

STUDY OF FINANCIAL, SOCIAL AND ENVIRONMENTAL
SUSTAINABILITY IN INDIAN BANKING SECTOR: A CASE OF
PUBLIC, PRIVATE AND FOREIGN BANKS IN NORTH INDIA

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DECLARATION

I hereby declare that the thesis entitled STUDY OF FINANCIAL, SOCIAL AND ENVIRONMENTAL SUSTAINABILITY IN INDIAN BANKING SECTOR: A CASE OF PUBLIC, PRIVATE AND FOREIGN BANKS IN NORTH INDIA submitted to Lovely Professional University, Jalandhar in September 2026, in partial fulfillment of the requirements for the degree of Doctor of Philosophy, is the original and independent work carried out by me under the supervision of Dr.Tajinder. This thesis has not previously formed the basis for the award of any Degree, Diploma, Fellowship or other similar titles.

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CERTIFICATE

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ABSTRACT

This study has critically reviewed the financial, social and sustainability profile of the sector, particularly public, private and foreign banks in North India. Today, the Indian banking industry is in the process of fast evolution stimulated by the changes in regulatory requirements, the introduction of new technologies and increasing focus on sustainable development in the financial arena worldwide. This research aims to identify how these changes affect sustainability in the context of the Indian banking sector and with focus on the northern Indian banks of various types. This research employs both quantitative approaches whereby it administered questionnaires to both bank managers and staff from different banking sectors in Rajasthan, Punjab and Haryana to analyze performance and sustainability of these banks. In all, 198 employees completed questionnaire, among them bank managers who make important decision and other staff who directly deal with the policies at the bank and its customers. It gives strong data to work with and gives an overview of the industry's sustainability position.

Since the early 1990s reforms for liberalization, globalization and technological changes have brought about a revolution in the banking industry in India especially in North India. Such changes have led the banks to embrace sustainability factors in their operations to attain sustainable future, stakeholders' confidence, and competitiveness in the market. The growth of sustainability is evident in changes in banking systems across the world where the finance institutions are required to conduct sustainable banking business operations. Financial institutions' sustainability has become an important factor for taking into consideration for the regulators, investors and customers since the global challenges.

Sustainability is defined within this work using a complex model based on the financial return, social, and environmental factors. Earnings ratio, NPAs, and analyze the risk management are examined for their relation with social and environmental responsibility which includes CSR, financial inclusion, and environment sustainability goals of banks. Customer satisfaction, rules and regulation and governance structure also equally have an important role for measuring the sustainability of local, national and international public, private and

foreign banks. This paper utilizes factor analysis, ANOVA, and regression tests for the analysis and the application of SPSS ensures the validity of the results and offer a bridging point between the sustainability practices and the performance of the bank.

The results presented that Yes Type I have better sustainability indexes than No Type II and No Type III. The banks of the public sector have a clear vision of their social and environmental responsibilities, mainly conveyed through effective delivery of financial services, especially under the joint climate change and green banking awareness campaigns. These bank have been lending to such core population in rural area or unbanked population for many years because they all have branch networks. This means that being operating as public sector banks, they can reliably enact long-term government policies, such as, catering for the underbanked population, providing credit to the SMEs, which are significant employment providers, and funding infrastructure projects meant to boost the population's welfare. Not only that, amalgamation to improve financial inclusion, the institutional development of public sector bank has shown great support for environment including renewable energy financing and eco-friendly banking. Private sector banks, on the other hand, have made significant strides in incorporating advanced technologies and adopting green banking practices. These banks tend to focus more on profitability and operational efficiency, leveraging digital innovations to streamline their services and enhance customer experience. Private banks have been particularly active in promoting paperless banking, offering green loans, and investing in environmentally friendly financial products. However, their financial sustainability often depends on market conditions, and their social and environmental contributions tend to be more reactive than proactive. Private banks prioritize maximizing shareholder value, which sometimes results in short-term financial gains taking precedence over long-term sustainability goals. Nevertheless, private banks have introduced a range of innovative financial products that contribute to environmental sustainability, such as electric vehicle loans, green bonds, and sustainable investment funds.

This aspect may be attributed to the fact that while foreign banks seek to adhere to the accepted code of conduct on environmental responsibility within the

international sphere, these do not tally with the prevailing socio-economic conditions in the Indian market. Many of the foreign banks are established in North India also carry over their international benchmarks and standards that are associated with corporate governance, transparency and environmental compliance. Though they experience moderate to high pressure in environmental issues, they are constrained by high regulatory risks and market entry barriers in India that may hamper their global sustainable strategies execution. Further, the FDIBs are said to mainly support only corporations and high income groups. They have less social developmental relevance in the context of financial services to the common man or the development of the rural sector. However, foreign banks have played their part in increasing awareness of sustainability practices amongst the banking sector in India, in terms of contributing towards environment sustainability and in their attempt to implement International best practices in Corporate Governance and Risk Management.

The study's primary contributions lie in its comprehensive evaluation of the Indian banking sector's sustainability across three critical dimensions: of corporate finance, social responsibility and the environment. The financial sustainability is discussed with reference to profitability, NPAs, capital adequacy and risk management. This study discovers that the PSBs are more efficient in handling the NPAs compared to the private and foreign competitors, which is key to long run viability. Banks can easily define NPAs based on their balance sheets and financial statements and the management of NPAs depends on the risk appetite of a bank and its ability to handle economic losses. Public sector banks are advantageously recapitalised by the government to handle the NPAs and they have other recovery procedures that assists them reacting effectively to the NPAs. Another subject of interest in the research is social sustainability, which encompasses the establishment of sustainable and efficient banking and financial systems needed for supporting the economic growth of communities. The public sector banks are best placed to offer banking solution to un-banked populace, this is they have extended credit and other banking services to rural and other deprived areas through government funded schemes such as the Pradhan Mantri Jan Dhan Yojana. This focus addresses the social aspect, which fits within the central goal of the Indian government's inclusive growth strategy that endeavours to distribute the

gains from growth to everyone in the country. Supporting these views public sector banks are extending affordable credit to small business, women entrepreneurs & farmers and thus promoting socio economic development. On the other hand, private and foreign banks have included financial inclusion as a strategic policy agenda, but have not included the policy as a major business imperative despite determined efforts in the last couple of years to open branches in rural and semi-urban areas.

Another dimension is environmental sustainability where a firm's green policies and plans in the banking sector are assessed through green investment in power through purchasing of renewable energy, and elimination of the usage of printed materials in the banking business through the use of e-governance. This research indicates that, especially within the five nations under study, the growth of green projects has been driven wholly by public banks but private and foreign banks have played an equally important role by coming up with new and innovative financial instruments for green projects. These banks have launched green bonds, electric vehicle loans, and solar-powered ATMs, and energy-efficient banking operations as well. The change towards becoming green banks is made possible by legal requirements among other factors with more concern from the consumers and investors on the desire to take care of the environment. Currently, the Reserve Bank of India (RBI) has provided standard guidelines to promote green banking in the country and affirmatively instructed banks to factor environmental issues into their credit decisions. Nevertheless, there is a mixed level of implementation of green banking practices around the banking sector, public banks are much ahead of private and foreign banks.

The thesis work continues the analysis of the current legislation and the significance of policy in creating the framework for sustainable practices of banks. Indian RBI has provided and implemented several reforms in order to manage sustainable banking and some of them concern with capital adequacy measures and stress testing while the others are related to Green Banking policies. Adherence to these regulations is critical as failure may lead to the loss of operating licenses or damaging of reputation, despite this, there are still differences in how various types of banks react to these requirements. Public sector banks being more policy bound

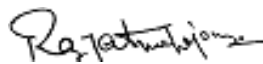
are much more conscience to the norms of sustainability than the policy bound planners of the private and foreign banks who are much more conscious of the profitability and operational effectiveness. Based on the performed analysis the author concludes that it is necessary to enhance the legal requirements for sustainable development for all types of banks regardless their ownership. It is hereby therefore important that the RBI plays a central role in the monitoring and enforcing of the compliance of the banking sector to the sustainability standards in order to support India's broader sustainable development objectives in terms of environment and social transformation.

The study being conducted using the Eagle Model shows that the public sector banks have greater capacity to achieve sustainability because of their scale, government support, and branch outreach. But these banks do not only top the financial performance but also give much backing at the service of social and environmental responsibilities. In financial terms the Eagle Model assists in concentration on the fact that public sector banks are in positions to deliver matching financial and social returns whilst at the same time fulfilling their functions with significantly less negative impact on the environment than other banks. Thus, private banks, while being creative, fast and adaptive, struggle to deal with the problem of providing stable profitability and, hence, sustainable revenue streams. Their primary concern with the quarterly rates of return can therefore sometimes result in strategies that are not quite sustainable. While global best practices that foreign banks deposit in their operations may be good, they are marred by the local market and regulatory factors than castrate their sustainability plans.

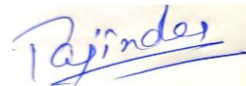
Thus, the study establishes the claim that the nature of sustainability of the Indian banking sector entirely depends upon the type of bank as well as operational scope. At the end of the day, PSBs come out as forerunners in sustainability albeit being once more coerced to setting a benchmark for private and foreign banks to follow. The study concludes that private and foreign banks should improve and implement wider social and /or environmental strategies, following the experience of the public sector. It also reinforces the question of the appropriateness of sustained supervisory regulation to guarantee that all involved banks maintain sustainable

activities, which are significantly helpful for the interest and lasting growth of the banking system and any associated financial system. The findings relate to the concept of sustainability, where sustainability risks cannot be addressed separately from financial performance, as those banks that ignore them impacting reputation, regulation and future earnings.

This study enhances current knowledge of sustainable banking by presenting an analysis of North Indian banks, insights that may be useful for the overall Indian banking industry and other growing economies. Hence, this paper raises awareness on the notion of sustainable and profitable banking business model that enhance the social and environmental corporate responsibilities that keep banks afloat in the ever-evolving economy. Given these outcomes, this study has important implications for policymakers, bank managers and investors because reflected in today's practice, the transition to sustainable development is not sufficiently comprehensive through the consideration of financial, social and environmental aspects. With recent advances in the international banking system the experience gained in Indian banking sustainability can be very helpful in building a more sustainable and innovative banking system in other countries.



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ABBREVIATIONS

1. RBI - Reserve Bank of India
2. SBI - State Bank of India
3. IDBI - Industrial Development Bank of India
4. NABARD - National Bank for Agriculture and Rural Development
5. SIDBI - Small Industries Development Bank of India
6. GCF - Global Climate Fund
7. ESG - Environmental, Social, and Governance
8. NPA - Non-Performing Asset
9. CAR - Capital Adequacy Ratio
10. Basel III - International banking regulations established by the Basel Committee on Banking Supervision
11. GDP - Gross Domestic Product
12. IPO - Initial Public Offering
13. CSR - Corporate Social Responsibility
14. SME - Small and Medium Enterprises
15. EV - Electric Vehicle
16. RBI - Reserve Bank of India
17. CAMEL - Capital adequacy, Asset quality, Management quality, Earnings, Liquidity (banking performance measurement system)
18. LCR - Liquidity Coverage Ratio
19. MFI - Microfinance Institution
20. ATMs - Automated Teller Machines
21. UPS - Uninterruptible Power Supply
22. NIM - Net Interest Margin
23. ROA - Return on Assets
24. ROE - Return on Equity
25. PCA - Prompt Corrective Action (RBI guidelines for financial institutions)
26. EAGLE - Earnings, Asset quality, Growth, Liquidity, Equity
27. NBFC - Non-Banking Financial Company
28. RRBs - Regional Rural Banks
29. FIs - Financial Institutions
30. PPP - Public-Private Partnership

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CHAPTER -I

INTRODUCTION

1.1. INTRODUCTION INDIAN BANKING

When the General Bank of India (1786–1786) and the Bank of Hindustan (1770–1786) declared bankruptcy, conventional banking in India came to a complete and utter halt. India was the birthplace of two of the very largest banks in the world. These companies were established for the first time in the 17th century. While everything was going on, they made their debut. It is a widely held idea that the State Bank of India (SBI), which was once known as the Bank of Calcutta, is the most well-known and oldest bank in the world. The Bank of Bengal changed its name in 1809 after a long history that began in 1806 (**Cheung et al., 2015**). Because the first bank in India, the State Bank of India (SBI), opened for operation. The Bank of Bombay, the Bank of Madras, and the Bank of Bengal were the three banks that welcomed clients in the middle of the nineteenth century. These three financial institutions are the bedrock of India's monetary system. Imperial Bank of India came into being in 1921 as a result of a merger of these three financial institutions. I had never dealt with the bank before and had no idea what the name meant. After much red tape, the bank finally became known as the "State Bank of India" in 1955." (**Sudhalakshmi & Chinnadorai, 2014**). For the sake of an accurate representation of the changes, we made these modifications. An Indian financial organization that has been in existence since 1935 is the Reserve Bank of India (RBI). In the end, the powers and obligations that come with a national bank were formed. Before 1935, the Reserve Bank of India's (RBI) whole existence was a total joke. When the government took over fourteen big privately owned banks between 1969 and 1980, it caused a massive reorganization in the industry. Neither of the retail establishments stood out from the other. A sea shift occurred in the sector because of these advances (**Sripalawat & Thongmak, 2011**). There was a chain reaction that culminated in the innovations at issue. The majority of India's banks fall into one of two categories: regular and non-regular. The

term "scheduled banks" refers to a group of financial institutions in India's banking system that includes private banks, MFIs, regional national banks, SBI, and its affiliates. Another illustration would be the private money market's constituent institutions. There are more suggestions for non-banking financial organizations as well. One kind of planned bank is a private-sector financial entity. Here, we may see the intricate Indian monetary system. Before rural parts of the country can have access to banking services, a big problem must be solved. Because of the widespread belief that bank deposits are more secure than other kinds of business accounts, they are more popular among Indians. The Indian government and SBI have launched many initiatives to tackle this issue. This trend only recently began to show up **(Mishler & Cole, 2006)**.

The evolution of the banking business may be broadly divided into three distinct stages:

Phase I: We lived through the Early Phase, which lasted from 1770 to 1969.

Phase II: Often called the "Nationalisation Phase," this period begins in 1969 and ends in 1991.

Phase III: The 1991–present liberalization period, sometimes called the banking sector reforms, has been quite successful thus far.

Usury, or the practice of charging interest on loans, has a long history in India since the name "kusidin" was used to describe a usurer in ancient Indian scriptures like the Vedas. The Vasishtha and other ancient writings point to the fact that the Brahmin and Kshatriya castes formerly disapproved of this. However, attitudes about usury began to change, and it was gaining acceptance by the second century CE. Though there were caste-based limitations on the amount of interest that may be charged, the ancient Manusmriti legal system nonetheless approved of usury as a valid means of accumulating wealth **(Berger et al., 2003)**.

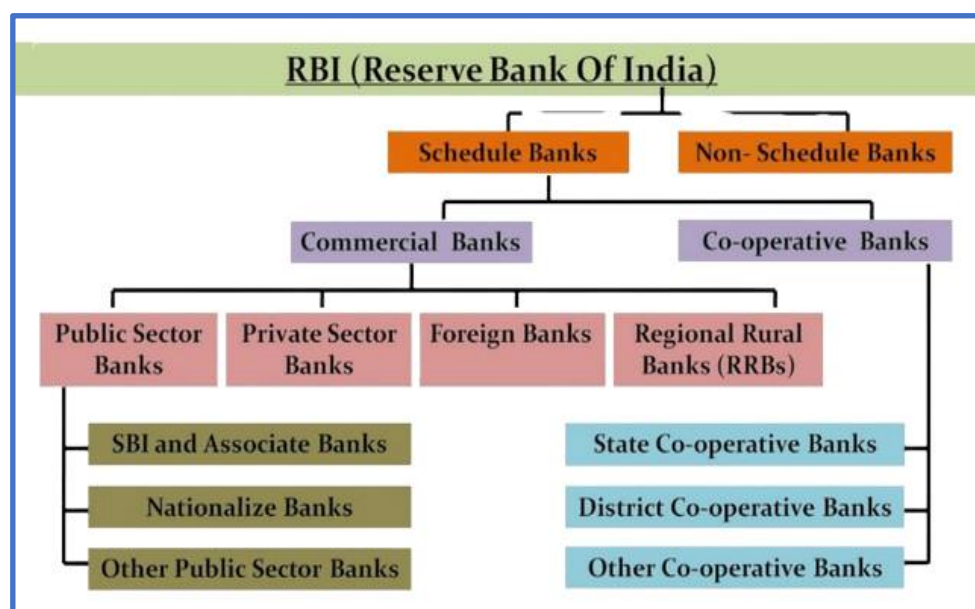
Some loan documents used in ancient India were the rnapatra, rnapanna, and rnalekhaya. In contrast, the adesha served as bills of trade throughout the early Mauryan era. Also, merchants in big cities commonly used letters of credit at this time. Borrowed papers went by several names until they were deemed unnecessary in the Middle Ages. As an example, the institution was known as "dastawez" under the Mughal Empire. Early parts of the Mughals' ever-expanding monetary system included credit instruments and bills of trade. Instructions from the imperial treasury laid the groundwork for this system, which facilitated international payments. The Mughals routinely audited the royal treasures **(Kasztelan, 2021)**.

A watershed moment in the development of colonial India's banking sector occurred in 1829 with the founding of the Union Bank of Calcutta. As a result of Calcutta's booming economy, several international banks were interested in setting up shop in India during this time. The city's rise to prominence as a financial hub was aided by this. One of India's earliest joint stock banks, the Oudh Commercial Bank, made history in 1881. It was an integral part of the growing system of national banks as well. Even other banking institutions, including the 1894-founded Punjab National Bank, were subject to this **rule (Rai et al., 2019)**.

Many of the banks that served the needs of the Indian people before the New Year, especially during the Swadeshi movement, are still operational today. Famous people like Sir Osborne Smith and C. D. Deshmukh were very much a part of society at this time. Their work demonstrated the significance of banks to India's economic growth by leading to the 1935 establishment of the Reserve Bank of India. In order to set up the contemporary banking system for which India is famous today, Indian banks triumphed over challenges such as the post-war financial crisis **(Austin, 2017)**.

1.1.1 A SURVEY ON THE LONG-TERM VIABILITY OF INDIA'S BANKS

Figure 1.1: RBI (Reserve Bank Of India)



Source: Publications, Reserve Bank of India, rbi.org.in

A. INDIAN BANKS FROM THEIR INITIAL YEARS, 1786 TO 1969

In 1720, the Bank of Bombay became operational, marking the beginning of banking in Bombay. Because of this, in 1770, Calcutta became home to the Bank of Hindustan. The first General Bank of India was established in 1786. Prior to their departure in 1906, the Bank of Hindustan held authority.

Oudh Commercial Bank Ltd. was India's first limited liability joint stock bank in 1881.

All three of these financial organisations may have traced their origins back to the East India Company. It was the "Three Presidency Banks" that were in issue here. These banks were totally free to do anything they wanted with their operations. The Bank of Bengal and the Bank of Madras were both established in 1840 and 1843, respectively. The other two companies' bottom lines were moving slowly as well. In 1921, these three financial institutions merged to become what is now known as the Imperial

Bank of India. Separate mergers in 1921 were the starting point. Along with India's independence in 1956 came a reorganisation and rebranding of the Imperial Bank of India as the "State Bank of India." Acts passed in 1955 formed the framework for what is now known as the State Bank of India Act (Sharma & Choubey, 2022).

Midway through the nineteenth century, businesses started establishing private banks run by Indians. The Swadeshi Movement was a horrible time, yet it was also the birth of many banks. Some of the most well-known banks in India are Bank of India Ltd., Punjab National Bank Ltd., Canara Bank Ltd., and Indian Bank Ltd. Established in the area now known as Pakistani Lahore on May 19, 1894, Punjab National Bank Ltd. was the first financial institution to employ a management team made up solely of Indian citizens (Sahoo et al., 2019)

B. NATIONALIZATION OF BANKS AND REFORMS TO THE BANKING SECTOR, 1969–1991.

The highest concentration of banks in India occurred in 1951, when 566 were established. By 1960, the Reserve Bank of India (RBI) had the power to force weaker banks to combine with stronger ones. Because of this cut, the number of banks dropped to 89 in 1969.

Nationalization of fourteen large banks occurred on July 19, 1969.

The overall number of nationalized banks reached twenty on April 15, 1980, with the addition of six further institutions.

C. ALL INDIA FINANCIAL SYSTEM REFORMS SINCE 1991

The Narasimha Committee's suggestions were considered at the Banking Regulation Act's 1993 revision. We moved on to this stage after carefully considering the ideas. The opening of formerly unattainable doors allowed new private sector banks to get off the ground. The Punjab National Bank and the New Bank of India formed a new financial institution in 1993 via their merger. In 1964, the "Industrial Development Bank of India (IDBI)" was established from the ground up by a bill passed by the Indian Parliament.

This financial institution was initially intended to serve as a development bank. It was not until the first month of 2004 that this bank was officially recognized as a scheduled bank by the Reserve Bank of India (RBI) (RBI, 2020).

Bharatiya Mahila Bank Ltd – In 2013, a pioneering bank that exclusively served female customers was established. The possible location of this company's headquarters is in New Delhi. The first commercial activity of the firm took place on November 19, 2013, when the first branch of the company was established for business. At the opening ceremony, former Indian Prime Minister S. Manmohan Singh served as the master of ceremonies, and he was entrusted with the responsibility of delivering the keynote speech (Adith, 2013).

1.1.2 THE INDIAN BANKING SYSTEM IS NOW STRUCTURED AS FOLLOWS:

As the country's central bank, the Reserve Bank of India (RBI) is responsible for enforcing regulations that all Indian banks must follow. The RBI is responsible for this. It is officially the Reserve Bank of India's responsibility to formulate these standards. At this very second, the building consists of the following details:

1. PUBLIC SECTOR BANKS:

India has seventeen nationalised public sector banks, according to official estimates; however, it is quite probable that there are nineteen more. Because of what has happened recently, the nation is in this situation. Out of the thirteen banks shown here, one merged with the Punjab National Bank in 1993. Among the other ten financial institutions included here is the State Bank of India (SBI), which remained independent of the government. Completing the group are the Bharatiya Mahila Bank, which was founded by Indian legislative laws, five subsidiaries of SBI, and the International Development Bank of India (Parasuraman, 2019).

All of these banks and other lending organizations fall under that category. These banks all demonstrate this. It is possible to classify all of these financial institutions under this heading. Surely every single bank and credit union falls within this umbrella. After the New Bank of India and the Public Sector Bank of India merged in 1993, a single financial organization was formed. The consolidation of these two financial institutions was made possible by this merger. An official and formal beginning to the process of establishing the new financial institution was recognized by this event, which marked the commencement of the procedure (Sreeramulu, 2019).

TABLE 1.1 List of Public Sector Banks in India

Sr. No	Name of the Bank
1	Bank of Baroda
2	Bank of India
3	Bank of Maharashtra
4	Canara Bank
5	Central Bank of India
6	Indian Bank
7	Indian Overseas Bank
8	Punjab & Sind Bank
9	Punjab National Bank
10	State Bank of India
11	UCO Bank
12	Union Bank of India

Source:<https://rbi.org.in/scripts/banklinks.aspx>

The State Bank Group encompasses all six of the affiliated banks of India's State Bank. Every single one of these businesses falls under this general category. All of these things come together to make up the State Bank Group. Several state-run financial institutions go by the initials SBT, SBP, SBH, SBM, and SBBJ. These include the State Bank of Travancore, the State Bank of Patiala, the State Bank of Hyderabad, the State Bank of Mysore, and the State Bank between Bikaner and Jaipur. Here are the five participating financial institutions' names for your convenience. State Bank of India (SBI) and Bharatiya Mahila Bank Ltd., along with five of its subsidiaries, merged on June 15, 2016, with the assent of the Union Cabinet. It was the last step in completing the merger. There has been progress toward completion of the merger, and it is now underway. The fact that the merger goes by more than just one name is another important issue (Singla, 2008).

Regional Rural Banks (RRBs): The 27 State Cooperative Banks were responsible for providing the capital for the 196 Regional Rural Banks that existed at one point in time. The number of their respective numbers has decreased from 196 to 64 as of March 31, 2013, due to mergers. It was this year that this autumn took place. No less than 1,856 RRB branches were operational throughout the country as of March 31, 2013, with a distribution across 635 municipalities. India has accomplished a great deal, and it is commendable that the nation has formed 664 districts so far (**Shobana, 2010**).

Table 1.2: List of Regional Rural Banks in India

Sr. No.	Name of RRB	Sr. No.	Name of RRB
1	Assam Gramin Vikash Bank	23	Manipur Rural Bank
2	Andhra Pradesh Grameena Vikas Bank	24	Meghalaya Rural Bank
3	Andhra Pragathi Grameena Bank	25	Mizoram Rural Bank
4	Arunachal Pradesh Rural Bank	26	Nagaland Rural Bank
5	Aryavart Bank	27	Odisha Gramya Bank
6	Bangiya Gramin Vikash Bank	28	Paschim Banga Gramin Bank
7	Baroda Gujarat Gramin Bank	29	Prathama U.P. Gramin Bank
8	Baroda Rajasthan Kshetriya Gramin	30	Puduvai Bharathiar Grama Bank
9	Baroda UP Bank	31	Punjab Gramin Bank
10	Chaitanya Godavari GB	32	Rajasthan Marudhara Gramin Bank
11	Chhattisgarh Rajya Gramin Bank	33	Saptagiri Grameena Bank
12	Dakshin Bihar Gramin Bank	34	Sarva Haryana Gramin Bank
13	Ellaquai Dehati Bank	35	Saurashtra Gramin Bank
14	Himachal Pradesh Gramin Bank	36	Tamil Nadu Grama Bank
15	J&K Grameen Bank	37	Telangana Grameena Bank
16	Jharkhand Rajya Gramin Bank	38	Tripura Gramin Bank
17	Karnataka Gramin Bank	39	Uttar Bihar Gramin Bank
18	Karnataka Vikas Gramin Bank	40	Utkal Grameen Bank
19	Kerala Gramin Bank	41	Uttaranga Kshetriya Gramin Bank
20	Madhya Pradesh Gramin Bank	42	Vidharbha Konkan Gramin Bank
21	Madhyanchal Gramin Bank	43	Uttarakhand Gramin Bank
22	Maharashtra Gramin Bank		

Source: <https://rbi.org.in/scripts/banklinks.aspx>

Development Banks: As an illustration, consider the fact that four separate banks are based in India: IFCI, EXIM Bank, NABARD, and SIDBI, also known as the Industrial Finance Corporation of India and the Small Industries Development Bank of India, respectively. The first two of these banks

opened their doors for business in 1948 and 1982, respectively. Each of these Indian financial institutions may be considered a starting point (**Chitwood, 2006**).

Table 1.3: List of Financial Institutions in India

Sr. No	Name of the Bank
1	National Bank for Agriculture and Rural Development
2	Export-Import Bank of India
3	National Housing Bank
4	Small Industries Development Bank of India

Source: <https://rbi.org.in/scripts/banklinks.aspx>

2. PRIVATE SECTOR BANKS:

1. **Private Banks and Foreign Banks:** About the provision of banking services, this group encompasses both the private banks and the foreign banks that are operating in India. While there are a significant number of banks in India that are now operating, it is possible that they may be classed as belonging to this category (**Keller, 2010**).

Table 1.4: List of Private Sector Banks in India

Sr. No	Name of the Bank	Sr. No	Name of the Bank
1	Axis Bank Ltd.	11	IDFC FIRST Bank Limited
2	Bandhan Bank Ltd.	12	Jammu & Kashmir Bank Ltd.
3	CSB Bank Limited	13	Karnataka Bank Ltd.
4	City Union Bank Ltd.	14	Karur Vysya Bank Ltd.
5	DCB Bank Ltd.	15	Kotak Mahindra Bank Ltd
6	Dhanlaxmi Bank Ltd.	16	Nainital bank Ltd.
7	Federal Bank Ltd.	17	RBL Bank Ltd.
8	HDFC Bank Ltd	18	South Indian Bank Ltd.
9	ICICI Bank Ltd.	19	Tamilnad Mercantile Bank Ltd.
10	IndusInd Bank Ltd	20	YES Bank Ltd.
		21	IDBI Bank Limited

Source: <https://rbi.org.in/scripts/banklinks.aspx>

Table 1.5: A list of International financial institutions that have a presence in India

SI No.	Name of the Bank	Sr. No	Name of the Bank
1	AB Bank Ltd.	23	Industrial & Commercial Bank of China Ltd.
2	American Express Banking Corporation	24	Industrial Bank of Korea
3	Australia and New Zealand Banking Group Ltd.	25	J.P. Morgan Chase Bank N.A.
4	Barclays Bank Plc.	26	JSC VTB Bank
5	Bank of America	27	KEB Hana Bank
6	Bank of Bahrain & Kuwait B.S.C.	28	Kookmin Bank
7	Bank of Ceylon	29	Krung Thai Bank Public Co. Ltd. \$
8	Bank of China	30	Mashreq bank PSC
9	Bank of Nova Scotia	31	Mizuho Bank Ltd.
10	BNP Paribas	32	MUFG Bank, Ltd.
11	Citibank N.A.	33	NatWest Markets Plc
12	Coöperatieve Rabobank U.A./ Coöperatieve Centrale Raiffeisen-Boerenleenbank B.A.	34	PT Bank Maybank Indonesia TBK
13	Credit Agricole Corporate & Investment Bank	35	Qatar National Bank (Q.P.S.C.)
14	Credit Suisse AG	36	Sberbank
15	CTBC Bank Co., Ltd.	37	SBM Bank (India) Limited
16	DBS Bank India Limited	38	Shinhan Bank
17	Deutsche Bank A.G.	39	Societe Generale India
18	Doha Bank Q.P.S.C	40	Sonali Bank PLC %
19	Emirates NBD Bank PJSC	41	Standard Chartered Bank
20	First Abu Dhabi Bank PJSC	42	Sumitomo Mitsui Banking Corporation
21	FirstRand Bank Limited	43	United Overseas Bank Limited
22	Hong Kong and Shanghai Banking Corporation Limited	44	Woori Bank

Source: <https://rbi.org.in/scripts/banklinks.aspx>

- 2. Cooperative Banks in India's Districts:** By April 1st, 2016, it was believed that 371 District Central Cooperative Banks were operating in India. The state of Uttar Pradesh and the state of Madhya Pradesh are home to fifty and thirty-eight establishments, respectively, of this kind of financial institution, making them the states with the highest concentration of this category of financial institutions (**Lach, 2009**).

