IMPACT OF FINTECH ON RISK MANAGEMENT FOR COMMERCIAL BANKS IN THE DIGITAL ERA

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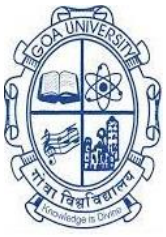

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DECLARATION BY STUDENT

I hereby declare that the data presented in this Dissertation report entitled, "**Impact Of FinTech On Risk Management For Commercial Banks in the Digital Era"** is based on the results of investigations carried out by me in the MBA – Financial Services at the Goa Business School, Goa University under the Supervision/Mentorship of Dr. **Narayan Parab** and the same has not been submitted elsewhere for the award of a degree or diploma by me. Further, I understand that Goa University or its authorities will not be responsible for the correctness of observations / experimental or other findings given the dissertation.

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COMPLETION CERTIFICATE

This is to certify that the dissertation report **"Impact Of FinTech On Risk Management For Commercial Banks in the Digital Era"** is a bonafide work carried out by **Mr.** ANURAAG MERANI under my supervision/mentorship in partial fulfilment of the requirements for the award of the degree of **Masters in Business Administration** in the Discipline Financial Services at the Goa Business School, Goa University.

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Abbreviations

S.No.	Abbreviation	Full Form
1.	CBDC	Central Bank Digital Currency
2.	GDP	Gross Domestic Product
3.	UPI	United Payment Interface
4.	ANN	Artificial Neural Network
5.	SVM	Support Vendor Machines
6.	KPI	Key Performance Indicator
7.	STRBI	Statistical Tables of Reserve Bank of India
8.	CMIE	Centre for Monitoring Indian Economy
9.	CAR	Capital Adequacy Ratio
10.	NIM	Net Interest Margin
11.	ROA	Return On Assets
12.	ROE	Return On Assets
13.	NPA	Non –Performing Assets
14.	RTGS	Real-Time Gross Settlement
15.	NEFT	National Electronic Fund Transfer
16.	M_BANK	Mobile Banking
17.	ADF	Augmented Dickey-Fuller

CHAPTER – 1

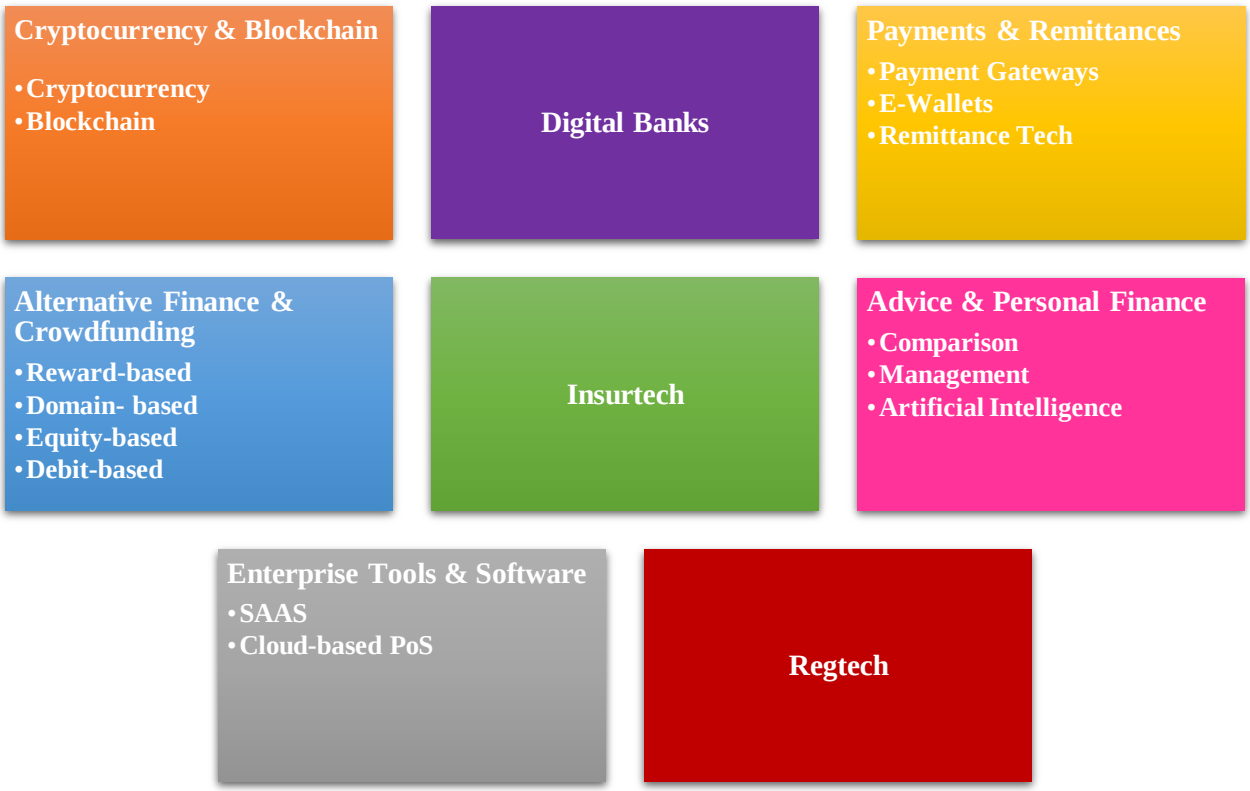
INTRODUCTION, LITERATURE REVIEW, AND THEORETICAL FRAMEWORK

1.1) INTRODUCTION

"Companies that implement software and computer technology to provide financial services are known as fintech companies, from smartphones to crypto payment apps. Fintech generally refers to transactions involving business-to-business (B2B). Most fintech products are designed to convert customer finances to simple software. Financial services and products have constantly evolved across the globe." Therefore, Fintech is viewed as a large and diverse area due to its size and complexity. As part of Fintech, financial changes are described, payment infrastructure is explained, key payment instruments are identified and explained, money flows are understood, and regulatory frameworks are recognized and analyzed to determine whether they hinder or promote innovation**. (Kukreja et al., 2020)**

Artificial intelligence, blockchains, and crypto currencies have all grown in popularity in recent years. Digitalization has created Neobanks, robotic advisors, and countless other mouthpieces throughout the media. Among the most notable technologies are the Internet of Things (IoT), Artificial Intelligence (AI), blockchain, and cloud computing. Customers' communication Innovations change customers' communication with buyers and their money management has disrupted traditional financial investors, but those who have embraced technological advancement are disrupting the industry from the outside. It is for this reason that they are not thriving in traditional markets. According to **Pollari and Raisbeck**, "Fintech is today's biggest disruptor in our financial institutions. In our survey, it was ranked number one by 57% of respondents, ahead of emerging global regulatory complexity (51%) and new business models (46%)". **(Raisbeck, 2017)** Financial services are being transformed by the FinTech industry. The user experience and comfort of a product, as well as savings in cost, are all factors that can greatly benefit a customer. As a result, they are now able to access financial services for the first time in history, and that's just the beginning. **(Kukreja et al., 2020).**

Fintech Domain



While Fintech promotes financial inclusion, creates more jobs, encourages innovation, and makes financial services more accessible, it also opens people, frameworks, and governments to emerging threats that could disrupt the proper functioning of activities and existing policies. Fintech offers more efficient and convenient payment choices, but it also introduces new concerns in terms of competition, privacy, and financial stability. As a result, many people are concerned about privacy issues, system dependability, cybersecurity, and potential vulnerability to cyber-attacks. The financial and monetary authorities are actively

evaluating this digital innovation in terms of impact, benefits, and threats to avoid risks from materializing. They are introducing new regulatory policies to reflect the most recent events in the financial service industry. Several financial institutions are concurrently examining various variations of central bank digital currency (CBDC). **(Vučinić & Luburić, 2022)**

Fintech has aided the banking system to develop, yet it has also modified conventional financial market structures and bridged the gap between financial and other businesses, generating new financial risks. (Chen et al., 2022) Commercial banks are all being disrupted by fintech, which is reshaping just how they continue to do business. The commercial banking sector is accelerating its digital transformation and raising the bar for a bank FinTech innovation to more effectively respond to FinTech innovation trends. Previous research has shown that several factors, "including bank size" **(Khan et al., 2017),** "ownership structure" **(Berger and Bouwman, 2013),** "bank concentration" **(Efthyvoulou and Yildirim, 2014),** "level of competition in the banking industry" **(Wagner, 2010),** "capital adequacy ratios" **(Chen et al., 2019a),** and "GDP growth rate" **(Lozano-Vivas et al (Pasiouras, 2008),** have a significant impact on a bank's risk appetite. **(C. Li et al., 2022)**

Commercial banks can enhance risk management's effectiveness, accuracy, quickness, and resilience by relying on financial technology to identify and assess risks. **(G. Li et al., 2022)**. By adopting FinTech innovation, commercial banks can improve service options, meet diverse customer needs, expand growth opportunities, and improve profitability **(Gomber et al., 2017).** As far as risk control is concerned, FinTech innovations can be used to reduce labour, capital, and time costs by using advanced technologies, such as biometrics and voice recognition, to improve data accuracy, reducing both the internal fraud risk and the systemic fraud risk **(Furster et al., 2019).**

Research in this field focuses on commercial banks' performance and operational efficiency, and most of the research evaluates the financial activities of fintech companies. For this study, we aim to examine the effect of fintech advancements on India's systemically important commercial banks and their sustainable development to gain a deeper understanding of the financial risks related to fintech.

