.05$) between demographics and usage affirm known trends of higher innovation adoption among 25–40 year olds. Ghosh (2021) confirms similar findings in India's urban fintech adoption.

3. Correlation Analysis

Justification:

Highlights the strength and direction of relationships between financial innovations (product, process, institutional) and customer satisfaction or operational efficiency.

Useful for hypothesis testing to see if innovations have statistically significant impacts on selected variables.

Helps identify which variables are most interrelated in the study context.

Limitations:

Does not imply causation, only association.

Sensitive to outliers which can skew results.

Ignores the effect of potential confounding variables, limiting analytical depth.

4. Factor Analysis

Justification

Reduces a large number of survey variables into core factors (e.g., consumer perceptions, innovation drivers) making data interpretation more manageable.

Identifies underlying constructs and patterns within the data, enhancing thematic clarity.

Supports validation of survey design by grouping similar items into coherent factors.

EFA was employed to uncover latent constructs behind innovation drivers, segmenting demand- and supply-side motivators. This technique is ideal when variables are interrelated but underlying dimensions are not pre-defined.

Limitations:

Requires large sample sizes for stable factor extraction.

Interpretation of factors can be subjective and influenced by researcher bias.

Assumes linear relationships and normality, which may not always hold true in real-world data.

Real-world Coherence and Examples:

The extracted components—Convenience, Security, Accessibility—mirror actual app reviews and consumer surveys, validating EFA utility. Hussain & Papastathopoulos (2022) also used EFA in analyzing organizational agility in fintech.

5. Content Analysis (Interview Data)

Justification:

Facilitates thematic extraction from qualitative interviews with banking professionals.

Complements quantitative findings by capturing expert opinions and contextualizing results.

Provides insights into demand and supply side drivers of innovation in the banking sector.

Limitations:

Subject to interpretive bias; dependent on researcher's objectivity and coding framework.

Limited sample (10 interviews) reduces generalizability.

Cannot provide statistical validation; purely qualitative in nature.

6. Regression Analysis

Justification:

Regression models were used to evaluate how independent variables like frequency of innovation use predict dependent outcomes such as satisfaction and loyalty. It quantifies the impact strength and direction, offering predictive insights.

Limitations:

Assumes linearity, which may not hold in all behavioral datasets.

Can be influenced by multicollinearity or outliers.

Real-world Coherence and Examples:

The models showed adjusted R^2 values between 0.45 and 0.60, suggesting moderate to strong explanatory power. This confirms that innovation adoption impacts satisfaction, echoing findings by Broby (2021) on banking digital maturity.

7. Cross-tabulation

Justification:

Used to show comparative adoption patterns across groups (e.g., gender vs. UPI use).

Supports visual interpretation and segmentation.

Limitations:

Does not test statistical significance unless combined with Chi-square.

Limited to binary and categorical comparisons.

Real-world Coherence and Examples:

It revealed clear behavioral differences—female respondents preferred mobile banking apps for fund transfers, consistent with behavioral research by Sundbo (1997) on gendered tech adoption.

5.6 Importance of Qualitative & Descriptive Analysis used

Chapter 5 of the thesis adopts a predominantly qualitative and descriptive analytical approach due to the nature and objectives of the research phase. This chapter seeks to capture perceptions, awareness, usage behavior, and preferences of respondents regarding financial innovations in the Indian banking context. Given that these insights are inherently subjective,

perception-driven, and contextual, a descriptive analysis becomes not only suitable but

essential. Descriptive statistics—such as frequency distributions, percentages, and ranking scales—allow for a clear depiction of trends across demographic groups (age, income, occupation) and usage segments (urban vs rural, tech-savvy vs conservative users). For instance, the use of frequency tables in Table 5.2 (awareness of innovations) and Table 5.4 (usage levels of financial innovations) helped identify significant patterns such as greater adoption of UPI and mobile banking among younger respondents. These descriptions provide a grounded baseline understanding without making inferential assumptions that may not be justified by the cross-sectional, perception-based dataset. Nonetheless, Chapter 5 is not devoid of quantitative rigor. Select quantitative tools were strategically applied to enhance the robustness of findings:

Correlation Analysis (Table 5.13 and 5.14): Quantitatively assesses relationships between variables such as awareness, usage, operational performance, and marketing strategy. For example, a strong positive correlation was found between respondents' awareness and their reported satisfaction with product features, suggesting a reinforcing relationship between

informed usage and positive experiences. This correlation insight strengthens the study's argument on the importance of financial literacy in driving innovation adoption.

Reliability Analysis (Table 5.15): Cronbach's alpha was computed to test internal consistency of the survey instruments, with values above the threshold (generally 0.7), indicating that the questionnaire scales were statistically reliable for analyzing constructs such as "awareness," "usage," and "importance of features."

The qualitative content analysis of expert interviews complements these findings by elucidating the demand and supply side drivers of innovation. For example, bankers cited regulatory support and changing consumer behavior as key drivers, which aligned with quantitative trends observed in customer responses. The hybrid approach in Chapter 5—primarily descriptive but bolstered by targeted quantitative methods—ensures a comprehensive understanding of financial innovation adoption from both the consumer and institutional perspectives. This mixed orientation was crucial for addressing the chapter's exploratory and diagnostic objectives, especially in the post-COVID landscape where digital

shifts were rapid and nuanced.

5.7 Conclusion

From the analysis done in phase 1,2 & 3 of the chapter, we can conclude that Indian Banking industry has been tremendously benefitting from the innovations happening in India and across the world. Entailed is the summary of positive impact of various financial innovations on the Indian Banking Industry:

Detailed Evaluation: Impact of Financial Innovations on Indian Banks

Product Innovations

Positive Customer Impact: Mobile banking apps, UPI, digital wallets, and biometric ATMs enhanced convenience, reduced transaction time, and facilitated 24/7 access to banking services. This has particularly benefited tech-savvy urban and semi-urban populations.

Increased Financial Inclusion: Micro-loans, “Buy Now Pay Later” services, and Aadhaar-enabled services have reached underserved rural and low-income groups, widening banking access.

Quantitative Evidence: Product Innovation Index in India grew by 45% from 2014 to 2021, though still trailing behind developed nations, indicating improving but slow penetration.

Economic Linkages: Regression analysis showed that the Product Innovation Index had a significant positive correlation with per capita income and Human Development Index (HDI) by 2021, suggesting delayed but growing macroeconomic impact.

Process Innovations

Operational Efficiency: Automation of KYC, online loan approvals, and real-time settlements (e.g., IMPS, RTGS) have reduced processing times and errors. SPSS regression models validated these improvements as statistically significant.

Customer Experience: Over 60% of survey respondents acknowledged enhanced service quality, speed, and convenience, affirming operational upgrades from innovation.

Macroeconomic Benefits: Process innovations had significant positive effects on per capita GDP and HDI and reduced unemployment by improving access to financial services and fostering small-scale entrepreneurship.

Institutional Innovations

Digital Ecosystem Expansion: Collaborations between public banks and fintechs (e.g., UPI,

Jan Dhan-Aadhaar-Mobile trinity) have revolutionized payments and remittances in India.

Structural Adaptation: Institutions like payment banks and small finance banks emerged to serve niche markets. Correlation analysis indicates that private banks adapting to institutional innovations reported better customer satisfaction and service diversification.

Cross-Segment Benefits

Bank Performance Metrics: Innovations led to measurable improvements in customer satisfaction, operational efficiency, and financial inclusion. Factor analysis confirmed these improvements across segments. Digital Divide Challenges: While urban and younger

demographics reported high satisfaction, around 30–40% of respondents remained neutral on flexibility and complexity, indicating partial exclusion or slow adaptation in certain areas.

Strategic Implications

Competitiveness: Existing banks adopting innovations experienced improved competitiveness and scalability. Those failing to innovate faced stagnation or customer attrition.

Future Readiness: AI, blockchain, and data analytics are emerging drivers for next-gen services like robo-advisory and fraud detection, preparing Indian banks for global standards.

CHAPTER 6 : SUMMARY AND CONCLUSION

6.1 FINDING

(A) Our analysis reveals that financial innovations have had a profound impact on the banking industry, fundamentally altering its capabilities and services:

Enhanced Efficiency and Speed: Innovations have streamlined transactions, leading to faster processing and delivery, minimizing delays and frustration for customers.

- **Reduced Error Rates:** Automation and digitalization have significantly minimized human error and inconsistencies, leading to greater accuracy and reliability in financial transactions.
- **Improved Service Quality:** The introduction of digital tools and platforms has enhanced the overall quality of banking services, offering greater convenience, accessibility, and personalization.
- **Driving Superior Customer Experience:** Innovation serves as the cornerstone for providing superior customer service in the future, with banks constantly developing new solutions to meet evolving needs and expectations.
- **24/7 Availability:** Technological advancements have enabled widespread adoption of 24/7 banking, allowing customers to access services and conduct transactions at any time, regardless of location.
- **Simplified Transaction Processing:** Innovations have simplified the complexity of transaction processing, making it easier for users to navigate and understand financial workflows.
- **Time Reduction:** By automating routines and eliminating manual steps, financial innovations have dramatically reduced the time required to process and complete transactions, boosting efficiency and convenience.

The wave of financial innovation has transformed the banking landscape, pushing towards a future characterized by automation, convenience, and enhanced customer experience. Banks that embrace these innovations and utilize them to their advantage will be better positioned to thrive in the ever-evolving financial ecosystem.

(B) Awareness of respondents regarding financial innovative product and services

- High Awareness: Services like Video KYC based Saving/Current Accounts, Pre-approved Consumer and Personal Loans, Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, and ATM received the highest levels of awareness, with over 120 respondents identifying as "Highly Aware" in each category.
- Moderate Awareness: Services like Apps built for Wealth Management & Investments, Bill Now Pay Later, Chatbots for inquiry and queries, Digital KYC, IMPS, RTGS/NEFT, Single authorization, and POS also received substantial awareness, with over 100 respondents expressing either "Highly Aware" or "Aware."
- Lower Awareness: Services like Passbook printing kiosks, Cash Deposit Machines, and Virtual/NFC based Plastic cards (Debit/Credit) received slightly lower awareness, but still had a significant majority of respondents indicating "Highly Aware" or "Aware."
- Emerging Awareness: Services like Virtual assistants and RMs, Crypto currency, and Block chain technology had a lower percentage of "Highly Aware" responses but still had a substantial number of "Aware" responses. This suggests growing awareness of these newer technologies.
- Least Awareness: Services like Robo Advisory and Positive Pay had the lowest levels of awareness, with a significant portion of respondents falling into the "Neutral" and "Unaware" categories. This suggests a need for further education and promotion of these services.

The survey reveals a high level of awareness among respondents regarding a variety of innovative financial products and services. Specifically, the majority of respondents are familiar with:

- Video KYC-based accounts and deposit schemes: This indicates a growing acceptance of digital on boarding and verification processes within the financial landscape.
- Online Transfers, Bill payment, UPI: This points towards a growing trend of using technology for payments for ease , simplicity, speed and convenience, potentially indicating a tech-savvy and financially engaged population.
- Pre-approved loans and BNPL: This highlights the increasing popularity of convenient and accessible credit options, particularly among younger demographics.
- Mobile banking: This reaffirms the dominance of mobile technology in financial transactions and management.

Overall, the survey results paint a positive picture of consumer awareness and openness towards innovative financial products and services. This trend suggests a growing demand for convenient, digital, and personalized financial solutions, which opens up exciting opportunities for financial institutions to cater to this evolving landscape. However, it is important to note that awareness alone doesn't necessarily translate to adoption. Further research might be needed to understand the factors influencing respondents' decisions to utilize these innovative offerings.

(C) Usage of financial innovative product and services

RTGS/NEFT: Ranked as the most used financial innovation technique with the highest Weighted Average Score (WAS) of 4.44. This suggests widespread familiarity and adoption of Real Time Gross Settlement and National Electronic Funds Transfer systems for instant fund transfers.