1.1.3 SUSTAINABILITY OF BANKS IN INDIA

Incredible development and revolution have taken place in India's banking industry in recent years, and this sector has played a crucial role in the country's economic success. Financial services, such as deposits and loans, have been provided by banking organizations for a very long time and have a rich history. Conversely, additional responsibilities and duties have been imposed on Indian banks due to a significant change in the environment.

These innovations have opened up new possibilities and challenges for financial institutions all across the globe **(Siddiqi, 2012)**.

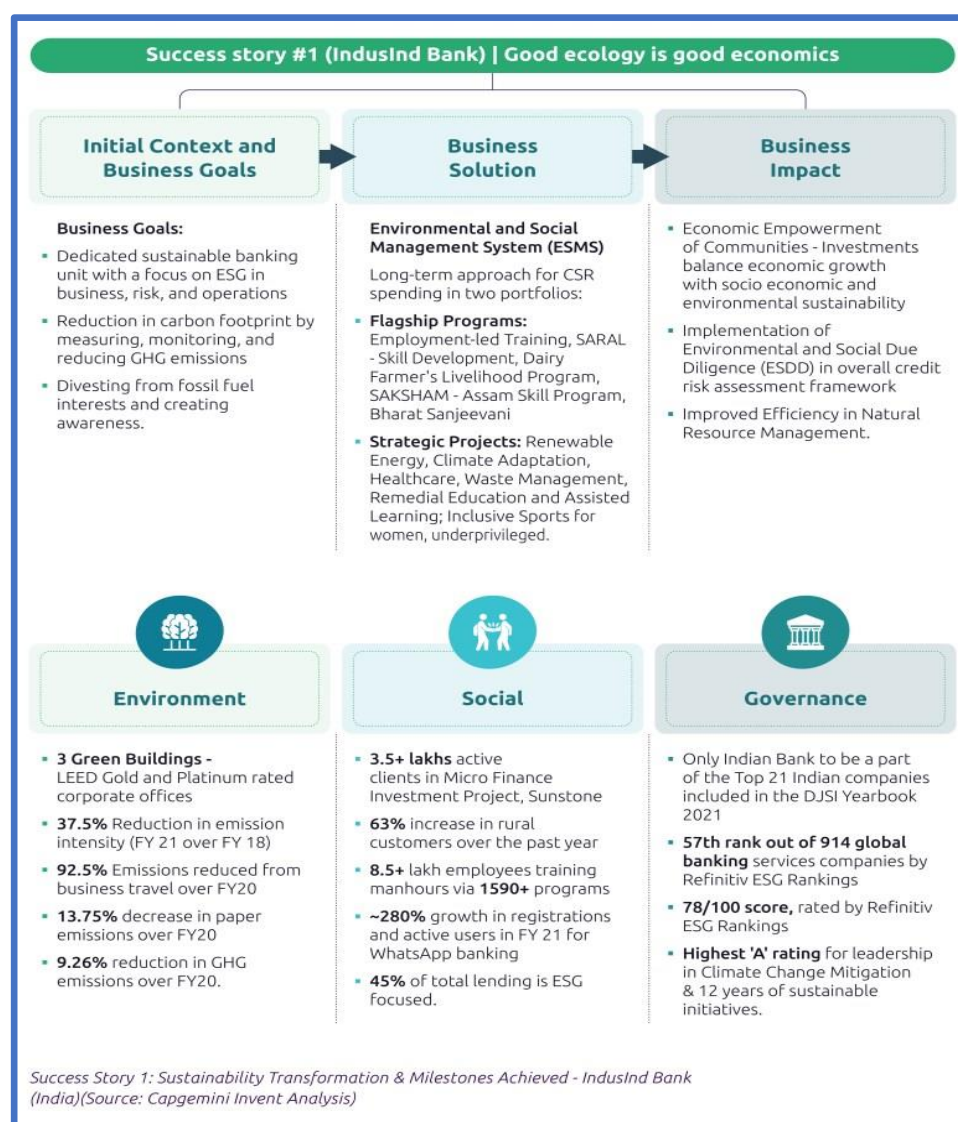
The renewable energy capacity goal of 500 GW in India is set to be achieved by 2030. To get there, India is planning to use non-carbonous energy sources to produce 50% of its power. The banking sector in India is required to work towards sustainable and ESG-linked finance for environmental preservation. Indeed, it aligns with the objectives that were previously articulated. Many people are interested in several advancements that came out of the banking business recently **(Nasir et al., 2019)**. For example, there have been developments in green banking, which advocates for online and card-based banking, and investments in environmentally friendly financial products. The past five years have seen a proliferation of programs with the stated goal of constructing eco-friendly infrastructure. These measures have been put in place to try to reach that goal. Projects that match this description include solar-powered uninterruptible power supply (UPS) systems, GSL and LED light bulbs, rainwater collecting systems for financial institutions, solar-powered automated teller machines (ATMs), and related endeavors **(Verma, 2012)**.

Here are a few of the most significant ongoing efforts to raise sustainability awareness within India's banking sector. These actions are now being taken:

- SIDBI, which stands for the Small Industries Development Bank of India, is an independent government agency that is responsible for the creation of a new program that is known as the Sustainable Finance Scheme. Through this program, funding may be made available for programs that are targeted at achieving sustainable development. Eligible projects include those that improve energy efficiency and lead to greener manufacturing. Power plants that make use of solar or wind energy, projects that make use of mini-hydroelectric power, power plants that make use of biomass gasifiers, and other projects that are comparable for both captive and non-captive production units are all included in this category. This category does not include any other projects that are comparable to the one being discussed here **(Ramli et al., 2018)**.

- The Global Climate Fund (GCF) is an international organization that has achieved a great deal via the various and varied projects that it has implemented. It is estimated that the total value of these projects is 43 billion. Several Indian institutions, such as IDFC First Bank, Yes Bank, SIDBI, and the National Bank for Agriculture and Rural Development (NABARD), have collaborated on these initiatives. These institutions include the National Bank for Agriculture and Rural Development. Electric transportation, solar roofing, and climate resilience projects are the primary areas of concentration for these aforementioned programs. In the end, these initiatives ought to result in a reduction of twenty million tons of greenhouse gas emissions **(Mothey, 2018)**.
- Blended finance has recently come into the spotlight due to the fact that both public and private capital have played a role in expanding and mixing pools of money and developing credit lines. There is a possibility that this might be attributed to the fact that mixed finance is expanding in popularity. The explanation for this is that blended finance is a kind of finance that incorporates both public and private resources into its overall financial structure. This is the reason why this is the case. Specifically, this is because blended finance helps to deliver a more substantial effect and enhances the practicability of projects that are meant to be sustainable **(Nawak & Washburn, 2015)**. This is the reason why this is the case. This is the reason why things transpire in the manner that they do. As of March in the year 2022, there are a total of 27 financial institutions that have made green loans, bonds, or money accessible in order to contribute to the mitigation of the bad consequences that are created by climate change. This is done in order to make a contribution to the mitigation of the situation. This assurance has also been provided by several other financial institutions that are not affiliated with the banks of the United States **(Mishler & Cole, 2018)**.

FIGURE 1.2:IndusInd Bank ESG Success Story



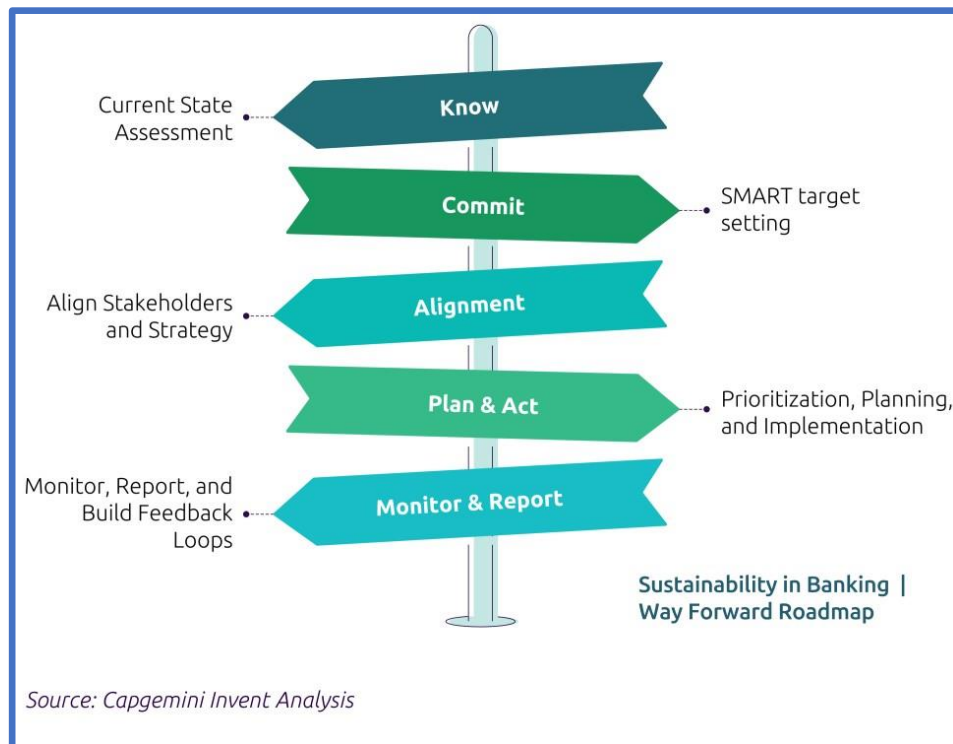
1.1.4 BEGIN SUSTAINABILITY TRANSFORMATION

Only 6% of India's largest commercial banks have offered environmentally friendly products or are seriously contemplating doing so in the near future, according to a recent survey by the Reserve Bank of India (RBI). This information is based on a recent survey. It was determined that this conclusion was achieved after conducting an exhaustive analysis of the survey data. In addition, considering climate change, environmental, social, and governance-related dangers, only 35% of the evaluated institutions maintained a webpage that was devoted to such topics. Most of the banks that were investigated belonged to this category (Berger et al., 2019). One may say that the banking industry in India is a "late majority" when it comes to

the adoption of policies and procedures that are beneficial to the environment. It is possible that this should be taken into account from a global perspective. Specifically, this is because Indian banks have been hesitant to adopt both of these methods. This is the reason why this result has occurred. A really positive tendency among these financial institutions is the fact that 56 percent of them intend to make sustainable lending a main priority in the short to medium term. This is a trend that is expected to continue. A course of action that is seen as being advantageous is now being taken by the scenario **(Tara et al., 2014)**.

In light of this, the participation of India's financial institutions is of the utmost importance in order to guarantee that the nation will be able to continue to function in a way that is suitable for long-term sustainability. When considering the concept of sustainable banking, it is vital to take into consideration a scenario in which all of the primary actors, including the financial institutions, the industries, and the economy, emerge victorious. This scenario is included in the process of contemplating the notion of sustainable banking. This is, in fact, the case when seen from every conceivable perspective. The creation of a sustainable ecosystem is something that financial institutions ought to do, beginning with their customer and investors on the outside and continuing with their products, services, and internal operations on the inside. Ensure that you carry out this action in both directions. It is of the utmost importance to put these steps into action with the intention of achieving sustainability throughout the course of time. This representation of the diagram illustrates one of the several courses of action that a financial institution may take in order to bring about change that is long-lasting. The purpose of this viewpoint is to illustrate one of the approaches that may be taken moving ahead **(Macesich, 2015)**.

Figure1.3: Sustainability Roadmap for Banking Sector



Most Indian banks would quickly demonstrate their dedication to sustainability by issuing green bonds and green lending products. An approach to ensuring the long-term viability of financial institutions may be initiated by gathering information on their existing condition. An up-to-date status evaluation of all organizational domains and activities is required to ensure accountability. In this manner, we can give due consideration to both the quantitative and qualitative features of our goods, services, processes, people, and technology (**Arya & Tandon, 2003**).

Also, when you set goals, the next stage is to really stick to them. The SMART framework—goals that are precise, measurable, attainable, relevant, and have a deadline—will be built around the existing state assessment and a general comprehension of the ideal state (**Choudhry, 2012**).

People (also known as stakeholders) and processes (sometimes called strategy) are often involved in alignment. One of the most important factors in a project's acceptance and successful completion is stakeholder alignment. The sustainability projects cannot go forward without the full support of the leadership team and the dissemination of information to all relevant departments. The incorporation of sustainability into the very fabric

of the financial institution is another area of congruence that must be preserved. In addition, the processes cannot exist apart from the plan. Sustainable practices are an essential element of the day-to-day operations of Kotak Mahindra Bank, for example. After hearing nothing but praise, the suggestion was quickly adopted by the leadership. The bank's strategy plan, "Think Green," encourages the use of greener goods and services. Another important goal is lowering the bank's carbon footprint **(Suresh & Sudeepta, 2011)**.

Numerous tasks, such as setting priorities, getting ready, and carrying out the plan, make up the next stage of the plan and act process. If the present situation were thoroughly analyzed and goals were created, it would be feasible to pave the way for several projects across different business functions. However, business operations within financial institutions are likely to face significant delays or bottlenecks if a systematic strategy is not taken to implement the initiatives. Sorting the projects into suitable categories and ranking them according to importance (such as "vital," "essential," and "desirable") is critical **(Arya & Tandon, 2003)**. Then, you should think about execution priorities, such as getting outcomes quickly. Additionally, you should now have a solid grasp on which tasks and endeavours rely on one another. Around a given day, we plan to do all of the necessary tasks and gather all of the necessary materials. On top of that, we find risks and try to mitigate them. In addition, the monitor and report process relies on good reporting governance and the development of widely used metrics for analysis. The quantifiable aspects are also flexible. Lastly, a feedback loop that accounts for any required course corrections requires the integration of the processes of measuring and reporting results **(Austin, 2017)**.

As we have discovered, a considerable number of Indian institutions have begun executing the continuous transformation approach. By showcasing key achievements, success stories from IndusInd Bank and ICICI Bank demonstrate that the implementation was successful and efficient **(Cooke, 2018)**.

The State Bank of India (SBI) deserves praise for being a trailblazer among Indian banks when it came to environmentally friendly practices and regulations. Two green bonds issued in 2018 under the Green Bond Framework enabled the bank to support initiatives that raise awareness about environmental issues. The bonds' respective values were ₹53 billion and ₹4 billion. To encourage the purchase of electric vehicles, South Bank of India (SBI) launched the country's first Green Car Loan in 2019. Its YONO programme introduced a novel method of rewarding members for exceptional performance: Green Reward Points. The bank will be able to launch initiatives that aid in environmental preservation via the YONO SBI Green Fund (**Chen et al., 2006**).

It would be really foolish not to add HDFC Bank as well. Social entrepreneurs with projects with the potential to benefit society may apply for funding via HDFC's unique investment and grant programme, SmartUp. Starting with an outside-in approach, the project got underway. In addition, HDFC Bank is actively working to lessen the environmental impact of its operations by adopting several initiatives. An important aspect of these endeavors is the training of personnel on topics like newspaper use, energy efficiency, and waste management (**Henriques & Sadorsky, 2014**).

Figure 1.4: FINANCIAL SUSTAINABILITY



What the financial sustainability hypothesis means is that a firm can succeed, weather any storm, and maintain the faith and confidence of its investors year after year if it can establish a financially strong institutional

framework. Stakeholders see this as a means to increase the value of the firm, as they seek out investments in companies with strong financial positions. Reducing the likelihood of bankruptcy and ensuring timely capital acquisition are its primary goals. Companies can better withstand market fluctuations if they have solid financial sustainability strategies. The capacity of a corporation to generate positive returns on the stock market is inversely related to its financial sustainability. Stock market prices grow when investors show interest in a company's shares, the company's financials are strong, and profits are high. The reason being, a company's financial sustainability is the deciding factor for investors **(Shobana, 2010)**.

Components of Financial Sustainability

1. **Investment of Capital and Time:** The bedrock of any enterprise, highlighting the significance of early and continuing investments in fostering development and sustainability.
2. **Potential to Earn a Profit:** The significance of a sustainable company strategy that can draw in clients, satisfy market needs, and make a profit is emphasised.
3. **Continuous Financial Review:** Examines financial operations regularly to minimise waste and abuse, ensuring accountability and effective use of money.
4. **Planning:** Emphasises the need for long-term planning for efficient financial management and readiness to meet both anticipated and unforeseen expenses.
5. **Commitment:** Highlights the significance of management's commitment to the company's prosperity rather than their own interests, guaranteeing the company's longevity.
6. **Good Management and Teamwork:** Acknowledges the significance of strong leadership and teamwork in achieving fiscal well-being via efficient use of resources and reduction of waste **(Singla, 2008)**.

Indicators of Financial Sustainability

1. **Strong Financial Strategy:** Provides insight into the state of a company by showing how well it follows applicable rules and regulations with its funds.
2. **Effective Management:** Places an emphasis on the role that talented and dedicated management plays in moving the attention away from personal profits and towards the company.
3. **Methodical Fundraising Arrangement:** Identifies the need for a methodical approach in the process of fundraising, which guarantees openness and honesty to interested parties.
4. **Periodic Monitoring:** Because of the importance of conducting frequent evaluations, it is necessary to detect and address inefficiencies, waste, and a lack of teamwork that might result in financial losses.
5. **High Revenue and Profit:** These are the most immediate measures of a company's capacity to maintain its financial stability, showing effective commercial operations and market exposure.
6. **Resource Diversification:** demonstrates how resources should be strategically allocated and used in order to get maximum results with the least amount of expenditure.
7. **Cost Control:** The need of operating effectively without sacrificing quality is emphasised by the fact that it is critical for retaining profitability.
8. **Efficient Accounting System:** When it comes to delivering transparent and accurate financial records, which are crucial for decision-making and auditing, the backbone of financial sustainability is the provision of such data.
9. **Efficient Auditing:** It is essential for recognising and resolving any financial concerns to ensure that the integrity of financial records and operations is maintained throughout the process.
10. **Good Cash Flow:** It is essential for day-to-day operations, and it indicates that a company is able to create adequate money and profits to maintain its activities (Mitra, 2009).

1.1.5 SOCIAL SUSTAINABILITY IN DEVELOPMENT

Providing resources, fostering relationships, and giving individuals the agency to produce good social change and inventive solutions are at the

core of development, which aims to empower humans and advance society(**Kioko & Marlowe, 2016**).Building inclusive communities where everyone has an opportunity to develop frequently requires navigating through challenging and divisive transition processes.A number of global crises, including as the COVID-19 pandemic, climate change, escalating conflicts, and economic recessions, are occurring simultaneously, adding to the uncertainty that plagues the path to sustainable development. In view of these challenges, which exacerbate existing inequalities and systemic injustices, a comprehensive approach to sustainability is critically needed, including social, economic, and environmental aspects (**Agarwal, 2003**).

According to "Social Sustainability in Development: Meeting the Challenges of the 21st Century," the goal of this conversation is to have a better understanding of social sustainability. The tale focuses on four important aspects of social sustainability: building resilience, fostering social cohesion, ensuring inclusivity, and sustaining the legitimacy of the process. This conglomeration of causes contributes to a societal structure whereby a larger number of individuals believe in the narrative of advancement and hold out hope that both the current and subsequent generations will enjoy the fruits of their labor (**Ganesan, 2009**).

The fundamental tenet of social sustainability is the belief that more cohesive social networks are better prepared to face adversity, make responsible use of available resources, and provide public goods equitably and legitimately. A thriving society may then emerge as a result of these factors coming together. Finding and implementing interventions that demonstrate their relationship to critical development outcomes while also strengthening the basis of social sustainability is of paramount significance (**Doss et al., 2004**). This approach sheds light on the concept of social sustainability and why it is crucial in solving the many difficulties we face today. An in-depth understanding of social sustainability principles and how to strategically apply them is necessary to advocate for a development model that is inclusive, equitable, and resilient. To navigate the complexities of modern global issues, this is essential. Social sustainability is crucial to

ensuring a prosperous and equitable future for all people and is not only a subset of sustainable development **(Naidu, 2012)**

1.1.6 FINANCIAL PERFORMANCE IN BANKING

The financial performance of a bank is seen as an indicator of its competence and profitability. Moreover, when it comes to banking, if there is anything more vital than competence and profitability, it is the ability to keep a steady hand on the tiller of the sheer force majeure that is changing the financial landscape at the speed of nanoseconds **(Fisher, 2006)**. These indicators and ratios underscore the bank's capacity to pull in revenue, capably steward its possessions and obligations, and achieve the important aims of good management—keeping a sufficient stock of highly liquid assets on hand and maintaining solvency by ensuring that the bank's array of assets has a sufficient value to cover its array of liabilities. The most fundamental measurements to use for decision-making are those that indicate how effectively a bank is generating the income it needs to keep operating. Moreover, as bankers certainly know, successful bench warmers during the good times but rarely pan out when the sagging sports club needs an infusion of assets from you **(Mishler & Cole, 2018)**. The comprehension that comes from this knowledge results in a better revelation of the operation's profitability. Moreover, the "Cost-to-Income Ratio" provides a useful tool for comparing the bank's operating expenses with its net income in order to ascertain operational efficiency. The metric is favored over all others because it presents a clear, whole bank picture of costs and revenues. This ratio also helps regulators, investors, and other interested parties figure out if the bank is using its capital in an economically sound manner. Certain other basic metrics monitor the bank's ability to honor withdrawal requests from its clients without incurring large losses. These traditional bank risks are liquidity **(Prashanta, 2009)**.

1.1.7 ENVIRONMENTAL SUSTAINABILITY

Financial institutions are undergoing a sea change with the advent of "green banking," an investment strategy that prioritises long-term viability

and ecological responsibility. In contrast to conventional banking methods, it places a premium on green projects, renewable energy, and sustainable technology. This strategy satisfies the increasing demand for ethical banking services while also tackling the critical issue of climate change. To better understand green banking and how people and companies may get involved, let us take a closer look at the following:

Core Aspects of Green Banking

- **Investment in Sustainable Technologies and Projects:** To lessen the severity of climate change, "green banks" aggressively search for ways to invest in green energy, reforestation, and carbon offset programmes.
- **Eco-Friendly Lending Policies:** Financial institutions like this not only provide money for massive infrastructure projects, but also for smaller, more personal endeavours to lessen their impact on the environment, such as the purchase of electric cars or solar panels (**Jeucken, 2019**).
- **Mission-Driven Policies:** Green banks stand out from the crowd by taking a stand for sustainability on a policy level, by refusing to invest in environmentally damaging businesses like fossil fuels.
- **Examples of Green Banking Practices:** Aspiration is a model for sustainable banking practices since it offers investing alternatives in ethical equities and donates a portion of its income to environmental causes (**Macesich, 2015**).

Getting Started with Green Banking

For individuals looking to support and benefit from green banking, here are practical steps to consider:

1. **Paperless Banking:** Forget about paper statements and the environmental impact of snail mail by becoming paperless.
2. **Bank on the Go with Your Mobile Device:** In addition to reducing emissions from consumers using branch locations and saving money on gas, this helps banks improve their own operational efficiency (**Graham & Dodd, 2009**).

3. Simple as pie Make Your Everyday Financial Transactions More Sustainable: You may participate in initiatives like tree planting with every transaction at several eco-friendly banks or make an automated donation to environmental charities **(Morelli, 2018)**
4. Join Forces with Ethical Banks: Changing to a bank that emphasizes ethics and sustainability may have a significant impact on the environment. Look for a financial institution that has publicly stated its refusal to invest in the fossil fuel sector or any other environmentally harmful enterprise **(Chitwood, 2006)**.

The Impact of Green Banking

Significant ecological advantages may result from the trend towards green finance. These institutions are vital in hastening the shift to a more environmentally friendly economy because they redirect funds to sustainable projects. Customer may help forward the sustainability movement by aligning their funds with environmental principles by selecting a green bank (RBI, 2020)

1.1.8 PERFORMANCE OF BANK AND ABOUT TYPES OF BANK

Not only can green banking assist with environmental challenges, but it also has the potential to change the game for the financial sector and encourage other firms to follow suit. This is just one of the numerous advantages of green banking. Environmentally responsible banking has the potential to expand as a result of the growing awareness among individuals and companies about the significance of their financial investments. A financial system that promotes the preservation of the environment might be established as a result of this, which could eventually lead to its implementation. **(Mishler & Cole, 2006)**

When it comes to assessing the performance of green banks, it is vital to look at two dimensions: first, their financial performance, which is only part of the overall story, and second, the extent to which they achieve what many on their team want, that is, the environmental impact of their

investment, or as a post-2016 U.S. Treasury Department report said, “The success of a green bank should not be measured solely by the financial bottom line. Impact on the environment, measured in terms of greenhouse gas (GHG) emission reductions or an increase in low-carbon or no-carbon sources of energy, is an equally important part of the story.

Financial institutions in the banking industry come in all shapes and sizes. They have very different business models and serve very different types of customers. Some offer a wide range of customer solutions, some not so much. Within the realm of the many offerings that banks have, **commercial banks** primarily cater to serving up loans, payment services, and places to park deposits. Underwriting debt and stock issues, as well as providing advice on mergers and acquisitions, are examples of the capital market operations that **investment banks** focus on. The role of central banks is to oversee a country's financial system and ensure that its currency remains stable. To better serve their local communities, **community banks** place a premium on building meaningful connections with its clients. To differentiate themselves from other types of banks, green banks prioritise funding projects and enterprises that have good benefits on the environment. They do this by aligning their financial operations with sustainability objectives. In the ecology of the financial system, every kind of bank fulfils a unique function, which is to meet the varied requirements of the economy while also providing assistance to a variety of industries and different projects. (Tiwari, 2009)

1.1.9 THE BENEFITS OF A BANK'S LONG-TERM VIABILITY

1. **Avoiding Dangers:** Financial institutions may lessen the likelihood of losing money due to poor investments, brand harm, or regulatory penalties by implementing sustainability strategies that improve their capacity to identify and mitigate social and environmental risks. This is because better risk management is possible as a result of sustainability regulations. (Egri & Herman, 2016)
2. **Compliance with Rules:** Financial institutions may be confident they are in line with these constantly evolving regulatory standards if they take

proactive sustainability initiatives. Consequently, these institutions may show accountability to investors and authorities while avoiding sanctions. **(Benedikter, 2013)**

3. **Maximizing operational efficiency:** Buildings and other institutions have a great opportunity to significantly reduce their operational costs via energy efficiency, waste reduction, and better resource management. **(Aquique, 2016).**
4. **Benefit over the Competition:** Attracting clients and investors that prioritise social and environmental responsibility gives sustainable banks a leg up on the competition. This is due to the fact that sustainable institutions have the potential to attract both customers and money. **(Gregory, 2013).**
5. **Confidence and Reputation Enhancement:** Banks may do their public relations a favour by showing they care about environmental issues. As a result, this might lead to more satisfied customers who have faith in the company **(Das, 1980).**
6. **Unlocking Untapped Markets.** Investing in sustainable development initiatives and green finance strategies are two examples of potential new market areas for sustainability-focused businesses. **(Gottheil, 2013).**
7. **Employee Engagement and Retention:** A sustainability-focused culture has the potential to increase staff morale and retention rates; it's also possible that this will really happen. Its value lies in the fact that it facilitates a sense of shared company values among employees. This is the main justification for its benefits. **(Muraleedharan, 2013).**

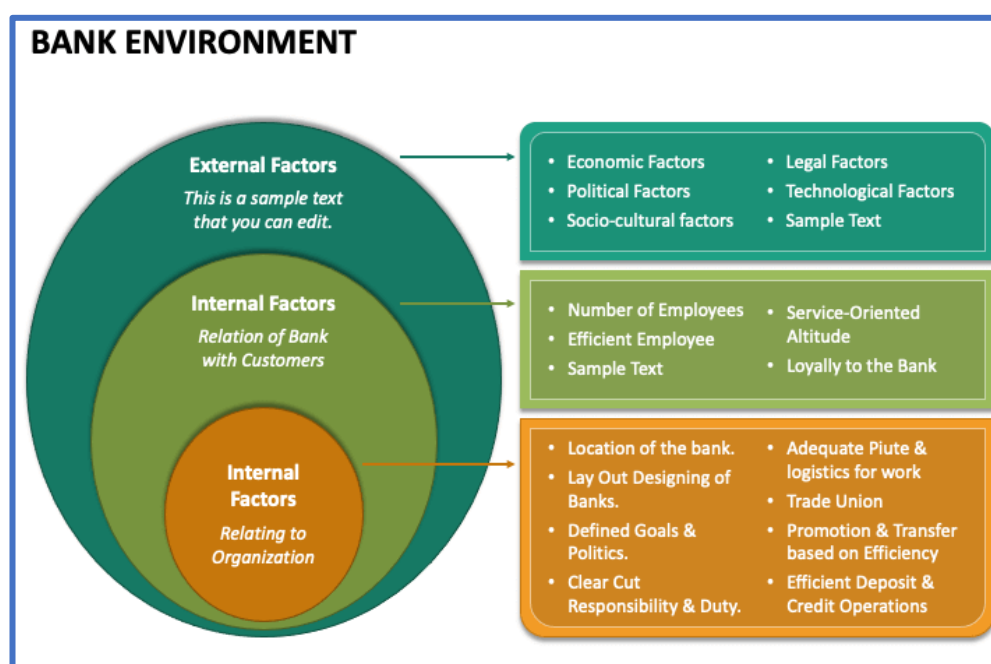
1.2 SIGNIFICANCE OF BANK'S SUSTAINABILITY

Social equity, environmental protection, and financial security are the three fronts where a bank's sustainability efforts may leave an indelible mark. Banks may improve their risk management methods in the face of unforeseen environmental, social, and economic changes by integrating ESG criteria into their daily operations. Additionally, this will help them conform to the values held by the boosting number of investors as well as customers that place a premium on doing the right thing by people and the earth. They

steps boost a bank's credibility, which in turn provides in more brand loyal clients as well as opens doors to new markets, such environmentally concerned investors (Kuan & Chau, 2015). Better operations as well as reduced expenses could be possible outcomes of sustainable banking practices' objectives of reducing waste and saving energy. By assuring adherence to visible rules and readiness for future regulatory developments, sustainable practices protect against financial and legal consequences. Many new avenues for investment have opened up as a result of sustainability's role as a catalyst for product innovation, most notably in green bonds and climate financing. By providing funding for initiatives that enhance people's quality of life and promote social equity, sustainable banks are vital in the advancement of societal well-being. Banks can take the lead in creating a better, more fair society by embracing sustainability in their financial services, which is both a morally admirable and strategically sound business move (Jeucken, 2019).