1.2) LITERATURE REVIEW

Several studies have shown that qualitative analysis is a useful tool for examining the relationship between FinTechs and traditional financial institutions. According to **Romānova and Kudinska (2016**), an analysis of the recent development trends in banking and FinTech will identify the risks banks face due to FinTech's emergence. **Lee and Shin (2018)** stated that it is essential to examine the advantages of FinTech in providing financial services as well as the challenges faced by traditional financial institutions. The **Financial Stability Board (2017)** hinted at certain pieces of evidence that FinTech activities may intensify risk contagion and asset volatility in the financial system, which may be detrimental to financial stability. A number of these studies acknowledge the potential risks posed by FinTech institutions to traditional financial institutions and even to the financial system as a whole. However, their views are not supported by empirical evidence from existing studies, commercial banks can benefit from the technology spill over effect by leveraging FinTech innovations. A key component of this is the optimization of operating performance and the improvement of risk control capabilities. **Gomber et al., (2017)** stated that FinTech innovation can empower commercial banks to improve profitability by augmenting product offerings, meeting diverse customer needs, and expanding their growing space. For instance, FinTech innovation can reduce labour costs, capital costs, and time costs by utilizing advanced technologies, such as biometrics and voice recognition, reducing fraud risk as well as systemic risk. **(Li et al., 2022).**

Julien Migozzi et al., Geoforum, mentioned that India is a success story in the fintech industry and is often portrayed as a global pioneer of innovation in finance **(IMF, 2022),** the result of which is "relevant to all economies, regardless of their stage of development". It is considered "relevant and applicable" **(BIS, 2019).** To increase its share of digital payments and face resistance from the mainstream US banking sector, Google showcased India's Unified Payment Interface (UPI). A model from the perspective of digital infrastructure and policymaking **(Isakowitz, 2019).** New Delhi (13th) and Bangalore (20th) are ahead of Mumbai (23rd) in **Findexable (2021)** latest World City Rankings. Chinese and US cities dominated the 2018 Global Fintech Hubs report, with Bangalore (25th) featured prominently and slightly ahead of Mumbai (26th) (CCAF, 2018). These upward moves seem to confirm that "tomorrow's fintech geography opens new windows of location opportunities for emerging financial centres" **(Hendrikse et al., 2020, p. 1517).**

Wang et al., (2021) "Intelligent decision-making, marketing, risk management, operations, and customer service enabled by fintech will streamline lending processes and customer scoring models for financial institutions" **(Aylin and Ahmet, 2020),** enabling faster loans and it reduces the overall cost of corporate financing and easing the financial burden. The efficiency of improving financial services **(Lucey and Roubaud, 2020).** The impact and challenges of fintech on commercial banks are largely reflected in the impact of online payments (including third-party and mobile payments) and intermediary services such as payments **(Chamley et al., 2012).** At the same time, the traditional lending and deposit operations of commercial banks have been challenged by the trend toward financial disintermediation. Fintech has therefore directly impacted both the customer base and market competition of commercial banks **(Dhar, 2016).**

Chengming Li (2022) stated that fintech innovation impacts development from a two – dimensional perspective: external FinTech innovation and Bank FinTech innovation. External FinTech innovation refers to non-banking FinTech, including FinTech companies, which can influence the development of commercial banks through competitive effects and technical advancements **(Cheng and Qu, 2020).** The exponential growth of fintech is having a profound impact on traditional financial companies. The process of aligning finance and technology has transformed traditional banking business concepts, loan modification, income transformation, and risk alteration **(Buchak et al., 2018)** but also the risk profile of the financial system itself. **(Zetsche et al., 2017). "**Based on the active analysis and the realities of the Fintech development, fintech can represent traditional financial risks such as credit risk, liquidity risk, and operational risk" **(Bartlett et al., (2022)) (Omarova (2019))**.

The rise of fintech is having a major impact on the traditional business of commercial banks **(Petralia et al., 2019).** In key areas such as mortgage lending, commercial banks are subject to various regulations and lose market share to shadow banks and fintech lenders who enjoy technological advantages **(Buchak et al., 2018).** Fintech lenders serve borrowers with better credit than shadow banks but charge higher interest rates (14-16 basis points). This supports the idea that consumers are willing to pay more for a better experience for their users and faster lending decisions.

Fintech and banking risks are becoming more prevalent, but existing research still leaves room for expansion **(Petter and Dean 2009; Shen and Pin 2015**). First, existing research focuses more on the impact of online financial development than on the impact of financial technology.

The development of FinTech is mainly divided into the Fintech-IT phase (Fintech version 1.0), the Internet finance phase (Fintech version 2.0), and the Fintech phase (Fintech version 3.0). Internet finance is version 2.0 of Fintech (1990-2010), which mainly utilizes Internet technology in the field of financial services, and is a "scale-driven financial model." In Fintech version 3.0 (2011-present), the Internet is no longer the main driving force behind the development of financial technology, and various cutting-edge digital technologies (new information technology represented by big data, cloud computing, artificial intelligence, blockchain) to realize financial functions.

Second, the sample of banks surveyed includes almost specific kinds of scheduled commercial banks. The two domains are public-sector banks and private-sector banks. As already mentioned, given the impact of new technology, the risk behaviour of each sector bank is very different.

Third, existing research shows that the development of fintech influences banks' risk-taking channels and mechanisms **(Pi and Zhao 2014; Xie and Zou 2012**). These channels include deposit structure and interest payment costs. Administrative and capital costs, risk management, operational efficiency, profitability, and contagion risk. We believe these channels can be further explored and analyzed.

Onay and Ozsoz (2013) found that customer deposit and lending behaviour in commercial banks increased significantly after the launch of the new online banking business, and the commercial bank deposit and lending business continues to grow. This increase was reflected in the fact that commercial banks' total assets expanded, their return on assets improved, and their non-performing loan ratios declined. Earlier research focused on financial risk warnings that use different types of regression techniques. For example, the mainstream models are the stochastic regression functions (Probit and Logit) proposed by **Frankel and Rose (1996)** proposed by **Sachs et al. (1996)**, the signal analysis method (KLR) proposed by **Kaminsky and Zhang (1997)**, and the artificial neural network (ANN) model established by **Mitra and Balaji (2010).** With the rapid development of computer technology, support vector machines (SVM) have become a new and effective risk-warning method in the field of artificial intelligence.

1.3) THEORETICAL FRAMEWORK

According to Cheng and Qu (2020), Fintech innovation was used to examine the risk appetite of banks, while other researchers usually measure the impact of Fintech on the banking industry externally. Fintech innovation assists banks in improving and increasing the no. of information sources and channels and also reduces conflicts between banks and SMEs **(Sanchez, 2018).** On one hand, banks increase investment during the mid-loan process of credit evaluation, to improve digital inclusion, reduce physical proximity to customers, and help uninformed customers in creating an accurate risk profile **(Hauswald and Marquez, 2006).** While banks based on automated credit scoring and credit decision systems can assess KPIs (Key Performing Indicators), compare them to the risk appetite for predicting risks, and set credit limits accordingly.

During the post-loan management process, Fintech innovations can facilitate information sharing amongst lenders, restricting borrower behaviour, and improve lenders' ability to manage risk information **(Livshifts et. Al, 2016),** thereby reducing the loans. Meanwhile, big data can help banks timely identify irregularities in the use of funds and other potential risks of default, and use appropriate machine learning to handle risks and estimate the required solution for the specific category.

From the perspective of internal control, fintech innovation uses advanced technologies, which include biometrics, voice recognition, and intelligent robo-advisors to reduce human, financial, and time costs, leading to reduced bank fraud and low systematic risk **(Fuster et al., 2019). Dynan et al., (2006)** stated that**,** bank lending systems have evolved into big data systems to reduce transaction risk and weaken consents for commercial banks to take risks. Big data can also enhance the bank's pre, on-lending, and post-lending underwriting capabilities, reducing its risk appetite.

Banks can process transactions for small and medium businesses, to solve the inherent cost of acquiring encrypted customer information at high costs, and enhance customer experience by diversifying customers' needs, thereby improving profitability **(Stulz, 2019). Gomber et al., (2019)** stated that**,** commercial banks can expand their development areas, by adopting better and more proficient technological concepts that will offer more services as well.