Online Bill & Credit Card Payment: Ranked second with a WAS of 4.39, indicating high adoption of online payment methods for bills and credit cards.

UPI, ATM, Mobile Banking & Internet Banking: These platforms ranked closely together, with WAS scores of 4.3250, 4.3200, 4.2950, and 4.1600 respectively. This indicates strong adoption of digital banking solutions for various transactions.

The findings highlight the growing preference for convenient and efficient digital financial solutions in India. The dominance of RTGS/NEFT, followed by online bill and credit card payments, and the strong presence of UPI, mobile banking, and internet banking showcases a shift towards online transactions. This trend aligns with the increasing penetration of mobile internet and the growing awareness of digital financial products.

These results offer valuable insights for policymakers and financial institutions aiming to further promote financial innovation in India. Focusing on initiatives that expand access to and awareness of digital platforms like UPI and mobile banking could be key to driving wider adoption and financial inclusion. Additionally, ensuring secure and reliable online infrastructure remains crucial to fostering trust and confidence in the digital financial ecosystem. Less common but still used by some are digital currency, virtual assistants, robo-advisors, and passbook printing kiosks.

The financial services industry is undergoing a significant digital transformation, with a shift towards convenient and accessible online and mobile banking solutions. While traditional services like ATMs and cash deposits are still widely used, innovative options like virtual cards, digital KYC, and mobile banking features are becoming increasingly popular among the majority of the population. There's also growing interest in emerging technologies like video KYC, Whatsapp banking, and digital currencies, indicating a demand for even more personalized and convenient financial services.

This data highlights the importance of financial institutions adapting to changing consumer preferences and continuously developing innovative products and services to cater to the evolving needs of their diverse customer base.

(D) Importance to each feature while using digital products and services

The importance of financial innovation in digital products and services is multifaceted. It plays a crucial role in:

- Ease and simplicity: Innovative features make using these products effortless, reducing friction and frustration.
- Cost-effectiveness: Financial innovation can streamline processes and optimize resource usage, leading to lower costs for both providers and users.
- Security: Cutting-edge security measures protect sensitive financial data and transactions, building user trust and confidence.
- Discoverability: Intuitive interfaces and relevant content make finding and accessing desired services a breeze, enhancing user experience.
- Reliability: Stable and dependable platforms ensure uninterrupted access and smooth operations, minimizing errors and disruptions.
- Information currency: Up-to-date information is critical for informed decision-making and efficient financial management.
- Speed and efficiency: Instantaneous transactions and processing times save valuable time and improve user satisfaction.
- Consistency: Reliable performance and predictable behavior foster user trust and confidence.
- Privacy: Robust privacy measures protect sensitive data and ensure users maintain control over their information.
- Interactivity: Engaging and responsive features create a dynamic user experience, encouraging interaction and engagement.
- Technological advancement: Utilizing the latest technology ensures products remain competitive and offer cutting-edge solutions.

- Pride and satisfaction: User-centric design and innovative features can foster a sense of pride and satisfaction in using these products.
- Empowerment and control: Intuitive interfaces and easy-to-use tools give users a sense of control over their finances and decision-making.
- Continuous improvement: A constant focus on innovation ensures products remain relevant and adapt to evolving user needs and market trends.

Financial innovation is not just a desirable feature, but a fundamental pillar of success for digital products and services in today's competitive landscape. By prioritizing user-centric design, cutting-edge technology, and robust security measures, financial innovators can create products that are not only functionally superior, but also foster user trust, satisfaction, and a sense of empowerment. This, in turn, leads to increased adoption, loyalty, and ultimately, sustainable growth.

(E) Feeling of respondents regarding financial innovative services and product:

The survey reveals a largely positive sentiment among respondents regarding the financial innovative services and product. Here are the key findings:

- Information and Technology: The majority of individuals appreciate the up-to-date information provided on the website/app and the presence of enhanced security features like face recognition or biometric.
- User Friendliness: Simplicity and ease of use are highly valued, with respondents favoring products that are intuitive and straightforward.
- Transparency and Trust: Transparency in information sharing, prompt and fair resolutions, and a secure platform for personal information are crucial factors for building trust with users.
- Accessibility and Availability: 24/7 availability and promotional offers further enhance the appeal of the product or service.

- **Support and Interactivity:** A robust response mechanism like chatbots, email, and Q&A sections caters to user needs and fosters a sense of engagement.
- **Information and Security:** Users highly value up-to-date information (82.7%) and appreciate enhanced security features like face recognition or biometrics (84.2%). They also expect password or PIN protection (75.8%) and transparency in information sharing (83.3%).
- **Ease of Use and Accessibility:** Users prefer products that are simple to use or obtain (82.7%) and have a user-friendly interface (88.2%). They also expect fast and instantaneous performance (78.9%).
- **Innovation and Trendsetting:** While users appreciate the latest technology (81.6%), being a pioneer or trendsetter is less important (63.8%).
- **Reliability and Support:** Consistent performance with minimal malfunctions is crucial for users (92.1%). They also value prompt and fair resolutions to issues (76.5%) and 24/7 availability (82.7%).
- **Promotional Offers and Discounts:** Promotional offers and discounts are moderately appreciated by users (54.2%), but not a major deciding factor.
- **Security and Privacy:** Users prioritize secure transactions free from cyber threats (86.4%) and expect comprehensive FAQs covering security, privacy, and general queries (63.3%).
- **Personal Information Protection:** Secure storage and protection of personal information is essential for users (81.6%).
- **Response Mechanism:** Effective response mechanisms like chatbots or email are well-received by users (77.8%).

The financial innovative services and product appear to be well-received by the majority of respondents. The focus on user-friendliness, security, transparency, and accessibility has created a positive perception among potential customers. Continued investment in these areas, along with effective marketing and promotional strategies, is likely to solidify the product's position in the market.

Findings on Awareness & Usage of Innovations basis Demographic profile of Customers:

Age :

- Customers in Age Group of 18-30 are highly aware on all /majority of products and services. But when it comes on usage most of the customers in this age bracket are using Video KYC based Saving/Current Accounts, Pre-approved Consumer and Personal Loans, Mobile Banking, Internet Banking, whatsapp banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT, Chat bots for inquiry and queries, Virtual assistants and RMs. Usage of products like Passbook printing kiosks, Cash Deposit Machines, Single Authorization, Positive Pay and Virtual/NFC based Plastic cards (Debit/Credit) , Crypto currency, and Block chain technology is low in this age group.
- Customers in Age group of 30 -45 were highly aware on Video KYC based Saving/Current Accounts, Pre-approved Consumer and Personal Loans, Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT, whatsapp banking,. However they were moderately aware on products like Passbook printing kiosks, Cash Deposit Machines, Single Authorization and Virtual/NFC based Plastic cards (Debit/Credit), Apps built for Wealth Management & Investments, Bill Now Pay Later, Chat bots for inquiry and queries, Virtual assistants and RMs, Crypto currency, and Block chain technology. Products mostly used by this age group are , Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT, whatsapp banking, Bill Now Pay Later, Chat bots for inquiry and queries.
- Customers in Age group of 45-60 were highly aware on Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT. However they were moderately aware on products like Passbook printing kiosks, Cash Deposit Machines but least aware on Single Authorization and Virtual/NFC based Plastic cards (Debit/Credit), Apps built for Wealth Management & Investments, Bill Now Pay Later, Chat bots for inquiry and queries, Virtual assistants and RMs, Crypto

currency, and Block chain technology. This age group is majorly using innovations or products like Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT.

Place of Residence:

- Metro and Urban Customers are highly aware on all /majority of products and services except Passbook printing kiosks, Cash Deposit Machines, and Virtual/NFC based Plastic cards (Debit/Credit) and emerging innovations or products like Virtual assistants and RMs, Crypto currency, and Block chain technology But when it comes on usage most of the customers are using Video KYC based Saving/Current Accounts, Pre-approved Consumer and Personal Loans, Mobile Banking, Internet Banking, whatsapp banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT, Chat bots for inquiry and queries, Virtual assistants and RMs. Usage of products like Passbook printing kiosks, Cash Deposit Machines, Single Authorization, Positive Pay is moderate while usage of Virtual/NFC based Plastic cards (Debit/Credit) , Crypto currency, and Block chain technology is low .
- Semi Urban and Rural Customers were highly to moderately aware on Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT. However they were least aware on products like Passbook printing kiosks, Cash Deposit Machines , Single Authorization and Virtual/NFC based Plastic cards (Debit/Credit), Apps built for Wealth Management & Investments, Bill Now Pay Later, Chat bots for inquiry and queries, Virtual assistants and RMs, Crypto currency, and Block chain technology. These customers are majorly using innovations or products like Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT.

Qualification:

- Customers who are Post Graduate and Graduate qualified are highly aware on all /majority of products and services except Virtual/NFC based Plastic cards

(Debit/Credit) and emerging innovations or products like Virtual assistants and RMs, Crypto currency, and Block chain technology But when it comes on usage most of the customers are using Video KYC based Saving/Current Accounts, Pre-approved Consumer and Personal Loans, Mobile Banking, Internet Banking, whatsapp banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT, Chat bots for inquiry and queries, Virtual assistants and RMs. Usage of products like Passbook printing kiosks, Cash Deposit Machines, Single Authorization, Positive Pay is moderate while usage of Virtual/NFC based Plastic cards (Debit/Credit) , Crypto currency, and Block chain technology is low .

- This behavior has strong resonance with place of residence as literacy rates and level of qualification is more in Metro and Urban Areas.
- Senior Secondary were highly to moderately aware on Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT. However they were least aware on products like Passbook printing kiosks, Cash Deposit Machines , Single Authorization and Virtual/NFC based Plastic cards (Debit/Credit), Apps built for Wealth Management & Investments, Bill Now Pay Later, Chat bots for inquiry and queries, Virtual assistants and RMs, Crypto currency, and Block chain technology. These customers are majorly using innovations or products like Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT.

Monthly Income:

- Customers with monthly income less than 25000 were highly aware on products Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT. They were moderately aware on products like Video KYC based Saving/Current Accounts, Pre-approved Consumer & Personal Loans Passbook printing kiosks, Cash Deposit Machines but were least aware on products like Virtual/NFC based Plastic cards (Debit/Credit) and emerging innovations or products like Virtual assistants and RMs, Crypto currency, and Block chain technology But when

it comes on usage most of the customers are using Video KYC based Saving/Current Accounts, Mobile Banking, Internet Banking, whatsapp banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT. Usage of products like Chat bots for inquiry and queries, Virtual assistants and RMs. Passbook printing kiosks, Cash Deposit Machines, Pre-approved Consumer and Personal Loans, is moderate while usage of Virtual/NFC based Plastic cards (Debit/Credit) , Crypto currency, and Block chain technology , Single Authorization, Positive Pay is low .

- Customers with monthly income between 25000 to 100000 were highly aware on products Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT, Video KYC based Saving/Current Accounts, Pre-approved Consumer & Personal Loans Passbook printing kiosks, Cash Deposit Machines but were least aware on products like Virtual/NFC based Plastic cards (Debit/Credit) and emerging innovations or products like Virtual assistants and RMs, Crypto currency, and Block chain technology But when it comes on usage most of the customers are using Video KYC based Saving/Current Accounts, Mobile Banking, Internet Banking, whatsapp banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT, Chat bots for inquiry and queries, Virtual assistants and RMs. Passbook printing kiosks, Cash Deposit Machines, Pre-approved Consumer and Personal Loans, while usage of Virtual/NFC based Plastic cards (Debit/Credit) , Crypto currency, and Block chain technology , Single Authorization, Positive Pay is low .
- Customers with monthly income greater than 100000 were highly aware on most of products like Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT, Video KYC based Saving/Current Accounts, Pre-approved Consumer & Personal Loans Passbook printing kiosks, Cash Deposit Machines, Virtual/NFC based Plastic cards (Debit/Credit) and emerging innovations or products like Virtual assistants and RMs, Crypto currency, and Block chain technology. But when it comes on usage most of the customers are using Video KYC based Saving/Current Accounts, Mobile Banking, Internet Banking, whatsapp banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT, Chat bots for

inquiry and queries, Virtual assistants and RMs. Passbook printing kiosks, Cash Deposit Machines, Pre-approved Consumer and Personal Loans, while usage of Virtual/NFC based Plastic cards (Debit/Credit) , Crypto currency, and Block chain technology , Single Authorization, Positive Pay is low .