1.3 DETERMINANTS OF BANK SUSTAINABILITY

Figure1.5:Bank Enviornment



1. **External Factors:** These encompass factors beyond the bank's control to which it is obligated to react. Economic factors might involve the state of the economy, interest rates, and financial markets. Political factors include government regulations and policies that affect banking operations. Socio-cultural factors cover societal norms and customer behaviors. Legal and technological factors encompass the regulatory framework the bank operates within and the impact of technological advancements on banking services. **(Kalra, 2016)**
2. **Internal Factors Relating to customers:** These are things that the bank can do something about, and they affect how it deals with consumers. Several factors come into play here, including the availability of staff, their efficiency, their attitude toward clients, and their commitment to the bank. How satisfied and loyal a consumer is depends on all of these factors **(Mishra, 2013)**.
3. **Internal Factors Relating to Organization:** The most fundamental aspects of the bank's internal policies and processes are included in this innermost circle. There are numerous operational factors to think about, such as the bank's location, the design and layout of its branches, the efficiency of its deposit and credit operations, pricing, logistics, relations with trade unions, policies regarding promotions and transfers, corporate goals and policies, and the clear definition of staff roles and duties **(Rachman, 2021)**.

1.4 ASSURANCE OF TRANSPARENCY

Financial institutions must provide transparency to all of their stakeholders. Achieving this level of openness requires financial institutions to pay close attention to the needs of their stakeholders for specific details regarding their policies, processes, and transactions, as well as to provide disclosure that is efficient, consistent, and regular. Invoking confidentiality as a pretext to keep stakeholders in the dark about the situation is becoming inappropriate. By providing financial support for market mechanisms, regulations, and government policies that prioritize sustainability as well as advocate for the comprehensive disclosure of social and environmental externalities, banks possess the ability to bolster the capacity of markets to

promote sustainability. As a result, marketplaces will have an increased capacity to integrate sustainability principles into their operational frameworks. One potential approach to achieve this objective is by establishing markets that possess the capacity to efficiently advocate for sustainability (Morelli, 2018).

DIFFICULTIES ENCOUNTERED BY THE INDIAN BANKING SECTOR

Rural Market

Local and international banks are investing heavily in rural parts of India, which is contributing to the country's stellar reputation for accessibility, diversity, and plenty of services. The Indian financial system is very advanced. When compared to other regional banks, Indian banks are often praised for their higher capital adequacy and asset quality.

Growth of Banking

Smaller financial institutions are encountering challenges within the framework of the global economic system. As a result, these institutions are asking for support in the form of mergers. The expansion of their business operations has been accomplished by a number of private banks via the use of mergers as a strategic instrument. Although most Indian banks have not yet investigated it, rural marketplaces in the country contain a large pool of talent. (Macesich, 2015)

1.5 MARKET DISCIPLINE AND TRANSPARENCY

In view of the shifting environment, Fernando (2011) contends that it is more vital than ever before to integrate internationally acknowledged notions of corporate governance into business operations. These concepts include standards for openness and transparency, among other things. One of the reasons behind this is that the environment is becoming more complicated. This occurs as a consequence of the fact that the size of the environment is growing over the course of time. A circumstance of this kind has materialized as a direct consequence of the growing adoption of these standards. Financial institutions are required to exhibit a heightened degree of customer accountability by delivering timely responses to inquiries from

potential clients. It is incumbent upon financial institutions to furnish thorough disclosures on their balance statements. All of the above data includes operational and profitability metrics, investments in fairness shares, lending activities in sensitive sectors, NPA management, capital and provisions, government shareholdings, investment values in India and abroad, models of mutual funds, bonds, debentures, aggregate advances, and investments in fairness shares.

International Banking

It would be very difficult, if not impossible, for any nation to completely cut itself off from the international monetary system. This means that following India's lead—which it achieved when it welcomed international corporations in 1991—and adopting an integration plan that encompasses liberalization and globalization is crucial for achieving sustained development. As a result of their impact on globalization, local businesses have challenges in competing with international players.

The presence of over 36 international banks in the Indian banking system poses a formidable threat to both public and private sector financial institutions. Indian merchants have access to a wider range of options and better quality services provided by these international banks because of their massive size, technical prowess, and worldwide market presence.

1.6 RESEARCH METHODOLOGY

Research methodology refers to a structured approach for solving research problems, encompassing all the steps a researcher will undertake in their study. This particular study utilized a combination of survey, descriptive, and analytical methods to conduct the research.

1.7 DATA COLLECTION

This study programme used a survey, as well as descriptive and analytical methods. For achieving the objectives of the study primary data collected by constructing questionnaires, and perusing the relevant literature. In addition to this primary data, secondary data collected by visiting various websites, bulletins, published or unpublished sources.

1.8 SELECTION OF SAMPLE:

Categories of banks:

- Public sector banks
- Private sector banks
- Foreign banks

Categories of Respondents:

- Bank Managers
- Bank Staff

For the purpose of carrying out the research, two banks from each of the public sector, private sector, and international banks were chosen for the study based on the total number of bank accounts, respectively. This was accomplished by selecting three states from the northern region of India based on the largest number of bank accounts in each of those states. The three states that make up North India were included in the suggested research. Rajasthan, Punjab, and Haryana are the three states that make up Delhi. An individual district has been chosen from each state based on the number of bank offices that are located there. The suggested districts were chosen using a multi-stage sampling procedure as the foundation for the selection process. A representative selected of six (6) banks, including two (2) public sector banks, two (2) private sector banks, and two (2) foreign banks, has been collected from each of the districts being studied. Within the whole of the 18 bank branches, the units of research were comprised. Based on the questionnaire technique of data collection, eighteen (18) bank managers from each branch and one hundred eighty (180) bank staff members participated in the data collecting process for the intense research. As a result, the sample for the research consisted of 198 individuals who were responders and represented 18 different bank branches. These individuals were from the states of North India.

Table 1.6: Showing the Selection of Respondents for the Study.
(of all the States of the North India)

STATES/UT SELECTED FROM NORTH INDIA (I)	DISTRICTS / CITIES SELECTED FROM STATES (II)	PUBLIC SECTOR BANKS (III)	PRIVATE SECTOR BANKS (IV)	FOREIGN BANKS (V)	TOTAL BANKS SELECTED FOR THE STUDY (III)+(IV)+(V)=(VI)	RESPONDENTS SELECTED FROM EACH BANK (BANK MANAGER =1, BANK STAFF =10) (VII)	TOTAL RESPONDENTS SELECTED FOR THE STUDY (VI)*(VII)=(VII I)
RAJASTHAN	JAIPUR	2	2	2	6	11	66
HARYANA	GURGAON	2	2	2	6	11	66
PUNJAB	LUDHIANA	2	2	2	6	11	66
TOTAL					6	33	198

1.9 RESEARCH QUESTION

1. What are the factors that affect of bank sustainability in the modern Indian context?
2. What factors affect whether public, private, and foreign banks operating in India are financially sustainable?
3. In light of the financial, social, and environmental risks that banks confront in the current Indian context, what are the main difficulties and opportunities in ensuring the sustainability of banks?
4. How are possibilities and ways to access new markets and clients created by the various sustainability risks?
5. What measures have banks done to put in place suitable management practices and systems for preserving sustainability?
6. What effect does the study's analysis of financial, social, and environmental sustainability have on their banking business operations?
7. What motivates Indian banks to review their operations and focus risk management and product development on sustainability?
8. What percentage of the study's sustainability measures for banks has been successful?
9. This study, "Study of Financial, Social and Environmental Sustainability in Indian Banking Sector: A Case of Public, Private and Foreign Banks in North India," was conducted in response to these and other research issues.

1.10 OBJECTIVES OF THE STUDY

1. To identify and analyse the factors affecting banking sustainability in the selected banks.
2. To analyse the financial performance of the selected banks.
3. To examine the financial sustainability of the selected banks.
4. To analyse the social sustainability practices of the selected banks.
5. To examine the environmental sustainability practices of the selected banks.
6. To study the impact of overall banking sustainability practices on the performance of the selected banks.

1.11 HYPOTHESIS

1. H0₁: The factors identified do not significantly affect the sustainability of the selected banks.
2. H0₂: There is no significant difference in the financial performance between the selected banks.
3. H0₃: There is no significant difference in the financial sustainability among the public sector, private sector, and foreign sector banks.
4. H0₄: There is no significant difference in the social sustainability among public sector, private sector, and foreign sector banks.
5. H0₅: There is no significant difference in the environmental sustainability among public sector, private sector, and foreign sector banks.
6. H0₆: Overall sustainability practices do not significantly impact the performance of selected banks.

1.12 IMPLICATION OF THE STUDY

This comprehensive analysis of governmental, commercial, and international banks in India looks at their financial soundness, social impact, and environmental concerns. The CAMEL metrics—accountability, management efficacy, good corporate governance, profitability, and liquidity—define a financially viable business. Prime lending rate, cash reserve ratio, statutory liquidity ratio, repo and reverse repo rates, and other

important financial indicators and interest rates are also analyzed in the research. Product pricing strategies, banking fraud incidences, non-performing asset levels, efficiency of transaction costs, sustainability in the short and long term, claims and liabilities against banks, and customer retention rates are all included in the evaluation. The study also evaluates the current situation of the Indian banking sector and provides insights into recent events. Sustainability is examined in the context of public, private, and international banking, with an emphasis on green and socially good project finance and the associated risks. This study is illustrative, based on selected samples, and inherently comes with its own set of limitations characteristic of sample-based research. In terms of data gathering, various methodologies were employed, including surveys and questionnaires, which could potentially introduce variability in the responses and outcomes, representing a notable constraint. Furthermore, when assessing the sustainability of public, private, and foreign banks, it's imperative to acknowledge that a uniform set of metrics may not be applicable. This is because each bank formulates and executes distinct sustainability strategies across financial, social, and environmental dimensions, necessitating a tailored approach to evaluation.

1.13 CHAPTERISATION

CHAPTER -I INTRODUCTION

The focus of this study is the Indian banking business. Further investigation of the country's complex regulatory structure and financial system is carried out in the report. By exploring a broad range of topics, including asset quality, technological development, the abundance of accessible financial services, and the incorporation of sustainable practices, this article aims to achieve ethical finance while also being socially and environmentally responsible.

CHAPTER -II REVIEW OF LITERATURE

Reviewing a range of academic publications, papers, and research on the subject of financial, social, and environmental sustainability is

essential for comprehending the dynamics of the Indian banking business. This literature sheds light on sustainability practices and challenges in banking through case studies, empirical research, regulatory reports, and theoretical frameworks.

CHAPTER -III RESEACH MEDOTHOLOGY

Through the use of a methodical methodology and design, the research investigates the challenges that have been reported in the banking industry. In order to direct the investigation, the scope of the research is established, which includes the subject matter and the geographical location that is being investigated. Additionally, the investigation's aims are expressed explicitly. For the purpose of putting the findings into perspective, the timeline of the study has been established. In order to carry out an investigation that is both comprehensive and reliable, it is essential to recognize the constraints that the study exhibited. We are able to investigate the complexities of the banking business and arrive at significant conclusions despite the constraints of the study in terms of both its practical and conceptual aspects because of these qualities, which influence the research.

CHAPTER -IV DATA ANALYSIS AND INTERPRETATION

North Indian public, private, and international banks are all assessed in this research for their environmental, social, and financial sustainability. It takes a financial stance, analyzing the banks' profitability, risk profiles, and compliance with regulations. From a societal viewpoint, it analyzes the banks' involvement in the community, their commitment to financial inclusion, and the wellbeing of their employees. The report examines the banks' operational carbon footprint and their participation in green finance from an environmental standpoint. In order to comprehend these banks' alignment with sustainable practices within the North Indian regional context, the research covers a wide range of measures and indicators. Their future preparedness, resilience, and accountability are explored in detail.

CHAPTER-V THEORETICAL IMPLICATIONS

In this section, a concise overview of the results, recommendations, and conclusion is presented.

REFERENCES

APPENDICES

LIST OF PUBLICATIONS

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CHAPTER II

REVIEW OF RELATED LITERATURE

This study of the literature shows that the issue of financial, social, and environmental sustainability in North Indian banks is complicated and affected by different academic views and real-life examples. As the sector changes, these insights can help policymakers, practitioners, and researchers promote actions that are good for society and make money at the same time. The goal of the study is to simplify the tough problems of North India's public, private, and foreign banks' ability to stay in business. For reasons of money, people, and the environment, it's important to know how these groups handle issues and make the most of opportunities that come up. These banks need to follow sustainability policies not only to follow the law, but they might also give them an edge in a market that is always **changing (Doss et al., 201520152004)**.

Penrose first thought of the RBV in 1959. It says that a business is mainly a group of tools. When used right, these tools can help a company do better. Looking at things from this angle will help you figure out how banks can use their special skills to help the environment. If you want to give your business a competitive edge, Barney said in 1991 that resources must be valuable, rare, hard to copy, and impossible to replace **(Mishler & Cole, 2018)**. All of these traits are very important in the very regulated and competitive banking business. Porter first came up with this idea in 1981. It says that the market a company is in and the competition in its field have a big effect on its strategy and how well it does. This theory helps banks in North India figure out how to be more sustainable by combining strengths from inside the bank with forces from the outside market. You can look at banks' attempts to be more eco-friendly in a strong way when you mix RBV and the Theory of Industrial Organization. This method takes into account both the good and bad things about banks on the inside as well as the outside factors that affect their strategies. There are many ways for banks to stay competitive. This piece shows how they can use their unique skills to not

only follow the rules of society and the environment, but also to think of new ways to do business (Morelli, 2018).

Some problems that banks in North India face are unique to that area. For example, the economy grows at different rates, customers have different needs, and the government has strict rules that banks must follow. Public, private, and foreign banks need to manage and share their resources (like money, technology, and skilled workers) in a way that is good for the environment (**Aquique, 2016**). For instance, state banks might put a lot of effort into social aid programs and financial inclusion. They could do this by using their many offices and government backing to reach people who aren't getting enough help. Instead, private banks might focus on new types of money that are good for the environment, such as green bonds or sustainable investment funds (**Jeucken, 2019**).

Indian bank laws are putting more and more stress on sustainability. For example, they require banks to use less energy in their operations and have responsible loan policies. Not only will following these rules help you avoid fines, but they can also make you stand out and give you an edge over other people. For instance, when foreign banks do business in India, they often bring with them the most eco-friendly methods used around the world. This could raise the bar for how companies treat the earth and their social duty (**Rachman, 2021**). When you look at case studies of banks in North India, you can see how ideas from the classroom are used in real life. You can use these cases to see how different sustainable strategies work and to see what resource-based and industry-focused approaches mean in real life. It's possible to compare how sustainable public and private banks are or to look at how the actions of foreign banks change the rules for local banks in this type of study (**Kasztelan, 2021**).

Wernerfelt (1984) and Grant (1996) built on the RBV to show how banks could gain long-term economic benefits by creating their own unique resources, like in-house technology, skilled workers, and ways of running the business. Chisholm and Nielsen (2009) looked into how smart utilization of resources can help companies do better in competitive markets. For Indian

banks, these resources include money and policies that protect people and the environment that are in line with world standards for sustainability.

The natural and social aspects of sustainability are becoming more and more important in how banks run their businesses. Lado, Boyd, Wright, and Kroll (2006) emphasized that resources which are socially responsible and environmentally friendly can also be sources of competitive advantage. In India, where banks are often looked at closely for their role in social justice and protecting the environment, this point of view is very important. Studies by Anand and Singh (2011) have shown that effective knowledge management can enhance these dimensions, improving overall organizational performance.

Research that looks at North Indian banks shows that they have different ideas about how to be sustainable. When it comes to environmental management, private banks are often the first to use cutting-edge technology. On the other hand, public banks are more focused on social issues because they are supposed to serve larger community goals. Of course, foreign banks bring with them world standards that set the bar in both areas. The way these different methods work together makes for a rich area for study and learning.

Grant (1996) and Lockett (2005) talk about the knowledge-based view (KBV) of the company, which says that knowledge is an important strategic resource. This point of view is especially important in the banking industry, where managing information can help with better risk assessment and customer relationship management, which are both important for long-term business. Executing knowledge management techniques may aid in the achievement of a more sustainable environment, according to many experts, including (Nonaka et al. ,2000). It could happen that banks will be able to better match their operations with their sustainability goals if they go further.

2.1 FINANCIAL SUSTAINABILITY PRACTICES IN INDIAN BANKS

"The Impact of Capital Adequacy on the Financial Sustainability of Banks in India." was a study co-authored by Singh, V., and Kumar, N. (2017). The long-term reliability and security of Indian banks' financial systems are going to be examined in this research to see how the capital adequacy ratio (CAR), which is mandated by Basel III regulations, affects things. An increased CAR, as stated in the article, ensures that financial institutions are more robust because it increases the likelihood that banks can withstand a certain level of loss before failing. To keep the trust of consumers and purchasers, especially in times of economic uncertainty, it is crucial to meet this need. Having adequate reserves of cash is crucial for financial institutions to ensure their continued performance over the long term, especially since the northern Indian economy is known for its volatility (Singh & Kumar, 2017). Quantitative methods are used by public, private, and global financial institutions to determine whether their adequate capital measurements are related to financial stability indicators including revenue, availability, and credit risk. It is done with the intention of discovering whether the two are related.

"Risk Management in Indian Banks: The Differences between Public and Private Sectors" was published by Gupta and Singhal (2018) provides information that clarifies the several risk management approaches used by the nation's public and private banks. There is a clear difference between public and private sector banks when it comes to risk control strategies, with the former being more active and innovative. This is the result that they achieve. This includes lowering functioning, market, and credit-related risks via the use of sophisticated analytics and risk modeling tools. Based on the way they manage and regulatory framework, public banks are known to be conservative when it comes to risk management, according to the report (Gupta & Singhal, 2018). Faster growth is a top priority for private banks compared to public ones, and therefore they must be more careful with risk. This is similar to the situation with banks that are owned by the

government. There are major differences between the two, and these distinctions impact banks' capacity to remain in business. This is due to the fact that enhanced safety and reduced losses are outcomes of organized risks.

One of J. Patil's (2009) "Effects of Regulatory Changes on the Financial Sustainability of Banks in India" Most of Patil's work is devoted to events that followed the 2008 global financial crisis and how those events prompted modifications in financial regulation in India. India was the site of Patil's research. Some of the improvements include increased monitoring standards, stricter capital requirements, and the adoption of liquidity regimes. To meet the new regulations, this essay will investigate how banks in Northern India have altered their operations. Regardless, banks and other financial organizations are still focused on making money and staying ahead of the competition (**Patil, 2009**). The author contends that although these laws have brought about price increases for many goods and services, they have also contributed to a more secure financial situation by discouraging people from taking unnecessary risks.

"Managing Non-Performing Assets: A Study of Public Sector Banks in India" and it was written .(Kaur, I2009). Kaur is the author of the piece. The released piece of writing was written by Kaur. In her study on public sector banks, Kaur talks about the important topic of non-performing loans (NPAs). The banks are having trouble making money because of this problem that has been bothering people for a long time. Kaur's main goal with her study is to find possible answers to this issue. The purpose of this probe is to find out how public banks handle and bring back to life their nonperforming assets (NPAs). Getting out of debt, selling property, and making assets are all methods that can be used in this category. All of these methods could be seen as examples of this type of approach (**Sahoo et al., 2019**). Having enough capital and cash on hand is important to make sure the business can keep running smoothly. How well these methods work is the most important thing when it comes to having enough capital and cash on hand. There are ideas in this paper for how to better manage things that aren't working as planned. Some of the ideas are to use advanced analytics to find

loan failures early and to set rules that will make it easier to get the money back.

"Strategic Responses to Economic Liberalization in North India: A Comparison of Banking Models," was written by **Mehta & Shah (2020)**. The goal of this study is to look into how economic independence has changed the ways that state, private, and foreign banks in North India make decisions about their future. By doing this, it shows how freedom has helped global banks come up with new products and ways to sell them. To fix this problem, local banks have had to think about how they normally do business. Because of these competition measures, the writers look into the factors that have helped the economy stay healthy over the years. For banks to keep their profit margins and customer bases stable, they have had to improve the operating efficiency of their businesses and the range of services they offer—this is something they pay close attention to.

Chandra and Agarwal (2021) published under the title "Technology Adoption in North Indian Banks: A Route to Financial Sustainability." In order to research the ways in which technological advancements have impacted the operations of banks in Northern India, the goal of this study is to analyze the ways in which these innovations have made the banks more competitive and sustainable. Digital financial systems, mobile banking, and blockchain technology are some of the technologies that Chandra and Agarwal are interested in for the future. The delivery of services has been much enhanced, and the amount of money spent on operations has been cut down significantly thanks to these technologies. In accordance with the viewpoint that is presented in the article, technology advancements have made it simpler for financial institutions to reach a greater number of consumers, particularly those who dwell in residential regions that are situated in rural areas for the most part (**Agarwal, 2021**). The number of people who can use financial services has gone up, which is an important part of making banks affordable. This rise is a direct result of what has happened. Financial institutions can find fake behavior and decide if someone is creditworthy much more easily thanks to fintech solutions. Because these solutions were put in place, these companies have also been able to improve

how they handle risks. In order to show that financial institutions that have successfully adopted technology are less vulnerable to the effects of changes in the economy and have more growth possibilities, the piece talks about examples from real life (**Chandra, 2021**).

"CRM Practices in Indian Banks and Their Impact on Financial Sustainability" is the name of the project that **Singh and Dhir (2020)**. Based on customer relationship management (CRM) techniques, Singh and Dhir are now doing a study on how well North Indian banks can run. This is an example of how a well-set up CRM can bring in more customers and keep them coming back. A lot of CRM (customer relationship management) ideas are talked about in this piece. Many different methods have been used by financial institutions to keep customers coming back and make them happier. One type of technique that falls under this one is personalized service. Others are managing award programs and building customer feedback systems. This study says that banks that have good customer relationship management (CRM) tools make more money (Dhir, 2020). It's cheaper to get new customers and there are more chances to sell to people who already buy from you. Since this is the case, this is why it's done that way. Another thing that banks that have good CRM systems can do is offer better financial products and services that are tailored to each customer's needs. This helps banks learn more about what their customers want and need.

"Corporate Governance and Its Impact on Financial Sustainability in the Indian Banking Sector" was written by **Verma and Gupta (2016)**. Verma and Gupta's study looks in detail at how good corporate governance processes in North Indian banks help people keep their money safe. It is set up so that this study is a full review. This study is mostly about corporate governance, but it also looks at things like accounting, safety measures, moral standards, and the make-up of the board of directors. The writers believe that banks with strict governance standards are more open and responsible, which attracts more investments and boosts trust among stakeholders. From their point of view, this fits with what they believe. That is not all (**Gupta, 2016**). A study also found that good government makes bad things less likely to happen. Sets like these make it possible for financial

companies to follow the rules and act responsibly. Disasters and theft of money are stopped, which are two things that could hurt banks' safety and well-being in the long run.

"A Study of Rural Areas in North India" is the name of the paper that **Joshi and Kumar (2009)**. The study is called "Financial Inclusion and Its Impact on the Financial Sustainability of Banks." People in rural and underdeveloped places are better able to handle their money when banks help them. That's why this study looks at how well attempts to make the banking system more open to more people work. More specifically, the study's purpose is to discover how much cash these jobs bring in. This study's goal is to find a degree of impact that will help us figure out how much these actions change the situation as a whole. Joshi and Kumar talk about what they could do in their current situation. We'd like to use this talk to help people who live in rural places (**Joshi, 2009**). These kinds of strategies can be seen in the growth of microfinance offices, the availability of service-free accounts, and the launch of mobile banking services. All of these things have been brought to the front. Researchers found that these efforts not only make life better for people, but they also keep financial companies safe. This is a very important extra. There are several ways to meet this goal, such as giving these groups more ways to make money and making them less dependent on standard urban markets. Financial inclusion also makes it easier to get new loans and save more money, which are both good for banks that want to grow and stay open for a long time. When more people use banks, more money is saved (**Kumar, 2009**).

"Adoption of Global Financial Practices by Foreign Banks in India and Their Impact on Local Markets" was written by **Malik and Vohra (2020)**. In their study of the North Indian banking business, Malik and Vohra look at how the use of international financial rules and processes by foreign banks has changed the field. There is a lot of information in the study about a lot of different projects that big global companies have started working on. As part of these efforts, companies must follow Basel III rules, put in place different corporate control models, and use cutting edge risk management strategies. The main point of this study is that local banks have had to raise

their standards in answer to the new practices if they want to stay ahead of the competition. There are many reasons why the banking system is more financially stable now. Some of these are more openness, better management of cash, and more thorough risk assessments. The writers then talk about the good and bad things that happen when local banks try to follow these foreign rules. If global banks want to stay ahead of their rivals, they need to follow these rules.

2.2 ENVIRONMENTAL MANAGEMENT AND GREEN BANKING INITIATIVES

"Integration of Environmental Strategies in Bank Operations" say that the piece was written in the year 2020. Gupta and Verma(2020) have spent most of their study time looking into how banking institutions in northern India are adding measures to protect the environment into their daily operations. In their study, they look into the many other ways that financial companies are making environmentally friendly practices part of their daily work. These options include getting rid of paper deals and building branch plans that use less energy, among other things. The purpose of this study is to find out how important these environmentally friendly activities are in order to lower operating costs and improve the public's view of banks as environmentally friendly businesses **(Gupta ,2020)**. Using technologies like eco-friendly company buildings and solar-powered ATMs has helped financial institutions cut down on their carbon loads by a large amount. Within the scope of this article, well-known case studies that show this point are being talked about. This section has case studies that show how the businesses listed above lessened the damage they did to the world. What makes this study important is that it shows how effective and useful environmental management can be in the real world, especially in the banking business **(Verma, 2020)**.

Singh and Patel (2021) piece "Regulatory Influence on Green Banking" was made public. Singh and Patel, the authors of this study, look at how legal systems affect the development of environmentally friendly banking practices in Northern India from their own point of view.

Additionally, they pay special attention to the place in Northern India. They look into the effectiveness of the restrictions put in place by the Reserve Bank of India to get financial institutions to use methods that are better for the environment on a more precise level (Singh,2021). The point of this study is to get banks to use cleaner methods. During the study, both the problems banks face when trying to follow these rules and the ways that these rules have changed the ways banks do things are studied and talked about. During the course of their study, Singh and Patel look at all policy papers and bank reports to bring attention to how the regulation environment is changing and how that is affecting the growth of sustainable banking practices. This review is done to draw attention to the fact that regulations are always changing. The information they found showed how important it is for banks to be able to move toward green banking in a setting that is friendly to those changes (Patel, 2021).

Mehta and Kaur (2020), the study " customers Perception and Demand for Green Banking" came out in 2014. In the northern part of India, Mehta and Kaur look at how people's views on green banking change over time and how these views affect the demand for green financial goods. More specifically, they check out how people feel about green banks. Just to be clear, they work mostly in the northern area. They use poll results to find out what buyers know, what they want, and how much they are willing to pay for banking services that are good for the environment (**Mehta, 2020**). They really care about making sure their clients know more about the world. Their research shows that customers are paying more attention to environmental problems, which changes how they spend their money. From the study, we can learn some good ways that banks could change their eco-friendly products to meet the needs of their customers better and get more eco-friendly customers (**Kaur,2020**).

Chopra and Joshi's (2020) book "Comparative Analysis of Green Banking in Public, Private, and Foreign Banks" Chopra and Joshi are doing a thorough comparison study to find out how public, private, and foreign banks in North India handle eco-friendly financial practices. The study gave them more

information about the various methods utilized and how well these methods perform in various banking areas. They look at a number of case studies and then talk about the pros and cons of the sustainability method used by each area. Why is the study important? Because it will help you learn more about the green banking obstacles and opportunities that are specific to your business. In this way, we can learn more about the different ways that the banking business can be more environmentally friendly.