Today, commercial banks are making use of big data and cloud computing technology to quickly query customer information and significantly reduce the cost involved in a bank's credit evaluation process. Fintech innovations can also help banks mitigate emerging information failures, improve interaction within the financial sector **(Law et al., 2018),** and reduce administrative expenditure **(Liberti, 2018, Grennan and Michaely, 2021).** In the past, for developing more financial services for their customers, commercial banks would have had to focus on expanding their business, making additional branches, and spending more on leasing, staffing, and equipment. Therefore, the impact of fintech can enable the banks to provide better financial services within 24 hours, eliminating time and distance barriers, and thereby reducing operational costs significantly

Fintech makes financial services more convenient and efficient for customers with diverse needs. It helps banks make use of digital technology, gaining 'digital' benefits in return, especially in terms of deposits and loan diversification, with effective technology integration **(Lee et al., 2021).** From a precautionary standpoint, fintech, especially big data and technological surveillance will improve commercial banks' risk management models and also develop better risk-taking, thereby mitigating identified risks.

1.4) RESEARCH METHODOLOGY

1.4.1) Data:

The data for the commercial banks used in this research were mainly obtained from the "CMIE – Economic Outlook", INDIASTAT, and the RBI Bulletin database. The types of fintech transactions were first analyzed over a period of years. After analysis, variables having information before 10 years were selected. Therefore, for the years, 2013-2022, the main public sector and private sector banks were considered, making 33 banks in total in the final sample.

1.4.2) Variables:

On the database of RBI, a list of indicators was available in the "Money and banking" sector. By analyzing various indicators under the domains of Payments and Settlements, financial performance, profitability, etc., the independent and dependent variables were determined. The independent variables are mainly taken from a part of the DPI (digital payment index), which

has a part in Online payments mainly. The dependent variables are chosen to determine to check the stability and the applicability of the banks, with the use of independent variables.

1.4.3) Computed Variable:

The purpose of this research is to measure the impact of fintech-based payment systems on the overall risk management of commercial banks. For conducting the research, the public sector banks and the private sector banks, which comprises of a total of 33 banks in India, was used for this study. The Z-Score was calculated as a measurement in the study. The formula is given below:

Z = (ROA + (Equity to Assets Ratio))/ σ(ROA) (Li et al., 2022)

In the above formula, ROA relates to the Return on Assets, the Owner's Equity Ratio, and the standard deviation of Return on Assets. Z-score measures a bank's overall stability. Changes in Z-score are routine with changes in bank durability. A higher Z-score indicates a more stable bank. A conversion in stability strength has an inverse effect, after an increase or decrease in risk. Z-scores have an inherent property of trailing after peaks, so it is necessary to obtain the logarithm of the Z-score during regression analysis. The default Z-Score has been in this paper, which is similar to relevant studies. Risk-taking has been labelled as the opposite of bank stability. A higher level of risk-taking indicates less bank stability, and vice versa **(Banna et al., 2021).**

1.4.4) Control Variables:

Capital Adequacy Ratio (CAR):

The capital adequacy ratio (CAR) is the appraisal of a bank's capacity to diminish losses and meet its monetary obligations. The higher this ratio, the better the bank can withstand financial stress. CAR usually consists of two components i.e., Tier 1 capital and Tier 2 capital. Tier 1 capital consists of common stock and retained earnings and is, therefore, considered the highest quality capital, while Tier 2 consists of subordinated debt and other instruments.

Recent empirical research uses capital adequacy ratios to measure bank resilience **(Wang et al., 2021).** The use of the Capital Adequacy Ratio (CAR) is to reflect a bank's recapitalization capacity **(Deng et al., 2021)**.

1.4.5) Variables representing Bank Characteristics:

The research uses the Owner's equity ratio, which is derived by dividing equity capital by the total assets of the bank. The higher the ratio, the lower the bank's debt, the higher its ability to repay, and the more stable its capital structure. Two micro variables have also been used in the research. Return on Assets (ROA) which can measure the level of leverage/debt, and Return on Equity (ROE).

Non – performing assets have also been used in the research. NPAs play the opposite role in measuring the profitability of a bank. With an increase in the value of NPA, leads to fall in the profitability of banks, leading to higher risks. Net Interest Margins (NIM) are also used. It is a measure of a bank's profitability and growth. It shows how much you are earning on interest on your loans compared to the interest your bank pays on your deposits.

To analyze the level of fintech payments, three explained variables have been used:

1. **Real-Time Gross Settlement (RTGS)**

Real-time gross settlement is the system of actual-time settlement of cross-bank payments across the central bank's books for each sequence. This system is different from the normal debit/credit balances. Real-time gross settlement is often used to move copious amounts of money between banks. RTGS reduces overall settlement (delivery) risk as interbank systems normally run in actual-time throughout the day rather than at the end of the day. RTGS processing mitigates credit risk by continuously allocating cash between banks for each transaction in actual-time. All payments are ultimately processed in Reserve bank money, so cross-bank money must be settled net in bulk.

2. **Mobile Banking**

The banking industry has never seen such a fundamental switch to mobile banking. There are millions of consumers worldwide already using various mobile devices for banking. Millions more are expected to go mobile in the future to come. But even with its growth comes many new threats like Mobile Malware, Third-Party apps, Unsecured Wi-Fi networks, and risky consumer behaviour **(Kiran et al., 2014).**

3. **National Electronic Fund Transfer:**

NEFT is a payment system, which enables the transfer of funds in an online mode, from one bank to another. With growing interest in online banking, NEFT has become one of the most popular money transfer methods. You can electronically transfer money from any bank account to another, so commuting to a bank branch is less required.

Table 1: Selecting Sample

Type of Banks	Quantity	Banks
Public Sector Banks	12	Bank of Baroda, Bank of India, Bank of Maharashtra, Canara Bank, Central Bank of India, Indian Bank, Indian Overseas Bank, Punjab & Sind Bank, Punjab National Bank, State Bank of India, UCO Bank, Union Bank of India
Private Sector Banks	21	Axis Bank, Bandhan Bank Ltd., Catholic Syrian Bank Private Ltd., City Union Bank Ltd., DCB Bank Ltd., Dhanalakshmi Bank Ltd., Federal Bank, HDFC Bank Ltd., ICICI Bank Ltd., IDBI Bank Ltd., IDFC First Bank Ltd., IndusInd Bank Ltd., Jammu & Kashmir Bank Ltd., Karnataka Bank Ltd., Karur Vysya Bank Ltd., Kotak Mahindra Bank Ltd., Ratnakar Bank Ltd., Tamilnad Mercantile Bank Ltd., South Indian Bank Ltd., Yes Bank Ltd., Nainital Bank Ltd.

Source: CMIE – Economic Outlook, IndiaStat, Reserve Bank of India (Statistics)

"India's Economic Growth rate (GDP)" was also selected as an unconventional variable in this research, as GDP has an unmediated impact on the business and performance of commercial banks. However, there is an opposite relationship between national economic growth and risk management by commercial banks **(Li et al., 2022).** Supplementary variables that also affect the performance of commercial banks are "inflation, government monetary policy, etc."

The above research covers a period of the past 10 years. The data gathered is based on annual frequency. CAR (Capital Adequacy Ratio) is taken as one of the control variables, as this ratio

measures the bank's soundness to operate in a situation of financial stress. The higher this ratio, the better the bank can withstand financial stress. Other variables like ROA (Return on Assets), ROE (Return on Equity), NIM (Net Interest Margin), and NPA (Non – Performing Assets) were also used. The data for the variables was gathered from STRBI, IndiaStat, and CMIE – Economic Outlook databases.

For the independent variables, traditional fintech based payment modes were used. RTGS, NEFT, and mobile banking, which are all are major system adopted by not only customers, but also banks as well, have been selected, to measure their impact on the different variables mentioned above. The data for the independent variables, has also been collected from IndiaStat, and CMIE – Economic Outlook.

The tests that were utilised in this study are as follows. Firstly, a trend analysis was done on all the variables, from dependent to independent variables, to ascertain the overall outlook in the present time. This was followed by gathering the summary statistics, where the mean and standard deviations of each variable was collected. Next, to verify the stationarity of data, the Augmented Dickey-Fuller (ADF) "Test" was conducted. The Correlation analysis was done between a single dependent and all 3 independent variables, to study the relationship between the variables. Lastly, regression analysis was performed, to measure the impact of the independent variables on the dependent variable. Estimation is required for getting values of the dependent variables with the help of the observations of the independent variables. A serial correlation test has also been done prior to regression analysis, to avoid any impact caused by two independent variables on each other. All the data gathered, was converted into logarithmic form, and the above analsysis were conducted.