- Customers of all income groups have inclination towards doing high value transaction via conservative /earlier modes of payment or banking and there is very huge surge in UPI transactions for small value and day to day transactions and huge lift in Mobile banking usage for fund transfer, RTGS/NEFT.

Occupation:

- Students : They were highly aware on most of products like Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT, Video KYC based Saving/Current Accounts, Pre-approved Consumer & Personal Loans Passbook printing kiosks, Cash Deposit Machines, Virtual/NFC based Plastic cards (Debit/Credit) and emerging innovations or products like Virtual assistants and RMs, Crypto currency, and Block chain technology. But when it comes on usage most of the customers are using Video KYC based Saving/Current Accounts, Mobile Banking, whatsapp banking, Online bill and credit card payment, UPI, ATM, IMPS, Chat bots for inquiry and queries . Most of these students use UPI and fintech apps like phone pe, Google pay and Paytm very regularly for day to day and low value transactions. Internet usage is high in this group.
- Home Maker : This group was aware on products like Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT but have least or moderate awareness on Video KYC based Saving/Current Accounts, Pre-approved Consumer & Personal Loans Passbook printing kiosks, Cash Deposit Machines, Virtual/NFC based Plastic cards (Debit/Credit) and emerging innovations or products like Virtual assistants and RMs, Crypto currency, and Block chain technology. This group is high on usage of Debit cards, credit cards, UPI , ATM Kiosks and avail

services by visiting for services available in branches. Internet usage is high in this group.

- **Retired Persons :** This group was aware on products like Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT but have least or moderate awareness on Video KYC based Saving/Current Accounts, Pre-approved Consumer & Personal Loans Passbook printing kiosks, Cash Deposit Machines, Virtual/NFC based Plastic cards (Debit/Credit) and emerging innovations or products like Virtual assistants and RMs, Crypto currency, and Block chain technology. This group is high on usage of Debit cards, UPI , ATM Kiosks and avail services by visiting for services available in branches. The usage of credit cards, RTGS/NEFT, Chatbots, Mobile and Internet Banking, virtual RMs is least. Internet usage is low in this group.
- **Salaried Class :** They were highly aware on most of products like Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT, Video KYC based Saving/Current Accounts, Pre-approved Consumer & Personal Loans Passbook printing kiosks, Cash Deposit Machines, Virtual/NFC based Plastic cards (Debit/Credit) but least to moderately aware on emerging innovations or products like Virtual assistants and RMs, Crypto currency, and Block chain technology. But when it comes on usage most of the customers are using Video KYC based Saving/Current Accounts, Mobile Banking, whatsapp banking, Online bill and credit card payment, UPI, ATM, IMPS, Chat bots for inquiry and queries . Most of salaried use UPI and fintech apps like phone pe, Google pay and Paytm very regularly for day to day and low value transactions. Internet usage is high in this group. They prefer to do regular and moderate value transactions via mobile or Internet banking but on high value transactions they prefer conventional and branch banking mode.
- **Business class:** They were highly aware on most of products like Mobile Banking, Internet Banking, Online bill and credit card payment, UPI, ATM, IMPS and RTGS/NEFT, Video KYC based Saving/Current Accounts, Pre-approved Consumer & Personal Loans Passbook printing kiosks, Cash Deposit Machines, Virtual/NFC based

Plastic cards (Debit/Credit) but least to moderately aware on emerging innovations or products like Virtual assistants and RMs, Crypto currency, and Block chain technology. But when it comes on usage most of the customers are using Video KYC based Saving/Current Accounts, Mobile Banking, whatsapp banking, Online bill and credit card payment, UPI, ATM, IMPS, Chat bots for inquiry and queries . Most of salaried use UPI and fintech apps like phone pe, Google pay and Paytm very regularly for day to day and low value transactions. Internet usage is high in this group. They use RTGS/NEFT, positive pay , Virtual RMs for high value transactions.

- Product wise UPI transactions and users are growing at very fast pace. Mobile banking has grown multifold. There is decline in trend of RTGS transactions , cheque clearing and very small percentage of Students, high salary class and business class had starting investing in wealth management products like SIP, MF and very few of them have agreed upon investing /trading in crypto currencies.

Findings on Effect of Financial Innovations on Operational Performance of Bank

Positive Impact:

Majority agrees: The majority of respondents (over 60%) agreed or strongly agreed with statements related to:

- Convenience: Financial innovations provide convenient methods for conducting bank business and accessing services 24/7.
- Speed and efficiency: Transactions are faster and easier, delivery speeds are accelerated, and processing times are reduced.
- Quality and cost: Services are of higher quality, cost per transaction is lowered, and operational efficiency is improved.
- Customer satisfaction: Customers are generally more satisfied with banking services.
- Product and service range: The variety of financial products and services has expanded.

These findings suggest that financial innovations have significantly improved the banking experience for a large portion of the population.

Neutral or mixed perspectives:

Neither agree nor disagree: A sizable group (around 30-40%) chose this option for statements regarding:

Flexibility: Whether flexibility in product and service offerings has significantly improved.

Customer base: Whether financial innovations significantly impact the number of customers banks attract.

Complexity: Whether innovations reduce the complexity of transaction processing.

Branch footfall: Whether innovations significantly diminish the need to visit physical branches.

These neutral responses indicate that the impact of innovations in these areas is less clear-cut, with potential benefits and drawbacks that require further evaluation.

Negative perceptions:

Minority disagrees: While smaller in number, some respondents disagreed or strongly disagreed with statements about:

Improved flexibility: A significant portion (35%) believes flexibility hasn't increased much.

Customer focus: 9 respondents strongly disagree that innovations guide service improvement.

Branch relevance: Over 60% disagree that innovations significantly reduce branch visits.

These dissenting opinions suggest that a segment of the population may feel left behind or not fully benefitting from some aspects of financial innovation.

6.2 Correlation Analysis

1. There is a positive impact on any customer segment or product segment due to Financial Innovations in the banking sectors

2. There is a positive impact of financial innovations on existing banks in Indian Banking Industry.

The conducted correlation analysis revealed several key findings regarding the impact of financial innovations in the Indian banking industry:

1. **Positive Impact Across Segments:** Financial innovations demonstrate a positive impact on both customer and product segments. This signifies that innovations benefit both the banks by expanding their product offerings and attracting new customers, as well as the customers themselves by providing them with enhanced convenience, accessibility, and product diversity.
2. **Boosted Performance for Existing Banks:** Existing banks in the Indian banking industry experience a clear positive impact from embracing financial innovations. This suggests that by adopting and integrating innovative technologies and practices, established banks can improve their competitiveness, operational efficiency, and overall performance.

The correlation analysis provides compelling evidence that financial innovations play a vital role in fostering a dynamic and thriving Indian banking landscape. By embracing these advancements, banks can not only enhance their own success but also contribute to a more accessible, inclusive, and customer-centric financial ecosystem. Further research can delve deeper into specific types of innovations and their nuanced impact on different customer segments and bank characteristics to provide even more granular insights into the transformative potential of this field.

6.3 Factors on demand & supply side that has led to rapid growth in financial innovations.

Followings are the demand & supply side factor that has led to rapid growth in financial innovations ;

- The demand for financial goods and services may be significantly influenced by financial developments. Financial innovations may make financial services more available, efficient, and inexpensive for people and enterprises by increasing access, developing new products, shifting how goods are provided, lowering costs, and generating new market possibilities.
- In addition to these macro influences, there are a number of micro drivers that influence the demand for new financial products and services across various industries. The need for digital payment and mobile banking solutions is on the rise, for instance, in the retail banking sector. Robo-advisors and similar forms of automated investing solutions are becoming more popular in the investment management industry. There is a rising need for trade finance and supply chain financing options in the commercial banking sector.
- The need for new financial goods and services is driven by a complex interplay of variables, including changing customer requirements, technology improvements, regulatory changes, economic situations, and competition. The future is bright for financial institutions that take the time to learn about these forces and use that knowledge to create new products and services that address their consumers' requirements.
- In a globalised economy, financial innovations are empowering people and companies by increasing access to money, fostering financial inclusion, and democratising the financial system. There is a growing need to ensure that these breakthroughs are widely accessible, mitigate any hazards they may pose, and maximize their positive societal effect.
- There are ethical possibilities and threats in the world of financial innovation. The advantages of innovation may be maximized while the hazards are mitigated if consumer protection, promotion of responsible financial practices, and promotion of financial inclusion are given top priority. To ensure that financial innovation serves the needs of all individuals and communities, a demand-side approach that empowers consumers with knowledge, choice, and protection is necessary.

- The rise of mobile banking and digital payments has had a significant impact on the demand for traditional banking services. While certain conventional banking services have dropped in demand, new possibilities have also developed for banks that can adapt to the shifting market.
- P2P lending has reduced the need for loans from conventional financial institutions. While conventional banks remain preeminent in the lending sector, the rise of peer-to-peer (P2P) lending presents both problems and possibilities for the industry's incumbents.
- Traditional financial institutions will need to make changes to keep up with the disruptive technologies of crypto currencies and blockchain.
- The demand for retirement planning goods and services is projected to rise in tandem with the growth of the elderly population. To keep up with the demands of this expanding market, conventional financial institutions will have to constantly improve and expand their services.
- Climate change and other environmental problems need the involvement of the financial sector. Financial institutions may assist reduce these risks and advance a sustainable future by creating and distributing novel goods and services.
- The convergence of economic, technical, regulatory, and competitive forces is propelling supply-side financial innovation. These dynamics are creating an atmosphere where financial institutions are continually exploring new and inventive methods to fulfill the demands of their clients, compete with competitors, and comply with regulatory obligations. Therefore, more developments in financial technology are to be anticipated in the future.
- The profitability and competitiveness of financial institutions are significantly impacted by financial innovations. Partnerships between financial institutions and fintech businesses are beneficial for both sides since they allow financial institutions to enhance their goods, services, and operations while also giving fintech companies exposure to new customers. In the financial sector, these alliances are propelling innovation, enhancing the client experience, and opening

up fresh avenues for expansion and cooperation. In the future, we may anticipate even more creative collaborations to form as technology advances.

- The proliferation of information and the advent of cutting-edge tools have altered the financial sector forever. Financial institutions that are open to these changes will be in the best position to provide cutting-edge digital goods, services, and delivery mechanisms.

6.4 Innovation in Indian Banking system with financial innovations happening in developed countries

Financial innovation plays a crucial role in economic development, but its impact unfolds in distinct ways depending on the type of innovation:

Process innovation, focused on streamlining financial services through technology, has a long-term positive impact on both income and human development. This is because it fosters financial inclusion by reducing transaction costs and increasing transparency, leading to higher per capita GDP and human development index (HDI). However, it may initially lead to job losses in the financial sector, eventually creating new opportunities as the industry adapts.

Product innovation, introducing new financial products, has a more complex impact. It benefits developed economies with robust infrastructure to handle the complexities of new products, boosting economic growth but not significantly impacting HDI. For developing economies like India, limited infrastructure can lead to negative impacts on income and development, or no impact at all. This highlights the need for careful consideration of infrastructure and risk management when introducing new financial products in developing markets.

The key takeaway is that process innovation, with its long-term benefits for income and human development, should be prioritized across all development levels. This includes expanding access to financial services through technology, while acknowledging the

potential for initial job losses and the need for adaptation. Product innovation, though beneficial for developed economies, requires careful implementation in developing countries to avoid negative repercussions.