"Impact of Green Banking on Bank Performance" should be printed and sent out in 2020. **Roy and Sharma(2020)** talk about how they are doing study to find out if there is a link between green banking actions and how well different banks are doing financially generally. Their study looks into how sustainable practices affect how much money financial institutions make, how well they handle risk, and how well they are known in the market. Quantitative research is used to make this happen. The writers show that banks that operate in an environmentally friendly way tend to have better financial health and be less affected by changes in the economy (**Roy, 2020**). They do this by looking at financial data and performance measures. This is clear because these banks tend to help protect the Earth. This research is important because it shows that green banking is not only good for the environment but could also be a win-win situation in the increasingly competitive banking business. Green banking is very important, and this shows why(**Sharma, 2020**).

"Barriers to Implementing Green Banking" was written by Kumar and Singh (2018) . In their study, Kumar and Singh found the main problems that are stopping Northern India from implementing environmentally friendly banking practices that work. The study talks about all of these problems. Based on what they found, these issues can be broken down into four separate groups: technical, legal, financial, and culture. The people who wrote this study look at how these problems affect the success and acceptance of green projects by talking to bank leaders and reading thorough bank performance reports (Kumar,2018). In particular, they look at how these problems affect the spread of green ideas. Two things that worry them a lot

are that smaller banks don't have up-to-date technology facilities and that older users do not want to learn how to use new banking technology. These are both things that make me worry. People from many different backgrounds need to be involved in the research, and a lot of money needs to be put into technology. The study also gives ideas for how to deal with the problems that might come up (Singh ,2018).

"Technological Innovations in Green Banking" by Agarwal and Malhotra (2021). The writers, Agarwal and Malhotra, look into how important it is for technology progress to help environmentally friendly banks grow. The goal of their study is to look at how cutting-edge technologies like blockchain (which aims to make green finance more open) and AI (which aims to improve resource management) are used and what effects they have. Both tools are on the cutting edge of their fields. Case studies of financial institutions that have successfully used digital solutions are looked at by the writers to show how revolutionary these technologies can be. Consequently, this helps lessen the damaging impacts that digital solutions have on the environment and raises the efficiency of operations. Nevertheless, the article also discusses the complications that arise from putting new technology into place. These difficulties include, but are not limited to, the high price of getting started and the need for education and training. Then the article shifts into presenting a number of potential solutions to these problems. (Agarwal,2021).

The article "Green banking and corporate social responsibility (CSR)" by **Bhatia and Reddy (2019)** is an open-access article that anyone can download and read. In this article, the two scholars focus on North Indian banks and their look into the relationship between green banking initiatives and corporate social responsibility (CSR) activities. This study highlights how banks use CSR initiatives to contribute to the natural environment. CSR programs have two critical components, community service and world-saving projects, both of which aim to help not only the immediate environment around banks but also the bigger global community. However,

the world-saving project program was more impactful than the community service programs.

The main purpose of this study is to evaluate whether the reputation and the "social license to operate" of leading financial institutions can be improved by their corporate social responsibility (CSR) initiatives. Specifically, Can CSR, as pursued by big global banks, really co-exist with "green banking" principles – the idea that the social and environmental risks of a bank's business should be contained? From there, we can see that it's going to be very complicated. Then we can see how this could work for us if we get them both working on it (**Bhatia & Reddy, 2019**).

Jain and Gupta (2022) gave birth to a publication they called "Sustainability Reporting in Green Banking," which was made available to the public in 2022. In their research study, these two scholars emphasize the importance of sustainability reporting in the context of green banking. Here is a part of their work: "Sustainability reporting has come a long way since that first ground breaking and voluntary account in 1975. The number of companies around the world that report on their sustainability performance has increased many times over."

This article was penned by Jain and Gupta (2020), and it examines the Northern Indian banking system. Their examination is divided into two parts. The first part looks at the method by which North Indian banks make their environmental initiatives known to the public. The second part of the study delves into the results of these disclosures and their effect on stakeholder investment. While the first part uses data collected through banks' public relations machinery as its main source, the second part depends on interpretive analytical workouts to interpret the impact of the announcements. The authors critically analyze the current methodologies used to report on sustainability. They find these methods seriously flawed. They list two areas of concern: first, a lack of consistency from report to report and from industry to industry; and second, a worrying lack of detail that can lead to a serious misunderstanding on the part of stakeholders. The authors also note that while the conversation surrounding these flaws is

serious and well-founded, they are not convinced that the same amount of serious dialogue is taking place regarding the overall interpretation of the results.

Additionally, they do not provide enough information. Several suggestions for improvements are provided on the basis of the findings of the study. These suggestions have a chance to result in reporting techniques that are not only more effective but also more open to inspection. Increasing openness and providing investors and customers with the ability to make choices that are better informed are two possible outcomes that might result from the implementation of these principles. Neither of these scenarios is a foregone conclusion; yet, both are also possible outcomes (Gupta, 2022).

"Global Trends in Green Banking and Lessons for Indian Banks" book, Sharma and Iyer wrote in the year 2023. The study & observations that they made served as the basis for this paper. Within the scope of this essay, Sharma and Iyer investigate the present situation of green banking around the globe and arrive at findings that may or may not apply to the Indian context. The discussion of these findings takes place across the whole of this work. As part of their comparative investigation, they want to look at financial institutions in both Europe and East Asia that have successfully adopted efficient procedures. To be more specific, they are interested in researching these establishments. The completion of extensive environmental risk assessments and the manufacture of new products that are helpful to the environment are two instances of the efforts that are being made (**Sharma , 2023**). As part of the scope of this project, an investigation is being carried out to establish the various ways in which these methods may be modified to make them suitable for use by banks in North India. Additionally, integration solutions are proposed, and any potential issues are identified. This is in spite of the fact that solutions are provided. This research aims to provide policymakers and bank strategists with knowledge to increase the effectiveness of green banking activities by drawing on experiences from other countries. This will be accomplished by collecting data from other

countries' experiences. The knowledge gathered from other nations' experiences will be used to reach this goal (**Iyer, 2023**).

"Green Banking & Risk Management" is the name of the book by Narayan and Mathur (2021). Everyone will be able to get the book. Narayan and Mathur look at the effects of doing environmentally friendly banking actions in North Indian banks in the context of risk management. In particular, they look into what these behaviors mean. More specifically, they think about what will happen because of these government programs. The point of their study is to look into all the different ways that environmental problems are being incorporated more and more into how financial companies evaluate risk. This is why they are looking into it. The writers of this essay give an outline of the possible advantages that could come from a combination like this one (Narayan,2021). This review lists several benefits, including a greater reduction in risk and greater financial safety over a longer period. The piece also discusses the challenges that arise when combining traditional risk management methods with environmental sustainability goals. The piece talks about this argument. The study also tells financial institutions how to strike a balance among the different things they are considering (**Mathur, 2021**).

The public will be able to read a book called "Financial Inclusion through Green Banking. Lal and Kapoor (2020) will be in charge of getting this book to people. Lal and Kapoor are conducting further research to understand how green banking projects could help more people in Northern India access money. The study's findings show that eco-friendly financial goods, especially those aimed at low-income groups, could help promote long-term growth and make more people eligible for financial services. This is particularly true for goods meant for groups that aren't well-represented in the market yet. The authors of this piece discuss several banking options that are good for the environment, easy to access, and helpful for people with low incomes. It is supposed to be easy for people to get these things. Putting these things together was meant to be eco-friendly. These things are being studied

to understand how they change people's money knowledge and how they affect the community as a whole **(Lal & Kapoor, 2020)**.

"Green Banking Training and Employee Engagement," book, Khanna and Verghese (2019) both worked together to write this. Khanna and Verghese are widening the scope of their study to examine how staff participation and training affect the implementation of environmentally friendly banking practices. What they found in their study makes it very important for workers to have access to training classes that cover a wide range of topics. The information and skills taught in these classes should help workers support and run green environmental projects as effectively as possible. The study also discusses some great things workers can do to help make banking companies more environmentally friendly. The study finds that giving people more power may be the main reason why green banking tactics work. This is clear from the poll. That this is the case is clear from the fact that the study is mostly about the best ways to do things **(Verghese ,2019)**.

2.3 ENVIRONMENTAL AND SOCIAL RESPONSIBILITY AND COMMUNITY ENGAGEMENT

State Bank of India (SBI) is primarily concentrating its research efforts on green banking and investments in renewable energy as its key areas of examination. By emphasizing the company's investment in solar energy projects, Gupta and Kumar (2019) highlight the State Bank of India (SBI) 's commitment to operating sustainably in the banking industry. Not only does this initiative bring attention to the part that SBI plays in promoting renewable energy, but it also exemplifies the wider strategy that SBI has chosen in order to include environmental issues in its financial products. SBI has high expectations that by taking this action, it would be able to significantly reduce its carbon footprint and make a contribution to the global efforts that are being made to address climate change (Gupta,2019). Furthermore, it has been shown that these investments increase SBI's sustainability key performance indicators (KPIs), thereby positioning the corporation as a pioneer in green banking in India. These actions not only

have a nice effect on the environment, but they also affect social views and the consumer's trust in the institution. The positive outcomes of these activities permeate every aspect of an organization, especially those that have a direct line of sight to consumers. Our goal is to demonstrate that we can truly make a difference in the world. As the chief executive of the Oceans Conservancy said, "When you clean up the ocean and everything that's touched by it, you also clean up human society." (**Kumar ,2019**).

The main research focus of HDFC Bank is community service and involvement. The study conducted by Mehta and Shah (2021) highlights the sturdy strategic approach that HDFC Bank is adopting in the area of corporate social responsibility. What is paramount for this initiative is the community involvement that the bank is cultivating. The push is on to draft the maximum number of people from "its system" (employees, stakeholders, and network communities) and carry forward this system. The service projects are typically not just charity but also involve improving the economic conditions of the project area, with a special emphasis on education and healthcare, which are the two supreme public goods that any private bank involved in CSR can provide. **Mehta and Shah (2021)** use the term "projects" for these initiatives and outline three routes to developing them and three strategies to maintain their steady growth.

The research primarily focuses on the consortium of banks known as Standard Chartered and how they apply environmental standards to their local activities. Chaudhry and Singh (2020) specifically study the Indian operations of the bank and evaluate just how effective Standard Chartered's adoption of "world class" environmental management methods has been in reducing the ecological footprint that the bank has historically left behind. Moreover, the researchers' inquiry shows that the bank's embrace of international environmental standards, established via global agreements (to which India is a signatory), is not an empty gesture. It affects the lives of the countless citizens in whose daily existence the bank is now embedded. Perhaps most important of all, the study reveals that the bank's application of these internationally recognized environmental best practices has proven

beneficial not just to citizens' environmental health, but to the bottom line of the bank itself (**Chaudhry & Singh, 2020**).

Punjab National Bank (PNB) has increasingly prioritized conservation and sustainable agricultural financing within its broader environmental responsibility framework. Through specialized green credit instruments, concessional agricultural loans, and targeted rural development schemes, PNB actively supports environmentally sustainable farming practices. These financial mechanisms enable farmers to adopt soil conservation techniques, efficient irrigation systems, and climate-resilient agricultural models. The impact of such initiatives is twofold: first, they contribute significantly to the preservation of natural resources and reduction of ecological degradation; second, they strengthen regional food security systems by reducing vulnerability to localized famine and hunger-related crises (Sharma & Mehta, 2021).

Similarly, ICICI Bank has focused extensively on waste management and energy optimization across its operational network. By integrating digital banking infrastructure, implementing paperless administrative systems, and adopting energy-efficient technologies across branches, the bank has reduced its operational carbon footprint. These sustainability-driven administrative reforms demonstrate that environmental responsibility can be aligned with financial efficiency. The measurable outcomes—such as the establishment of zero-waste operational zones and a documented reduction in energy consumption—reflect the institution's commitment to sustainable banking practices (Iyer & Kapoor, 2022).

Research conducted on Citibank primarily examines Environmental, Social, and Governance (ESG) reporting and its implications for corporate governance transparency. A study by Lee and Jain (2017) critically analyzed how Citibank communicates its ESG initiatives through annual sustainability and public disclosure reports. Their findings suggest that while ESG reporting enhances institutional transparency and stakeholder engagement, concerns remain regarding the depth and authenticity of such disclosures. Critics often describe certain forms of ESG reporting as symbolic compliance

or “greenwashing,” where routine corporate practices are framed as sustainability achievements without substantial structural transformation. These critiques highlight the need for rigorous evaluation of the actual social impact of corporate sustainability programs (Lee & Jain, 2017).

Axis Bank’s research focus centers on sustainable finance and ethical lending practices. Studies indicate that the bank has progressively integrated environmental and social risk assessment into its credit appraisal mechanisms. Long-term sustainability initiatives, including structured green financing projects and policy commitments toward responsible banking, demonstrate its institutional shift toward environmentally conscious financial intermediation. Strategic programs led under internal sustainability leadership initiatives further reinforce the bank’s objective to position itself as a responsible and environmentally committed financial institution (Verma & Kulkarni, 2023).

Yes Bank has emphasized carbon footprint reduction and environmental sustainability through the implementation of structured environmental management systems such as ISO 14001 certification. Malhotra and Gupta (2020) argue that prior to adopting standardized environmental frameworks, monitoring and mitigation mechanisms were fragmented and insufficient. However, post-certification, the bank established systematic sustainability metrics, improved regulatory compliance, and enhanced brand credibility in environmentally sensitive markets. These developments illustrate how institutional sustainability frameworks can strengthen both operational efficiency and corporate reputation (Malhotra & Gupta, 2020).

A study examining Kotak Mahindra Bank highlights the strong interrelationship between corporate social responsibility (CSR) and community development initiatives. According to Singh and Raj (2019), the bank’s CSR framework strategically prioritizes investments in public health and education as foundational pillars of socio-economic empowerment. These sectors are considered critical pathways for poverty alleviation, as improved healthcare infrastructure enhances community resilience while

access to quality education promotes skill development and employment opportunities. In a country where large segments of the population face healthcare disparities and limited educational access, targeted CSR interventions in these domains contribute meaningfully to long-term social mobility and inclusive growth (Singh & Raj, 2019).

Similarly, the Bank of Baroda emphasizes energy conservation and sustainable banking operations as central components of its environmental strategy. Analytical assessments indicate that the bank has implemented energy-efficient technologies across its branch network, reducing electricity consumption and operational costs. Such initiatives not only enhance financial efficiency but also support broader environmental objectives, including greenhouse gas emission reduction. The bank's comprehensive sustainability plan integrates infrastructural reforms, staff training programs on environmentally responsible practices, and stakeholder engagement strategies aimed at minimizing energy usage. These systematic measures reflect an institutional commitment to aligning banking operations with sustainable development principles (Kumar & Desai, 2021).

2.4 PROFITABILITY OF THE NORTH INDIAN BANKS

Gupta and Kumar (2021) have written and titled "Impact of Digital Banking on Profitability" is scheduled. This research aims to look into and understand the numerous diverse factors that have made digital banking a revolutionary force for banks in North India. One of the most significant aspects of this revolution is that it is inclusive; it spreads its reach across the entire populace. However, even as a revolution, it is led by only a few banks, primarily the State Bank of India (SBI) and ICICI Bank. Gupta and Kumar's research has established that financial companies that have made big investments in digital infrastructure and solutions—examples of which include online transactions and mobile banking experiences—see big payoffs. A large part of returns to such investments comes from more profitable undertakings: There is a noticeable enhancement of client access that has accompanied an increase in the overall number of digital transactions, says Gupta. At the same time, the company has managed to

reduce operating expenses. Furthermore, the results of this investigation illuminate the major role technology will likely play in shaping the banking industry's future profits **(Gupta & Kumar, 2021)**.

The article titled "Influence of Regulatory Changes on Bank Profitability" was the first publication by Mehta and Joshi. Their research deals with the primary and recent subject of changes in bank regulation by the Reserve Bank of India. That work analyzes the many reforms being implemented and concentrates on two of the most important: revised, tougher loan quality guidelines; and a mandatory increase in the capital requirements for all banks. Even though these laws initially put a strain on the profitability of the banks as a result of rising compliance costs, the results of their investigation indicate that they have also contributed to the formation of a banking environment that is more stable and concerned with avoiding risk. This is due to the fact that the regulations have resulted in an increase in the expenses of compliance between the government and different banks (Mehta & Joshi, 2022). These regulatory frameworks are expected to, over the course of time, lower the risks that are associated with excessive leverage and poor asset quality, therefore increasing the profitability of banks in a way that is both sustainable and long-lasting. This is the intention of the regulatory frameworks.

"Effects of Non-Performing Assets on Profit Margins" is the title of the book that Singh and Patel (2020) want to write. This book is going to come out. To find out why non-performing assets (NPAs) hurt the bottom line of banks and other financial institutions, this study's main objective is to ask what causes these problems. Singh and Patel have seen that profit margins get much smaller as the share of non-performing assets to overall assets goes up. What happened is that higher levels are linked to higher support needs, which is what led to this situation. The results of their study give us useful information about how to handle non-performing assets (NPAs) more effectively. NPAs are assets that are not working as planned. These methods include bold debt recovery and reorganizing bad debts.

Putting these plans into action could make banks' finances a lot better and help them get back to making money.

"Role of Corporate Governance in Enhancing Bank Profitability" was the title of the paper that Chopra and Malhotra (2019) helped get published. Chopra and Malhotra wrote this paper. They say that banks need good corporate governance in order to make more money. They think it's important because it is part of the process. What their study found is that there is a direct link between open government, business growth, and good government. This is the only statement that can be made based on what they found. These people believe that strong governance systems help cut down on financial crimes and build trust with customers, which in turn leads to better management of capital and bigger profits. This is an idea that they have.

"Impact of Interest Rate Changes on Profitability," Khan and Raghav (2023), said the following: The main goal of the study is to find out how companies are affected by changes in interest rates. To make matters worse, it will also look at how rich banks are. Khan and Raghav look into the idea that banks that have more loans with variable rates might make money when interest rates go up and banks that have more loans with fixed rates might lose money. Khan and Raghav's ideas led to this point. What the study showed is that banks need to use advanced asset-liability management techniques to protect their profits from changes in interest rates. They wrote a piece together that year called "Prosperity of Banks and Economic Downturns." They looked into what happens when the economy is bad and found that banks with branches all over the world and a lot of different kinds of assets are less affected by bad economies in their own zones. They learned this from their study. Their study shows that having a lot of different things and places to shop can help banks stay open when the economy is bad. So, this helps them keep making money.

Narayan and Sharma (2021) wrote an article with the title "customers Service Quality and Its Impact on Profitability." Narayan and Sharma investigate the evident connection that exists between the level of

customers care provided by banks and the profitability of such institutions. In particular, they concentrate on the connection that exists between the two terms. They found that providing excellent customers service leads to higher success in cross-selling services as well as enhanced customers retention rates. This was one of the outcomes of their research. A considerable amount of the increase in profitability that banks enjoy may be attributed to both of these causes. It is crucial for firms to make the most of opportunities to enhance customers service as a viable business strategy, as shown by the findings of this study in the field of business.

"Technological Innovations and Their Economic Impact on Banks" Written In Iyer and Kaul (2019).The point of this study is to find out how much new technologies like bitcoin and artificial intelligence have changed the banking industry's bottom line. Iyer and Kaul say that using these technologies lowers running costs and creates new income streams, which leads to higher profits in the end. To be more specific, the study examines how technological advancement is important for the success of financial companies like banks in the future.

"Market Competition and Profitability" is the topic that Bhatia and Lal (2022) want our attention on. Bhatia and Lal conclude that more competition in the market not only pushes financial institutions to keep coming up with new ideas, but it also makes profit margins tight. Based on their analysis of the economic situation, they have come to this opinion. The study they did looks into a number of different ways to stay ahead of the competition without losing money. Some of these tactics are using specialized markets and giving each person banking services that are made just for them.

Roy and Singh (2020) talk about how important human capital is to success in the banking business. In this study, Roy and Singh look at the connection between how profitable a bank is and how much it invests in its employees. In particular, they look at how profitable banks are. This study's findings show that financial firms that spend more time helping their

employees learn and grow are able to make more money and be more productive. The results of this study show that human capital is a useful tool that can help banks do better overall and make more money. Human capital is a very important part. So that all the things that affect the success of North Indian banks can be properly looked at, each study should be made as big as it can be. By digging deeper into these topics, we can find out more about how things like going digital, new rules, managing assets, and strategy innovation affect the money of these organizations. It is not only how well the business runs, but also how much money it makes. This is because each part impacts the economy, which in turn impacts revenue in a number of ways. This study shows how hard banking can be and how important it is to be able to change with the times because the market and technology are always getting better.

NPAS of The North Indian Banks

The term "NPA influence on profit margins" was used by Kannan and Mehta (2018) for their article, which is also the focus of their investigation. After carrying out a study, Kannan and Mehta discovered that there was an extremely weak negative correlation between Non-Performing Assets (NPAs) and profit margins. This was how the situation appeared to them after studying the matter in depth. They employed a decade-long investigation to gather data from banking entities in northern India. The figures were then thoroughly analysed. The investigators noted that two important economic downturns—the global financial crisis of 2008 and the regional recessions of the 2000s—could be used as models for understanding NPA problems in Indian banks. Over the course of these economic downturns, the number of nonperforming assets (NPA) rose significantly. This made it even harder for banks to make money. Based on their research, they found that bigger NPAs cause higher support costs, which in turn have a direct effect on making money. Because of their research, the researchers came to this conclusion. In order to reach this goal, they use two different methods: regression analysis and trend analysis. Furthermore, the study looks into the maximum amount of non-performing assets (NPAs) that, if reached,

would significantly affect a business's ability to make money. On top of what was already said, this is another point. Because of this, financial institutions are given critical information about the basic quality standards for assets that they must meet. There is a lot of useful information in this study for financial experts and bank managers who are trying to come up with ways to make more money even though nonperforming assets (NPAs) are going up. This information will be very helpful for people who work in the banking business.

Sharma and Singh (2019) wrote was called "Regulatory Responses to NPAs". There are more and more loans that aren't being paid back, the following things happen: They say that the Reserve Bank of India (RBI) has made big changes to the rules that Sharma and Singh are worried about. Because the number of NPAs keeps going up, these changes had to be made immediately. They maintain a record of the dates on which legislative amendments have happened in order to facilitate the research that they are doing. Not only do these dates cover the dates on which more restrictive financing constraints were established, but they also include the dates on which the framework for restructuring stressed assets was developed. In order to provide a comprehensive analysis of the ways in which these new rules would impact the financial and commercial health of banks in the short term as well as in the long term, the objective of this paper is to provide an in-depth evaluation of the situation. The amount of money that is necessary to comply with the standards is not the only factor that they take into consideration; they also take into account the impact that the rules have on operations and the degree to which they are able to successfully control the expansion of assets that are not running as intended. Additionally, the research raises issues about whether or not these efforts are sufficient to address the true causes of NPAs, and it proposes areas in which extra regulatory assistance may be required. The study shows that both of these things are true. There is a lot of information in this book about these two ideas.

"Management Strategies for High NPAs" by Patel and Kumar (2020). It is very important that you do something like this. Patel and Kumar

did a large study that looks at many things, such as the different ways that North Indian banks deal with non-performing assets (NPAs). This job was done by Patel and Kumar. As part of this process, companies that deal with assets as their main business are hired to fix up assets and reorganize debt in a smart way. There are also a lot of other ways added. The study says that the things that have been thought to be helpful are the ones that have been shown to lessen the bad effects of high NPAs. Case studies and performance reviews can help you reach this goal. The study's findings show that using a number of different methods could lead to a number of different outcomes. It also tells financial companies how to pick and use the best ways to handle assets that aren't making money. In terms of getting rid of non-performing assets (NPAs), it also talks about what new financial tools and public-private partnerships might be able to do. It talks about the chances of getting involved and the chances of getting to know other people.

Jain and Gupta (2022) called "Economic Impact of NPAs" was looked at. This study by Jain and Gupta looks into what happens to the economy when there are a lot of non-performing assets (NPA). There are many ways to consider this issue. For starters, they make it more challenging for banks to lend out money, which in turn makes it harder for companies of all sizes to access credit. Using some sophisticated math, one can also see how harmful NPAs are to the economy, affecting not just the banking sector but many other businesses as well. In order to reach their investigation's goal, this was done. It can be harder for people to get credit when there are a lot of large nonperforming assets (NPAs). This can slow down economic growth. They can also make people not spend money or think of new ideas in areas that are good for the economy. This is because it is harder to get credit when they are around. They cannot give money because things that aren't being used hold them back. Based on what the study showed, this is the truth.

Chopra and Das (2022) wrote something together that was called "NPA Resolution Mechanisms. "In their study into how well different approaches work, Chopra and Das look at a number of different ways that banks deal with loans that are not being paid back (NPAs). The Insolvency and Bankruptcy Code (IBC) is one of these rules. What took place changes

how banks in North India handle their bad loans (NPAs). As part of this study, researchers look at how well and how long different treatments help NPA get better. In-depth case studies are used to look at how these models have been used in real life and how they have changed the finances of banks. What the study really does is look at how these models have changed things. In the last part of the piece, some policy ideas are given that should be put into action to improve the ways things are done now. There are also new ways that are based on what has worked best with other countries in the past.

"Impact of Non-Performing Assets on Bank's Risk Management" by Reddy and Kaur (2018) was made public. The study by Reddy and Kaur goes into great depth about how North Indian banks have had to change their risk management methods because of the rise in non-performing assets (NPAs). Because of the results of their study, risk assessment models have been changed in big ways to account for the higher number of loans that aren't being paid back since the research began. At the moment, these models are in charge of reviewing loan applications and keeping an eye on loans that are already underway. These models go into more detail about how they do their jobs, which helps them handle these tasks better. This piece talks about how advanced prediction analytics and data models might help find possible non-performing assets (NPAs) early on. This would allow preventative steps to be taken before the NPA actually happens. In addition, Reddy and Kaur look into how banks' internal rules about how much risk they are willing to take have changed over time. They put a lot of stress on using more conservative methods to protect themselves against problems with the quality of their assets that might happen in the future. People who work in risk management and bank leaders who want to learn more about the connection between non-performing assets (NPAs) and risk management measures might find this piece interesting. This is because the piece will give them the details they need to understand the connection.

"NPA and Shareholder Value" was written by Agarwal and Malhotra (2019). After a thorough study, Agarwal and Malhotra found that non-performing assets (NPAs) had an effect on the value of the owners' shares in the company. It was clear what this meant when the study was over.

Their main question is about what happens to the stock prices of financial institutions when news comes out that nonperforming The rising level of non-performing assets (NPAs) has emerged as a critical concern in the banking sector, particularly due to its direct impact on market valuation and investor confidence. A study by Malhotra and Agarwal (2021) investigates the relationship between public disclosure of increasing NPAs and stock market reactions. Their findings indicate that announcements reporting a rise in NPAs generate significantly negative abnormal returns, suggesting that investors interpret such information as a signal of deteriorating asset quality and future profitability risks.

The study further demonstrates a strong correlation between adverse loan-related disclosures and fluctuations in bank valuation. This implies that market participants closely monitor asset quality indicators when assessing the financial stability and intrinsic worth of banking institutions (Gupta & Sinha, 2020). Beyond short-term market responses, the research also evaluates long-term implications for shareholder value and institutional credibility.

To mitigate negative market reactions, Malhotra and Agarwal (2021) recommend the implementation of comprehensive NPA management frameworks, including proactive loan restructuring mechanisms, strengthened credit appraisal systems, and transparent disclosure policies. Effective communication strategies—characterized by timely reporting and open engagement with stakeholders—are identified as essential tools for restoring investor trust and stabilizing stock performance (Reddy & Thomas, 2022).

Understanding the influence of NPAs on investor sentiment and stock market dynamics is therefore crucial for financial analysts, policymakers, and banking professionals. The empirical evidence suggests that asset quality

deterioration not only affects immediate market performance but also shapes long-term perceptions of institutional reliability and governance standards (Gupta & Sinha, 2020; Reddy & Thomas, 2022).

The book "Comparative Study of NPA Management" by Bose and Sharma (2002). The study by Bose and Sharma shows that public sector banks and private sector banks in North India handle bad loans (NPAs) in very different ways. In North India, the two types of banks work in different ways, which makes this clear. When it comes to working with non-political players (NPAs), they found that these two places have very different plans and strategies. Because of these differences, there are different success rates when working with NPAs. There will be more talk about these differences in the lines that follow. They realize that private banks are more likely than public banks to hire asset reconstruction firms and write off bad loans. This is because public banks are more likely to be careful because of the rules set by the government and the courts (**Bose & Sharma, 2002**). This is what they find. The study not only shows how well different NPA management methods are used, but it also gives public sector banks thoughts on how they can improve their own NPA management by looking at how private sector banks handle NPAs. This is done by looking at how private sector banks deal with NPAs.

Verma and Joshi (2002) worked together on a project called "Technological Interventions in Nationwide Public Administration Management." The project was being worked on to finish it. Verma and Joshi, the writers of this study, look into new technology ways to handle loans that aren't being paid back (NPAs). Pay close attention to how AI and ML are changing the way that non-performing assets (NPAs) are handled in the world of fintech. How well can these tools handle nonperforming assets, speed up loan recovery, and correctly predict when loans will not be paid back? That's the question they want to answer with their study. The things that interest them are the ways that these tools might make getting back debts faster and easier. There are a lot of case studies in the piece that show how North Indian banks have used technology to improve the way they deal with non-performing assets (**Verma & Joshi, 2002**). These examples come from

the study. Because of this, the amount of non-performing assets (NPAs) and the costs that come with them have gone down by a huge amount. The work that Verma and Joshi did is very useful for people who work in banking technology and for financial institutions that want to use technology to improve how they handle their assets. They did this because the results of their work have been a clear change.