1.5) OBJECTIVES OF THE STUDY:

The below objectives have been framed for this research, in contrast to various research papers, which have been mentioned earlier studies, as well.

- ✓ To measure how Fintech innovations strengthen banks' financial stability in a situation of crisis, in India.
- ✓ To ascertain the impact and the level of functioning, which Fintech aids in order to help banks improve their operating efficiency.
- ✓ To measure how much of a positive impact does fintech innovation have over the scheduled commercial banks in India.
- ✓ To study the overall impact of fintech innovations on the risk-taking, by observing various bank characteristics, that are key indicators of the banks.

1.6) HYPOTHESES DEVELOPMENT:

1.6.1) Augmented Dickey – Fuller Test:

H_1A – CAR has a unit root.

H_1B – M_BANK has a unit root.

H_1C – NEFT has a unit root.

H_1D – NIM has a unit root.

H_1E – NPA has a unit root.

H_1F – ROA has a unit root.

H_1G – ROE has a unit root.

H_1H – RTGS has a unit root.

1.6.2) Correlation Analysis:

H_2A – CAR has no significant relationship with M_BANK, NEFT, and RTGS.

H_2B – NIM has no significant relationship with M_BANK, NEFT, and RTGS.

H_2C – NPA has no significant relationship with M_BANK, NEFT, and RTGS.

H_2D – ROA has no significant relationship with M_BANK, NEFT, and RTGS.

H_2E – ROE has no significant relationship with M_BANK, NEFT, and RTGS.

1.6.3) Regression Analysis:

H_3A – RTGS, M_BANK and NEFT have no significant impact on CAR.

H_3B – RTGS, M_BANK and NEFT have no significant impact on NIM.

H_3C – RTGS, M_BANK and NEFT have no significant impact on NPA.

H_3D – RTGS, M_BANK and NEFT have no significant impact on ROA.

H_3E – RTGS, M_BANK and NEFT have no significant impact on ROE.

1.6.4) Serial Correlation Test:

H_4A – Equation for CAR has an error of serial correlation.

H_4B – Equation for NIM has an error of serial correlation.

H_4C – Equation for NPA has an error of serial correlation.

H_4D – Equation for ROA has an error of serial correlation.

H_4E – Equation for ROE has an error of serial correlation.

1.7) LIMITATIONS TO THE STUDY:

1. First, due to inadequacy of data, barely a sample of 33 listed banks was used to perform the research. Therefore, there is also a need for further analysis on the influence of banking fintech innovations on the risk –taking of "small and medium-sized banks".
2. Due to lack of availability of sufficient data, as mentioned in the first limitation, the Fintech Index was not computed, which led to less variables in the research study.

3. For the computed variable i.e., Z-Score, the regression and correlation analysis couldn't be performed, as the relevant data regarding ROA for public sectors were in negative figures, therefore, the standard deviation could not be ascertained, leading to less observations, in order to carry out the regression analysis.
4. The description of banks' risk appetite in this paper is proportionately limited, and the distinct impact of bank Fintech innovations on discrete types of risk is not analyzed independently.
5. Fourth, only the impact of banks' Fintech innovations on their risk appetite was explored, as it does not cover the impact on any other aspects of banking

Given the limitations of these studies, subsequent studies may further expand their sample size and scale to cover up a sample of as many banks as possible, by also making use of a multi-dimensional Fintech Innovation Index to improve the potential in deriving better conclusions and effectively decomposing the numerous bank risk variables.

1.8) PRESENTATION OF THE REPORT:

Chapter 1 consists of Introduction, Literature Review, Theoretical Framework, and Research Methodology, Objectives of the study, Hypotheses Development, and Limitations of the Study.

Chapter 2 describes the Data Sample, and the Variables in detail. This is followed by Trend Analysis of both Sectors, Summary Statistics, Correlation Analysis, Regression Analysis, and Serial Correlation Tests of the variables and independent variables.

Chapter 3 finishes off with the findings of the study, conclusions drawn along with necessary recommendations.

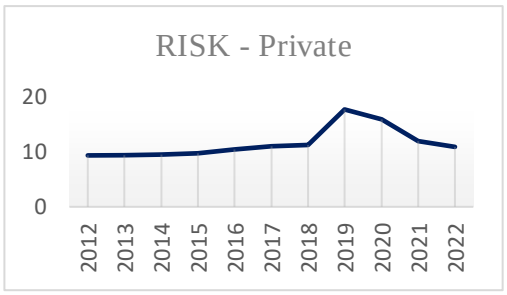
CHAPTER – 2

DATA ANALYSIS, FRAMEWORK & DISCUSSION

2.1) TREND ANALYSIS – GRAPHICAL REPRESENTATION:

Fig. 1 – RISK (Public)

Fig. 2 – RISK (Private)



Source: Author's Compilation

By analyzing the Z-Score over the past 10 years, the private sector banks reached a high score of 17.60 in 2019 and have now declined to 10.79 in 2022. This indicates that several Private Banks are having a higher probability of becoming bankrupt. This indicates that investing in private sector banks is slightly riskier at the moment, though still very good to buy a stake in them. When it comes to public sector banks, the average score was estimated at 3.80 (as the Z score was not available for the years 2016-2020). It can be said that investors can consider it safe to buy stocks of these financial institutions, but they are subject to very high risks, as they have a higher chance of becoming insolvent.

Fig. 3 – CAR (Public)

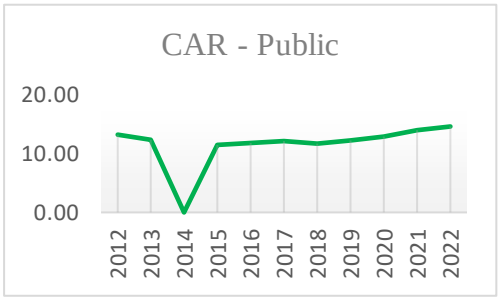
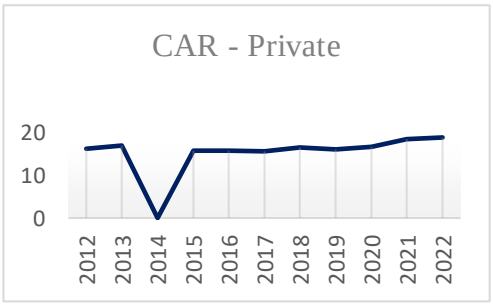


Fig. 4 – CAR (Private)



Source: Author's Compilation

The Capital adequacy ratio of banks is provided for both public and the private sector over the period of the past 10 years. Both the graphs indicate an upward trend in the capital to risk-weighted assets value, which is a good indication, however public sector banks are having an average CAR of 11.31%, which falls short of the maintenance level at of 12%, as specified by the RBI. Therefore, most of the public sector banks are not operating at full capacity, to meet the financial obligations of the company, in the wake of a crisis. On the other hand, the private sector banks are at 15% operating capacity, which is well above the minimum required level as per RBI, stated at 9%, therefore, they are claimed to be able to meet their financial obligations, even after winding up.

Fig. 5 – ROA (Public)

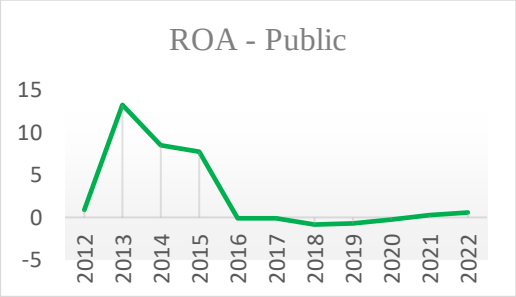
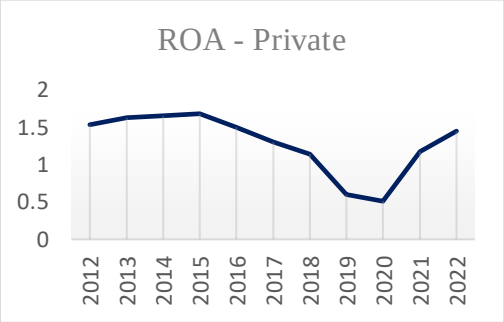


Fig. 6 – ROA (Private)



Source: Author's Compilation

An analysis of the Return on Assets shows that the Return on Assets in the public sector is much more attractive than in Private Banks. Public sector banks have been on a downward trend since 2016 and have become very asset inclusive since then. Private banking has been on the upswing slightly but has remained an asset-heavy business over the past decade.