This study highlights the importance of understanding the nuanced impact of different types of financial innovation, especially in developing economies like India. By prioritizing process innovation and carefully navigating product innovation, developing countries can unlock the full potential of financial advancements for sustainable economic and social development.

6.5 Conclusion

Impact of financial innovations have impacted banks as per our analysis:

- ❖ Financial innovations made transactions swift and simple, which accelerated delivery speed.
- ❖ Innovation greatly lowers human errors.
- ❖ Financial innovation improves the quality of banking services.
- ❖ The way forward in providing superior service to clients is determined by innovations in the financial sector.
- ❖ Technological advancement in the financial sector offers 24–7 banking.
- ❖ Innovations in the financial sector reduce the complexity of the transaction processing.
- ❖ Financial innovation reduces the amount of time required to process and carry out transactions
- ❖ Financial innovations have improved operational performances of the Bank.
- ❖ Financial Innovation has led to better customer perception and Experience about the bank and its products and services which ultimately complimented with bank's marketing strategies.

Key Customer Segments Impacted:

- ❖ Students
- ❖ Salaried and Business Class
- ❖ Customers in age group of 18 to 30 and 30 to 45.
- ❖ Metro and Urban Customers.
- ❖ Customers which have high usage of Internet
- ❖ Customer with income less than 25000 are benefited with ease in transactions and ease of receiving /giving money while customers with income greater than 25000 are benefited in terms of easy access to credit/loans, investment options and service delivery by a click

Key Product Segments Impacted:

- ❖ Payments – Mobile Banking, Internet Banking, UPI, IMPS, RTGS/NEFT.
- ❖ Credit – Pre approved Loans and Credit cards, Bill now Pay later.
- ❖ Acquisition & Inclusion – Account opening with VKYC, Digital on boarding.
- ❖ Services – Mobile Banking , Internet Banking , Cheque book order, Block card, Set Pin, Limit change, Address change, Stop payment etc
- ❖ Investment – Digital Gold, Mutual funds, SIP, Insurance
- ❖ New Investment Avenues & Services - Virtual RM's , Robo advisory, model portfolios, Crypto currency.
- ❖ Trade – Blockchain, Cross border payments, Forex cards and remittances.
- ❖ New Products – Watsapp banking, Chatbots

Comparing financial innovation in Indian Banking system with financial innovations happening in developed countries.

In India Process Innovation Index is higher than Product Innovation Index indicating that in developing countries Process Innovations takes place first and with higher speed.

- In Developed countries Product innovation is higher than Process Innovation Index.

- As compared to developed countries average Process Innovation Index , India Process Innovation Index is low in value .
- Product Innovation Index of India as compared to developed countries is also on lower side. Here the difference between Index values is higher than process innovation index indicating that in developed countries product innovation happens at faster pace than developing countries.
- Being a developing nation , India HDI, GDP Per Capita, Secondary School enrollment percentage, Urban population percentage is at lower side as compared to developed countries.
- Process Innovation has positive impact on employment. It leads to more income generation , thus Process Innovation has positive impact on GDP per capita which further leads to more disposable income in hand, which further strongly correlates to more people and families enrolling for better and higher education , more employment , higher HDI and cycle continues.
- Product innovation index has significantly grown across countries from 2014 to 2021. This indicates high demand of financial products which has impacted positively on the economy. The lower number of index in 2014 and its little impact on economy shows immature stage of financial product market. Later when market matured, the index has shown lagged positive impact on HDI, Per Capita Income, Trade openness , Import of ICT goods , share of service sector in economy and growth in industry value added. However Product innovation Index has very little impact on unemployment.

Demand Side Factors leading to Financial Innovations –

- Financial innovation leads to the ways that leads to developments that broaden consumers' and enterprises' access to these resources. The convenience of being able to handle one's financial affairs from any location at any time, due to the rise of internet banking and mobile banking systems lead to more demand of financial products hence leading to more financial innovations.

- Altering the distribution channels via which financial products and services are made available have an impact on the demand for such goods and services. In initial financial innovations success of ATM has lead to financial innovations like Cash Deposit machines, Service Kiosks.
- Making financial goods and services more accessible by decreasing the prices associated with executing financial transactions. Digital wallets and mobile payment applications are just two examples of how advancements in payment technology have lowered transaction costs for merchants and shoppers which has lead to further growth of these innovations from a single product selling / service providing platform to multiple products and services offering channel. Ex Paytm which was initially for making the payments started other services like train tickets, movie tickets, insurance and further added many more products in its wallet.
- Financial innovations itself open new avenues like block chain lead to innovation of crypto currency. Sovereign Gold Bonds lead to Digital Gold and so on.
- Changing consumer needs and preferences: As consumers' needs and preferences evolve, they demand new financial products and services that better meet their needs. For example, the rise of the gig economy has led to a demand for financial products and services that are tailored to the needs of gig workers.
- Regulatory changes: Changes in regulations can also create new opportunities for financial innovation. For example, the introduction of open banking regulations has made it easier for fintech companies to develop new financial products and services.
- Economic conditions: The overall economic environment can also affect the demand for new financial products and services. For example, during periods of economic uncertainty, there may be an increased demand for financial products that offer protection against risk.
- Competition: Competition among financial institutions can also drive innovation and the development of new products and services. As financial institutions compete for customers, they are constantly looking for new ways to differentiate themselves and attract new business.

- **Change in Demography of Consumers:** The demand for retirement planning services and products is being significantly impacted by the aging population. As the population ages, more people will be eligible for retirement benefits; these individuals will need to be ready to take charge of their financial futures.
- **Availability of Good Infrastructure:** Infrastructure facility like electricity, Internet availability, easy access and cheap price of data has lead to rapid growth in Financial Innovations.
- **Education:** Rise in education level , availability of education facilities , higher enrollment ratios and more women participation in education has lead to higher demand of more financial innovations.

Supply Side factors which lead to Financial Innovations

- Availability of telephone lines and higher ICT imports has lead to more opportunities to create new and more financial Innovations.
- Consumers' shifting priorities, which need financial institutions to adapt to meet their growing expectations for individualized, convenient, and effective service. Financial institutions are responding to this need by creating innovative new products and services.
- Traditional business models in the financial services sector are being challenged by new entrants such as fintech startups and large technology organizations. This is causing traditional banking systems to adopt new strategies in order to remain competitive.
- **Technological Drivers:**
 - **Advances in artificial intelligence (AI):** AI is being utilized to generate new financial products and services, such as robo-advisors and tailored investment advice. Traditional financial businesses are also making use of AI to automate processes and increase productivity.
- **Blockchain,** a distributed ledger technology, has the potential to completely reshape the financial services sector if it is developed further. New types of digital assets

might be developed, international payments could be streamlined, and transaction transparency could be enhanced with the use of blockchain technology.

- Data analytics is expanding as a tool for gaining insight into consumer habits and industry shifts. This data may be utilized to create more tailored and more efficient monetary offerings.
- Regulatory sandboxes: Currently, regulators are experimenting with regulatory sandboxes, which provide a safe space for financial institutions to try out novel goods and services without being subject to strict oversight.
- Competition: Financial institutions are under intense pressure from new entrants and innovative technology to maintain or increase their market share. This is spurring innovation as financial institutions attempt to separate themselves from their competition.
- . Partnerships between traditional banks and fintech firms are on the rise and are crucial in advancing the financial sector. These kind of collaborations may be beneficial for everyone involved since they allow each partner to draw on the other's resources to create ground-breaking new goods, services, and enterprises. By forming strategic alliances, banks and other financial institutions may get access to cutting-edge technologies that will allow them to streamline existing processes , cut costs become more agile and create innovative new products and services.

Social and Managerial Recommendations

Basis above findings, following are the social and managerial recommendations along with validation and recheck points which can be utilized by Banks, Fintech's to increase digital adoption and implement financial innovations for benefit of consumers and organizations both. These recommendations are derived from the findings presented in the document, focusing on promoting digital adoption, enhancing customer experience, ensuring security, and leveraging technology and partnerships to remain competitive in the evolving banking landscape. Validation and recheck points help

to measure the success and make adjustments to ensure these strategies effectively meet organizational goals.

1. Enhance Customer Awareness of New Products

Recommendation: Conduct targeted marketing campaigns to raise awareness of lesser-known products (e.g., Robo-Advisory, Positive Pay, and virtual assistants).

Validation: Survey customers periodically to measure changes in awareness levels.

Recheck Points: Increase in the number of inquiries and new subscriptions for these products.

2. Promote the Adoption of Digital Platforms

Recommendation: Develop user-friendly mobile and web applications to encourage the use of digital platforms such as UPI, mobile banking, and internet banking.

Validation: Monitor user engagement metrics (e.g., app downloads, active users, and transaction volumes).

Recheck Points: Growth in digital transaction numbers and a decrease in branch footfall.

3. Improve User Experience on Digital Platforms

Recommendation: Focus on simplifying interfaces, reducing load times, and enhancing security features (e.g., biometric authentication).

Validation: Collect user feedback through app ratings and reviews.

Recheck Points: Improvement in app ratings and reduction in complaints related to usability and security issues.

4. Expand 24/7 Banking Services

Recommendation: Provide round-the-clock access to essential banking services via digital channels and automated support tools (e.g., chatbots).

Validation: Track the usage of services outside of regular business hours.

Recheck Points: Increase in 24/7 service usage and customer satisfaction ratings.

5. Leverage Emerging Technologies (AI, Blockchain)

Recommendation: Invest in AI-driven tools like robo-advisors and blockchain technology to enhance transparency and reduce transaction costs.

Validation: Evaluate the cost savings and efficiency gains from implementing these technologies.

Recheck Points: Reduction in operational costs and faster transaction processing times.

6. Strengthen Data Privacy and Security Measures

Recommendation: Implement advanced encryption and security protocols to protect customer data and ensure safe transactions.

Validation: Regular audits and penetration tests to identify vulnerabilities.

Recheck Points: Fewer security breaches and customer complaints regarding data privacy.

7. Encourage Usage of Innovative Payment Solutions

Recommendation: Promote digital payment solutions like UPI, mobile wallets, and contactless cards through discounts, cashback, or partnerships.

Validation: Track growth in digital payment transactions and customer participation in promotional offers.

Recheck Points: Increase in digital transaction volume and higher customer retention rates.

8. Enhance Financial Inclusion Efforts

Recommendation: Develop simplified onboarding processes (e.g., Video KYC) to facilitate access to banking services for underserved populations.

Validation: Monitor the number of new accounts opened through digital onboarding.

Recheck Points: Growth in new customer acquisition from rural or semi-urban areas.

9. Offer Personalized Financial Products

Recommendation: Use data analytics to offer customized financial products based on customer behavior and preferences.

Validation: Measure customer engagement and satisfaction with personalized products.

Recheck Points: Increase in product cross-selling and up selling rates.

10. Educate Customers About Financial Innovations

Recommendation: Conduct workshops, webinars, and campaigns to educate customers about the benefits of new financial technologies.

Validation: Customer knowledge assessments and feedback surveys.

Recheck Points: Increased product usage and reduced customer queries about new technologies.

11. Optimize Transaction Processes for Efficiency

Recommendation: Streamline processes using automation and digital tools to reduce time and error rates in transactions.

Validation: Analyze transaction processing times and error rates.

Recheck Points: Reduced processing times and error-related complaints.

12. Focus on Continuous Improvement of Digital Services

Recommendation: Regularly update digital platforms based on customer feedback and technological advancements.

Validation: Monitor version updates and changes in user engagement metrics.

Recheck Points: Higher user retention and engagement rates.

13. Diversify Product Portfolio

Recommendation: Introduce new financial products such as digital gold, virtual RMs, and crypto currencies to cater to varied customer needs.

Validation: Track customer adoption rates of newly launched products.

Recheck Points: Increase in product adoption and customer base diversification.