Sethi and Iyer's (2022) study, "International Practices on Non-Performing Asset Management," examines non-performing asset management from a global viewpoint, drawing comparisons between the approaches taken by banks in North India and those in Europe and East Asia. Multinational banks that have responded to high levels of non-performing loans (NPAs) by implementing new policies and innovative strategies are the focus of their examination. These institutions have achieved this answer. By analyzing and contrasting North Indian methods, the authors provide suggestions for improvement and showcase instances of globally recognized best practices. Policymakers and bank executives in India may benefit greatly from this research if they were to compare their NPA management tactics to global best practices and draw lessons that could be applied to their own country (Sethi & Iyer, 2022)

2.5 CHALLENGES AND OPPORTUNITIES IN ACHIEVING SUSTAINABILITY

"Regulatory and Compliance Costs" was done by Gupta and Verma (2021). In order to make things more sustainable, Gupta and Verma look at the money problems that banks in North India are having because of all the new rules and regulations. This study also looks at what these forces will do to other things. Their research shows that meeting strict environmental and social governance (ESG) standards usually costs a lot of money. It involves changing how goods and services are organized to meet sustainable standards, spending money on technology to track and report ESG factors, and teaching workers how to follow the new rules. There are only a few cases here. The writers think these costs are important for the future because they could improve the image and win over customers, which are both very

important in today's tough business world. The writers say that these costs are necessary for the long term, even if they mean less money in the short term.

Singh and Patel's (2020) "Technological Adaptation Challenges" will be available to readers. The technological obstacles that North Indian banks have while seeking to diversify their financing away from foreign institutions were the primary subject of Singh and Patel's investigation. It is a costly and culturally disruptive endeavor to deploy cutting-edge technology like blockchain to make green finance more transparent or AI to forecast loan defaults, according to their study. Singh and Patel's(2020) Conventional banking sectors are reluctant to adopt these new technologies, and the authors point out that a lack of understanding and fear of being replaced are prevalent causes for this. They contrast this by focusing on the technology's long-term benefits, such as improving sustainability via reduced operational expenditures and enhanced service efficiency. All through the article, these advantages are highlighted.

The 2019 book by Mehta and Kaur, "Risk Management in Green Financing," maintains that although financing might lead to a sustainable future, it also carries with it new risk-management problems for financial institutions. Even if environmentally friendly financing leads to the long-sought-after world of ecological viability, this fact remains largely unaddressed by the authors as a reason for worry. They assert that difficulties in gauging the durability and dependability of eco-friendly companies make up a large part of the risk management problem; indeed, all kinds of unique risks associated with "green" investments are more properly understood as forms of unknown-unknowns for which traditional risk assessment methodologies were not designed to account(**Mehta & Kaur, 2019**).The reasoning for this is that environmentally conscious investments have their own distinct qualities. Contrarily, they believe that developing personalized risk assessment systems presents an opportunity for financial gain. The availability of these assets has the potential to provide financial institutions a

competitive advantage and unlock opportunities in hitherto unexplored sectors.

The article "Balancing Profitability and Sustainability" by Chopra and Joshi (2022) addresses a related topic. Banking in North India has to walk a narrow, tightrope between making money and being responsible. The authors analyze this issue. They point out that the long-term health of the financial system depends on striking such a balance. Banks have to make money to be able to do any good at all. Nevertheless, they also have to honor their part in creating a sustainable financial system that serves society as well as itself. Investors in sustainability initiatives with a longer time horizon may not see quick returns, and there is a risk of conflict due to the two competing goals, according to their study. According to them, the only way for banks to assist solve this problem is to come up with new kinds of financial products and services that are both sustainable and profitable. Doing this is crucial if you want to fix the issue. Designing goods with sustainability in mind is one method to appeal to the increasing number of customers who are concerned about society and the environment. You never know, this may give your wares an edge over the competition.

Roy and Sharma (2020) penned the article "Harnessing Sustainable Banking as a Competitive Advantage. Roy and Sharma examine how North Indian banks could leverage sustainability for both regulatory compliance and competitive advantage. When it comes to sustainability, they believe that financial institutions would get a reputation boost, new clients, and investment from eco-conscious stakeholders if they took the lead. Their study's results indicate that customers are more loyal to and knowledgeable about financial institutions' brands and products when such institutions are open and honest about their sustainability initiatives and participate in community-oriented programs.

Agarwal and Malhotra (2018), with the working title "Educating Stakeholders on Sustainability Practices." According to Agarwal and Malhotra, sustainability-minded financial institutions must inform their stakeholders about their work. They claim that the lack of understanding

among both customers and employees of the value of environmentally responsible policies and the rewards associated with them is one of the biggest problems banks face. Some of the most critical issues now confronting financial institutions are these. To address this issue, the authors propose that educational campaigns that cover all bases may be effective. Agarwal and Malhotra (2018) By drawing attention to the social and environmental consequences of government decisions, these campaigns can help stakeholders make more informed financial decisions. These results suggest that truthful stakeholders are more inclined to rally behind the bank's sustainability efforts and become involved. As a result, the shift toward greener banking practices is picking up speed.

Bhatia and Reddy (2021) contributed to the publication "Challenges in Sustainable Resource Management" in the year 2021. The purpose of the study conducted by Bhatia and Reddy is to shed light on the difficulties that financial companies face in sustaining resource management procedures that are sustainable. In the context of financial institutions, they place significant value on energy management and waste disposal. They enumerate a great number of significant obstacles, including the high cost of transitioning to renewable energy and the difficulty of establishing broad recycling programs across all of a bank's branches. The seriousness of every one of these issues cannot be disregarded in any degree. Bhatia and Reddy (2021) Both of these issues having an impact on everyone and everything in the ecosystem. Despite the difficulties they have faced, the authors offer their views on the long-term cost reductions and reputational advantages that may be achieved through effective resource management. Effective resource management brings a variety of advantages. Particularly, they call attention to case studies that demonstrate how green energy solutions, as well as waste reduction techniques, have assisted financial institutions in lowering their operating costs as well as their impact on the environment.

Verma and Joshi (2022). "Opportunities in Green Bond Markets." Verma and Joshi are investigating the increasing demand for green bonds in the market. These North Indian financial institutions are considering

this sector as a way to shore up their environmental initiatives and bring in fresh funding. Financial institutions have used green bonds to support eco-friendly projects, including renewable energy generation and sustainable agriculture, as shown in their research. According to the authors, investing in green bond markets might help banks reach their sustainability targets while also appealing to eco-conscious consumers. Consequently, this helps these institutions attract a larger pool of clients and investors.

Kumar and Singh (2019), "Impact of Digital Banking on Sustainability," was released. The shift toward digital banking has many positive environmental effects, including reducing the need for physical infrastructure and paper-based processes. The use of online banking reduces the need for these items, according to Kumar and Singh. Financial organizations may be able to drastically reduce their environmental impact when customers utilize digital services like online banking and smartphone applications, according to the experts. However, they also highlight issues that would make implementing these ideas more challenging. The digital divide and the dangers associated with insufficient cybersecurity are two examples of these issues. The authors argue that strict cybersecurity measures and consumer initiatives to increase digital literacy are crucial for addressing these issues. This is what the authors advise doing, so the logic goes.

Narayan and Mathur's (2020)"Employee Engagement in Sustainability Initiatives" will presumably be published. In this study, Narayan and Mathur examine how employee engagement levels affect the effectiveness of sustainability programs in banks and other financial firms. In particular, they highlight the ways this participation is noteworthy. Sustainability initiatives, they say, fail to provide results because workers aren't enthusiastic about or dedicated to them. Since this is the case, sustainability efforts are doomed to fail. Several potential methods for increasing employee participation are laid forth in the research. Some of the strategies that come under this category include teaching employees on sustainable practices, including them in the planning phases of sustainability

activities, and acknowledging and rewarding their contributions to sustainability objectives.

"The Role of Sustainability Reporting in Transparency" was written by Agarwal and Kapoor (2021). The publication took place. According to Agarwal and Kapoor, sustainability reporting is a powerful tool that financial institutions may use to make their sustainability operations more open and accountable. Sustainability reporting is highly emphasized by them. They focus on how stakeholders may learn about a bank's sustainability efforts and its progress towards social and environmental objectives via thorough reporting. The authors have acknowledged a number of issues, including the potential for greenwashing and the absence of defined reporting procedures. Their goal is to make sure the reports are accurate and legitimate, so they're fighting for things like independent third-party audits and worldwide sustainability reporting standards.

"Sustainable Investment and Financing Products" was written by Sharma and Iyer and is scheduled . Sharma and Iyer (2022) investigate potential avenues for green investment and financing options offered by financial organizations. The needs of these institutions' customers would be satisfied, and broader social and environmental goals would be advanced, thanks to their solutions. Green mortgages, eco-friendly loans, and investment funds that prioritize ESG (environmental, social, and governance) factors are among the sustainable goods that their analysis uncovered. Aside from the possible competitive advantage that banks may get by extending their product offerings to include sustainable options, the piece also emphasizes the increasing demand for such products among customers.

Mehta and Joshi (2022)"Challenges in Aligning with Global Sustainability Standards."Mehta and Joshi's study delves at the challenges faced by North Indian banks in their pursuit of global sustainability standards. Problems encountered by these financial institutions are the primary emphasis of the writers. Some examples of such standards are the Equator Principles and the UN Principles for Responsible Banking (**Mehta, 2022**). In order to achieve such global standards, their research sheds insight on the necessary cultural,

operational, and legal challenges. Notwithstanding these obstacles, the writers nonetheless discuss the strategic benefits of the alignment, including enhanced global competitiveness and access to international financial markets. Because of the inherent intricacy of the process, their counsel is priceless.

2.6 NEED FOR STUDY

The need of studying the long-term viability of the public, private, and international banking systems in Northern India from a social, economic, and environmental perspective cannot be emphasized enough. This investigation has to be carried out with the backdrop of North India in mind. The significance of this kind of study cannot be overstated, which is why it is relevant. Gupta and Verma (2021) have highlighted the need for a rigorous and consistent approach in the field of banking sustainability. This is crucial in the same way that knowledge management requires stringent assessment criteria to determine its efficacy. These two methods are essential because they address a real need. Financial robustness (including elements that include capital adequacy and profitability) and the ways in which banks contribute to environmental conservation and social welfare are both recognized as important aspects of banking environmental sustainability in this study. The assessment of financial performance is an essential component of banking sustainability because it reflects a bank's ability to maintain long-term operations, absorb financial risks, and support social and environmental commitments. Indicators such as profitability, liquidity, capital adequacy, asset quality, and operational efficiency provide evidence of the financial strength required to sustain responsible banking practices. Therefore, this study considers financial performance as one of the core dimensions of financial sustainability, alongside social and environmental sustainability, to provide a comprehensive evaluation of the sustainability of public, private, and foreign banks in North India. Global Reporting Initiative, (2021). Kumar and Singh (2022) emphasize the importance of this latter factor. This study delves at the many ways in which financial institutions help the community and the environment. In this study, we look at the many ways

that banks and other financial institutions help keep our planet habitable and our communities healthy. For instance, this research highlights the many ways in which banks and other financial institutions help keep the planet habitable and contribute to society's overall prosperity. There is an immediate need to study how increasingly strict sustainability requirements are influencing bank operations because the regulatory landscape is still evolving, particularly in view of the adoption of such standards by national and international authorities. This effect is caused by the fact that the regulatory environment is always changing. Therefore, this is the situation due to the fact that the regulatory landscape is always changing. Another interesting note is that Mehta and Kaur (2019) have highlighted the study's applicability, which is based on the findings that Sharma & Patel (2020) have made so far. This project's overarching objective is to learn how different types of banks—public, private, and foreign—deal with these issues in the North Indian environment by collecting data on the effectiveness of sustainability policies. Public banks' handling of these concerns will be the primary emphasis of the investigation. The North India would be the exclusive focus of the probe. Furthermore, this study aims to examine the balance that forms when short-term financial limitations are balanced with intended long-term sustainability goals. The overarching goal of this research is to identify effective management practices that may boost company performance. Singh and Gupta (2023) found that there is a lack of understanding of the factors that encourage or discourage the implementation of sustainable practices in their most current study. After doing their investigation, they arrived to this conclusion. The importance of this finding has been emphasized by Joshi and Narayan (2021), and it will add to the ongoing conversation on sustainable finance. With this knowledge in hand, policymakers and bank executives may improve the economic and ecological fabric of the areas being considered by implementing more nuanced policies. Overarchingly, this research is significant because it may deepen our understanding of eco-friendly banking practices, which in turn could lead the banking sector to more conscientious and efficient practices that support broader social objectives. To effectively navigate the sustainability problems in the ever-changing Indian banking environment, such research is necessary,

say Reddy and Chatterjee (2022). The reason for this is because the environment is always changing. Researchers, industry professionals, and government agencies all stand to benefit from this study's findings. The findings of this study may guide future research and inform real-world applications in the banking industry, as noted in Agarwal and Malik (2021). The results of this research can serve as a standard, hence this is correct.

2.7 RESEARCH GAP

The earlier research study made an effort to develop and expand on the research that had been done previously, providing more insight into the specific concerns and causes that influence sustainability in the banking business. To achieve this goal, a literature was conducted on each area bank sustainability. This study discusses various aspects of sustainability, including the financial, social, and environmental sustainability of banks. Both the results of the review and a more in-depth analysis of the selected banks used in the research contributed to supporting the argument for sustainable banking and highlighting the progress that has been made in managing financial, social, and environmental activities. Earlier studies carried out in this field had considered a lesser number of banks, which meant that they did not provide a comprehensive picture of the banking business in India. Within the context of India, there is a dearth of research examining the similarities and differences between public sector banks, private sector banks, and international financial institutions.

It has also been observed, based on the evaluation of the relevant literature, that prior research used a fairly restricted number of factors to investigate the sustainability of the banking business. Additionally, the review revealed that previous research had only used a single state for the study; hence, it is necessary to research a sample that includes multiple states. Within the scope of this research, the selection of North Indian states for the sample attempts to fill that gap. Previous research on the Indian banking industry predominantly concentrated on financial sustainability, neglecting social and environmental sustainability. Because of this, there is a dearth of study about the long-term viability of both civilization and the environment.

As a consequence of this, it is essential to carry out research that will investigate all three components of sustainability, namely the financial, social, and environmental aspects.

There are a significant number of different types of bank sustainability that are now in existence. The concept of sustainability has a tremendous number of facets, some of which are the financial sustainability, the social sustainability, and the environmental sustainability. There were no concepts such as BASEL III, Prudential Rules, NPA, Transaction Cost, Asset and Liability Management, or electronic banking in existence prior to the implementation of reforms in the banking system. These ideas did not exist in the past at any point in time. The present research, among other things, takes into consideration each of these characteristics in a careful and thorough way.

CHAPTER -III

RESEARCH METHODOLOGY

3.1 INTRODUCTION

To accomplish the several objectives of the study, we shall discuss the specifics of the methodology that was used in the process of developing the research project. You will only be able to do this inside the confines of this chapter. Immediately after this, we will discuss a wide range of topics, including the research strategy, the sampling process, selected banks, and the many sorts of analytic procedures. To analyse the data, a variety of statistical approaches were selected and used. Analysis techniques such as factor analysis, regression, descriptive analysis, ANOVA analysis, and the eagle model were among them. These strategies were also used throughout the process of assessing the data that was gathered during the preceding processes. To improve our comprehension of the material throughout the whole of the study process, we made use of several visual aids. This collection of visual tools included diagrams, charts, graphs, and tables, among other types of visual graphics.

3.2 RESEARCH /DESIGN

The success of banks in northern India is looked at in this study using a ratio-based method that is both casual and observational. This model takes into account several things that impact how well a bank works. It can be the plan and progress, as well as its cash flow, asset health, revenue, and other measures. This study takes the lead in examining thirteen key areas to provide a comprehensive overview of how the banking industry evolved from 2012–2013 to 2021–2022. The information used in the study came from yearly reports, bank websites, papers, and magazines that were open to the public. There is a lot of data from different sources that lets us look at patterns and trends in how banks have done financially over the last ten years. It is easy for everyone to access and more useful for research to use extra data. Jones (2021) says that this will make sure that only good data is used for research. Thirteen things were picked out to show how well a bank does in different

areas. Included among the many financial metrics found here are ROA and ROE, or return on assets. You should also think about the quality of the assets, how profitable they are, and how liquid they are. During the study, these parts made a clear picture of the factors that affected the bank's long-term success and performance (Lee, 2022).

Figure 3.1 : Research Design



Figure 1: <https://ideascale.com>

The t-test, the mean, the standard deviation, and the coefficient of variation are only a few of the statistical tools used by statisticians in their work. The mean is instrumental in determining the central trend, offering insight into performance across multiple institutions. Two approaches exist for examining data spread: the coefficient of variation and deviation from the mean. These tools allow experts to evaluate the reliability of financial procedures undertaken by institutions.

The t-test is used in studies to determine if there are any performance differences that are statistically significant either over time within an institution or between institutions for a similar time frame. By identifying these differences and then delving deeper into the factors that might be influencing them, one can obtain a rather granular picture of how a given institution might be performing in comparison to its peers and why. In this way, the EAGLE model hopes to provide not just a top-level understanding of what might be going on in the banking sector in a given region but also the tools with which policymakers and stakeholders might be able to respond effectively to changes in those understood or not understood dynamics.

The research we are conducting follows an inquisitive methodology in order to gain important insight into the financial operations of the institutions under investigation. This method has the potential to provide in-depth and much-needed intelligence when it comes to understanding why some of these institutions succeed while others fail. The research is a painstaking analysis of the kind of financial ratios that are critical to revealing the health of a bank; including the liquidity ratios, the profitability ratios, and the leverage ratios. It is also an examination of what is happening, both internally and externally, to the bank. This kind of knowledge is of immense use to those inside the bank (stakeholders and policy designers) and those outside the bank who are infinitely curious and need to know for either strategic or risk-management reasons.

3.3 SAMPLING PLAN

Population:

Banks from Rajasthan, Punjab, and Haryana have been selected for this study due to their strong banking presence and institutional diversity. According to the Reserve Bank of India (RBI, 2022), these states record a high number of bank accounts, extensive branch density, and a well-distributed network of bank offices across districts. Rajasthan provides wide geographical coverage, with branches operating in both rural and urban areas. Punjab demonstrates high credit–deposit activity, supported by its developed

agricultural and industrial sectors. Haryana reflects rapid banking expansion and increasing financial inclusion. The district-wise distribution of bank offices across these three states ensures access to employees from public, private, and foreign banks. This broad banking outreach, high account penetration, and operational diversity justify the selection of these states as a representative and methodologically appropriate sample for the research. By covering all three regions, the study is able to include a large number of banking institutions and employees, thereby enhancing the reliability and generalizability of the findings.

The choice of these states was made for a reason. They are very important for the growth of the economy and the banking industry. They were selected because the potential for our bank's growth appears to be greatest there, given the states' regulatory structures. **(Smith, 2020).**

Different kinds of banks, including public sector banks, private sector banks, and foreign banks, perform, how long they endure, and how their operations evolve **(Jones, 2021)**. The many types of banks and business models have their own combination of pros and cons. To get a clear picture of the banking sector in North India, this research examines a wide range of financial institutions **(Lee, 2022)**.

Sample Units

The main aim of this chapter is to conduct a thorough examination by focusing on sample units, which refer to individual entities selected from larger populations. The key focus of the research is to explore activities in several states in the northern area of India. We have selected the states of Rajasthan, Punjab, and Haryana for our due to the high number of bank accounts within them. From each state, one district has been chosen, specifically because of its notable number of bank branches. This painstaking approach guarantees the inclusion of banks falling under three categories: public, private, and international. The selection of reserves for each survey group is based on certain predefined criteria, which consider aspects such as the type and number of accounts and local branches. This careful selection

process ensures a respondent sample that is very diverse—much like the banking scene in North India. The survey straightaway taps into the essence of India's corporate world, maintaining a focus on the manifold practical realities and challenges faced by a whole range of financial institutions and companies operating across this giant region.

Categories of Respondents:

The participants in this research are the people who provide insightful commentary about the banking industry. There are two categories that these replies fit into. There is a bank managers and a staff group inside the bank. Bank managers have big responsibilities. They take care of what goes on at the bank, make sure everybody follows the rules, and make the decisions that are most important for the bank's welfare. They are the people who most directly determine what happens to a bank's woeful fortunes or its fabulous opportunities. For this 18 male and female bank managers and 180 staff members were encompassing in thus study. Meanwhile, the frontline workers of the bank are responsible for delivering services to customers, managing customer interactions, and handling the day-to-day operations of the bank. The Northern Indian banking industry faces significant management and operational challenges. To gain a deep understanding of these challenges, it is helpful to consider the experiences and perspectives of both bank managers and staff, as they provide different—but equally valuable—insights. The managers can speak to the strategic direction of their banks, while the staff can provide a window into the world of customers and identify operational areas for improvement (**Thompson & Zhang, 2019; Johnson & Lee, 2021**).

3.4 SAMPLING TECHNIQUE

The study covers the period from 2012–2013 to 2021–2022 and assesses banking performance over a decade to provide a comprehensive view of banking trends in North India. This period is particularly significant because many bank branches were reduced or merged due to consolidation policies, digital banking expansion, and structural reforms in the banking sector. Branch rationalization and mergers affected operational efficiency,

cost structures, customer outreach, and asset management. Therefore, evaluating performance during this transitional decade helps in understanding how banks adapted strategically, maintained liquidity, managed asset quality, and sustained revenue despite organizational restructuring and reduced physical branch networks. Researchers used a variety of scientific and mathematical tools to analyze financial and non-financial information against a backdrop of economic conditions within the regions under scrutiny. By doing so, the study could pinpoint which banking factors and sectoral contexts were most important for enabling some banks to succeed and others to fail (El-Hage, 2021). The study included 13 different determinants that reflected different aspects of the banks' successes. These determinants represented a wide range of measures, such as the return on equity, profitability, and asset quality rankings. The research team applied these variables to give them a whole picture of the performance and, more importantly, the stability of the banks in the region. Once the analysis was complete and the data were bundled together, the team used a mix of simple arithmetic and more advanced forms of statistical analysis to calculate just how significant all these different determinants are when it comes to the chances of banking success in northern India over the long term(**Choudhry, 2012**).

3.4.1 SAMPLE SIZE

The research process involved several establishments from personal, societal, and foreign banking sectors, depending on account balances. The selection of three regions in Northern India—Haryana, Rajasthan, and Punjab—was based on their vast number of bank accounts. The inquiry focused on these provinces in the north of India, choosing areas based on the number of bank branches in each state. Each of the chosen zones was home to a total of six banks: two from the public sector, two from the private sector, and two from outside. The selection process included a multi-level approach. A total of eighteen bank branches were included in the study, which comprises 180 Bank employees and 18 bank managers of each bank branch, who were selected as respondents through a questionnaire. The research is

done on a population of 198 people in 18 bank branches of the northern states of India. An in-depth examination of banking operations was done as a critical part of this study, following a systematic plan through a multilevel selection. This enabled the evaluation of the public, private, and international banking sectors in a thorough manner. States were picked on the basis of their pronounced account numbers in each state, and so that parts of the states in which notable banking activities took place were included to provide precious insights into the Northern India banking sector. Rajasthan, Punjab, and Haryana were picked as the states to be studied as they have manifested significant account populations and are famous and multifaceted for their thriving banking sectors.

A diverse assortment of banking operations was taken into account, including those in rural and urban settings, depicting a comprehensive overview of the banking landscape in Northern India. To facilitate comparisons across different establishments, the study scrutinized two factors from each region, emphasizing the disparities in their methodologies and outcomes. The study emphasizes bank branches as its main unit of analysis. These banks act as small variants of the banking industry as a whole, allowing us to learn a lot about the quotidian chores, transactions with customers, and management styles. The focus on branch-level statistics in this research allows it to notice details that could be overlooked in macroeconomic evaluations of the banking sector. For the study, discussions will be conducted with the office head and personnel at each of the selected banks. Employing this method makes it easier to receive firsthand narrations from significant individuals in the banking industry. Branch managers are hugely crucial because they are in charge of managing activities, ensuring protocols are followed, and enhancing performance in their offices. From their vantage point, they can discern the possibilities, obstacles, and trends that are shaping the banking business, which is seriously helpful. The study's reach has also been widened to include polls with questionnaires that were given to bank employees. This study gains a better understanding of the practicalities that govern daily life in the financial business by asking direct workers for comments. Employees provide valuable information about how

to interact with customers, handle complex tasks, and provide services, which gives a more complete picture of how bank branches operate. Collecting information using the questionnaire method is helpful when you want to get data from a lot of different kinds of people. Can you conduct a quiz, a survey? Can you give ratings? Are you writing your own story? Using these many different ways to collect information makes any series of studies richer and illuminating to the audience and, indeed, also to the investigators. By using the many methods available to collect information, you heighten the opportunity to see the phenomenon under study from different angles. It is like solving a whodunit when you have clues from several witnesses. These are some of the reasons the questionnaire remains a popular method for collecting information both in the lab and in the field. Through polls and conversations, the study gathers a variety of viewpoints from people who work in the banking industry. This helps illustrate its challenges, opportunities, and complex aspects (Taylor & Brooks, 2017).

Table 3.1: Showing the Selection of Respondents for the Study.

(of all the States of North India)

States/UT Selected from North India (i)	Districts / Cities selected from States (ii)	Public Sector Banks (iii)	Private Sector Banks (iv)	Foreign Banks (v)	Total Banks Selected for the study (iii)+(iv)+(v) = (vi)	Respondents selected from each bank Bank manager =1, Bank staff =10 (vii)	Total Respondents selected for the study (vi)*(vii) = (viii)
RAJASTHAN	JAIPUR	2	2	2	6	11	66
HARYANA	GURGAON	2	2	2	6	11	66
PUNJAB	LUDHIANA	2	2	2	6	11	66
Total					6	33	198

3.5 DATA COLLECTION

In conjunction with descriptive and analytic research methods, a survey was conducted as part of this research program's objectives. Two different approaches were utilized to gather raw data for the study: the administration of surveys and an exhaustive examination of existing literature sources (Smith, 2019). Secondary data were acquired by

scrutinizing numerous publicly accessible and undisclosed websites, newsletters, and other sources. The research on "Financial, Social, and Environmental Sustainability in the Indian Banking Sector: Public, Private, and Foreign Banks in North India" was meticulously organized following a thorough review of prior studies **(Johnson, 2020)**. Precise study objectives and hypotheses were then formulated after analyzing all relevant factors extensively. These objectives and theories guide the development of questions, ensuring the data collection process is aligned with the study's aims. A standardized question format was used. Before the question was circulated widely, it was pretested with participants who gave feedback to improve the questions related to the study. The purpose of the pretest was to ensure that the question or composite of questions effectively measured each variable, correctly elicited the desired response, and that responses did not privilege or appropriate anyone **(Brown & Davis, 2018)**.

Bank managers and staff members were contacted. Then, we made sure to gather data meticulously in order to make sure that it was reliable and it was accurate. As soon as we gathered the necessary data, we then examined and analyzed the data in the best way to do so using statistical methods and analysis tools. Everything must be accurate when examining this data as it needs to be reliable. The researcher used this demanding methodology to deduce thoughtful conclusions from North India's Banks sustainability, including the financial, personnel, and environment standpoint **(Lee & Kim 2021)**.

The researchers articulated and discussed findings, perspectives, and ideas, created from the analysis of data. The study claims to take a detective strategy to the problem, giving valuable visions to the sustainable area in various banking industry, also to uncover the undiscovered areas by raising pertinent questions, and providing the useful recommendations for finance professionals.

Descriptive and Analytical Study:

The thorough inquiry uncovered crucial findings for people wanting to know about the sustainable practices of banks and investment firms. This enabled them to evaluate their options and devise strategies based on factual data. The meticulous documentation of pertinent facts and figures by this expert contributed to further research and study in the domain of sustainability.

The researcher further expounded upon the aims of the selected banks that were employed in the analysis. A comprehensive evaluation was undertaken to analyze the financial, social, and environmental sustainability of six distinct institutions, with two institutions utilized from each region. The causal structure of the research exposed the interdependencies of the variables under investigation. Therefore, it is now clear which elements affect sustainability results.

The expert employed scales and statistical methods to quantify parameters related to sustainability. This enabled thorough examinations and comparisons across sectors regarding institutions. To quantify the qualitative data, the researchers utilized the Likert scale, which illustrated to the researcher the diversity of viewpoints concerning efforts to reduce environmental impact

3.6 VARIABLES

Several variables are very crucial for evaluating the sustainability and the performance in the banking sector; sustainability, that is wraps financial, social, and environmental dimensions, that serves as a critical aspect for assessing the bank's long-term liabilities and impacts. Financial sustainability examines indicators like profitability, liquidity, and solvency to ensure a bank's financial health and resilience. Social sustainability focuses on a bank's role in promoting ethical practices, community engagements, and positive social outcomes. Environmental sustainability evaluates the bank's

efforts in reducing its environmental footprints, conserving resources, and mitigating environmental risks.

Alongside sustainability; financial performance is a key variable for assessing the overall effectiveness and efficiency of the banking sector. Measures of financial success, including sales and profit margins, and ROI shows how well the bank is doing at running its operations and making money for its stakeholders. In order to make strategic choices that will increase efficiency and competitiveness, it is helpful to analyse financial performance. This helps to identify the banking sector's strengths and shortcomings. All of these factors work together to provide a thorough framework for assessing the banking sector's performance and sustainability and encouraging well-informed choices and cultivating sustained achievement.