Fig. 7 – ROE (Public)

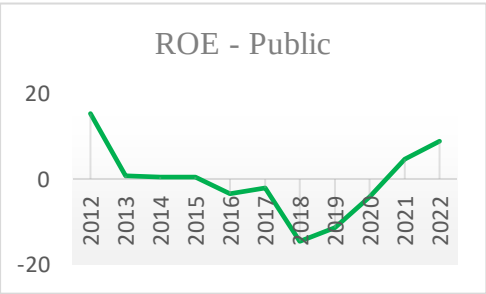
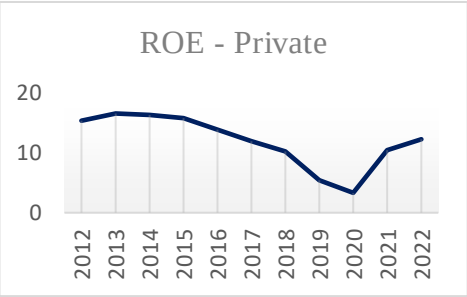


Fig. 8 – ROE (Private)



Source: Author's Compilation

Presently, the ROE of the public and private sectors are valued at 8.83% and 12.2% respectively. This shows that private sector banks are better at generating higher earnings with the same amount of resources. The ROE of private sector banks has been showing an upward trend, after falling in 2020. The public sector banks we negative during 2015-2020. This may have happened as the liabilities had exceeded the assets, indicating that the investors shall buy or sell shares while maintaining extreme caution.

Fig. 9 – NPAs (Public)

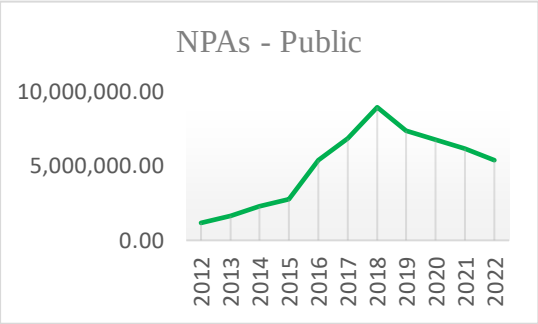
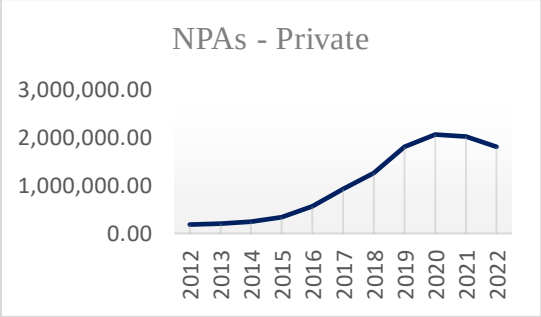


Fig. 10 – NPAs (Private)



Source: Author's Compilation

The NPAs of both the banking sectors have shown to have a downward trend, which is a good indication, as the RBI has created measures for the management of NPAs, like various settlement schemes, improved corporate debt & asset restructuring, etc. However, the NPAs of public sector banks are very high in comparison to that of private sector banks. Therefore, they shall find effective methods of reducing these NPAs, to gain public confidence and reduction in costs of capital.

Fig. 11 – NIM (Public)

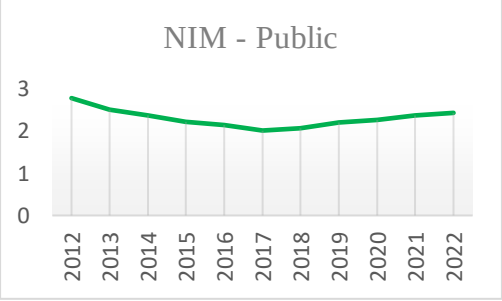
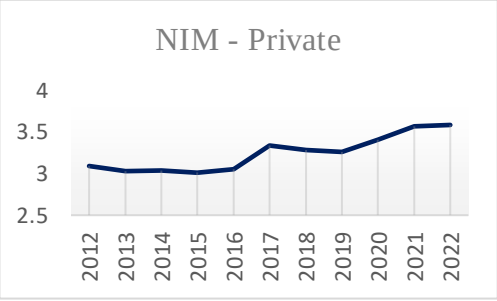


Fig. 12 – NIM (Private)



Source: Author's Compilation

The Net Interest Margin for public sector banks shows a rising trend over the last 5 years. Though it is very minimal, there is a good reason to believe that these banks will improve their operations and technology, by offering much better services, in addition to UPI, IMPS, etc. Private Sector banks, on the other hand, are having a much better NIM ratio in comparison to the public sector. This is mainly because banks like HDFC, ICICI, Axis Bank, etc., offer services to their customers with greater ease, building a good public confidence level.

Fig. 13 – RTGS (Public)

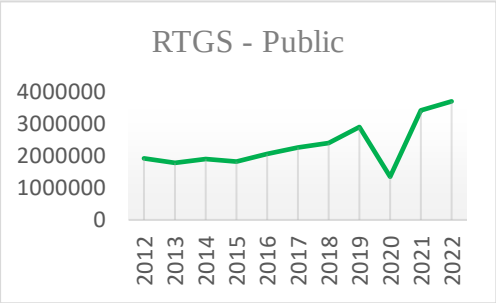
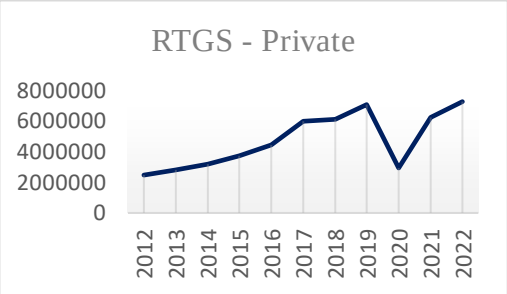


Fig. 14 – RTGS (Private)



Source: Author's Compilation

By comparing the graphs, it can be said that due to increased bank innovations over the years, many scheduled commercial banks in India have enabled mechanisms like liquidity reserve functions, which form a collateral management system allowing participants to use eligible assets as collateral for intraday credit, and a hybrid system that combines RTGS and net settlement functioning. Now, RTGS can also enable real-time settlement of cross-border payments. Therefore, this explains the rising trends in the RTGS transactions over the years, for both public and private sector banks.

Fig. 15 – M_BANK (Public)

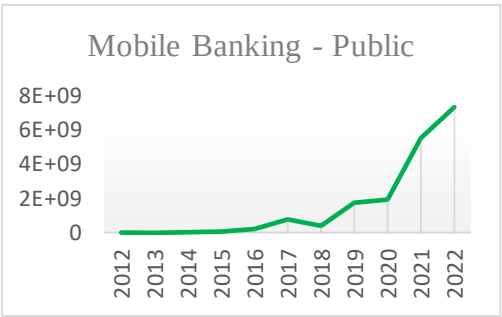
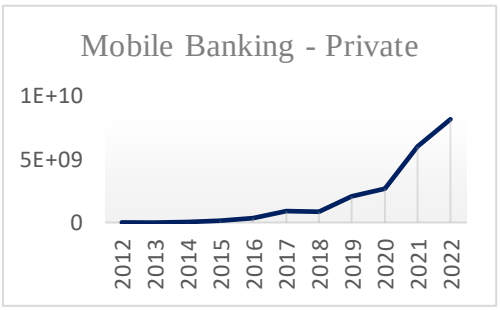


Fig. 16 – M_BANK (Private)



Source: Author's Compilation

Since the COVID-19 pandemic in 2020, the majority of people decided to avoid visiting banks as often, which is when the "Online" approach had begun. Online modes of payments are taking the shape of a new reality, as they are now more customer-centric in nature. Nowadays, mobile banking has been made accessible to everyone, and not only just for banking. With mobile banking, new trends like blockchain, voice banking, etc. have all taken shape, to provide customers with a much better ease of making payments, without any hindrances. Since 2020, there is a rising trend in the implementation of mobile banking in India, in many scheduled commercial banks.

Fig. 17 – NEFT (Public)

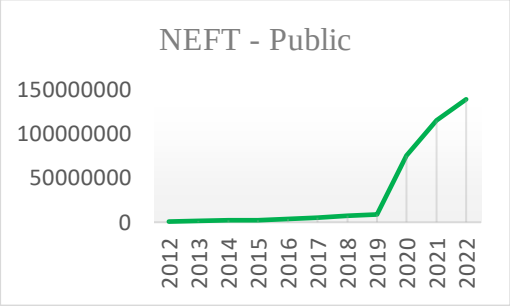
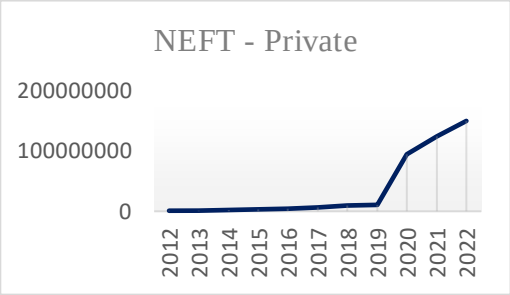


Fig. 18 – NEFT (Private)



Source: Author's Compilation

The above graphs show that there has been a huge increase in the volume and no. of transactions in NEFT, starting from the year 2020. This is due to the reason that people had started to use methods, which involved making payments "virtually". Therefore, NEFT became among the major modes of settling funds.