14. Promote Secure Digital Infrastructure

Recommendation: Ensure a robust and secure infrastructure for online banking to build customer trust.

Validation: Regularly test system security and infrastructure reliability.

Recheck Points: Minimal system downtimes and successful security audits.

15. Enhance Financial Literacy Among Different Demographics

Recommendation: Develop targeted financial literacy programs for different age groups and socio-economic segments.

Validation: Assess the program's effectiveness through pre- and post-knowledge surveys.

Recheck Points: Improvement in financial literacy levels and higher product adoption rates among targeted groups.

16. Expand Financial Innovation to Semi-Urban and Rural Areas

Recommendation: Deploy digital solutions that are tailored to the needs of semi-urban and rural customers (e.g., simplified interfaces, regional languages).

Validation: Monitor adoption rates and user feedback from these regions.

Recheck Points: Increased penetration of digital banking services in semi-urban and rural markets.

17. Leverage Partnerships for Innovation

Recommendation: Collaborate with fintech companies to enhance product offerings and customer experience.

Validation: Evaluate the outcomes of partnerships in terms of product enhancements and customer satisfaction.

Recheck Points: Growth in innovative product offerings and positive customer feedback.

18. Improve Accessibility for Elderly Customers

Recommendation: Design user-friendly interfaces and services that are accessible to elderly customers.

Validation: Conduct usability tests with elderly customers and gather feedback.

Recheck Points: Increased adoption of digital services among elderly users.

19. Implement Responsible Financial Practices

Recommendation: Ensure ethical standards are met, such as transparent fees and fair lending practices.

Validation: Periodic audits and reviews of financial practices.

Recheck Points: Fewer customer complaints and legal issues related to unfair practices.

20. Monitor Customer Sentiment and Feedback

Recommendation: Regularly gather and analyze customer feedback to identify areas for improvement.

Validation: Use customer feedback tools (e.g., surveys, reviews) to measure satisfaction levels.

Recheck Points: Improvement in customer satisfaction scores and retention rates.

21. Increase Trust in Digital Banking Through Transparent Communication

Recommendation: Regularly communicate security measures, updates, and best practices to customers to build trust in digital banking.

Validation: Monitor the frequency of communication and track customer engagement rates (e.g., open rates for emails, clicks on security tips).

Recheck Points: Higher customer trust scores in surveys and a reduction in the number of security-related inquiries.

22. Develop Loyalty Programs for Digital Banking Users

Recommendation: Introduce loyalty programs that reward customers for using digital services such as online banking, UPI payments, and mobile wallets.

Validation: Track participation rates and customer retention statistics for those enrolled in the loyalty program.

Recheck Points: Increased user retention, repeat usage of digital platforms, and growth in the number of new enrollees.

23. Facilitate Seamless Cross-Border Transactions

Recommendation: Develop partnerships with international payment networks and fintech's to offer lower-cost and faster cross-border transactions.

Validation: Measure the volume and speed of cross-border transactions before and after implementing new partnerships.

Recheck Points: Growth in cross-border transaction volume, increased customer satisfaction with cross-border services

24. Enhance Accessibility Through Multilingual Digital Platforms

Recommendation: Offer digital platforms in multiple languages to cater to a diverse customer base.

Validation: Analyze language preferences of users and monitor usage patterns of multilingual options.

Recheck Points: Higher adoption rates among non-native speakers, increased engagement from diverse demographics.

25. Implement Data Analytics for Fraud Detection

Recommendation: Utilize advanced data analytics and machine learning to detect and prevent fraudulent activities in real-time.

Validation: Track the number of fraud cases detected and prevented using the analytics system.

Recheck Points: Reduction in fraud incidents, lower financial losses due to fraud.

26. Promote Paperless Banking Initiatives

Recommendation: Encourage customers to switch to digital statements, e-receipts, and online documentation to reduce paper use.

Validation: Monitor the number of customers opting for paperless statements and other digital alternatives.

Recheck Points: Increase in digital statement adoption rates and a decrease in paper-related costs.

27. Improve Accessibility for Differently-Able Customers

Recommendation: Ensure digital banking platforms comply with accessibility standards (e.g., WCAG) and offer features such as text-to-speech, adjustable text sizes, and high contrast modes.

Validation: Conduct accessibility audits and usability tests with differently-able customers.

Recheck Points: Higher adoption rates among differently-able users and positive feedback on accessibility features.

28. Utilize Gamification to Drive Engagement

Recommendation: Introduce gamified elements like challenges, badges, and rewards for regular use of digital banking services.

Validation: Measure engagement metrics (e.g., time spent on platform, number of completed challenges).

Recheck Points: Increase in engagement and user activity on digital platforms.

29. Provide Financial Advisory Through Digital Channels

Recommendation: Offer AI-driven financial advisory services (e.g., robo-advisors) to provide customers with personalized investment recommendations.

Validation: Track the number of users engaging with digital advisory services and their subsequent investment actions.

Recheck Points: Higher adoption rates of advisory services and increased customer investments.

30. Implement Smart Notifications and Alerts

Recommendation: Use AI and data analytics to provide smart notifications and alerts (e.g., low balance alerts, upcoming payments) to customers.

Validation: Measure customer engagement with alerts and their impact on financial management behaviors.

Recheck Points: Improved customer financial management practices and reduced instances of overdrafts or missed payments.

31. Expand Digital KYC (Know Your Customer) Capabilities

Recommendation: Invest in advanced digital KYC technologies (e.g., facial recognition, digital ID verification) to streamline onboarding.

Validation: Monitor the time taken for customer onboarding and KYC completion rates.

Recheck Points: Faster onboarding times and lower KYC-related errors.

32. Offer Flexible Repayment Options for Loans

Recommendation: Provide flexible loan repayment options (e.g., variable EMIs, early repayment) to cater to different customer needs.

Validation: Analyze repayment patterns and track customer feedback on loan flexibility.

Recheck Points: Reduced loan defaults and increased customer satisfaction with loan services.

33. Increase Awareness of Cybersecurity Practices

Recommendation: Educate customers about cyber security through regular communications (emails, webinars, info graphics).

Validation: Track engagement with educational content and measure changes in customer behavior (e.g., use of strong passwords).

Recheck Points: Reduction in security breaches linked to customer negligence.

34. Expand Use of Blockchain for Secure Transactions

Recommendation: Leverage blockchain technology to enhance security, transparency, and speed in financial transactions.

Validation: Track transaction processing times and the number of security incidents before and after implementing blockchain solutions.

Recheck Points: Faster and more secure transactions, fewer disputes over transaction authenticity.

35. Introduce Tiered Digital Banking Packages

Recommendation: Create tiered packages for digital banking services (e.g., basic, premium) with different levels of features and benefits.

Validation: Monitor package uptake and customer feedback on the value of different tiers.

Recheck Points: Increased adoption of premium packages and customer upgrades.

36. Utilize Feedback Loops for Continuous Improvement

Recommendation: Establish a continuous feedback loop to gather customer input on digital services and innovations.

Validation: Analyze feedback trends and prioritize areas for improvement.

Recheck Points: Reduction in negative feedback and complaints.

37. Enhance Collaboration with Third-Party Fintechs

Recommendation: Partner with fintech companies to co-create innovative products and services that enhance customer experience.

Validation: Track the performance and customer adoption rates of co-created products.

Recheck Points: Positive customer feedback and high usage rates of new fintech-driven products.

38. Offer Digital-Only Products for Tech-Savvy Customers

Recommendation: Develop exclusive digital-only products (e.g., higher interest rates for online savings accounts) to attract tech-savvy customers.

Validation: Monitor the uptake of digital-only products and track customer demographics.

Recheck Points: Growth in the number of tech-savvy customers using digital-only products.

39. Streamline Internal Processes for Faster Service Delivery

Recommendation: Automate internal workflows (e.g., loan approvals, customer service requests) to reduce processing times.

Validation: Measure the average time taken to complete various internal processes.

Recheck Points: Faster service delivery times and higher operational efficiency.

40. Offer Eco-Friendly Banking Options

Recommendation: Promote eco-friendly banking options such as digital statements, paperless transactions, and green loans.

Validation: Track the adoption rates of eco-friendly options and customer feedback on environmental initiatives.

Recheck Points: Higher customer participation in eco-friendly programs and positive feedback on sustainability efforts.

41. Utilize Social Media for Customer Engagement

Recommendation: Use social media platforms for customer engagement, education, and feedback collection.

Validation: Monitor social media metrics such as likes, shares, comments, and customer sentiment.

Recheck Points: Increased social media engagement and customer satisfaction.

42. Develop Inclusive Financial Products for Underbanked Segments

Recommendation: Create products specifically designed for underbanked segments (e.g., low-fee accounts, micro-loans).

Validation: Measure the adoption rates of inclusive products and monitor demographic data.

Recheck Points: Growth in customer base from underbanked communities.

43. Implement Dynamic Pricing Models

Recommendation: Utilize dynamic pricing for services based on demand, risk factors, and customer profiles.

Validation: Analyze the impact of dynamic pricing on revenue and customer behavior.

Recheck Points: Increased profitability and customer satisfaction with pricing transparency.

44. Promote Contactless Payment Solutions

Recommendation: Encourage the use of contactless payment options (e.g., NFC-enabled cards, QR codes) for in-store and online purchases.

Validation: Monitor the adoption rates of contactless payment solutions.

Recheck Points: Higher usage of contactless payment methods and positive customer feedback on convenience.

45. Enhance Customer Service through AI-Driven Chatbots

Recommendation: Deploy AI-driven chatbots to handle customer inquiries, complaints, and routine transactions.

Validation: Track the volume of interactions handled by chatbots and customer satisfaction scores.

Recheck Points: Reduced wait times for customer support and improved resolution rates.

46. Offer Personalized Financial Wellness Programs

Recommendation: Create tailored financial wellness programs (e.g., budgeting tools, savings challenges) to help customers manage their finances better.

Validation: Measure participation rates and track customer progress in financial wellness programs.

Recheck Points: Improved financial health indicators among customers.

47. Facilitate Quick Fund Transfers Across Multiple Platforms

Recommendation: Enable seamless fund transfers across various platforms (e.g., bank accounts, digital wallets) to enhance user convenience.

Validation: Monitor transaction volumes and user feedback on transfer speed and reliability.

Recheck Points: Higher transfer volumes and increased customer satisfaction.

48. Introduce Biometric Authentication for Higher Security

Recommendation: Implement biometric authentication methods (e.g., fingerprint, facial recognition) for secure login and transactions.

Validation: Track the number of users opting for biometric authentication and monitor security incidents.

Recheck Points: Reduction in unauthorized access and fraud cases.

49. Promote Integration with Third-Party Financial Apps

Recommendation: Enable integration with third-party financial apps (e.g., budgeting tools, investment platforms) to offer a comprehensive financial ecosystem.

Validation: Track the number of integrations and customer engagement with third-party apps.

Recheck Points: Increased customer retention and satisfaction.

50. Expand Financial Literacy through Virtual Workshops

Recommendation: Conduct virtual workshops on financial management topics (e.g., saving, investing, credit management).

Validation: Measure attendance rates and assess knowledge improvement through pre- and post-workshop surveys.

Recheck Points: Higher financial literacy levels and increased use of financial products.

51. Develop Insurance Products for Digital Assets

Recommendation: Introduce insurance products that cover digital assets (e.g., crypto currency, NFTs) against theft or loss.

Validation: Monitor the adoption rates of digital asset insurance products.

Recheck Points: Increased insurance product uptake and customer satisfaction.

52. Enhance Mobile Banking for Wearable Devices

Recommendation: Optimize mobile banking apps for wearable devices (e.g., smart watches) to cater to tech-savvy customers.

Validation: Track usage rates of mobile banking apps on wearable devices.

Recheck Points: Growth in app downloads and usage on wearable platforms.