Scales

To measure sustainability, financial performance, and general performance, a standard questionnaire be used. It will include items wanting to test various dimensions of sustainability, financial healthiness, and performance within the bank sector. Each item will be craftily created to catch specific parts of the constructs measured, ensuring dependability or validity. For sustainability, the questions will cover financial, social, and environmental aspects. Profit ratios, community involvement initiatives, and efforts to reduce environmental impacts. Responders measure on a Likert scale; that is, ranging from “Strongly Agree” to “Strongly Disagree.” It lets respondents express their perceptions accurately.

Similarly, questions regarding to the financier's performance are going to evaluate important finance metrics, including revenue growth, return on investment and asset quality. These questions will offer insights on the bank's financial healthiness and how operational efficiency they are. Moreover, questions on general performance will gauge the perceptions of stakeholders regarding the bank's effectiveness in meeting its goals and

delivering value to stakeholders. This sector might include items on customer satisfaction, employee engagement, and market competitiveness.

Questionnaire items will be included for assure transparency and credibility. These citations will reference such as academic journals, industry reports and regulatory guidelines. By using a standard questionnaire complete with proper citations, this study aims to gather dependable and valid data regarding sustainability and performance within the banking sector. Facilitating meaningful analysis and informed decision-making.

3.7 DATA ANALYSIS TECHNIQUES

A lot of different statistical tools and methods have been added to the process so that the data can be analyzed. These include Factor Analysis, Eagle Model, Descriptive, Annova Analysis, and Regression. During the study, different kinds of graphs, tables, charts, and pictures were used to show the information in a way that was easy to understand.

Factor Analysis

A statistical method called factor analysis can be used to cut down on the number of unknown variables so that the found relationships between variables can be explained. For example, it's possible that changes in two basic factors mostly explain the differences seen in six variables. Factor analysis can be used to find these shared changes that happen because of hidden variables that can't be seen. You could think of factor analysis as a subset of errors-in-variables models, since the variables that you study are made up of different factors and "error" terms that are put together in a straight line.

Factor analysis is a statistical method for breaking down a big set of visible variables into a smaller set of factors that, when put together, show how the observed variables are related to each other. There is a factor loading matrix that shows how the measured variables are related to a common set of factors that, in this model, explain what each person saw. The model's premise that there are fewer factors than observations per unit means that

each person's observations are affected by their own unique set of shared factors.

The factor analysis model can be expressed mathematically as:

$$X - M = LF + \epsilon$$

Where:

- X is the observation matrix,
- M is the mean matrix,
- L is the factor loading matrix,
- F is the factor matrix,
- ϵ is the error term matrix.

The factor loading matrix L shows the connection between the observed variables and the shared factors. On the other hand, the X matrix observes the variables for each person. The F matrix shows the shared factors' scores for each person. The ϵ matrix shows the random error that is unknown.

The factor analysis model assumes several key assumptions:

- The factors and error terms are independent.
- The expected value of the factors is zero.
- The covariance matrix of the factors is the identity matrix, indicating that the factors are uncorrelated.
- The error term matrix has finite variance.

Based on these principles, the covariance matrix of the variables that were observed can be shown as the product of the factor loading matrix, its transpose, and the error term matrix.

Finding unseen trends or dimensions in datasets and lowering the number of dimensions in data are common goals of factor analysis, which is used in many fields, such as psychology, finance, and economics. This makes

it easier for researchers to figure out how variables are related to each other and find the secret reasons why variables change.

EAGLE MODEL

In the banking industry, the EAGLE MODEL is a made-up system that is based on comparable characteristics that are used to evaluate the performance of banks. This has been discussed before. Due to the fact that it is not a typical model, let us define it here with the many techniques and measurements that are conceivable. Earnings, Asset quality, Growth, Liquidity, and Equity are all possible meanings that might be associated with the letters EAGLE. These are all significant aspects that are taken into consideration when determining the state of a bank's finances.

In addition to the formulae that are associated with each of these components, the EAGLE MODEL could be composed of the following components:

E - Earnings

Earnings reflect the profitability of the bank. It's a direct indicator of how well a bank can leverage its assets to produce income.

- **Return on Assets (ROA):** This ratio is useful for determining the efficiency with which a bank turns its assets into net income..

$$ROA = \frac{\text{Net Income}}{\text{Total Assets}}$$

Net Interest Margin (NIM): This measures the difference between the interest income generated and the interest paid relative to the amount of their interest-earning assets.

$$NIM = \frac{\text{Interest Income} - \text{Interest Expense}}{\text{Average Earning Assets}}$$

- **A - Asset Quality**

Asset quality assesses the health of the bank's loan portfolio and the risk of default on said loans.

Non-Performing Loans Ratio (NPL Ratio): Indicates the level of loans in default or near default.

$$\text{NPL Ratio} = \frac{\text{Non-Performing Loans}}{\text{Total Loans}}$$

Loan Loss Provision to Total Loans:

$$\text{Loan Loss Provision Ratio} = \frac{\text{Loan Loss Provisions}}{\text{Total Loans}}$$

G - Growth

Growth measures the ability of the bank to expand its assets, deposits, and customer base.

Annual Growth Rate in Total Assets:

$$\text{Asset Growth Rate} = \frac{\text{Current Year Total Assets} - \text{Previous Year Total Assets}}{\text{Previous Year Total Assets}}$$

- **L - Liquidity**

Liquidity is crucial for the bank's day-to-day operations, ensuring it can meet its short-term obligations.

Liquidity Coverage Ratio (LCR):

$$\text{LCR} = \frac{\text{High-Quality Liquid Assets}}{\text{Total Net Cash Outflows over 30 Days}}$$

E - Equity

Equity is about the capital adequacy of the bank, its buffer against potential losses.

Tier 1 Capital Ratio: Measures the core equity capital against total risk-weighted assets.

$$\text{Tier 1 Capital Ratio} = \frac{\text{Tier 1 Capital}}{\text{Risk-Weighted Assets}}$$

Equity to Total Assets:

$$\text{Equity to Assets Ratio} = \frac{\text{Total Equity}}{\text{Total Assets}}$$

ANOVA (Analysis Of Variance)

The purpose of the statistical models known as ANOVA (Analysis of Variance) is to compare the average of two independent groups by separating their variability into systematic and random components. This might lead to a clearer picture of how the independent and dependent variables interact with one another.

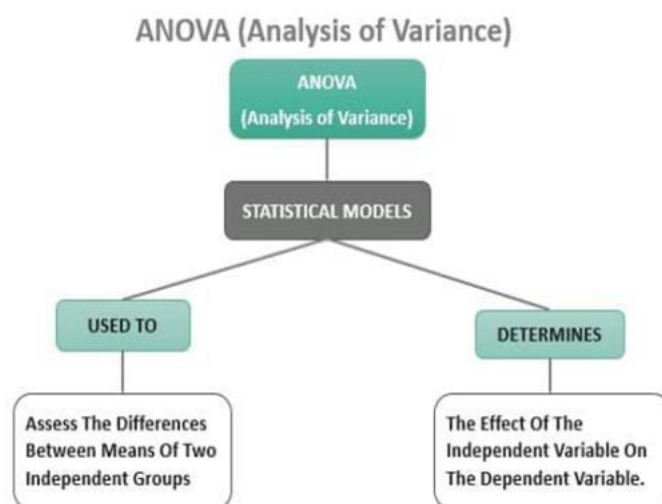


Figure 3.2 : ANOVA (Analysis of Variance)

One way statisticians find out how different two groups' means are is by using analysis of variance (ANOVA). A possible way to get the value of this variable is to divide the average sum of squares across all groups by the average square of errors. Analysis of variance relies on three main assumptions. These assumptions are as follows: a population that is normally distributed, a variance that is homogeneous, and samples that are selected independently. There are three versions of the Analysis of Variance (ANOVA) test: one-way, two-way, and multi-way (ANOVA). When the p-value is less than 0.05, the analysts reject the analysis of variance (ANOVA)

test. When the p-value is more than 0.05, the analysts accept it. Economists and statisticians only use the analysis of variance test when there is data on the dependent variable or when there is more than one sort of independent variable in a single category.

One-Way ANOVA

To learn how a single factor impacts a particular outcome, we can use the statistical tool called one-way analysis of variance, or ANOVA. ANOVA is a simple and direct method. Here is where the One-Way Analysis of Variance (ANOVA) comes into play: for instance, if we want to explore how IQ levels fluctuate from country to country, we may use this method. There is no limit to the number of categories that may be included in this country variable; as many as twenty nations can be included in this variable. On the other hand, it is essential to bear in mind that the "one way" component implies that we are just taking into account one independent variable, which in this particular case is the nation.

Assumptions:

- It is the population specified by the factor levels from which the observations are randomly and independently retrieved.
- Both the whole population and its subsets follow normally or almost normally distributed distributions.
- "Homoscedasticity" means that the populations' variances are same.

Formulas:

- **Sum of Squares Total (SST):** The total variability in the data.

$$SST = \sum_{i=1}^k \sum_{j=1}^{n_i} (Y_{ij} - \bar{Y}_{..})^2$$

where Y_{ij} is the observation, $\bar{Y}_{..}$ is the overall mean, k is the number of groups, and n_i is the number of observations in group i .

- **Sum of Squares Between (SSB):** The variation that results from the groupings interacting with one another.

$$SSB = \sum_{i=1}^k n_i (\bar{Y}_{i.} - \bar{Y}_{..})^2$$

where , $\bar{Y}_{i.}$ is the mean of group i.

- **Sum of Squares Within (SSW):** The variability within each group

$$SSW = \sum_{i=1}^k \sum_{j=1}^{n_i} (Y_{ij} - \bar{Y}_{i.})^2$$

This is also sometimes denoted as SSE (Sum of Squares Error).

- **Degrees of Freedom Between (DFB):**

$$DFB = k - 1$$

- **Degrees of Freedom Within (DFW):**

$$DFW = N - k$$

where NN is the total number of observations.

- **Mean Square Between (MSB):**

$$MSB = \frac{SSB}{DFB}$$

- **Mean Square Within (MSW):**

$$MSW = \frac{SSW}{DFW}$$

F-statistic:

The Mean Square Within divided by the Mean Square Between yields this value. The greater the size of this ratio, the stronger the indication that there is variation in the means of the groups.

P-value: How likely it is that, if the null hypothesis is correct, a test statistic at least as severe as the one we saw would be seen. You generally obtain this from F-distribution tables or software with the calculated F-statistic and degrees of freedom.

Hypotheses:

- **Null Hypothesis (H0):** All group means are equal $\mu_1 = \mu_2 = \dots = \mu_k$.
- **Alternative Hypothesis (H1):** At least one group mean is different.

N-Way ANOVA

Analysts take advantage of the N-Way Analysis of Variables (ANOVA) to determinate the degree to which two objects are unique from one another. In this instance, the letter "n" indicates the number of distinct elements that are being considered. One approach to doing this would be to investigate the way in which factors such as aged, gender, culture, and nation all influent IQ scores simultaneously. It enables individuals to get a more comprehensive comprehension of the system's functioning by enabling them to examine in depth the ways in which many elements influence one another and the dependent variable as a whole. This is referred to as the N-Way analysis of variables (ANOVA). The statistical approach called analysis of variance (ANOVA) is quite powerful, and it can be used to investigate the effects of a single factor (referred to as One-Way ANOVA) or several variables (referred to as Two-Way or N-Way ANOVA) on a result. When researchers employ analysis of variance (ANOVA), they are not limited to just the direct influence of an independent variable on a dependent variable—they can also uncover how these variables interact with one another. As a result, investigators have access to plenty of information about complex topics, which you will learn about in this and the next couple of chapters.

3.8 RELIABILITY AND VALIDITY

Reliability

Cronbach's alpha is a dependable measure to know how uniformly connected a set of things is in general. It is thought of as a measure of the dependability of a scale. A measure is not always unifocal just because it has a "high" alpha value. We may do additional studies if we want to demonstrate that the scale in question is unifocal in addition to testing internal consistency. To test for dimensionality, one can use exploratory factor analysis. As a dependability (or consistency) coefficient, Cronbach's alpha is not a statistical test either. You may calculate Cronbach's alpha by dividing the total number of test items by their average inter-correlation. Below, for idea reasons, we offer the formula for Cronbach's alpha:."

$$\alpha = \frac{N\bar{c}}{\bar{v} + (N - 1)\bar{c}}$$

Here The average inter-item correlation, where N is the number of items, and $\bar{c}$ equals the average variance.

Table:3.2:Case Processing Summary

Case Processing Summary			
		N	%
Cases	Valid	218	99.5
	Excluded ^a	1	0.5
	Total	219	100

Listwise deletion based on all variables in the procedure.

Table 3.3: Reliability Statistics

Reliability Statistics	
Cronbach's Alpha	N of Items
0.977	87

Total Cases:-So this column what we're seeing it's totals numbers of cases or observations that kinda considered during analysis stuff.

Valid:- These being the cases they been included on analysis cause they meet needs for criteria of inclusion, If we're counting, there are 218 valid cases, they accounts for like, um, 99.5% of those totals.

Excluded:-This bit refers to them cases they didn't made it into analysis, might be 'cause missing data's, errors or did not met the criteria of inclusion, right? One case, was excluded, Just making Up 0.5% of whole total.

Using this method, it is clear that Cronbach's alpha increases with increasing item counts. Furthermore, a low alpha indicates a low average inter-item correlation. Keeping the total number of items constant, Cronbach's alpha grows in proportion to the average inter-item correlation.

Validity -or face validity

To ensure the face validity of the questionnaire used by this study. A comprehensive validation process will be implemented. First, the questionnaire will be showcased to a bunch of bank managers for their review and feedback, those managers. Being quite familiar with the banking sector will provide valuable insights about the relevance and clarity of the questions. Based on their suggestion and recommendations, necessary adjustments and additions will be made to the questionnaire to enhance comprehensiveness and accuracy. Moreover, to validate the questionnaire from an academic perspective, it will be reviewed by professors or experts in the field of banking and finance. These individuals are supposed to assess the questionnaire's alignment with established theory and concepts in the field, ensuring that it effectively captures the intended construct. By incorporating feedbacks from both practitioners and experts, the questionnaire will undergo rigorous validations, enhancing its face validity and ensuring that it accurately measure sustainability and performance within the banking

3.9 OBJECTIVES OF THE STUDY

1. To identify and analyse the factors affecting banking sustainability in the selected banks.
2. To analyse the financial performance of the selected banks.
3. To examine the financial sustainability of the selected banks.
4. To analyse the social sustainability practices of the selected banks.
5. To examine the environmental sustainability practices of the selected banks.
6. To study the impact of overall banking sustainability practices on the performance of the selected banks.

3.10 HYPOTHESIS

1. H₀₁: The factors identified do not significantly affect the sustainability of the selected banks.
2. H₀₂: There is no significant difference in the financial performance between the selected banks.
3. H₀₃: There is no significant difference in the financial sustainability among the public sector, private sector, and foreign sector banks.
4. H₀₄: There is no significant difference in the social sustainability among public sector, private sector, and foreign sector banks.
5. H₀₅: There is no significant difference in the environmental sustainability among public sector, private sector, and foreign sector banks
6. H₀₆: Overall sustainability practices do not significantly impact the performance of selected banks.

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3.11 OBJECTIVE & THEIR RESEARCH METHODOLOGY

Objective 1: To identify and analyse the factors affecting banking

sustainability in the selected banks.

Methodology: Factor Analysis

Employ factor analysis to identify and quantify the factors that significantly affect bank sustainability. This involves extracting data from financial reports, customer satisfaction surveys, and market analyses over the past decade. Continuously update and interpret both contemporary and historical data to assess trends and their impacts on bank sustainability.

2 Objective: To analyze the financial sustainability of selected banks

Methodology: Eagle Model

Use the Eagle Model, a specialized financial performance analysis tool that focuses on ratio-based evaluations, to assess key performance indicators such as return on assets, return on equity, and net interest margin. Design and administer an Objective 2 Questionnaire specifically tailored to collect pertinent data directly from the banks, ensuring the relevance and specificity of the data to the financial metrics under evaluation.

3 Objective: To analyze the social sustainability of selected banks

Methodology: Descriptive & ANOVA Analysis

Implement descriptive statistics to provide an initial overview of the financial health across the **selected** banks. Conduct ANOVA to compare and identify differences in financial sustainability measures among the banks, which helps in understanding variance in financial practices and outcomes.

4 Objective: To analyze the environmental sustainability of selected banks

Methodology: Descriptive & ANOVA Analysis

Utilize descriptive statistics to outline the social initiatives and community engagement efforts of the banks. Apply ANOVA to evaluate the effectiveness of these social sustainability efforts, comparing results across different banks to identify benchmarks and areas needing improvement.

5 Objective: To study the impact of overall bank sustainability practices on the performance of selected banks

Methodology: Descriptive & ANOVA Analysis

Use descriptive statistics to catalog environmental practices such as energy usage, waste management, and green financing. Perform ANOVA to assess the impact of these practices on overall environmental sustainability, determining which banks are leaders in environmental stewardship.

6 To study the impact of overall banking sustainability practices on the performance of the selected banks.

Methodology: Regression Analysis

Conduct regression analysis to explore the relationship between sustainability practices (encompassing financial, social, and environmental aspects) and bank performance. This analysis will help to quantify how much of the variance in bank performance can be explained by sustainable practices, providing insights into the effectiveness of these strategies in enhancing overall performance.

3.12 RELATIONSHIP BETWEEN RISK AND DISCLOSURE

Hypothesis 1 (H1a, H1b, H1c): Risk management and disclosure score of public sector banks (H1a), private sector banks (H1b), and foreign banks (H1c) are significantly dependent on their risk profiling parameters.

Hypothesis 2 (H0): There is no significant dependency of risk management and disclosure score on the risk profiling parameters of the banks.

Hypothesis 3 (H1): Risk management and disclosure score of the banks is significantly dependent on their risk profiling parameters.

Hypothesis 4 (H1a, H1b, H1c): The risk management and disclosure score of banks is significantly influenced by social and environmental sustainability considerations. For public sector banks (H1a), private sector banks (H1b), and foreign banks (H1c), this influence is assessed independently based on their risk profiling parameters.

CHAPTER - IV

DATA ANALYSIS AND INTERPRETATION

Financial activity is defined as activities conducted in regards to management and use of finances. An individual, organisation, or team which handle financial resources, on behalf of another, whether as remuneration or voluntarily are usually evaluated in terms of financial performance. The financial performance is a measure of the degree to which set goals and targets are attained and is measured in terms of financial results that are measurable, namely profitability, efficiency, and value creation. Such results can be the preparation of annual financial statements or the contribution of organisational managerial teams to enhance organisational results. These are the results that constitute performance-tracking and record-based culture of an organisation.

Financial performance analysis gives an understanding of the strengths and weaknesses that are underlying in a firm; it is done through analysis of the financial standing and the results of operations. It brings a purposeful relationship between the balance sheet and the profit and loss account by a methodical analysis of the appropriate financial information. Financial analysis is very useful, but it greatly depends on how it is chosen, organised and interpreted to facilitate decision making.

The financial performance and status of a firm is a key aspect that analysts rely on through different analytical tools to gauge the performance of a firm. Financial ratios are the most popular and potent tools of these as they demonstrate the quantitative dependence between two or more financial variables. In this regard, the current paper uses the chosen financial ratios to evaluate the performance of the banks selected to be investigated.

1. Trend Analysis

2. Assessment of Financial Sustainability (Eagle Model)

4.1 OBJECTIVE 1: To identify and analyse the factors affecting banking sustainability in the selected banks.

FACTOR ANALYSIS FOR FINANCIAL SUSTAINABILITY

Table 4.1: Correlation Matrix

		My bank enhanced the number and amount of different deposits schemes.	My bank before providing loan to the customers verifies the credibility, solvency and feasibility of the customers to avoid non performing loans.	My bank profitability position from year on year basis is growing on a sustained basis.	The spread (difference between interest given and interest taken) is sustained in spite of severe competition in the banking industry.	The multifarious activities of my bank including banking business, mutual fund business, insurance business, fee based business, agency related business have strengthened my bank's financial sustainability both in the short-run and long run.	My bank's compounded annual growth rate (CAGR) is growing or sustained level.	Effective measures by the bank reduced the NPA level.	Technology impacted the cost of transaction both or the bank and the customers.	Sustainable_banking_concentrates	In order to reduce the percentage of non-performing assets, banking practices should concentrate on projects with high environmental, social and financial performance.	Banks need to align their business goals with trends in the markets and sectors in which they operate.	The interest rate fluctuations did not reduce the customer base in all types of accounts.	Pricing and services is of banking products and services is risky in the competitive world.	Competition impacted my banks bottom - line (profit)	Interest rate var among the banks is the biggest competitive factor that impacts the banking business.	Retaining cash - cov (profitable) customers such as high net - worth individuals corporate customers is very difficult.	Addressing the frauds in the banking business is a challenge for external sustainability.	Banks liability and claims are surging on account of multiple customers and multiple banking products such as personal loans, auto loan, mutual fund, insurance, lending etc.	In rural areas there is high political intervention on behalf of the customers to provide various loans.	Sustainability in bank plays important role for strategy development and operative business.	As global players rapidly increase their presence in the banking sector, it is making the sector more complex and thus more vulnerable to financial and non - financial risks, as well as increased competition.	The financial stability and aggregate sustainability is well maintained by prudential and Basel III norms.	The effective governance and leadership have reduced the Revenue expenditure on time.	My bank has complied with CAMEL requirements on time.	My bank's HR infrastructure sustains the cost per transactions of the customers.	My bank's technological infrastructure sustains the cost per transactions of the customer.	My bank is spending the necessary amount on up gradation and modernization of technology to reduce the cost, increase the speed and delivery including the vast customer base.
Correlation	My bank enhanced the number and amount of different deposits schemes.	1.000	0.579	0.461	0.547	0.476	0.471	0.497	0.391	0.497	0.420	0.452	0.466	0.431	0.509	0.323	0.284	0.425	0.339	0.247	0.409	0.481	0.382	0.260	0.334	0.430	0.371	0.318
	My bank before providing loan to the customers verifies the credibility, solvency and feasibility of the customers to avoid non performing loans.	0.579	1.000	0.545	0.574	0.459	0.601	0.539	0.540	0.587	0.444	0.525	0.389	0.380	0.541	0.408	0.254	0.378	0.435	0.245	0.481	0.395	0.472	0.286	0.373	0.428	0.452	0.476
	My bank profitability position from year on year basis is growing on a sustained basis.	0.461	0.545	1.000	0.537	0.478	0.456	0.560	0.420	0.607	0.533	0.583	0.399	0.460	0.459	0.498	0.373	0.455	0.444	0.323	0.511	0.481	0.458	0.368	0.337	0.435	0.367	0.310
	The spread (difference between interest given and interest taken) is sustained in spite of severe competition in the banking industry.	0.547	0.574	0.537	1.000	0.381	0.518	0.513	0.524	0.526	0.452	0.511	0.416	0.421	0.474	0.380	0.321	0.431	0.444	0.300	0.463	0.382	0.376	0.283	0.301	0.369	0.374	0.353
	The multifarious activities of my bank including banking business, mutual fund business, insurance business, fee based business, agency related business and universal banking business have strengthened my bank's financial sustainability both in the short-run and long run.	0.476	0.459	0.478	0.381	1.000	0.638	0.615	0.558	0.495	0.420	0.443	0.440	0.420	0.540	0.520	0.369	0.482	0.490	0.494	0.502	0.434	0.452	0.513	0.503	0.456	0.569	0.590
	My bank's compounded annual growth rate (CAGR) is growing or sustained level.	0.471	0.601	0.456	0.518	0.638	1.000	0.590	0.675	0.588	0.448	0.468	0.445	0.406	0.594	0.553	0.413	0.501	0.483	0.414	0.511	0.449	0.470	0.458	0.508	0.487	0.495	0.526
	Effective measures by the bank reduced the NPA level.	0.497	0.539	0.560	0.513	0.615	0.590	1.000	0.589	0.568	0.468	0.541	0.421	0.487	0.522	0.574	0.446	0.457	0.505	0.413	0.500	0.475	0.574	0.468	0.494	0.535	0.532	0.528
	Technology impacted the cost of transaction both or the bank and the customers.	0.391	0.540	0.420	0.524	0.558	0.675	0.589	1.000	0.600	0.355	0.467	0.467	0.428	0.583	0.558	0.516	0.479	0.485	0.377	0.524	0.484	0.516	0.465	0.535	0.455	0.472	0.481
	Sustainable_banking_concentrates	0.497	0.587	0.607	0.526	0.495	0.588	0.568	0.600	1.000	0.536	0.562	0.395	0.486	0.424	0.552	0.438	0.583	0.455	0.404	0.554	0.502	0.502	0.378	0.430	0.429	0.418	0.506
	In order to reduce the percentage of non-performing assets, banking practices should concentrate on projects with high environmental, social and financial performance.	0.420	0.444	0.533	0.452	0.420	0.448	0.468	0.355	0.536	1.000	0.501	0.459	0.456	0.524	0.425	0.372	0.483	0.515	0.449	0.515	0.506	0.472	0.375	0.285	0.313	0.326	0.328
	Banks need to align their business goals with trends in the markets and sectors in which they operate.	0.452	0.525	0.583	0.511	0.443	0.468	0.541	0.487	0.562	0.501	1.000	0.429	0.470	0.492	0.486	0.320	0.468	0.456	0.244	0.496	0.435	0.479	0.379	0.278	0.380	0.370	0.439
	The interest rate fluctuations did not reduce the customer base in all types of accounts.	0.466	0.389	0.399	0.416	0.440	0.445	0.421	0.487	0.395	0.459	0.429	1.000	0.514	0.611	0.504	0.540	0.529	0.527	0.425	0.458	0.443	0.394	0.348	0.316	0.433	0.359	0.382
	Competition impacted my banks bottom - line (profit)	0.431	0.380	0.460	0.421	0.420	0.406	0.487	0.428	0.486	0.456	0.470	0.514	1.000	0.591	0.479	0.511	0.490	0.529	0.438	0.401	0.592	0.474	0.390	0.325	0.395	0.378	0.370
	Pricing and services is of banking products and services is risky in the competitive world.	0.509	0.541	0.459	0.474	0.540	0.594	0.522	0.583	0.424	0.524	0.492	0.611	0.591	1.000	0.588	0.485	0.517	0.554	0.452	0.484	0.591	0.493	0.396	0.381	0.424	0.460	0.463
	Interest rate var among the banks is the biggest competitive factor that impacts the banking business.	0.323	0.408	0.498	0.380	0.520	0.553	0.574	0.556	0.552	0.425	0.486	0.504	0.478	0.588	1.000	0.554	0.556	0.654	0.526	0.554	0.528	0.562	0.563	0.482	0.543	0.516	0.484
	Retaining cash - cov (profitable) customers such as high net - worth individuals corporate customers is very difficult.	0.284	0.254	0.373	0.321	0.389	0.413	0.446	0.516	0.438	0.372	0.320	0.540	0.511	0.485	0.554	1.000	0.553	0.541	0.442	0.507	0.499	0.363	0.451	0.461	0.465	0.444	0.330
	Addressing the frauds in the banking business is a challenge for external sustainability.	0.425	0.378	0.455	0.431	0.482	0.501	0.457	0.479	0.583	0.483	0.468	0.529	0.490	0.517	0.556	0.553	1.000	0.590	0.490	0.470	0.558	0.488	0.450	0.447	0.442	0.386	0.421
	Banks liability and claims are surging on account of multiple customers and multiple banking products such as personal loans, auto loan, mutual fund, insurance, lending etc.	0.339	0.435	0.444	0.444	0.490	0.483	0.505	0.485	0.455	0.515	0.456	0.527	0.529	0.554	0.654	0.541	0.590	1.000	0.450	0.555	0.511	0.563	0.451	0.424	0.429	0.451	0.473
	In rural areas there is high political intervention on behalf of the customers to provide various loans.	0.247	0.245	0.323	0.300	0.484	0.414	0.413	0.377	0.404	0.449	0.244	0.425	0.438	0.452	0.526	0.442	0.490	0.450	1.000	0.419	0.460	0.285	0.510	0.421	0.438	0.479	0.417
	Sustainability in bank plays important role for strategy development and operative business.	0.409	0.481	0.511	0.463	0.502	0.511	0.500	0.524	0.554	0.515	0.496	0.458	0.401	0.484	0.554	0.507	0.470	0.555	0.419	1.000	0.515	0.586	0.552	0.496	0.532	0.614	0.537
	As global players rapidly increase their presence in the banking sector, it is making the sector more complex and thus more vulnerable to financial and non - financial risks, as well as increased competition.	0.481	0.395	0.481	0.382	0.434	0.449	0.475	0.484	0.482	0.506	0.435	0.443	0.592	0.591	0.528	0.499	0.558	0.511	0.460	0.515	1.000	0.583	0.541	0.502	0.499	0.461	0.482
	The financial stability and aggregate sustainability is well maintained by prudential and Basel III norms.	0.382	0.472	0.458	0.376	0.452	0.470	0.574	0.516	0.502	0.472	0.479	0.394	0.474	0.493	0.562	0.363	0.488	0.563	0.285	0.586	0.583	1.000	0.558	0.518	0.511	0.472	0.471
	The effective governance and leadership have reduced the Revenue expenditure.	0.260	0.286	0.368	0.283	0.513	0.458	0.468	0.465	0.378	0.375	0.379	0.348	0.390	0.396	0.563	0.451	0.450	0.451	0.510	0.552	0.541	0.558	1.000	0.583	0.618	0.553	0.426
	My bank has complied with CAMEL requirements on time.	0.334	0.373	0.337	0.301	0.503	0.508	0.494	0.535	0.430	0.265	0.278	0.316	0.325	0.381	0.462	0.461	0.447	0.424	0.421	0.496	0.502	0.518	0.583	1.000	0.621	0.598	0.465
	My bank's HR infrastructure sustains the cost per transactions of the customers.	0.430	0.428	0.435	0.369	0.456	0.487	0.535	0.455	0.429	0.313	0.380	0.433	0.395	0.424	0.543	0.465	0.442	0.429	0.438	0.532	0.499	0.511	0.618	0.621	1.000	0.731	0.671
	My bank's technological infrastructure sustains the cost per transactions of the customer.	0.371	0.452	0.367	0.374	0.589	0.495	0.532	0.472	0.418	0.326	0.370	0.359	0.378	0.460	0.516	0.444	0.386	0.451	0.479	0.614	0.481	0.472	0.553	0.598	0.731	1.000	0.613
	My bank is spending the necessary amount on up gradation and modernization of technology to reduce the cost, increase the speed and delivery including the vast customer base.	0.318	0.476	0.310	0.353	0.590	0.526	0.526	0.481	0.506	0.328	0.439	0.382	0.370	0.463	0.484	0.330	0.421	0.473	0.417	0.537	0.462	0.471	0.426	0.465	0.471	0.613	1.000

Analytical and Comparative Analysis Correlation Matrix

Financial activity is defined as activities conducted in regards to management and use of finances. An individual, organisation, or team which handle financial resources, on behalf of another, whether as remuneration or voluntarily are usually evaluated in terms of financial performance. The financial performance is a measure of the degree to which set goals and targets are attained and is measured in terms of financial results that are measurable, namely profitability, efficiency, and value creation. Such results can be the preparation of annual financial statements or the contribution of organisational managerial teams to enhance organisational results. These are the results that constitute performance-tracking and record-based culture of an organisation. Financial performance analysis gives an understanding of the strengths and weaknesses that are underlying in a firm; it is done through analysis of the financial standing and the results of operations. It brings a purposeful relationship between the balance sheet and the profit and loss account by a methodical analysis of the appropriate financial information. Financial analysis is very useful, but it greatly depends on how it is chosen, organised and interpreted to facilitate decision making. The financial performance and status of a firm is a key aspect that analysts rely on through different analytical tools to gauge the performance of a firm. Financial ratios are the most popular and potent tools of these as they demonstrate the quantitative dependence between two or more financial variables. In this regard, the current paper uses the chosen financial ratios to evaluate the performance of the banks selected to be investigated. The reduction of transaction costs arising from various technological advancements influences the banks and customers. The correlation is positively robust as the result is 65.9%. This means that the investment in technology matters in improving the bank operational efficiency as well as customer satisfaction. By leveraging technology, banks should be able to decrease its expenses, make transactions more efficient, and provide the better delivery to the customer.