2.2) ANALYTICAL FRAMEWORK (PUBLIC SECTOR BANKS & PRIVATE SECTOR BANKS):

2.2.1) Summary Statistics:

Table 2: Statistics of Variables

	Public Sector Banks			Private Sector Banks		
	Mean	**Standard Deviation**	**Obs**	**Mean**	**Standard Deviation**	**Obs**
CAR	11.36	4.1059	10	15.00	5.3875	10
M_BANK	1790263046	2559923094.8618	10	2112927898	2806315735.8818	10
NEFT	36004657.6	53191484.0920	10	40506426.8	58395392.8625	10
NIM	2.24129967	0.1586	10	3.254984	0.2198	10
NPAS	5365953.04	2402095.5430	10	1122049.2	762531.7774	10
ROA	2.84	5.0397	10	1.26	0.4192	10
ROE	-2.04	6.9630	10	11.55	4.4538	10
RTGS	2353569.28	757748.2873	10	4983559.24	1758504.3915	10

Source: Eviews8 (Computation)

The above is the summary statistics provided for the data. By analyzing the variables of public sector banks, we observe that for a period of 10 years (2013-2022), the mean, and standard deviation have been provided. The data is asymmetrical. Variables like M_BANK, NEFT, NPA, and RTGS are have high standard deviations, indicating heavy movement. While CAR, NIM, ROA, and ROE are having a low standard deviation. The CAR will change with alteration in the mean, indicating less dispersion. For the private sector banks, the data is asymmetrical as well. The variables that show high standard deviations are M_BANK, NEFT, NPAS, and RTGS. The remaining i.e., CAR, ROA, ROE, and RTGS have low standard deviation values and mean, indicating less dispersion.

By the descriptive statistics, it can be analyzed that, fintech can significantly improve the stability of commercial banks and reducing bank risks. For different dimensions, commercial banks are enjoying the positive effects created out of the payment systems and investment management particularly, with a little more impact through business development in the process. The application of fintech in the payment and investment sector is enough to improve the overall stability of commercial banks, and also in reducing the risk appetite of banks.

2.2.2) AUGMENTED DICKEY-FULLER TEST FOR STATIONARITY:

In statistics, the Dickey-Fuller test (ADF) tests the null hypothesis (H_0) that a time series sample has a root of 1. The alternative hypothesis (H_1) usually depicts stationarity or trend stationarity. The ADF test is an extension of the Dickey-Fuller test, for more complex time series models.

The statistic used in the Dickey-Fuller test is a negative number. The more negative the statistic, the higher will be the probability of the hypothesis getting rejected, for a unit root at a particular confidence level.

Table no. 3: ADF Test of the variables

	Public Sector Banks		Private Sector Banks	
Variable	**t-stat**	**Probability**	**t-stat**	**Probability**
CAR	-3.048121	0.0109	-3.3309	0.0073
M_BANK	-5.832084	0.0001	-2.4523	0.0218
NEFT	-2.020789	0.047	-2.0982	0.0407
NIM	-2.093145	0.0411	-2.5376	0.0179
NPAS	-4.675277	0.0005	-1.7438	0.0776
ROA	-2.794584	0.0223	-2.9436	0.009
ROE	-3.152661	0.0093	-2.5453	0.0184
RTGS	-3.540446	0.0033	-4.1023	0.0011

Source: Eviews8 (Computation)

The results of the "Augmented Dickey-Fuller" test indicate that all the P-values (except NPAS of Private sector banks) are below 0.05. Therefore, we reject the null hypothesis, and the regression analysis can be conducted on the variables.

2.2.3) Correlation Analysis:

1. Capital Adequacy Ratio (CAR):

Table 4: Correlation Analysis (CAR)

Public Sector Banks		**Private Sector Banks**	
Probability	**CAR**	**Probability**	**CAR**

CAR	1	**CAR**	1
	-----		-----
M_BANK	0.897355	**M_BANK**	0.262616
	0.0153		0.6151
NEFT	0.009442	**NEFT**	0.38743
	0.9858		0.4479
RTGS	0.237725	**RTGS**	0.072143
	0.6501		0.892

Source: Eviews8 (Computation)

By analyzing correlation amongst among the variables, it is observed that, for the public sector banks, the capital adequacy ratio has a significant relationship with M_BANK, NEFT, and RTGS. M_BANK has a low positive impact on the CAR, as it has a p-value of 0.0153, depicting that the correlation isn't very high. NEFT and RTGS have a high positive relationship on the change in CAR, at 0.9858 and 0.6501 respectively, at 5% level of significance. On the other hand, the correlation analysis on the private sector banks denote, that M-BANK, NEFT, and RTGS have a positive relationship with CAR. NEFT has a medium positive impact on the change in CAR, with a p-value of 0.4479, while M_BANK and RTGS have high positive impact, with p-values 0.6151 and 0.892 respectively, at 5% level of significance.

2. Net Interest Margin (NIM):

Table 5: Correlation Analysis (NIM)

Public Sector Banks		**Private Sector Banks**	
Probability	**NIM**	**Probability**	**NIM**
NIM	1	**NIM**	1
	-----		-----
M_BANK	0.038269	**M_BANK**	0.18025
	0.9221		0.6183
NEFT	0.164543	**NEFT**	0.393699

	0.6723		0.2603
RTGS	0.199089	**RTGS**	0.053477
	0.6076		0.8834

Source: Eviews8 (Computation)

The correlation analysis shows that the dependent variable i.e., NIM, has a positive relationship with the independent variables M_BANK, NEFT, RTGS, in the public sector banks. NEFT and RTGS tend to have a somewhat high impact on NIM, as they have p-values of 0.6723 and 0.6076 respectively. M_BANK has a high positive impact on NIM, as it has a p-value of 0.9221, at 5% level of significance.
For the private sector banks, M_BANK, NEFT and RTGS have a significant positive relationship with NIM. NEFT has a low positive impact on NIM, with a p-value of 0.2603. M_BANK has a medium positive impact, p-value of 0.6183, while RTGS has a high positive impact on NIM, at 5% level of significance.

3. Non-Performing Assets (NPAs):

Table 6: Correlation Analysis (NPAs)

Public Sector Banks		**Private Sector Banks**	
Probability	**NPAS**	**Probability**	**NPAS**
NPAS	1	**NPAS**	1
	-----		-----
M_BANK	-0.490999	**M_BANK**	-0.816173
	0.1795		0.0073
NEFT	-0.294275	**NEFT**	-0.491065
	0.4421		0.1795
RTGS	-0.123519	**RTGS**	-0.332005
	0.7515		0.3827

Source: Eviews8 (Computation)

Correlation Analysis for the public sector banks indicates that NPAs have a negative relationship with M_BANK, NEFT, and RTGS. M_BANK has a low negative impact on the change in NPAs, as it has a p-value of 0.1795. NEFT has a p-value of 0.4421, indicating moderate impact, and RTGS has a highly negative impact on NPAs, with a p-value of 0.7515, at 5% level of significance.

For the private sector banks, NPAs are seen to have negative relationship with the independent variables M_BANK, NEFT, RTGS. M_BANK, and NEFT have a significantly low negative impact on the change in NPAs, with a p-value of 0.0073 and 0.1795 respectively. RTGS has a somewhat moderately negative impact on NPAs, as it has a p-value of 0.3827, at 5% level of significance.

4. Return on Assets (ROA):

Table 7: Correlation Analysis (ROA)

Public Sector Banks		**Private Sector Banks**	
Probability	**ROA**	**Probability**	**ROA**
ROA	1	**ROA**	1
	-----		-----
M_BANK	-0.383768	**M_BANK**	0.053546
	0.3954		0.8832
NEFT	-0.534446	**NEFT**	-0.137928
	0.2165		0.704
RTGS	0.540831	**RTGS**	0.49477
	0.21		0.146

Source: Eviews8 (Computation)

For the public sector banks, correlation analysis shows that the dependent variable ROA, has a significantly positive relationship with the independent variables, M_BANK, NEFT, and RTGS. While M_BANK has a somewhat moderate impact on ROA of the banks (p-value = 0.3954), NEFT and RTGS have significantly low positive impact on ROA, with p-values

0.2165 and 0.21 respectively, at 5% level of significance. Correlation analysis for private sector banks have almost similar indications to that of public sector banks, i.e., ROA has a significantly positive relationship, with the independent variables M_BANK, NEFT, RTGS. M_BANK and NEFT have a high positive impact on the dependent variable ROA, with a p-values 0.8832 and 0.704 respectively, while RTGS has a low positive impact on the ROA of the banks, at 5% level of significance.