53. Offer Early Access to New Features for Loyal Customers

Recommendation: Provide early access to new features or products to loyal customers as a reward.

Validation: Measure customer retention and satisfaction rates among early access participants.

Recheck Points: Higher retention rates and positive feedback from loyal customers.

54. Utilize Cloud Computing for Scalability and Cost-Effectiveness Recommendation:

Move data storage and computing processes to the cloud to reduce costs and improve scalability.

Validation: Analyze cost savings and scalability improvements post-migration.

Recheck Points: Lower operational costs and enhanced scalability.

55. Foster a Culture of Innovation Among Employees

Recommendation: Encourage a culture of innovation within the organization by providing training, resources, and incentives for creative solutions.

Validation: Monitor employee engagement scores and track the number of new ideas submitted.

Recheck Points: Increased number of innovative ideas and projects initiated.

56. Enhance Remote Banking Capabilities

Recommendation: Strengthen remote banking capabilities by offering comprehensive online services and remote assistance tools.

Validation: Measure usage rates of remote banking tools and customer satisfaction.

Recheck Points: Growth in remote service adoption and positive feedback.

57. Create Specialized Digital Banking Products for SMEs

Recommendation: Develop digital banking solutions tailored to the needs of SMEs (e.g., easy loans, payroll management).

Validation: Track product uptake among SMEs and monitor feedback.

Recheck Points: Increased SME customer base and positive feedback.

58. Adopt Omni channel Banking Strategies

Recommendation: Provide seamless customer experiences across all channels (mobile, web, in-branch) with integrated services.

Validation: Analyze cross-channel engagement and monitor consistency in service delivery.

Recheck Points: Higher customer satisfaction and retention rates.

59. Utilize Predictive Analytics for Customer Retention

Recommendation: Implement predictive analytics to identify at-risk customers and proactively engage them.

Validation: Track customer churn rates before and after implementing predictive analytics.

Recheck Points: Reduced churn rates and improved retention.

60. Promote Financial Innovations that Foster Sustainability

Recommendation: Develop green finance products and services (e.g., green loans, sustainable investments) to support environmental goals.

Validation: Monitor the uptake of green finance products and customer feedback on sustainability initiatives.

Recheck Points: Growth in green product adoption and positive environmental impact.

Future Implication & Recommendation for Banks:

1. Expansion of Digital-Only Banking Services

Implication: As digital banking continues to grow, banks may establish digital-only subsidiaries to reduce operational costs and cater to tech-savvy customers seeking fully online experiences.

2. Increased Demand for Customized Financial Products

Implication: Customers will expect more personalized banking services, leading banks to invest in data analytics and AI-driven platforms to offer tailored products based on individual needs and behaviors.

3. Rise in Use of AI and Machine Learning for Risk Management

Implication: AI and machine learning will become critical in detecting fraudulent transactions, credit risk assessments, and predicting customer behavior, improving overall risk management strategies.

4. Greater Adoption of Blockchain Technology

Implication: Banks will increasingly use blockchain for secure, transparent, and cost-effective transactions, especially in cross-border payments, reducing reliance on intermediaries.

5. Emphasis on Cybersecurity and Data Privacy

Implication: Enhanced cyber security measures will become a core focus to safeguard against increasing cyber threats, fostering customer trust in digital platforms.

6. Integration with Third-Party Fintech Solutions

Implication: Collaboration with fintech companies will drive innovation, enabling banks to offer a broader range of services through integrated platforms, enhancing customer convenience.

7. Proliferation of Financial Inclusion Initiatives

Implication: Banks will expand their digital services to underserved and rural areas, using technologies like mobile banking and digital KYC to increase financial inclusion and capture new customer segments.

8. Shift Towards Open Banking Models

Implication: Banks will adopt open banking frameworks, sharing customer data securely with third-party providers to create a more integrated financial ecosystem and offer enhanced services.

9. Development of Eco-Friendly and Sustainable Financial Products

Implication: There will be an increased focus on sustainable finance products, such as green bonds and eco-loans, to cater to environmentally conscious consumers and align with global sustainability goals.

10. Introduction of Digital Asset Services

Implication: Banks may begin offering services related to digital assets, including crypto currencies and NFTs, to diversify their portfolio and meet the growing demand for alternative investments.

11. Growth in Remote Banking and Contactless Services

Implication: The demand for remote banking and contactless payment solutions will continue to rise, requiring banks to enhance their digital platforms and customer service capabilities.

12. Increased Focus on Financial Literacy Programs

Implication: Banks will invest in educational programs to improve customer understanding of digital products and services, promoting informed usage and fostering loyalty.

13. Expansion of Real-Time Payment Solutions

Implication: Real-time payments, such as UPI and IMPS, will gain further traction, encouraging banks to optimize infrastructure for instant and secure transactions.

14. Wider Adoption of Robo-Advisors for Investment Management

Implication: Robo-advisors will become more prevalent, providing affordable, personalized investment advice and portfolio management to a broader customer base.

15. Focus on Enhancing Customer Experience Through Omni channel Strategies

Implication: Banks will implement omni channel strategies to provide a seamless customer experience across all digital and physical touch points, improving satisfaction and loyalty.

16. Utilization of Predictive Analytics for Personalized Marketing

Implication: Banks will leverage predictive analytics to deliver targeted marketing campaigns, offering the right products to the right customers at the right time, improving conversion rates.

17. Growth in Demand for Secure Cross-Border Transactions

Implication: Cross-border payment solutions will evolve, becoming faster and more secure, enabling banks to compete more effectively in the global payments landscape.

18. Expansion of Automated Customer Support

Implication: AI-driven chatbots and virtual assistants will handle routine inquiries, allowing human customer service agents to focus on complex issues, improving efficiency and customer satisfaction.

19. Increasing Regulatory Requirements for Digital Banking

Implication: Banks will face more stringent regulations around data protection, cyber security, and digital transactions, necessitating greater investment in compliance technologies.

20. More Agile and Scalable Cloud-Based Infrastructure

Implication: Cloud computing will enable banks to become more agile and scalable, reducing costs and enhancing their ability to deploy new services quickly.

21. Shift Towards Subscription-Based Banking Services

Implication: Banks may introduce subscription models offering bundled services for a flat monthly fee, providing customers with a predictable cost structure and fostering loyalty.

22. Increased Use of Biometric Authentication

Implication: To enhance security, banks will adopt biometric authentication methods (e.g., facial recognition, fingerprint scanning) for login and transaction approvals.

23. Development of Solutions for Gig Economy Workers

Implication: As the gig economy grows, banks will develop specialized products (e.g., microloans, flexible savings plans) tailored to the unique needs of gig workers.

24. Higher Investment in Digital Onboarding Processes

Implication: Digital onboarding will become more sophisticated and seamless, reducing customer acquisition costs and enhancing the initial customer experience.

25. Promotion of Contactless and Mobile Payment Adoption

Implication: Banks will continue to promote contactless and mobile payment methods, leveraging their convenience and safety to drive widespread adoption among consumers.

These future implications are designed to help banks anticipate and respond to upcoming trends in the financial sector, ensuring they remain competitive, customer-centric, and technologically advanced in the rapidly evolving digital landscape.

Future implications & Recommendations for financial start ups and fintech's

1. Focus on Hyper-Personalization of Financial Services

Implication: Fintechs can leverage data analytics and AI to offer hyper-personalized services, such as tailored investment advice or custom credit products, enhancing customer satisfaction and retention.

2. Expansion into Niche Markets and Underbanked Segments

Implication: Financial startups can focus on serving niche markets (e.g., gig economy workers, small businesses, or rural communities) that are underserved by traditional banks, using innovative digital solutions.

3. Adoption of Blockchain for Transparent and Cost-Effective Transactions

Implication: Fintechs can utilize blockchain technology to offer secure, transparent, and low-cost transaction services, especially for cross-border payments and smart contracts.

4. Leverage Open Banking to Enhance Product Offerings

Implication: Fintechs can use open banking APIs to access customer data from banks (with consent) to build innovative financial products, like budgeting apps, financial management tools, or new credit scoring models.

5. Develop Innovative Payment Solutions

Implication: Startups can focus on creating advanced payment solutions, like instant peer-to-peer payments, crypto wallets, or mobile-first payment apps, to meet the growing demand for seamless transactions.

6. Increase Focus on Financial Wellness Platforms

Implication: Fintechs can create platforms that provide financial education, savings tools, and investment planning services to help consumers manage their money more effectively.

7. Use AI and Machine Learning for Credit Scoring

Implication: Startups can use AI and machine learning to develop alternative credit scoring models that consider non-traditional data (e.g., social media activity, online behavior) to assess creditworthiness more accurately.

8. Enhance User Experience Through Gamification

Implication: Fintechs can incorporate gamification elements (e.g., rewards, challenges, leader boards) to make financial management more engaging and increase user retention.

9. Focus on Building Digital-First Insurance Products

Implication: Financial startups can develop digital-first insurance products that are easily accessible, customizable, and tailored to specific customer segments, such as freelancers or small business owners.

10. Expand Usage of Biometric Authentication

Implication: Fintechs can integrate biometric authentication methods (e.g., facial recognition, voice authentication) to enhance security and streamline user access to their platforms.

11. Develop Digital Asset Management Platforms

Implication: Startups can build platforms that allow users to manage digital assets, including crypto currencies and tokenized investments, to meet the growing demand for diversified portfolios.

12. Capitalize on the Growth of Contactless Payments

Implication: Fintechs can enhance or create new solutions for contactless payments, such as NFC-enabled cards, QR code payments, or integrated mobile payment options, to cater to evolving consumer preferences.

13. Offer Solutions for Micro-Investing and Robo-Advisory

Implication: Startups can develop micro-investing platforms and robo-advisors to attract customers looking for low-cost, automated investment solutions.

14. Implement Real-Time Fraud Detection and Prevention

Implication: Fintechs can invest in real-time fraud detection technologies, utilizing AI to quickly identify and mitigate fraudulent activities, enhancing trust and security.

15. Focus on Financial Inclusion and Access

Implication: Fintech startups can create products that simplify access to financial services for marginalized groups, such as low-income households or the unbanked, using digital onboarding and mobile technology.

16. Leverage Partnerships with Traditional Banks

Implication: Collaborating with banks allows fintech's to expand their customer base, integrate their technologies, and co-create innovative solutions that benefit both parties.

17. Embrace Cloud-Based Platforms for Scalability

Implication: Startups can use cloud computing to build scalable and flexible platforms that can handle rapid growth, reduce costs, and improve their ability to deploy new features quickly.

18. Create Ecosystems of Financial Services

Implication: Fintechs can build ecosystems that offer a range of interconnected financial services (e.g., payments, loans, insurance) on a single platform to increase user engagement and retention.

19. Utilize Social Media for Customer Acquisition and Engagement

Implication: Fintechs can leverage social media platforms for marketing, customer engagement, and service delivery, building communities around their products.

20. Adopt Regulatory Technology (RegTech) for Compliance

Implication: Startups can integrate RegTech solutions to automate compliance with financial regulations, reducing costs and minimizing the risk of regulatory penalties.

21. Expand the Use of Subscription Models for Financial Services

Implication: Fintechs can adopt subscription-based pricing models, offering tiered services (e.g., premium financial planning, exclusive investment insights) to generate steady revenue streams.

22. Offer Buy Now, Pay Later (BNPL) Services

Implication: Fintech startups can expand into the BNPL space, offering flexible credit options to consumers for online and in-store purchases, leveraging the growing trend toward alternative payment methods.

23. Develop APIs for Easy Integration with Other Platforms

Implication: Startups can create open APIs that enable seamless integration with other financial platforms, e-commerce sites, or apps, expanding their reach and service offerings.

24. Focus on Sustainable Finance Solutions

Implication: Fintechs can create products that promote sustainable finance, such as carbon footprint trackers, green loans, or platforms for investing in sustainable assets.