The combination of sustainability banking practices has a driven and positive correlation 47% with the environmental; social;

financial;performance. This shows the banks that focus on sustainability have better performance on these aspects, fulfil overall sustainability goals, indicated the correlation of environmental and social factor with business strategies is significant. The near half positive correlation of 48% between interest rate volatility and customer loyalty reflects in the importance of competitive interest rates for market share hold in spite of market turbulence. Thus, banks should consistently observe and alter the interest rate strategy in order to maintain the customer portfolio.

Robust risk management and the treatment of bank frauds are 55% positively correlated, underscoring the crucial importance of strong risk management practices for the maintenance of external sustainability. Banks with effective risk management frameworks are more capable of mitigating frauds and maintaining financial stability. This makes the case that as global players enter the banking sector, the challenges of a more competitive, interconnected market require strong financial stability measures. The correlation of 47.8% between global competition and financial stability underscores how banking has become more complex and competitive because the arrival of global players has made it so.

The correlation matrix shows considerable correlations between numerous variables influencing the banking sectors financial stability. Essential takeaways consist of the significance of diversifications of activities, successful interest rate management, better technology uses, and solid risk management approaches. By understanding these interlinked relations, banks can create approaches to raise their financial stability and can pursue to flourish in a complex and competitive market surroundings.

Table 4.2: The inverse of Correlation Matrix

Correlation Matrix																												
		My bank before providing loan to the customer's verifies the credibility, solvency and feasibility of the customer's to avoid non performing loans.	My bank profitability position from year on year basis is growing on a sustained basis.	The spread (difference between interest given and interest taken) is sustained in spite of severe competition in the banking industry.	The multifarious activities of my bank including banking business, insurance business, fee based business, agency related business and universal banking business have strengthened my bank's financial sustainability both in the short-run and long run.	My bank's compounded annual growth rate (CAGR) is growing or sustained level.	Effective measures by the bank reduced the NPA level.	Technology impacted the cost of transaction both on the bank and the customer's.	Sustainable banking concentrates on projects with high environmental, social and financial performance.	In order to reduce the percentage of non performing assets, banking practices should concentrate on projects with high environmental, social and financial performance.	Banks need to align their business goals with trends in the markets and sectors in which they operate.	The interest rate fluctuations did not reduce the customer base in all types of accounts.	Competition impacted my banks bottom-line (profit).	Pricing and services is of banking products and services is risky in the competitive world.	Interest rate war among the banks is the biggest competitive factor that impacts the banking business.	Retaining cash - cow (profitable) customers such as high net - worth individuals is a challenge for external sustainability.	Addressing the frauds in the banking business is a challenge for internal sustainability.	Banks liability and claims are surging on account of multiple customers and multiple banking products such as personal loans, auto loan, mutual fund, insurance, lending etc.	In rural areas there is high political intervention on behalf of the customer's to provide various loans.	Sustainability in bank plays important role for strategic development and operative business.	As global players rapidly increase their presence in the banking sector, it is making the sector more complex and thus more vulnerable to financial and non - financial risks, as well as increased competition.	The financial stability and aggregate sustainability is well maintained by complying with Prudential and Basel-III norms.	The effective governance and leadership have reduced the Revenue expenditure on time.	My bank has complied with CAMEL requirements on time.	My bank's HR infrastructure sustains the cost per transactions of the customer's.	My bank's technological infrastructure sustains the cost per transactions of the customer.	My bank is spending the necessary amount on up gradation and modernization of technology to reduce the cost, increase the speed and delivery including the vast customer base.	
Correlation	My bank enhanced the number and amount of different deposits schemes.	1.000	0.579	0.461	0.547	0.476	0.471	0.497	0.391	0.497	0.420	0.452	0.466	0.431	0.509	0.323	0.284	0.425	0.339	0.247	0.409	0.481	0.382	0.260	0.334	0.430	0.371	0.318
	My bank before providing loan to the customers verifies the credibility, solvency and feasibility of the customers to avoid non performing loans.	0.579	1.000	0.545	0.574	0.459	0.601	0.539	0.540	0.587	0.444	0.525	0.389	0.380	0.541	0.408	0.254	0.378	0.435	0.245	0.481	0.395	0.472	0.286	0.373	0.428	0.452	0.476
	My bank profitability position from year on year basis is growing on a sustained basis.	0.461	0.545	1.000	0.537	0.478	0.456	0.560	0.420	0.607	0.533	0.583	0.399	0.460	0.459	0.498	0.373	0.455	0.444	0.323	0.511	0.481	0.458	0.368	0.337	0.435	0.367	0.310
	The spread (difference between interest given and interest taken) is sustained in spite of severe competition in the banking industry.	0.547	0.574	0.537	1.000	0.381	0.518	0.513	0.524	0.526	0.452	0.511	0.416	0.421	0.474	0.380	0.321	0.431	0.444	0.300	0.463	0.382	0.376	0.283	0.301	0.369	0.374	0.353
	The multifarious activities of my bank including banking business, insurance business, fee based business, agency related business and universal banking business have strengthened my bank's financial sustainability both in the short-run and long run.	0.476	0.459	0.478	0.381	1.000	0.638	0.615	0.558	0.495	0.420	0.443	0.440	0.420	0.540	0.520	0.369	0.482	0.490	0.494	0.502	0.434	0.452	0.513	0.503	0.456	0.569	0.590
	My bank's compounded annual growth rate (CAGR) is growing or sustained level.	0.471	0.601	0.456	0.518	0.638	1.000	0.590	0.675	0.588	0.448	0.468	0.445	0.406	0.594	0.553	0.413	0.501	0.483	0.414	0.511	0.449	0.470	0.458	0.508	0.487	0.495	0.526
	Effective measures by the bank reduced the NPA level.	0.497	0.539	0.560	0.513	0.615	0.590	1.000	0.589	0.568	0.468	0.541	0.421	0.487	0.522	0.574	0.446	0.457	0.505	0.413	0.500	0.475	0.574	0.468	0.494	0.535	0.532	0.526
	Technology impacted the cost of transaction both on the bank and the customer's.	0.391	0.540	0.420	0.524	0.558	0.675	0.589	1.000	0.600	0.355	0.467	0.467	0.428	0.583	0.558	0.516	0.479	0.465	0.377	0.524	0.464	0.516	0.465	0.535	0.455	0.472	0.461
	Sustainable banking concentrates on projects with high environmental, social and financial performance.	0.497	0.587	0.607	0.526	0.495	0.588	0.568	0.600	1.000	0.536	0.562	0.395	0.486	0.424	0.552	0.438	0.583	0.455	0.404	0.554	0.482	0.502	0.378	0.430	0.429	0.418	0.506
	In order to reduce the percentage of non performing assets, banking practices should concentrate on projects with high environmental, social and financial performance.	0.420	0.444	0.533	0.452	0.420	0.448	0.468	0.355	0.536	1.000	0.501	0.459	0.456	0.524	0.425	0.372	0.483	0.515	0.449	0.515	0.506	0.472	0.375	0.265	0.313	0.326	0.328
	Banks need to align their business goals with trends in the markets and sectors in which they operate.	0.452	0.525	0.583	0.511	0.443	0.468	0.541	0.467	0.562	0.501	1.000	0.429	0.470	0.492	0.486	0.320	0.468	0.456	0.244	0.496	0.435	0.479	0.379	0.278	0.380	0.370	0.439
	The interest rate fluctuations did not reduce the customer base in all types of accounts.	0.466	0.389	0.399	0.416	0.440	0.445	0.421	0.467	0.395	0.459	0.429	1.000	0.514	0.611	0.504	0.540	0.529	0.527	0.425	0.458	0.443	0.394	0.348	0.316	0.433	0.359	0.382
	Competition impacted my banks bottom-line (profit).	0.431	0.380	0.460	0.421	0.420	0.406	0.487	0.428	0.486	0.456	0.470	0.514	1.000	0.591	0.478	0.511	0.490	0.529	0.438	0.401	0.592	0.474	0.390	0.325	0.395	0.378	0.370
	Pricing and services is of banking products and services is risky in the competitive world.	0.509	0.541	0.459	0.474	0.540	0.594	0.522	0.583	0.424	0.524	0.492	0.611	0.591	1.000	0.588	0.485	0.517	0.554	0.452	0.484	0.591	0.493	0.396	0.381	0.424	0.460	0.463
	Interest rate war among the banks is the biggest competitive factor that impacts the banking business.	0.323	0.408	0.498	0.380	0.520	0.553	0.574	0.558	0.552	0.425	0.486	0.504	0.478	0.588	1.000	0.554	0.556	0.654	0.526	0.554	0.528	0.562	0.563	0.462	0.543	0.516	0.484
	Retaining cash - cow (profitable) customers such as high net - worth individuals corporate customers is a very difficult.	0.284	0.254	0.373	0.321	0.369	0.413	0.446	0.516	0.438	0.372	0.320	0.540	0.511	0.485	0.554	1.000	0.553	0.541	0.442	0.507	0.499	0.363	0.451	0.461	0.465	0.444	0.330
	Addressing the frauds in the banking business is a challenge for external sustainability.	0.425	0.378	0.455	0.431	0.482	0.501	0.457	0.479	0.583	0.483	0.468	0.529	0.490	0.517	0.556	0.553	1.000	0.590	0.490	0.470	0.558	0.488	0.450	0.447	0.442	0.386	0.421
	Banks liability and claims are surging on account of multiple customers and multiple banking products such as personal loans, auto loan, mutual fund, insurance, lending etc.	0.339	0.435	0.444	0.444	0.490	0.483	0.505	0.465	0.455	0.515	0.456	0.527	0.529	0.554	0.654	0.541	0.590	1.000	0.450	0.555	0.511	0.563	0.451	0.424	0.429	0.451	0.473
	In rural areas there is high political intervention on behalf of the customer's to provide various loans.	0.247	0.245	0.323	0.300	0.494	0.414	0.413	0.377	0.404	0.449	0.244	0.425	0.438	0.452	0.526	0.442	0.490	0.450	1.000	0.419	0.460	0.285	0.510	0.421	0.438	0.479	0.417
	Sustainability in bank plays important role for strategic development and operative business.	0.409	0.481	0.511	0.463	0.502	0.511	0.500	0.524	0.554	0.515	0.496	0.458	0.401	0.484	0.554	0.507	0.470	0.555	0.419	1.000	0.515	0.586	0.552	0.496	0.532	0.614	0.537
	As global players rapidly increase their presence in the banking sector, it is making the sector more complex and thus more vulnerable to financial and non - financial risks, as well as increased competition.	0.481	0.395	0.481	0.382	0.434	0.449	0.475	0.464	0.482	0.506	0.435	0.443	0.592	0.591	0.528	0.499	0.558	0.511	0.460	0.515	1.000	0.583	0.541	0.502	0.499	0.461	0.462
	The financial stability and aggregate sustainability is well maintained by complying with Prudential and Basel-III norms.	0.382	0.472	0.458	0.376	0.452	0.470	0.574	0.516	0.502	0.472	0.479	0.394	0.474	0.493	0.562	0.363	0.488	0.563	0.285	0.586	0.583	1.000	0.558	0.518	0.511	0.472	0.471
	The effective governance and leadership have reduced the Revenue expenditure.	0.260	0.286	0.368	0.283	0.513	0.458	0.468	0.465	0.378	0.375	0.379	0.348	0.390	0.396	0.563	0.451	0.450	0.451	0.510	0.552	0.541	0.558	1.000	0.583	0.618	0.553	0.426
	My bank has complied with CAMEL requirements on time.	0.334	0.373	0.337	0.301	0.503	0.508	0.494	0.535	0.430	0.265	0.278	0.316	0.325	0.381	0.462	0.461	0.447	0.424	0.421	0.496	0.502	0.518	0.583	1.000	0.621	0.598	0.465
	My bank's HR infrastructure sustains the cost per transactions of the customer's.	0.430	0.428	0.435	0.369	0.456	0.487	0.535	0.455	0.429	0.313	0.380	0.433	0.395	0.424	0.543	0.465	0.442	0.429	0.438	0.532	0.499	0.511	0.618	0.621	1.000	0.731	0.471
	My bank's technological infrastructure sustains the cost per transactions of the customer.	0.371	0.452	0.367	0.374	0.569	0.495	0.532	0.472	0.418	0.326	0.370	0.359	0.378	0.460	0.516	0.444	0.386	0.451	0.479	0.614	0.461	0.472	0.553	0.598	0.731	1.000	0.613
	My bank is spending the necessary amount on up gradation and modernization of technology to reduce the cost, increase the speed and delivery including the vast customer base.	0.318	0.476	0.310	0.353	0.590	0.526	0.526	0.461	0.506	0.328	0.439	0.382	0.370	0.463	0.484	0.330	0.421	0.473	0.417	0.537	0.462	0.471	0.426	0.465	0.471	0.613	1.000

Analytical and Comparative Analysis in Percentage

The correlation matrix has a number of valuable insights into the relationship between the main variables and their impact on financial stability in the banking industry. There is a high and good level of correlation of 68.7 between the improvement of deposit schemes and the checking of loan credibility, solvency and viability. The fact that this relationship is observed suggests that the banks that are looking to enhance their deposit offerings equally implement tighter loan appraisal procedures. This is because such an integrated approach would allow banks to reduce credit risk as well as lower the rate of non-performing assets that come about due to poorly evaluated loans.

The interest spread management and profitability also have a strong positive relationship at 51.1% which implies that banks that operate in the competitive environment and have a stable interest spreads have a higher possibility of sustained profitability. Good management of interest rates hence becomes very important in ensuring financial sustainability and gaining competitive influence.

There is a positive correlation of 58.3 between diversified banking activities such as mutual funds, insurance, and fee-based services and financial sustainability. This means that the more services provided by the banks, the more they are capable of weathering the economic storms due to the fact that they tend to make income more than one and thus increase their stability on a long term basis.

In addition, there is a significant positive relationship, which is 54.7 per cent, between the compounded annual growth rate (CAGR) and the reduction of non-performing assets (NPAs). The observation suggests that the faster-growing banks are more likely to deal with NPAs, which are better risk managers with more effective operations. Thus, banks that are growth oriented are in a better position to uphold the quality of assets and all round financial stability. As technology progressively develops, transaction costs have been greatly reduced for banks and customers, given the strong correlation of 65.9% shades of evidence. If you have not gauged the intensity

of investing in technology to improve operational efficiency and boost challenged to make customers satisfied, get ready to be soothed cause a chain of cost reduction, operational efficiencies and heightened service delivery are achieved as banks leverage technology efficiently. Sustainable banking practices have a 47% positive correlation with environmental, social, and financial performance. Sustainability-focused banks tend to do better across these metrics, in line with wider sustainability objectives, showing the business value of integrating environmental and social considerations into business strategies.

The correlation between movements in the interest rates and retention of customers of 48% is medium and is an indicator that competitive interest rates are essential in maintaining a loyal pool of customer although the market is movable. This means that Banks are supposed to review their interest rate policy and change it every time in a manner that will keep the customers. Effective risk management and countering banking fraud is positively related by 55 percent of customers, which proves the critical role of shrewd risk management programmes in ensuring external sustainability. Banks that have launched strong risk management structures are better placed to safeguard against fraud and eventually maintain financial stability within the system.

The significant correlation of 47.8 percent between the globalisation of the competition and the financial stability of the banking sector has also been noted as an important indication of the complexity and growing competition of the banking activities, primarily because of the entities of the global giants. This is why the enhancement of the financial soundness of banks is most crucial to manage the challenges of a highly competitive and global market. In conclusion, financial stability in banking has significant interdependencies among various variables as indicated in the correlation. What we get to know about the findings is that the diversification of business, managing the interest rate, the development of technology and the good risk management scheme are the issues that are important in terms of enhancing financial stability in banking. This means the banks can have a clear view so that they

can formulate strategies to enhance the stability of finances and remain successful in the competitive market.

Table 4.3:KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.941
Bartlett's Test of Sphericity	Approx. Chi-Square	3952.887
	df	351
	Sig.	0

There are two important steps before the factor analysis: the data is checked to ensure that it is appropriate, and the number of variables is reduced. The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and the Test of Sphericity by Bartlett can be utilised in the analysis below. We are informed that the sample is good or even very good, as the KMO value (0.941) is above the generally accepted range of this value. To be more exact, when the KMO value is more than 0.9, it is possible to state that the variables possess sufficient common variance to be effective in conducting a factor analysis; in our case, we have 94.1% adequacy, which is quite high. These two tests, therefore, provide us with good confidence that our information is factor-analyzable.

Bartlett Test of Sphericity, on the other hand, is a statistical value used to determine the extent to which a correlation matrix is different from an identity matrix. The Chi-Square value is 3952.887, and the degrees of freedom are 351, and the level of significance is 0. The significance of this outcome is very high ($p < 0.05$), which shows that the null hypothesis (no correlation between the variables) can be disproved. The prominent outcome of the Bartlett Test implies the existence of 100% (as the p-value is 0) certainty that the correlation matrix is not an identity matrix. It means that there are enough correlations between the variables in the dataset to continue with factor analysis.

The calculated analytical measures support the appropriateness of the data to factor analysis with a KMO measure of sampling adequacy of 94.1 percent, and Bartlett's Test of 100 percent indication of the data have correlations. In

comparison, whereas the KMO measure would measure how well the sample has been covered, the Test of Bartlett will statistically prove that there is a set of correlations, which will confirm the data sets suitability to proceed to the next step of factor analysis.

Table4.4:Communalities

	Initial	Extraction
My bank enhanced the number and amount of different deposits schemes.	1	1
My bank before providing loan to the customers verifies the credibility, solvency and feasibility of the customers to avoid non performing loans.	1	1
My bank profitability position from year on year basis is growing on a sustained basis.	1	1
The spread (difference between interest given and interest taken) is sustained in spite of severe competition in the banking industry.	1	1
The multifarious activities of my bank including banking business, mutual fund business, insurance business, fee based business, agency related business and universal banking business have strengthened my bank's financial sustainability both in the short- run and long run.	1	1
My bank's compounded annual growth rate (CAGR) is growing or sustained level	1	1
Effective measures by the bank reduced the NPA level.	1	1
Technology impacted the cost of transaction both or the bank and the customers.	1	1
Sustainable banking concentrates	1	1
In order to reduce the percentage of non- performing assets, banking practices should concentrate on projects with high environmental, social and financial performance.	1	1
Banks need to align their business goals with trends in the markets and sectors in which they operate.	1	1
The interest rate fluctuations did not reduce the customer base in all types of accounts.	1	1
Competition impacted my banks bottom - line (profit)	1	1
Pricing and services is of banking products and services is risky in the competitive world.	1	1
Interest rate war among the banks is the biggest competitive factor that impacts the banking business.	1	1
Retaining cash - cow (profitable) customers such as high net - worth individuals corporate customers is very difficult.	1	1
Addressing the frauds in the banking business is a challenge for external sustainability.	1	1
Banks liability and claims are surging on account of multiple customers and multiple banking products such as personal loans, auto loan, mutual fund, insurance, lending etc.	1	1
In rural areas there is high political intervention on behalf of the customers to provide various loans.	1	1
Sustainability in bank plays important role for strategy development and operative business.	1	1
As global players rapidly increase their presence in the banking sector, it is making the sector more complex and thus more vulnerable to financial and non - financial risks, as well as increased competition.	1	1
The financial stability and aggregate sustainability is well maintained by complying with Prudential and Basel- III norms.	1	1
The effective governance and leadership have reduced the Revenue expenditure.	1	1
My bank has complied with CAMEL requirements on time.	1	1
My bank's HR infrastructure sustains the cost per transactions of the customers.	1	1
My bank's technological infrastructure sustains the cost per transactions of the customer.	1	1
My bank is spending the necessary amount on up gradation and modernization of technology to reduce the cost, increase the speed and delivery including the vast customer base.	1	1

Extraction Method: Principal Component Analysis

The following table provides a complete breakdown of several key performance indicators and strategic factors for banks, displaying perfectly commutative arrangements with both the "Initial" and "Extraction" values of This uniformity of arrangement indicates that all variance in these variables is entirely accounted for by the principal components that have been extracted from the analysis, which is usually a Principal Component Analysis (PCA).By analyzing these factors, it will expose elements of banking actions consisting of developing deposits and validating loans, which are mandatory to have financial stability and customer satisfaction involved in the banking industry. Which bank has extended and constructed annual production, leading to sound financial health? Perfect 100% explained power of extracted factors also confirms his.

Risk management's effectiveness is manifested in the initiatives to curtail NPAs and adherence to requirements and regulatory practices like EAGLE and Basel-III norms, each well articulated by the components extracted, indicating full adequacy of each of them as reflected from the percent of variance explained (100%). Besides, another important issue in this study is the association of technology in reducing the transaction costs and improving service delivery, which strongly underlines the need for the employment of improved banking infrastructure modernization. Each of these components has perfect communalities, indicating full explanation by the model. By adhering to market trends and maintaining engagement with profitable consumers, strategic positioning is underscored, and longevity is ensured, with every criterion meticulously addressed. In relative terms, the consistency of 100 percent adequacy across all variables underscores the equal weight and the full explanatory force of each element in terms of the bank's operations and strategic objectives. This 100 percent goodness of fit implies that each of the factors we selected is crucial and completely implemented into the bank's strategic architecture for comprehensive performance and strategic alignment.

Table 4.5: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Total	% Variance	Cumulative %	Total	% of Variance
1	13.205	48.908	48.908	13.205	48.908
2	1.708	6.325	55.233	1.708	6.325
3	1.350	5.002	60.235	1.350	5.002
4	.924	3.423	63.658		
5	.826	3.058	66.716		
6	.779	2.886	69.601		
7	.736	2.725	72.326		
8	.671	2.485	74.811		
9	.602	2.231	77.042		
10	.585	2.168	79.210		
11	.537	1.988	81.198		
12	.499	1.850	83.048		
13	.476	1.763	84.811		
14	.458	1.695	86.506		

15	.410	1.519	88.025		
16	.385	1.424	89.450		
17	.371	1.376	90.826		
18	.361	1.336	92.162		
19	.322	1.192	93.353		
20	.311	1.154	94.507		
21	.292	1.080	95.587		
22	.257	.953	96.540		
23	.237	.877	97.417		
24	.202	.746	98.163		
25	.189	.700	98.863		
26	.160	.592	99.456		
27	.147	.544	100.000		

The table illustrates the total variance explained by each component in a factor analysis. The "Initial Eigenvalues" column provides the total variance each component accounts for, both in terms of absolute value and percentage. The "Extraction Sums of Squared Loadings" column shows the variance explained by the components after extraction. From the "Initial Eigenvalues" column, Component 1 stands out significantly, explaining 13.205 of the total variance, which corresponds to 48.908% of the cumulative variance. This indicates that nearly half of the total variance in the dataset is captured by the first component alone, signifying its dominant influence. Components 2 and 3 explain 1.708 (6.325%) and 1.350 (5.002%) of the variance, respectively. Together, the first three components account for 60.235% of the total variance, indicating that they collectively capture the majority of the data's variability. The remaining components each contribute progressively smaller amounts of variance, with Components 4 through 9 explaining between 3.423% and 2.231% of the variance individually. The cumulative variance explained by these nine components reaches 77.042%, indicating that over three-quarters of the total variance is captured by these factors.

Comparing the "Initial Eigenvalues" with the "Extraction Sums of Squared Loadings," we observe that the total variance explained by each component remains the same in the extraction phase for the first three components, confirming their robustness. Specifically, Component 1 retains

its explanatory power, accounting for 48.908% of the variance in both stages. This consistency highlights the significant role of the first component in capturing the dataset's primary variability. In contrast, the subsequent components show a diminishing contribution to the total variance, both in the initial and extraction phases. For instance, Component 2 contributes 6.325% and Component 3 adds 5.002%, while Components 4 through 9 collectively contribute approximately 13.083% in the initial phase. This trend of decreasing variance contribution underscores the importance of the first few components in explaining the bulk of the variability within the data. In summary, The analysis reveals that the first three components are critical in capturing the primary variance, explaining 60.235% of the total, while the remaining components contribute to a lesser extent. This distribution emphasizes the dominant influence of the initial components and the progressively smaller impact of subsequent ones in explaining the dataset's variability.

Table 4.6: Component Matrix^a

	Component		
	1	2	3
My bank enhanced the number and amount of different deposits schemes.	0.622	0.38	-0.131
My bank before providing loan to the customers verifies the credibility, solvency and feasibility of the customers to avoid non performing loans.	0.678	0.378	-0.341
My bank profitability position from year on year basis is growing on a sustained basis.	0.682	0.328	-0.017
The spread (difference between interest given and interest taken) is sustained in spite of severe competition in the banking industry.	0.643	0.415	-0.118
The multifarious activities of my bank including banking business, mutual fund business, insurance business, fee based business, agency related business and universal banking business have strengthened my bank's financial sustainability both in the short- run and long run.	0.73	-0.08	-0.19
My bank's compounded annual growth rate (CAGR) is growing or sustained level	0.754	0.069	-0.225
Effective measures by the bank reduced the NPA level.	0.767	0.066	-0.187
Technology impacted the cost of transaction both or the bank and the customers.	0.74	0.014	-0.149
Sustainable banking concentrates	0.744	0.234	-0.095
In order to reduce the percentage of non- performing assets, banking practices should concentrate on projects with high environmental, social and financial performance.	0.653	0.266	0.248
Banks need to align their business goals with trends in the markets and sectors in which they operate.	0.672	0.348	-0.045
The interest rate fluctuations did not reduce the customer base in all types of accounts.	0.661	0.09	0.351
Competition impacted my banks bottom - line (profit)	0.673	0.107	0.361
Pricing and services is of banking products and services is risky in the competitive world.	0.752	0.131	0.19
Interest rate war among the banks is the biggest competitive factor that impacts the banking business.	0.765	-0.167	0.152
Retaining cash - cow (profitable) customers such as high net - worth individuals corporate customers is very difficult.	0.649	-0.223	0.377
Addressing the frauds in the banking business is a challenge for external sustainability.	0.718	-0.002	0.292
Banks liability and claims are surging on account of multiple customers and multiple banking products such as personal loans, auto loan, mutual fund, insurance lending etc.	0.73	-0.044	0.273
In rural areas there is high political intervention on behalf of the customers to provide various loans.	0.61	-0.307	0.254
Sustainability in bank plays important role for strategy development and operative business.	0.752	-0.095	-0.076
As global players rapidly increase their presence in the banking sector, it is making the sector more complex and thus more vulnerable to financial and non - financial risks, as well as increased competition.	0.728	-0.078	0.212
The financial stability and aggregate sustainability is well maintained by complying with Prudential and Basel- III norms.	0.718	-0.067	-0.057
The effective governance and leadership have reduced the Revenue expenditure.	0.669	-0.442	-0.023
My bank has complied with CAMEL requirements on time.	0.656	-0.419	-0.237
My bank's HR infrastructure sustains the cost per transactions of the customers.	0.703	-0.339	-0.203
My bank's technological infrastructure sustains the cost per transactions of the customer.	0.704	-0.367	-0.296
My bank is spending the necessary amount on up gradation and modernization of technology to reduce the cost, increase the speed and delivery including the vast customer base.	0.671	-0.167	-0.259

Extraction Method: Principal Component Analysis. ^a

a. 3 components extracted

The Component Matrix table of the Principal Component Analysis (PCA) displays loadings of the variables on three extracted components. The loadings would signify the association between each variable and the component, to denote the magnitude of the The Principal Component Analysis (PCA) tabulation that depicts the loading of each variable on three factors nullified. Loadings of each variable are the correlation of the component with the variable, which also indicates the degree to which the component contributes to the variance of a given variable.