5. Return on Equity (ROE):

Table 8: Correlation Analysis (ROE)

Public Sector Banks		**Private Sector Banks**	
Probability	**ROE**	**Probability**	**ROE**
ROE	1	**ROE**	1
	-----		-----
M_BANK	-0.373059	**M_BANK**	0.121004
	0.4098		0.7391
NEFT	-0.462592	**NEFT**	0.34024
	0.2959		0.3361
RTGS	0.439136	**RTGS**	0.688537
	0.3243		0.0277

Source: Eviews8 (Computation)

After conducting the correlation analysis, the results indicate the following:
In the public sector banks, ROE has shown a significantly positive relationship with all the three independent variables M_BANK, NEFT, RTGS. NEFT and RTGS shows that they have a low positive impact on the ROE, as it has estimated a p-value of 0.2959 and 0.3243. M_BANK has a moderate positive impact on ROE, with a p-value of 0.4098, at 5% level of significance.
In the private sector banks, ROE tends to have a significant positive relationship with M_BANK, NEFT, and RTGS. Similar to the public sector banks, NEFT and RTGS have a

moderate to low positive impact on the ROE, with p-values 0.3361 and 0.0277 respectively. M_BANK on the other hand has a high positive impact on the ROE, as it has a p-value of 0.7391, at 5% level of significance.

2.3.4 (a) REGRESSION ANALYSIS:

1. CAR (Capital Adequacy Ratio):

Table 9: Regression Analysis (CAR)

	Public Sector Banks				**Private Sector Banks**			
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-0.79	1.00	-0.79	0.51	-4.26	5.82	-0.73	0.54
M_BANK	0.04	0.00	8.59	0.01	-0.13	0.09	-1.51	0.05
NEFT	0.03	0.01	2.70	0.11	0.16	0.07	2.12	0.01
RTGS	-0.005	0.02	-0.26	0.02	0.24	0.12	1.94	0.19
Adjusted R-Squared		0.287				0.943		

Source: Eviews8 (Computation)

PUBLIC SECTOR BANKS:

CAR = -0.79 + (-0.005)RTGS + (0.04)M_BANK + (0.03)NEFT

PRIVATE SECTOR BANKS:

CAR = -4.26 + (0.24)RTGS + (-0.13)M_BANK + (0.16)NEFT

The result of the regression analysis is shown above in Table, For the public sector banks, RTGS and M_BANK have a significant impact on the dependent variable i.e., CAR, as they have a p-value of **0.01** and **0.02** respectively, which is lesser than the required margin at **0.05.** NEFT does not have a significant impact on CAR, as its p-value is **0.11**, which is greater than **0.05**. Thus, we accept null hypothesis (H_0) for the variables RTGS and M_BANK, and can explain that they have a statistically significant impact on CAR, in public sector banks. As for the private sector banks, NEFT and M_BANK have an explained impact on CAR, as they have p-values **0.01** and **0.05** respectively. RTGS is not able to explain the impact on CAR, as it has a p-value of **0.19**, which is greater than **0.05.** Thus, we accept the null hypothesis (H_0),

for the variables NEFT and M_BANK, which have a statistically significant impact on the CAR, in private sector banks.

2.3.4 (b) Serial Correlation test:

Table 10: Serial Correlation Analysis (CAR)

	Public Sector Banks		Private Sector Banks	
Variable	**F-statistic**	**Prob. F(1,1)**	**F-statistic**	**Prob. F(1,1)**
CAR	0.173333	0.7488	0.847044	0.5264

Source: Eviews8 (Computation)

The serial correlation test shows that the probability value is greater than 0.05 for both sectors. Therefore, this indicates that 1-2 lag time periods, there is no degree of correlation between the same variables for that period, indicating no errors in the data. Therefore, fail to reject the null hypothesis (H_0).

2. **NIM (Net Interest Margin):**

Table 11: Regression Analysis (NIM)

	Public Sector Banks				**Private Sector Banks**			
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-3.35	3.30	-1.01	0.36	-3.50	2.16	-1.62	0.16
M_BANK	0.00	0.02	0.08	0.94	-0.01	0.01	-0.66	0.53
NEFT	0.05	0.05	1.05	0.04	0.09	0.02	3.59	0.01
RTGS	0.07	0.07	1.05	0.34	0.12	0.04	3.27	0.02
Adjusted R-Squared		-0.257				0.546		

Source: Eviews8 (Computation)

PUBLIC SECTOR BANKS:

NIM = -3.35 + (0.07)RTGS + (0.001)M_BANK + (0.05)NEFT

PRIVATE SECTOR BANKS:

NIM = -3.50 + (0.12)RTGS + (-0.01)M_BANK + (0.09)NEFT

The regression analysis indicates that, for the public sector banks, NEFT has been contributing little to the value of the Net Interest Margin of the banks, as the p-value obtained is **0.04**, which is less than **0.05,** explaining its significance. M_BANK and RTGS, do not have a statistically significant impact on NIM, as their p-value is high, at **0.94** and **0.34** respectively. Therefore, we fail to reject the null hypothesis (H_0) and can conclude that NEFT has a statistically significant impact on NIM, in public sector banks.

In the private sector banks, NEFT and RTGS are shown to have a statistically positive impact on the NIM, as their p-values are **0.01** and **0.02** respectively. M_BANK is an exception as its p-value exceeds **0.05,** which is **0.53**. Thus, we accept the null hypothesis (H_0) and can make the statement that NEFT and RTGS are statistically significant in explaining the impact on NIM, in private sector banks.

NEFT has also been contributing to the private sector as well, along with the RTGS. With increase in fintech services over the past 3 years, it can be said that, fintech has been helping in improving the NIM of the banks, which is effective determinant in improving the bank's profitability and growth.

Serial Correlation test:

Table 12: Serial Correlation Analysis (NIM)

	Public Sector Banks		**Private Sector Banks**	
Variable	**F-statistic**	**Prob. F(1,4)**	**F-statistic**	**Prob. F(1,5)**
NIM	3.420278	0.1381	0.123876	0.7392

Source: Eviews8 (Computation)

By conducting the serial correlation test for the above regression equation, degree of correlation at 1 -2 lag time periods doesn't exist. Therefore, the data does not have any errors. Thus, we fail to reject the null hypothesis (H_0).

3. Non-Performing Assets (NPAs):

Table 13: Regression Analysis (NPAs)

	Public Sector Banks				**Private Sector Banks**			
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**

C	-13.69	17.10	-0.80	0.46	-8.66	7.03	-1.23	0.27
M_BANK	-0.10	0.09	-1.16	0.30	-0.23	0.05	4.25	0.81
NEFT	-0.12	0.23	0.52	0.63	-0.19	0.08	-2.34	0.07
RTGS	-0.18	0.34	0.53	0.62	-0.23	0.12	-1.89	0.11
Adjusted R-Squared		-0.137				0.745		

Source: Eviews8 (Computation)

PUBLIC SECTOR BANKS:

NPA = -13.69 + (0.18)RTGS + (-0.10)M_BANK + (0.12)NEFT

PRIVATE SECTOR BANKS:

NPA = -8.66 + (-0.23)RTGS + (0.23)M_BANK + (-0.19)NEFT

The analysis of the regression equation shows that, in the public sector, all the independent variables are not statistically significant in explaining the impact on the NPAs of the banks, as the p –values of all the variables are greater than the required value of **0.05.** However, when we analyse the coefficients, we observe that all have a negative value, indicating that there is an inverse impact on the NPAs of the bank. Thus, we reject the null hypothesis (H_0) for all the independent variables, as they aren't able to signify the impact on NPAs, in public sector banks. In the case of the private sector banks, NPA does not have a statistically significant relationship with the independent variables M_BANK, NEFT, and RTGS. The coefficients, on the other hand, are negative, indicating an inverse impact on the NPA of the bank. Thus, we reject the null hypothesis (H_0), for all the independent variables, as they are not significant in explaining the NPA, in private sector banks.

However, with an increase in the number of fintech payments, the number of non – performing assets will be able to reduce, as high level of NPAs, have a negative impact on profitability of banks.

Serial Correlation test:

Table 14: Serial Correlation Analysis (NPA)

	Public Sector Banks		**Private Sector Banks**	
Variable	**F-statistic**	**Prob. F(1,4)**	**F-statistic**	**Prob. F(1,4)**
NPAs	0.084321	0.786	0.085917	0.784

Source: Eviews8 (Computation)

Serial correlation test result states that, the probability values are values are greater than 0.05, which indicates that there is no error of autocorrelation the regression equation. Thus, the null hypothesis (H_0) has been failed to be rejected.