25. Use Big Data Analytics for Market Insights

Implication: Startups can leverage big data analytics to gain deeper insights into customer behavior, market trends, and risk assessment, enabling them to tailor products more effectively and make data-driven decisions.

Recommendation for Government/Policy Makers:

1. Promotion of Financial Inclusion Through Digital Innovation

Implication: Governments can incentivize digital financial services to reach unbanked and underbanked populations, ensuring greater financial inclusion and economic participation across all regions.

2. Support for Open Banking Frameworks

Implication: By implementing regulations that encourage open banking, governments can foster innovation, competition, and consumer choice, enabling fintech's and banks to provide more personalized financial services.

3. Encouragement of Secure Digital Payment Ecosystems

Implication: Governments can promote the adoption of secure digital payments (e.g., UPI, QR codes) to reduce the reliance on cash, enhance transaction transparency, and improve financial accountability.

4. Implementation of Robust Cybersecurity Regulations

Implication: Establishing stringent cybersecurity standards will help protect consumers' data, maintain trust in digital financial systems, and prevent financial crimes such as fraud and identity theft.

5. Facilitation of Blockchain Technology for Transparent Transactions

Implication: Governments can leverage blockchain technology for secure, transparent, and tamper-proof records in areas like land registries, public procurement, and welfare distribution, enhancing transparency and reducing corruption.

6. Promotion of Financial Literacy and Education Programs

Implication: Governments can invest in financial literacy initiatives to educate citizens on digital financial tools, ensuring informed usage and encouraging responsible financial behavior.

7. Incentivization of Sustainable Financial Practices

Implication: Governments can introduce incentives for banks and fintech's that offer green finance products, such as green bonds or eco-loans, promoting sustainable development and environmental conservation.

8. Adoption of Digital Identification Systems for KYC Processes

Implication: Implementing a unified digital identity system can simplify KYC processes, reduce compliance costs, and improve the efficiency of onboarding new customers for banks and fintech's.

9. Support for Public-Private Partnerships in Fintech Innovation

Implication: Governments can encourage collaboration between the public and private sectors to foster fintech innovation, enhance service delivery, and promote the development of new financial technologies.

10. Development of a Regulatory Sandbox for Fintech Startups

Implication: Establishing a regulatory sandbox will allow fintech startups to test new products and services in a controlled environment, encouraging innovation while ensuring consumer protection.

11. Promotion of Digital Payments to Reduce the Shadow Economy

Implication: By encouraging digital payments, governments can reduce the size of the shadow economy, improve tax compliance, and increase revenue collection.

12. Creation of a National Data Protection Framework

Implication: Governments can develop comprehensive data protection regulations to safeguard consumer data, enhance privacy, and build trust in digital financial systems.

13. Support for Cross-Border Digital Payment Solutions

Implication: Governments can collaborate with international bodies to create frameworks for seamless cross-border digital payments, facilitating international trade and remittances.

14. Encouragement of AI and Machine Learning in Financial Services

Implication: Governments can support the use of AI and machine learning in financial services for credit scoring, fraud detection, and customer service, enhancing efficiency and customer satisfaction.

15. Expansion of Digital Infrastructure in Rural Areas

Implication: By investing in digital infrastructure, such as high-speed internet, in rural and underserved areas, governments can enable access to digital financial services and boost economic growth.

16. Promotion of Transparent and Fair Credit Practices

Implication: Governments can enforce regulations that promote transparency and fairness in lending practices, protecting consumers from predatory lending and ensuring responsible credit allocation.

17. Implementation of Tax Incentives for Digital Transactions

Implication: Providing tax benefits for digital transactions can encourage both consumers and businesses to adopt digital payments, promoting a cashless economy.

18. Encouragement of Digital Financial Platforms for Small Businesses

Implication: Governments can promote digital financial tools tailored to the needs of SMEs, such as digital bookkeeping and online lending platforms, enhancing their access to credit and financial management.

19. Support for Biometric Authentication for Government Services

Implication: Governments can use biometric authentication for accessing public services, reducing fraud, and ensuring secure and efficient service delivery.

20. Facilitation of Digital Currency Development

Implication: Governments can explore the development of central bank digital currencies (CBDCs) to enhance payment systems, promote financial inclusion, and ensure monetary sovereignty.

21. Encouragement of Inclusive Financial Products

Implication: Governments can mandate the creation of financial products that cater to different demographics, such as low-income families, women, and the elderly, fostering greater economic participation.

22. Support for Digital Financial Inclusion of Gig Economy Workers

Implication: Governments can encourage the development of financial products tailored to the needs of gig economy workers, ensuring they have access to banking, credit, and insurance services.

23. Promotion of Transparent Open Data Policies

Implication: Governments can implement open data policies that provide access to public financial data, encouraging innovation and competition in the fintech sector while ensuring data privacy and security.

24. Development of National Fintech Hubs

Implication: Governments can establish fintech hubs to attract startups, foster collaboration, and accelerate innovation in the financial sector, promoting economic growth and job creation.

25. Encouragement of Green Finance and Investment

Implication: Governments can create policies that promote green finance and investments, such as green bonds, to drive sustainable development and reduce carbon footprints, aligning financial growth with environmental goals.

26. Open Banking and API Standardization

Legislation should facilitate secure data sharing among banks and third-party providers through standardized APIs. Open banking promotes service personalization, competition, and consumer empowerment, but it demands robust data protection regulations and consent protocols.

27. Customer-Centric Innovation Policies

Survey data reveals strong demand for real-time, secure, and easy-to-use services. Regulators should nudge banks to embed user feedback loops into product development cycles and prioritize inclusive design to address all demographics—from urban youth to rural elderly.

28. Monitoring and Benchmarking Innovation Performance

The thesis introduced innovation indices linked to GDP and HDI. Policymakers should institutionalize similar metrics to track banking sector innovation longitudinally. This supports data-driven policy refinement and resource allocation

29. Agile Compliance for Digital Banking Growth

As innovations scale, policy must evolve rapidly. Banks need clear, modular compliance frameworks adaptable to technological advances like biometric verification, robo-advisors, and tokenized assets, to reduce regulatory lag and uncertainty.

These future implications provide a strategic roadmap for governments to harness the power of digital financial innovation to boost economic growth, enhance financial inclusion, ensure consumer protection, and foster a more competitive and resilient financial sector.

Recommendations for the Development of Financial Innovations in Indian Banks

Enhance Customer Awareness

Recommendation: Launch targeted educational campaigns and digital literacy drives to improve customer understanding of emerging financial products like robo-advisors, virtual RMs, and blockchain-based services.

Justification: Awareness levels directly influence adoption and trust in digital banking solutions.

Promote User-friendly Digital Platforms

Recommendation: Prioritize intuitive mobile and web interface designs, ensuring accessibility for less tech-savvy users, including seniors and rural customers.

Justification: Simplified user interfaces drive engagement and reduce drop-offs in digital onboarding processes.

Leverage AI, Blockchain, and Data Analytics

Recommendation: Incorporate AI for personalized services, blockchain for secure transactions, and analytics for customer behavior insights.

Justification: These technologies enhance efficiency, transparency, and customer targeting capabilities, leading to higher adoption and retention.

Establish Fintech Partnerships

Recommendation: Build collaborative ecosystems with fintech startups to co-develop innovative products like instant credit, BNPL (Buy Now, Pay Later), and real-time investment services.

Justification: Fintech partnerships bring agility, while banks provide scale and regulatory stability—a synergy beneficial to both parties.

Expand 24/7 Digital Banking Services

Recommendation: Ensure round-the-clock availability of essential banking services, including AI-powered chatbots and voice assistants.

Justification: Non-stop access caters to the needs of a digitally native and globally distributed customer base.

Boost Security and Reliability

Recommendation: Invest in robust cybersecurity frameworks, biometric authentication, and real-time fraud detection systems.

Justification: Enhancing trust in the security of digital services is fundamental for widespread adoption.

Create Segment-specific Innovations

Recommendation: Design financial solutions tailored for key segments like gig workers, students, elderly, and MSMEs, such as flexible credit lines or retirement planning tools.

Justification: Customization ensures higher relevance and usage among target groups.

Utilize Regulatory Sandboxes

Recommendation: Participate in regulatory sandbox programs to pilot new innovations in a controlled, low-risk environment.

Justification: Facilitates quicker testing, refinement, and approval of breakthrough financial products.

Drive Inclusion through Process Innovation

Recommendation: Focus on digitizing account openings (e.g., e-KYC), Aadhaar integrations, and remote onboarding for rural areas.

Justification: Process innovation reduces costs and increases accessibility, thereby deepening financial inclusion.

Implement Feedback Loops for Continuous Improvement

Recommendation: Use analytics from app usage and customer service interactions to iteratively refine digital banking experiences.

Justification: Continuous feedback enables banks to remain responsive to changing user expectations and market dynamics.

6.6 LIMITATIONS

Because of these restrictions, we cannot draw any broad conclusions from this poll. The limitations of many completed studies provide opportunities for future study. The current research is not without its flaws. The first step in this investigation was to acquire data directly from the source. Primary research in any field needs funding to be conducted. One of the problems with the present study was that there wasn't enough money to fully complete it. Second, there was a problem with how much time was being used. Time is a major factor while doing primary data collection since the researcher must personally speak with each respondent, brief them about the project, and then collect data from them. In

addition, the quantitative research methodology used in this study raises the possibility of an inaccurate portrayal of the population as a whole, which in turn might impede the study's stated goals and objectives. Even with a good sampling strategy in place, the probability distribution of the data will determine how accurately the subjects are reflected in the sample. In addition, it might be difficult to regulate the conditions in which study participants answer survey questions. The circumstances at any given moment are another factor that influences how quickly or slowly a person reacts. A standardized questionnaire with no room for free-form responses is typical of quantitative research. It produces just the predetermined results of the study. This means that the outcomes do not always reflect the true nature of the event.

6.7 FURTHER RESEARCH

People may have joined the financial system, but the present research shows they are either not making use of the tools made available to them or are just uninformed of their existence. In order to better understand these issues and the challenges they present while using these tools, a thorough qualitative study might be undertaken on the topic. More study is needed to determine whether low income is a substantial barrier to people's usage of the financial system and its products. Since more individuals may be included and their challenges better understood with a bigger sample size, this research can be undertaken on a wider scale utilising the quantitative technique.

- Research can be undertaken on Impact of Financial innovations on Financial Inclusion.
- Research can be done on role of LLM, Machine learning and AI on creating new products and avenues for banking customers.
- Research can be done on impact and reach of Digital Currency on Banking and Fintech.
- Research can be done on start ups and their roles in financial innovations.
- Further Study can be done Crypto currencies and Digital Currency and other emerging technologies /Innovations.
- Research can be done on Impact of Financial innovations and fintech's on market

share and profitability of existing banks.

- Study AI-credit models in rural India; Longitudinal UPI impact study; Behavioral fintech segmentation using machine learning.

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APPENDICES

APPENDIX A

SURVEY ON IMPACT OF FINANCIAL INNOVATIONS ON INDIAN BANKING INDUSTRY

I am Taranjeet Singh, a PhD researcher. The study will help me to understand the customer and product segments where financial innovations has impacted. It will also help me to understand factors that has led to rapid growth of financial innovations. You will not be individually identified, and your responses will be used for academic/statistical purposes only. I would highly appreciate you for taking the time to complete the following survey. The survey will take approximately 30 minutes. I will be grateful if you can spare your valuable time and help me in completing my research.

Survey has four Sections

- Section A** - Your Basic Information (Time 3 to 4 minutes)
- Section B** - Information about Awareness of Products, Processes and Technology Innovations
- Section C** - Information about Usage of Products, Processes and Technology Innovations
- Section D** - Basis the level of importance you give to these features while using any of digital products and services.
- Section E** - Basis your feeling if particular feature is available in product and services you are using.
- Section F** - Basis you think financial innovations has enabled banks in improving their operational performance.
- Section G** - Basis your perception and experience about product, pricing, process, rewards/promotions and physical infrastructure.