4. ROA (Return on Assets):

Table 15: Regression Analysis (ROA)

	Public Sector Banks				**Private Sector Banks**			
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	100.05	85.63	1.17	0.33	-39.88	28.67	-1.39	0.21
M_BANK	-0.55	0.22	-2.51	0.03	-0.05	0.18	-0.26	0.04
NEFT	-1.70	1.81	-0.94	0.04	0.59	0.32	1.83	0.12
RTGS	-0.99	3.88	-0.25	0.82	1.23	0.49	2.52	0.05
Adjusted R-Squared		0.543				0.286		

Source: Eviews8 (Computation)

PUBLIC SECTOR BANKS:

ROA = 100.05 + (-0.99)RTGS + (-0.55)M_BANK + (-1.70)NEFT

PRIVATE SECTOR BANKS:

ROA = -39.88 + (1.23)RTGS + (-0.05)M_BANK + (0.59)NEFT

The regression equation for Return on Assets shows that, for the public sector banks, M_BANK and NEFT have a statistically significant impact on the ROA of the banks, as they have a p-value of **0.03** and **0.04** respectively, which is less than **0.05.** RTGS is not significant in explaining the impact on ROA, due to a high p-value of **0.82**. Thus, we accept the null hypothesis (H_0), for the variables M_BANK and NEFT, for they are statistically significant in deriving the impact on ROA, in public sector banks.
For the private sector banks, M_BANK and RTGS have an explained impact over the ROA as well, due to good p-value at **0.04** and **0.05** respectively. Since NEFT has a high p-value of **0.12**, it is not significant in explaining the impact on ROA. Therefore, we accept the null hypothesis (H_0), for the variables M_BANK and RTGS, for they are statistically significant in explaining the impact on ROA.

Serial Correlation test:

Table 16: Serial Correlation Analysis (ROA)

	Public Sector Banks		Private Sector Banks	
Variable	**F-statistic**	**Prob. F(1,2)**	**F-statistic**	**Prob. F(1,5)**
ROA	0.283659	0.6476	0.173172	0.6946

Source: Eviews8 (Computation)

By analysing the serial correlation test for ROA, it can be concluded that no error of autocorrelation exists, since the P-value of both the sectors is greater than 0.05. Thus, the null hypothesis (H_0) has been accepted.

5. **Return on Equity (ROE):**

Table 17: Regression Analysis (ROE)

	Public Sector Banks				Private Sector Banks			
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	110.40	98.56	1.12	0.34	-48.43	30.10	-1.61	0.16
M_BANK	-0.52	0.25	-2.04	0.13	-0.06	0.19	-0.32	0.76
NEFT	-2.30	2.09	-1.10	0.03	0.66	0.34	1.93	0.01
RTGS	-2.71	4.47	-0.61	0.05	1.67	0.51	3.28	0.02
Adjusted R-Squared		0.343				0.525		

Source: Eviews8 (Computation)

PUBLIC SECTOR BANKS:

ROE = 110.40 + (-2.71)RTGS + (-0.52)M_BANK + (-2.30)NEFT

PRIVATE SECTOR BANKS:

ROE = -48.43 + (1.67)RTGS + (-0.06)M_BANK + (0.66)NEFT

By conducting the regression equation above, for public sector banks, NEFT and RTGS have a significant impact on the ROE of banks, with p-values of **0.03** and **0.05**, while M_BANK is not considered significant, as it has a relatively higher p-value **(> 0.05).** Thus, we accept the null hypothesis (H_0), for the variables NEFT and RTGS, as they have a significant impact on

the ROE, in public sector banks.

In the private sector banks, NEFT and RTGS have a significant impact on the ROE, as they present a p-value of **0.01** and **0.02** respectively, while M_BANK is not regarded as significant, as its p-value is **0.76, (greater than 0.05).** Thus, we accept the null hypothesis (H_0), for the variables NEFT and RTGS, as they have a significant impact on the ROE, in private sector banks.

Fintech helps the banks in gaining high customer confidence, proper infrastructure, and good profitability, can help in reducing capital costs for the banks, which can help in improving the market value of the banks. Therefore, ROE is also an important variable used in the study.

Serial Correlation test:

Table 18: Serial Correlation Analysis (ROE)

	Public Sector Banks		**Private Sector Banks**	
Variable	**F-statistic**	**Prob. F(1,2)**	**F-statistic**	**Prob. F(1,5)**
ROE	0.000188	0.9903	0.102898	0.7614

Source: Eviews8 (Computation)

By conducting the serial correlation test, it is observed that there are no errors of autocorrelation, as the probability values in both the sectors are greater than 0.05. Therefore, the regression equation can be considered as correct, and the null hypothesis (H_0) is accepted.

CHAPTER 3

FINDINGS AND CONCLUSIONS:

3.1) FINDINGS:

Based on the Objectives, analysis and tests were done in the previous chapter. Following are the important findings:

- ✓ The graph in CAR depicted an upward trend for both sectors, and the data came out as stationary. The summary statistics state that CAR has a low standard deviation at 4.10, in comparison to the mean which is at 11.31. Therefore, there is less dispersion in the CAR.
- ✓ In both the sectors, mobile banking, NEFT and RTGS have a positive relationship with the CAR.
- ✓ Mobile banking and RTGS can explain the impact on CAR in public sector banks, while mobile banking and NEFT can explain the impact on CAR in private sector banks. As payment systems like NEFT and RTGS require a great level of technological infrastructure to maintain its systems, these ensure minimal faults of errors like failed transactions, improper details, etc. Although, NEFT might not have an impact on the CAR of public sector banks, they are still contributing to the overall Tier 1 capital, which is one of the major components in calculating the ratio for the banks.
- ✓ The ROA has recently shown an upswing in the private sector banks, and the data has proven to be stationary.
- ✓ In both of the banking sectors, mobile banking, NEFT, and RTGS have a positive relationship with the ROA.
- ✓ Mobile banking and NEFT have a statistically significant impact on ROA in public sector banks, while mobile banking and RTGS have a statistically significant impact on ROA.
- ✓ The data for NPAs have recently shown a downtrend recently, in both the sectors, although public sector has a very high valuation of NPAs in comparison to private sector banks. The data is stationary.
- ✓ NPAs have a negative relationship with mobile banking, NEFT, and RTGS in both banking sectors.

- ✓ The NIM is seeing a rising trend in both the sectors, over the past 5 years. It has a positive relationship with mobile banking, NEFT and RTGS. This denotes that improvements in technology can help in better operational infrastructure, leading to more customer confidence, which is beneficial in improving NIM ratio.
- ✓ RTGS has been kept rising over the years at a steady rate, while both mobile banking and NEFT have shown a massive rising trend, since 2020, when the pandemic had begun. Mobile banking and NEFT, mainly serve as the prime examples of payments in a Fintech stage, which will keep increasing in the future.

3.2) CONCLUSION:

In this study, a regression model was identified, to evaluate the impact of fintech on the risk administration of commercial banks. The outcomes determine that the overall sample and each type of banking FinTech are notably and categorically correlated with bank risks. Fintech can therefore help mitigate bank risks for banks. When the impact of financial automation on commercial banks' risk handling was examined, the results were slightly discrete.

The results also showed that banking ratios like Capital Adequacy ratio, Net Interest margin, and Non-performing Assets, are almost all significant. This means that a bank's financial automation can be gradually improved to boost financial efficiency and the universal level of financial remodelling and risk administration. Furthermore, the results suggest that financial efficiency, financial remodelling, and risk administration have influenced the effectiveness of commercial banking financial technology on risk mitigation, especially over the past 3 years, especially with significant benefaction through mobile banking, RTGS, and NEFT.

Based on the above the above findings, there are some suggestions for the commercial banks. Firstly, it will be beneficial for the commercial banks to follow the development model of the era and adopt improved Fintech solutions that would assist them in accelerating their digital transformation, by continuously working on their unique characteristics Secondly, banks must enact and sustain efficient risk management to link up exact risk requirements that the use of Fintech may pose. Finally, governments should provide appropriate managerial measures such as information declaration standards and risk management signals.

(Li et al., 2022) states that “Fintech is also a double-edged sword for banks”. Fintech is driving change and transforming banks, but it also comes with a precise amount of risk. “Fintech innovations”, like financial risks at every corner of the financial sector, are unseen. Banks should also carry through potent risk-warning mechanisms in their groundwork. Fintech provides with well-being to the banks, but it also brings risks. A sensible risk-warning system can help banks pinpoint such risks early. Commercial banks should cultivate, test, and use these alert signals to keep a track of their operations. This lessens risk impact and losses.

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ANNEXURE

A) Multicollinearity Analysis:

H_0 – There is no relationship between independent variables.

H_1 – Relationship between independent variables exists

Variable	Centered VIF
M_BANK	1.4185
NEFT	2.1765
RTGS	2.5678

Source: Eviews8 (Computation)

By performing the test for multicollinearity, it is observed that VIF values are below 10, Therefore, there is no correlation between the independent variables. Hence, we fail to reject null hypothesis (H_0) and regression analysis can be done.