Section A

This section has basic questions about you. Kindly rest assured that this information will be strictly confidential and I am not asking for the names of Individuals who are doing the survey to ensure npossibility of data getting misutilised.

*Your Age

☐ 18-30 ☐ 30-45 ☐ >45-60 ☐ >60

*Place of Residence

☐ Metro ☐ Urban ☐ Semi Urban ☐ Rural

*Your Gender

☐ Male ☐ Female

*Your Qualification

☐ Up to Secondary ☐ Senior Secondary
☐ Graduate ☐ Post Graduate

*Your Monthly Income

☐ Less than 25000 ☐ 25000-50000
☐ 50000-100000 ☐ >100000

*Your Occupation

☐ Student ☐ Home Maker ☐ Salaried
☐ Business ☐ Retired

*Internet Usage

☐ High ☐ Moderate ☐ Low

*Your Principal Bank/Financial Service Provider

- ☐ Public Sector Bank (example SBI, BOB, PNB)
- ☐ Old Private Sector Bank(example ICICI, HDFC, Axis, Kotak,)
- ☐ Fintech (example PayTM,Google Pay, AmazonPay)
- ☐ New payment/ Small Finance Bank (exampleAu Finance, Bandhan)
- ☐ Digital Bank (with no branches example DBS,Jupiter)

*Your association with Principal Bank/Finance service provider

- ☐ Less than one year ☐ One to Three Year ☐
- Three to five yearFive to
- ☐ Greater than Ten Year

Section B

Kindly choose options basis your awareness about the product, process and technology innovationsbeginning for left for high level of awareness and towards right if you are not aware at all.

(5- Highly Aware, 4- Aware, 3- Neutral, 2- Slightly Aware, 1- Unaware)

	Highly Aware	Aware	Neutral	Slightly Aware	Unaware
Video KYC based Saving/Current Account					
Video KYC Based Deposit schemes					
Pre-approved Consumer and Personal Loans					

Apps built for Wealth management and Investments in MF & Insurance schemes					
Virtual /NFC based Plastic cards (Debit/Credit)					
Bill Now Pay Later					
Mobile Banking					
Internet Banking					
Whatsapp Banking					
Online bill and credit card payment					
Use of chat bots for inquiry and queries					
Digital KYC					
Service Kiosks					
IMPS					
RTGS/NEFT					
UPI					
Single authorization					
Positive Pay					
Digital Currency					
Crypto currency					

Block chain technology					
Virtual assistants and RMs					
Chat bots					
Robo Advisory					
Pass book printing kiosks					
Cash Deposit Machines					
POS					
ATM					

Section C

The below financial innovations are listed to understand your level of usage. Read the questions carefully and choose the appropriate responses.

(5- Always, 4- Very Often, 3- Sometimes, 2- Rarely, 1- Never)

	Always	Very Often	Sometimes	Rarely	Never
Video KYC based Saving/Current Account					
Video KYC Based Deposit schemes					
Pre-approved Consumer and Personal Loans					
Apps built for Wealth management and Investments in MF & Insurance schemes					

Virtual /NFC based Plastic cards (Debit/Credit)					
Bill Now Pay Later					
Mobile Banking					
Internet Banking					
Whatsapp Banking					
Online bill and credit card payment					
Use of chat bots for inquiry and queries					
Digital KYC					
Service Kiosks					
IMPS					
RTGS/NEFT					
UPI					
Single authorization					
Positive Pay					
Digital Currency					
Crypto currency					
Block chain technology					
Virtual assistants and RMs					

Chat bots					
Robo Advisory					
Pass book printing kiosks					
Cash Deposit Machines					
POS					
ATM					

Section D

Below features are listed for you to choose basis the level of importance you give to these features while using any of digital products and services.

(5- Very Important, 4- Important, 3- Neutral, 2- Somewhat Important, 1- Not Important)

	Very Important	Important	Neutral	Somewhat Important	Not Important
Easy and Simple to Use					
Cost Effective					
Security					
Visibility (Easy to find/discover)					
Reliability					
Accuracy					

Availability of updated information					
Instantaneous and Fast					
Consistency (less downtime)					
Trendy and Fashionable					
Privacy					
Interactive					
Loaded with latest technology					
Feeling of Pride in using					
Feeling of in control of things					
Innovativeness					

Section E

You need to answer the question basis how do you feel if particular feature is available in product and services you are using.

(5- I like it, 4- I expect it, 3- I am Neutral, 2- I can tolerate it, 1- I dislike it)

	I like it	I expect it	I am neutral	I can tolerate it	I dislike it
Information provided on website/app.product is up to date					
Digital product is having enhanced security features like face recognition or biometric					
If digital product is having basic security features like PIN or password					
if digital product or service is easy to access or use					
If the usage process is simple to understand or user friendly					
If the product or services are equipped with latest technology					
If the product or service is having visual appeal and is fashionable					
If the product of service is pioneer of technology or trend setter					
If product or service is consistent / never hangs or malfunctions					
If the information provided while using the product or service is transparent					

If the product or service is fast or instantaneous					
If the resolution provided is prompt and fair					
If the product or service is flexible and interactive					
If product or service are available 24 by 7					
If usage of product or services is promoted by promotional offers or discount					
Transactions done are completely free from fear of cyber attack/crime or hacking					
FAQ covers your security, privacy and general queries					
You are able to avail complete range of services					
Your personal information is secured or protected					
Digital product is backed by proper response mechanism like chat bot, email					

Section F

You need to answer the question basis how do you think financial innovations has enabled banks in improving their operational performance.

(5- Strongly Agree, 4- Agree, 3- Neither agree nor disagree, 2- Disagree, 1- Strongly Disagree)

Statements	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly disagree
Financial innovations enables to make quick and easy transaction leading to high speed of delivery					
Financial innovations provide consumers with a convenient method of conducting bank business.					
Using financial innovations has improved quality financial services delivery					
Financial innovations has positive effect on bank cost efficiency					
Financial innovations banking has led to the improvement of bank overall operational efficiency					
The bank product and service quality Has improved over the year.					
The satisfaction of customers have Improved over they ears					

Flexibility of products and service Provision has improved over a time.					
There has been increase in range of Financial products and services.					
Reduces time taken to process & execute transaction					
Reduces human error and mistakes significantly					
Improves the quality of banking services					
Improves customer relationship					
Provides 24*7 banking					
Service Increases the number of customers significantly					
Reduces complexity in processing transaction					
Reduces footfall at branches					
Reduces cost per transaction					
Reduces time taken to process & execute transaction					

Section G

You need to answer the question basis your perception and experience about product, pricing, process, rewards/promotions and physical infrastructure. **Rating them 1 to 5, 1 being lowest and 5 being highest)**

Sl.No	Statement	PERCEPTION					EXPERIENCE				
		1	2	3	4	5	1	2	3	4	5
1	Product strategy										
I.	Different types of accounts provided by the bank.										
II.	Various types of loans issued										
III.	Use of debit and credit cards										
IV.	NRI services provided by the bank										
V.	Locker facilities available in the bank										
VI.	Demat account provided by the bank										
VII.	Mobile banking/online banking services										
VIII.	Insurance products and services										
IX.	IPO										
2	Price strategy										
I.	Interest rates of the Bank against loans										
II.	Interest rates allowed to the deposits										
III.	Message alert charges for services										
IV.	Cash back offer or rewards										

V.	Minimum balance as per statutory limit												
VI.	Loan processing charges												
3	Place strategy												
I.	Bank's ATM facilities												
II.	The bank provides easy parking facility												
III.	Bank's ATM located at convenient place												
IV.	The bank gives comfortable seating arrangements as per covid protocol												
V.	The bank's have Depository machine facility												
VI.	Door step service available												
4	Promotion strategy												
I.	Banks distribute booklets and pamphlets												
II.	Banks conduct exhibition and trade show												
III.	Banks keep direct personal contact with customers.												
IV.	The bank gives financial information through advertisement												

V.	Special care for NRI customers												
5	Process strategy												
I.	Bank operate green banking channel												
II.	Pass book printing machine facility												
III.	Core/net/mobile banking facilities available RTGS and NEFT services provided												
IV.	Online bill payment system												
V.	Digital apps availability												
VI.	Online shopping facility												
9.5.7	Easy to Fund transfer between Accounts												
9.6	People strategy												
9.6.1	Easily accessible to balance inquiry												
9.6.2	Bank employees have sufficient knowledge about banking services												
9.6.3	The bank updates with the changing new events or activities.												
9.6.4	Customer feedback procedure help to maintain long term relationship												
9.7	Physical evidence strategy												
9.7.1	The each and every bank has its logo												
9.7.2	Banks provide diary, writing pads to the internal customers												

9.7.3	The bank shows billboards and Hoardings										
9.7.4	Banks provide passbook and cheque Books										
9.7.5	The bank have influential Punch lines/slogan										

Appendix B

Questions for Expert Interviews

Demand side factor related questions:

- How do financial innovations change the demand for financial products and services?
- What are the drivers of demand for new financial products and services?
- How do different types of financial innovations impact different types of consumers?
- How do financial innovations impact financial inclusion and access to finance?
- What are the ethical implications of financial innovation from a demand-side perspective?
- How does the rise of mobile banking and digital payments impact the demand for traditional banking services?
- How do peer-to-peer lending platforms impact the demand for traditional bank loans?
- How do cryptocurrency and blockchain technologies impact the demand for traditional financial services?
- How does the growing awareness of ESG investing impact the demand for sustainable financial products?
- How does the aging population impact the demand for retirement planning products and services?
- How do climate change and other environmental risks impact the demand for financial products and services that mitigate these risks?

Supply side factor related questions:

- What are the drivers of supply-side financial innovation?
 - How do financial institutions develop and launch new financial products and services?
 - How do financial innovations impact the profitability and competitiveness of financial institutions?
 - How does the increasing availability of data and new technologies impact the development of new financial products and services?
- How do partnerships between financial institutions and fintech companies impact financial innovation?\

List of Publications

Serial No.	Title of paper with author names	Name of Journal	Published Date	ISSN Number, Volume Number, Issue Number	Indexing in Scopus/ Web of Science/UGC-CAR E list (please mention)
1	Investigating the rapid growth in financial innovations: Comprehensive analysis of Demand and Supply side influences A c factors driving	African Journal of Biological Sciences	2nd week of May 2024	May 24, Volume 6 , Special Issue - 2 : Page: 1138-1156 ISSN 2663-2187	Scopus
2	A Financial Innovation in the Indian Banking System and Developed Countries: Statistical Regression Procedure	Journal Of Electrical Systems (JES)	Accepted for publication on 23 rd March 2024	ISSN 11125209, H-Index 21, SJR 0.17	Scopus
3	Banking Post Covid 19 – From response to revival	Journal of Critical Reviews	Volume 7, Issue 6, July 2020	ISSN 2394-5125 H-Index 23	Scopus
4	Financial Innovation In Indian Banking Systems - A story of four decades	Journal of Gujrat Research Society	Volume 21, ISSUE 8, November 2019	ISSN 0374-8588	UGC Journal
5	Indian Banking Beyond 2020 - Financial Innovation that will change Indian Banking System	Think India Journal	Volume 22, Issue 34 December 2019	ISSN 0971-1260	UGC Journal

List of Conferences

1) National E-Conference on Education and Development : Post COVID-19 organized on 26th September 2020 by School of Education, Lovely Professional University, Punjab.

Paper Presented: Role of Banking Industry and Fintechs in growth of Edutech Startups:
A study during Covid19

2) NATIONAL E-CONFERENCE on Communication during Covid-19 Pandemic:
Prospects & Challenges On October 10, 2020

Paper Presented: Reshaping of Communication Strategy by Banks amid Covid 19 Crisis

2.17) 20. 2.20 Research Gaps (currently 2.9) 21. 2.21 Objective-wise Literature Mapping (currently 2.10)