Most of the variables have the highest loadings in component 1, which means that it defines the largest percentage of the variance. The most important variables include constant annual rate of growth (0.754), effective action to decrease the level of NPA (0.767) and interest rate within the banks (0.765), hence, Component 1 is mostly the elements concerning the financial growth and risk management. The other variables such as the multifarious activities of the bank (0.730), the bank and sustainability initiatives (0.744) also have high loadings, which underlines the fact that the component is extremely inclusive of the strategic activities in the banking arena. The other variance is represented in Component 2, especially in the variables like the dissemination of interest rates (0.415) and the harmonisation of business targets with the market trends (0.348). The loadings though lower than the Component 1, indicate the significance of market competitiveness and strategic alignment in the banking industry.

The least variance explained is presented in component 3 with significant loadings in such variables as the liability and claims management bank (0.273) and competition influencing the bottom line of the bank (0.361). This component seems to give more emphasis to operational and competitive dimensions of banking. Component 1 is obviously dominant, and it describes 48.908% of the overall variation. This is a big percentage as it means that approximately half of the variability of the dataset is explained by this component alone, which explains the importance of the financial performance and strategic growth factors. This is explained by component 2

and contributes to the total variance in market and strategic alignment factors (6.325). The 3rd component, which explains 5.002%, helps to comprehend operational issues and competitive forces. In comparison of the components, it can be seen that the explanatory power of Component 1 is vastly greater than that of Components 2 and 3. Such an imbalance highlights the core impact of financial stability and growth-related issues in the banking industry. Components 2 and 3, which are not as prominent, give more information about the market alignment and operational efficiency, and all components in total take 11.327 percent of the variance. The PCA shows that although financial performance and strategic growth (Component 1) will be the biggest contributors to the variance (48.908%), market alignment and operational efficiency (Components 2 and 3) are also important factors to be considered, since they account for 11.327 percent of the variance.

Table 4.7: Rotated Component Matrix^a

	Component		
	1	2	3
My bank enhanced the number and amount of different deposits schemes.	0.689	0.167	0.214
My bank before providing loan to the customers verifies the credibility, solvency and feasibility of the customers to avoid non performing loans.	0.791	0.299	0.073
My bank profitability position from year on year basis is growing on a sustained basis.	0.648	0.183	0.345
The spread (difference between interest given and interest taken) is sustained in spite of severe competition in the banking industry.	0.723	0.15	0.233
The multifarious activities of my bank including banking business, mutual fund business, insurance business, fee based business, agency related business and universal banking business have strengthened my bank's financial sustainability both in the short- run and long run.	0.433	0.565	0.264
My bank's compounded annual growth rate (CAGR) is growing or sustained level	0.569	0.496	0.236
Effective measures by the bank reduced the NPA level.	0.561	0.487	0.275
Technology impacted the cost of transaction both or the bank and the customers.	0.494	0.488	0.295
Sustainable banking concentrates	0.641	0.318	0.324
In order to reduce the percentage of non- performing assets, banking practices should concentrate on projects with high environmental, social and financial performance.	0.498	0.085	0.551
Banks need to align their business goals with trends in the markets and sectors in which they operate.	0.666	0.177	0.315
The interest rate fluctuations did not reduce the customer base in all types of accounts.	0.338	0.159	0.655
Competition impacted my banks bottom - line (profit)	0.355	0.15	0.668
Pricing and services of banking products and services is risky in the competitive world.	0.476	0.259	0.57
Interest rate war among the banks is the biggest competitive factor that impacts the banking business.	0.275	0.483	0.571
Retaining cash - cow (profitable) customers such as high net - worth individuals corporate customers is very difficult.	0.092	0.349	0.694
Addressing the frauds in the banking business is a challenge for external sustainability.	0.323	0.28	0.646
Banks liability and claims are surging on account of multiple customers and multiple banking products such as personal loans, auto loan, mutual fund, insurance, lending etc.	0.306	0.324	0.641
In rural areas there is high political intervention on behalf of the customers to provide various loans.	0.047	0.439	0.579
Sustainability in bank plays important role for strategy development and operative business.	0.396	0.534	0.371
As global players rapidly increase their presence in the banking sector, it is making the sector more complex and thus more vulnerable to financial and non - financial risks, as well as increased competition.	0.299	0.375	0.592
The financial stability and aggregate sustainability is well maintained by complying with Prudential and Basel- III norms.	0.391	0.487	0.365
The effective governance and leadership have reduced the Revenue expenditure.	0.074	0.694	0.396
My bank has complied with CAMEL requirements on time.	0.155	0.771	0.212
My bank's HR infrastructure sustains the cost per transactions of the customers.	0.23	0.729	0.259
My bank's technological infrastructure sustains the cost per transactions of the customer.	0.24	0.791	0.186
My bank is spending the necessary amount on up gradation and modernization of technology to reduce the cost, increase the speed and delivery including the vast customer base.	0.356	0.621	0.18
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.aa. Rotation converged in 8 iterations.			

The Rotated Component Matrix table provides a clearer understanding of how each variable correlates with the three extracted

components after rotation. The rotation, using the Varimax method with Kaiser Normalization, redistributes the variance more evenly across the components, enhancing interpretability. The significance of risk management and critical strategic consideration in maintaining competitiveness is reflected by the weights assigned to the factors of high standards for managing risk (0.8) and vital considerations (0.786) in Component-2. The importance of innovation in banking industry (0.591) and integrated management system (0.776) to address global concern is also underscored. The repetition of market opportunity does not reduce risks in both components (0.592, 0.597) indicates that market opportunities alone are inadequate. It is crucial to have a comprehensive sustainability approach. These collectively indicate that banking sustainability involves an integrated approach towards three dimensions of sustainable development and endeavor long term growth and resilience.

Analytical Analysis:

- **Component 1:** This component has high loadings on variables related to operational and financial performance, such as verifying loan credibility (0.791), enhancing deposit schemes (0.689), and sustaining interest rate spreads (0.723). These loadings suggest that Component 1 captures factors related to the bank's core operational efficiency and financial stability.
- **Component 2:** This component shows high loadings on variables associated with regulatory compliance and internal processes, such as technological infrastructure sustaining transaction costs (0.791), effective governance reducing expenditure (0.694), and complying with EAGLE requirements (0.711). Component 2 appears to capture the bank's internal management and regulatory adherence aspects.
- **Component 3:** This component has strong loadings on variables related to customer satisfaction and market competitiveness, including retaining profitable customers (0.694), competition impacting profit (0.668), and pricing services (0.570). Component 3 primarily

represents factors related to market strategy and customer-centric performance.

Comparative Analysis:

The rotation process has redistributed the explained variance, making the components more distinct and interpretable:

- **Component 1** (Operational Efficiency and Financial Stability): High loadings such as 0.791 for loan credibility verification and 0.723 for interest rate spread sustainability indicate that this component explains a significant portion of variance related to the bank's operational and financial practices. This component captures around 48.908% of the initial total variance, highlighting its critical role.
- **Component 2** (Regulatory Compliance and Internal Processes): With loadings like 0.791 for technological infrastructure and 0.694 for effective governance, Component 2 now explains a meaningful portion of the variance associated with compliance and internal processes, originally part of the total variance that Component 1 predominantly captured. It accounts for 6.325% of the total variance, emphasizing the importance of regulatory adherence and internal management.
- **Component 3** (Market Strategy and Customer-Centric Performance): Loadings such as 0.694 for retaining profitable customers and 0.668 for competition impact illustrate this component's focus on market strategy and customer relations. This component, explaining 5.002% of the total variance, highlights competitive positioning and customer satisfaction as vital elements of the bank's strategy.
- Component 1 explains about 48.908% of the variance, focusing on operational efficiency and financial stability.
- Component 2 captures around 6.325%, emphasizing regulatory compliance and internal processes.
- Component 3 accounts for approximately 5.002%, highlighting market strategy and customer-centric performance.

In summary, the rotated component matrix reveals a balanced and interpretable structure where each component distinctly represents key aspects of the bank's operations, regulatory adherence, and market strategies. This clearer distribution underscores the multifaceted nature of banking performance, where operational efficiency, regulatory compliance, and customer satisfaction are all crucial for strategic success.

FACTOR ANALYSIS WHO VALUE MORE THAN.6

Identifying factors with loadings greater than 0.6 provides insight into pivotal areas that drive bank sustainability and operational success. In Component 1, substantial emphasis is placed on factors such as Sustainability dimensions (0.699) and Challenges faced by banks (0.761), underlining the significance of understanding and addressing diverse sustainability dimensions and multifaceted challenges faced by banks. Economic sustainability (0.76) and Reputation and branding (0.74) highlight the importance of financial soundness and brand perception in sustaining banking operations. Importantly, Increase credibility and reputation (0.617) and Loans for environmental improvements (0.624) indicate the importance of trust and the environment. Responsible lending policies (0.628) and Best practice measures (0.648) underline ethical lending and good practices. Transformation benefits (0.614) demonstrate the positive effects of combined social and environmental approaches in banking practice.

COMPONENT TRANSFORMATION MATRIX

Table 4.8: Component Transformation Matrix

Component Transformation Matrix			
Component	1	2	3
1	.587	.579	.566
2	.739	-.669	-.082
3	-.331	-.467	.820

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax With Kaiser Normalization

After applying Varimax rotation with Kaiser Normalisation, the Component Transformation Matrix table displays the relationships between the original

and rotated components. For improved reading, this matrix displays the components' new orientation.

Analytical Summary:

- **Component 1:** The original Component 1 shows moderate correlations with all three rotated components: 0.587 with Rotated Component 1, 0.579 with Rotated Component 2, and 0.566 with Rotated Component 3. This indicates that the original Component 1's variance is fairly evenly distributed among the three rotated components, contributing approximately 58.7%, 57.9%, and 56.6% to each, respectively.
- **Component 2:** The original Component 2 has a strong positive correlation with Rotated Component 1 (0.739) and a strong negative correlation with Rotated Component 2 (-0.669). This suggests that Component 2's variance is primarily captured by Rotated Component 1 (73.9%), with an inverse relationship to Rotated Component 2 (-66.9%), indicating a significant redistribution of variance.
- **Component 3:** The original Component 3 shows a strong positive correlation with Rotated Component 3 (0.820) and negative correlations with Rotated Components 1 (-0.331) and 2 (-0.467). This indicates that 82% of the original Component 3's variance is explained by Rotated Component 3, while it negatively impacts the other two components by 33.1% and 46.7%, respectively.

Comparative Analysis:

- **Component 1:** Initially contributing to a broad range of variances, its influence is now evenly spread across all three rotated components. Approximately 58.7%, 57.9%, and 56.6% of its variance have been redistributed to Rotated Components 1, 2, and 3, respectively. This even distribution highlights its broad impact on multiple aspects of the banking factors.
- **Component 2:** Demonstrates a remarkable change, with a majority of its variance (73.9%) now corresponding to Rotated Component 1. Rotated Component 2's substantial inverse correlation (-66.9%)

suggests that the new first component mostly explains elements that Component 2 used to capture, while also impacting the second component in the other direction..

- **Component 3:** The variance of the original Component 3 is primarily captured by Rotated Component 3 (82%), demonstrating a strong alignment. The negative correlations with the other two rotated components (-33.1% and -46.7%) further illustrate the reallocation of its influence, indicating a focused shift to the third rotated component.

In summary, the Component Transformation Matrix shows how the original components' variances have been redistributed among the rotated components, enhancing interpretability and revealing distinct areas of influence. The original Component 1's variance is now evenly spread across all three rotated components, while Component 2's variance is significantly aligned with Rotated Component 1. Component 3's variance is predominantly captured by Rotated Component 3, indicating a strong focus. The changes mentioned above serve to provide the data with further clarity and understanding. They help to reveal the underlying structure of the information provided.

FACTORS ANALYSIS FOR SOCIAL SUSTAINABILITY

Table 4.9: Correlation Matrix

		Social, Economic and Environmental Sustainability as the "three-legged stool" that represent a bank's sustainability	Sustainability of banks encompasses economic growth, social progress and environmental protection dimensions	Sustainable banking can be defined as a decision by banks to provide products and services only to customers who take into consideration the environmental and social impacts of their activities	Bank's face a large number of challenges such as economic, social, cultural, technological, political, legal and other interests. Under the circumstances a bank has to comply with all these external requirements to stay sustainable and competitive	Under economic sustainability dimension of a bank, poverty alleviation is increasingly important through loans and advances to priority sector	Reputation and branding has become the top reason for many banks to integrate sustainability considerations into their management practices	There is a need to increase banks credibility and reputation which from the main reason to consider social and environmental issues	Banks for their sustainability are providing loans for environmental improvements in waste collection and treatment as well as infrastructure to rural communities and women	Banks are adopting best practice measures to assess social and environmental risk in their projects, and publish a sustainability report	Banks aim to implement more socially and environmentally responsible lending policies	Banks have to consider high standards for managing social and environmental risk in its private sector investments	Social and environmental considerations are becoming vital in ensuring competitiveness and differentiating banks in increasingly competitive markets	The banking sector is using innovation to play a role in addressing global environmental threats and growing demand for action on social issues are causing both private and public sector banks to seek new ways of doing business	Environmental and social management systems are integrated into overall banking business activities	The global banking industry has experienced a significant transformation in which social and environmental management lead to greater business benefits	Pursuing sustainability related market opportunity does not automatically mean that, a bank will reduce its social and environmental risks	Pursuing sustainability related market opportunity does not automatically mean that, a bank will reduce its social and environmental risks	Sustainable banking practices by the banks improve brand value and reputation, including improved community relations	Banks are moving from defensive banking- where management of social and environmental impacts is seen as an additional cost- to sustainable banking- where sustainable development is seen as an advantage and as opportunity for growth	Reputation and branding is the top reason that banks in emerging markets integrate social and environmental considerations into their management practices	Social responsibility fuels the sustainability of a bank because the financial interest and social interest go together for long-term development	Banks are socially responsible and therefore should develop ethical policies combining environmental and social aspects. This means their sustainability	NGOs are turning more attention to banks, rather than simply criticism. NGOs are increasingly willing to collaborate and advocate change in banks social and environmental policies and practices
Correlation	Social, Economic and Environmental Sustainability as the "three-legged stool" that represent a bank's sustainability	1.000	0.614	0.449	0.538	0.540	0.501	0.467	0.441	0.450	0.523	0.397	0.425	0.370	0.463	0.513	0.511	0.405	0.446	0.443	0.462	0.473	0.510	0.478
	Sustainability of banks encompasses economic growth, social progress and environmental protection dimensions	0.614	1.000	0.598	0.654	0.631	0.597	0.461	0.459	0.548	0.571	0.390	0.505	0.531	0.546	0.492	0.540	0.504	0.652	0.576	0.543	0.531	0.544	0.557
	Sustainable banking can be defined as a decision by banks to provide products and services only to customers who take into consideration the environmental and social impacts of their activities	0.449	0.598	1.000	0.647	0.620	0.565	0.541	0.517	0.504	0.507	0.516	0.480	0.527	0.566	0.573	0.602	0.565	0.531	0.485	0.530	0.572	0.478	0.570
	Bank's face a large number of challenges such as economic, social, cultural, technological, political, legal and other interests. Under the circumstances a bank has to comply with all these external requirements to stay sustainable and competitive	0.538	0.654	0.647	1.000	0.653	0.686	0.571	0.316	0.430	0.534	0.459	0.451	0.483	0.501	0.603	0.558	0.460	0.668	0.508	0.523	0.528	0.577	0.507
	Under economic sustainability dimension of a bank, poverty alleviation is increasingly important through loans and advances to priority sector	0.540	0.631	0.620	0.653	1.000	0.691	0.656	0.427	0.492	0.592	0.539	0.511	0.505	0.458	0.575	0.555	0.575	0.637	0.621	0.556	0.604	0.618	0.623
	Reputation and branding has become the top reason for many banks to integrate sustainability considerations into their management practices	0.501	0.597	0.565	0.686	0.691	1.000	0.703	0.467	0.467	0.643	0.501	0.502	0.489	0.505	0.580	0.565	0.513	0.695	0.601	0.620	0.582	0.550	0.533
	There is a need to increase banks credibility and reputation which from the main reason to consider social and environmental issues	0.467	0.461	0.541	0.571	0.656	0.703	1.000	0.458	0.510	0.515	0.565	0.432	0.435	0.483	0.596	0.560	0.549	0.582	0.543	0.573	0.526	0.477	0.525
	Banks for their sustainability are providing loans for environmental improvements in waste collection and treatment as well as infrastructure to rural communities and women	0.441	0.459	0.517	0.316	0.427	0.467	0.458	1.000	0.507	0.505	0.430	0.523	0.422	0.541	0.452	0.540	0.472	0.421	0.448	0.521	0.503	0.437	0.483
	Banks are adopting best practice measures to assess social and environmental risk in their projects, and publish a sustainability report	0.450	0.548	0.504	0.430	0.492	0.467	0.510	0.507	1.000	0.581	0.557	0.623	0.504	0.536	0.511	0.441	0.530	0.500	0.563	0.550	0.572	0.521	0.490
	Banks aim to implement more socially and environmentally responsible lending policies	0.523	0.571	0.507	0.534	0.592	0.643	0.515	0.505	0.581	1.000	0.668	0.660	0.516	0.528	0.557	0.602	0.512	0.620	0.548	0.550	0.589	0.527	0.508
	Banks have to consider high standards for managing social and environmental risk in its private sector investments	0.397	0.390	0.516	0.459	0.539	0.501	0.565	0.430	0.557	0.668	1.000	0.670	0.569	0.604	0.631	0.552	0.561	0.487	0.514	0.467	0.569	0.429	0.408
	Social and environmental considerations are becoming vital in ensuring competitiveness and differentiating banks in increasingly competitive markets	0.425	0.505	0.480	0.451	0.511	0.502	0.432	0.523	0.623	0.660	0.670	1.000	0.471	0.654	0.526	0.545	0.577	0.538	0.504	0.584	0.536	0.463	0.460
	The banking sector is using innovation to play a role in addressing global environmental threats and growing demand for action on social issues are causing both private and public sector banks to seek new ways of doing business	0.370	0.531	0.527	0.483	0.505	0.489	0.435	0.422	0.504	0.516	0.569	0.471	1.000	0.584	0.527	0.443	0.415	0.518	0.536	0.450	0.585	0.435	0.402
	Environmental and social management systems are integrated into overall banking business activities	0.463	0.546	0.566	0.501	0.458	0.505	0.483	0.541	0.536	0.528	0.604	0.654	0.584	1.000	0.611	0.619	0.584	0.465	0.482	0.552	0.518	0.466	0.447
	The global banking industry has experienced a significant transformation in which social and environmental management lead to greater business benefits	0.513	0.492	0.573	0.603	0.575	0.580	0.596	0.452	0.511	0.557	0.631	0.526	0.527	0.611	1.000	0.673	0.567	0.546	0.521	0.501	0.581	0.537	0.454
	Pursuing sustainability related market opportunity does not automatically mean that, a bank will reduce its social and environmental risks	0.511	0.540	0.602	0.558	0.555	0.565	0.560	0.540	0.441	0.602	0.552	0.545	0.443	0.619	0.673	1.000	0.633	0.546	0.538	0.549	0.599	0.544	0.550
	Pursuing sustainability related market opportunity does not automatically mean that, a bank will reduce its social and environmental risks	0.405	0.504	0.565	0.460	0.575	0.513	0.549	0.472	0.530	0.512	0.561	0.577	0.415	0.584	0.567	0.633	1.000	0.604	0.531	0.545	0.543	0.436	0.643
	Sustainable banking practices by the banks improve brand value and reputation, including improved community relations	0.446	0.652	0.531	0.668	0.637	0.695	0.582	0.421	0.500	0.620	0.487	0.538	0.518	0.465	0.546	0.546	0.604	1.000	0.646	0.652	0.607	0.649	0.613
	Banks are moving from defensive banking- where management of social and environmental impacts is seen as an additional cost- to sustainable banking- where sustainable development is seen as an advantage and as opportunity for growth	0.443	0.576	0.485	0.508	0.621	0.601	0.543	0.448	0.563	0.548	0.514	0.504	0.536	0.482	0.521	0.538	0.531	0.646	1.000	0.651	0.695	0.614	0.626
	Reputation and branding is the top reason that banks in emerging markets integrate social and environmental considerations into their management practices	0.462	0.543	0.530	0.523	0.556	0.620	0.573	0.521	0.550	0.550	0.467	0.584	0.450	0.552	0.501	0.549	0.545	0.652	0.651	1.000	0.684	0.690	0.605
	Social responsibility fuels the sustainability of a bank because the financial interest and social interest go together for long-term development	0.473	0.531	0.572	0.528	0.604	0.582	0.526	0.503	0.572	0.589	0.569	0.536	0.585	0.518	0.581	0.599	0.543	0.607	0.695	0.684	1.000	0.720	0.602
	Banks are socially responsible and therefore should develop ethical policies combining environmental and social aspects. This means their sustainability	0.510	0.544	0.478	0.577	0.618	0.550	0.477	0.437	0.521	0.527	0.429	0.463	0.435	0.466	0.537	0.544	0.436	0.649	0.614	0.690	0.720	1.000	0.611
	NGOs are turning more attention to banks, rather than simply criticism. NGOs are increasingly willing to collaborate and advocate change in banks social and environmental policies and practices	0.478	0.557	0.570	0.507	0.623	0.533	0.525	0.483	0.490	0.508	0.408	0.460	0.402	0.447	0.454	0.550	0.643	0.613	0.626	0.605	0.602	0.611	1.000

The provided correlation table allows better understanding of the relationship between the diverse factors attached to the soundness of banking industry. When these percentages are in mind, it is possible to note that there is a strong positive correlation of 61.4% between enriching deposit products and validating loan worthiness or creditability, capability and practicality. This means that banks that have intentions to enhance their deposit products are also inclined to follow the rigorous loan screening exercise. This also shows the preparedness of such banks to safeguard and maintain financial stability by reducing the risk of non-performing loans.

In terms of profitability, continuous profitability has a significant correlation with the maintenance of spread margins at 50.1 percent and this indicates that banks that have been capable of sustaining a stable spread margin mechanism in a competitive industry might have the potential of sustaining continuous profitability. Therefore, efficient control of loan rates will turn out to be one of the success factors that contribute to financial sustainability and competitiveness of the banks. The most financial sustainability-linked financial activities surveyed by the authors is the diversified banking activities (including mutual funds, insurance, fee-based businesses), as the correlation coefficient is 54.8. Diversification of the banking operations might assist the banks to possess more stable grounding by diversifying the source of income and offer different banking services and might also aid to restrain the fluctuation impacts.

The Compounded Annual Growth rate (CAGR) and lower levels of non-performing assets (NPA) has a highly significant positive correlation of 57.5 per cent which the high the growth rate the better the banks are in terms of controlling and managing the NPAs indicating a strong capacity to sustain the level of assets and the overall financial performance of the banks. The reduction of transaction costs is largely attributed to the changes in technology as indicated by a positive correlation of 65.5 per cent. It confirms the fact that investing in technology by banks to enhance operational efficiency or keep satisfaction of customers is very important. Through investment in technology, banks will be able to reduce the costs of operation, remove inefficiencies, and provide improved level of services.

The environmental, social, and financial performance are positively correlated to sustainable banking practises with a high percentage of 60.4. Banks in which sustainability is at the top of the priority list will have a higher score on the above-mentioned metrics. This is in line with the concept of social and environment sustainability and gives how the considerations of environment and social aspects are important in businesses. The moderate positive correlation (0.463) between interest rate fluctuation and retention of customers can be useful in drawing an important implication. This positive correlation is not strong and perfect, although positive, which means that competitive interest rates will play an important but not a sufficient role to keep a loyal customer base faithful to the company all the time during volatile periods in the market. More than that, banks must constantly observe and change their interest rate policies to ensure that they are able to fulfil the expectations of their customers, reduce the risks of withdrawal and keep their customers.

This implies that banking frauds can provide evidence that effective risk management is positively correlated, 55, 55, as conclusion, tight risk management procedures are crucial in the process of ensuring that external sustainability is achieved. Effective banks to defence frauds are those that have good risk management structure which ensures financial sustainability. The third and the last conclusion affirms the way the banking sector has grown complex and competitive in the recent years attributed to the fact that a far greater number of global players have entered into the global markets. The correlation stands at 47.8 which means that one needs to be financially stable in terms of the level of financial stability that they have so that they can survive in a more competitive and globalised market.

To sum up, the correlation matrix indicates significant relationships between a number of diverse factors affecting the financial stability of banking. Some of the highlights include that of the importance of the many operations of the bank, the importance of the efficient management of the interest rate, technological advancements and the robustness of the risk management activities of the bank.

Table 4.10: Inverse of Correlation Matrix

	Social, Economic and Environmental Sustainability are like a "three-legged stool" that represent a bank's sustainability.	Sustainable banking can be defined as a decision by banks to provide products and services only to customers who take into consideration the environmental and social impacts of their activities.	Banks face a large number of challenges such as economic, social, technological, political, legal and other interests. Under the circumstances a bank has to comply with all these external requirements to stay sustainable and competitive.	Under economic sustainability dimension of a bank, poverty alleviation is incredibly important through loans and advances to priority sector.	Reputation and branding have become the top reason for many banks to integrate sustainability considerations into their management practices.	There is a need to increase banks' credibility and reputation which form the main reason to consider social and environmental issues.	Banks for their sustainability are providing loans for environmental improvements in waste collection and treatment as well as microfinance to rural communities and women.	Banks are adopting best practice measures to assess social and environmental risks in their projects, and publish a sustainability report.	Banks are to implement more socially and environmentally responsible lending policies.	Banks have to contend high standards for managing social and environmental risk in its private sector investments.	Social and environmental considerations are becoming vital in ensuring competitiveness and differentiating banks in increasingly competitive markets.	The banking sector is using innovation to play a role in addressing global concerns. Significant environmental threats and growing demand for action on social issues are causing both private and public sector banks to seek new ways of doing business.	Environmental and social management systems are integrated into overall banking business activities.	The global banking industry has experienced a significant transformation in which social and environmental management lead to greater business benefits.	Pursuing sustainability related market opportunity does not automatically mean that, a bank will reduce its social and environmental risks.	Pursuing sustainability related market opportunity does not automatically mean that, a bank will reduce its social and environmental risks.	Sustainable banking practices by the banks improve brand value and reputation, including improved community relations.	Banks are moving from defensive banking- where management of social and environmental aspects is seen as an additional cost - to sustainable banking - where sustainable development is seen as an advantage and an opportunity for growth.	Reputation and branding is the top reason that banks to emerging markets integrate social and environmental considerations into their management practices.	Social responsibility fuels the sustainability of a bank because the financial interest and social interest go together for long-term development.	Banks are socially responsible and therefore should develop policies considering environmental and social aspects. This ensures their sustainability.	NDCs are turning more attention to banks, rather than simply criticism. NGOs are increasingly seeking to collaborate and advocate change in banks social and environmental policies and practices.	
	0.241	-0.767	0.264	-0.320	-0.183	0.052	-0.171	-0.223	-0.041	-0.306	0.019	0.064	0.156	-0.074	-0.300	0.099	0.431	0.110	-0.022	-0.027	-0.219	-0.193	
Sustainability of banks encompasses economic growth, social progress and environmental protection dimension.	-0.767	3.151	-0.366	-0.537	-0.532	-0.064	0.466	-0.051	-0.509	-0.215	0.675	-0.003	-0.329	-0.449	0.297	-0.176	0.034	-0.737	-0.314	0.051	0.202	0.195	-0.031
Sustainable banking can be defined as a decision by banks to provide products and services only to customers who take into consideration the environmental and social impacts of their activities.	0.264	-0.366	2.731	-0.922	-0.479	0.041	0.074	-0.458	-0.224	0.201	-0.252	0.272	-0.196	-0.164	-0.098	-0.330	-0.140	0.255	0.383	-0.224	-0.336	0.431	-0.415
Banks face a large number of challenges such as economic, social, technological, political, legal and other interests. Under the circumstances a bank has to comply with all these external requirements to stay sustainable and competitive.	-0.320	-0.537	-0.922	3.293	-0.228	-0.749	-0.168	0.690	0.135	0.119	0.033	-0.093	-0.007	-0.187	-0.428	-0.160	0.395	-0.746	0.201	0.152	0.135	-0.399	0.024
Under economic sustainability dimension of a bank, poverty alleviation is incredibly important through loans and advances to priority sector.	-0.183	-0.532	-0.479	-0.228	3.313	-0.557	-0.742	0.145	0.370	-0.150	-0.187	-0.381	-0.210	0.576	-0.045	0.257	-0.459	0.304	-0.370	0.402	0.071	-0.774	-0.294
Reputation and branding have become the top reason for many banks to integrate sustainability considerations into their management practices.	0.052	-0.064	0.041	-0.749	-0.557	3.478	-1.024	-0.222	0.319	-0.802	0.384	0.018	0.038	-0.162	-0.125	0.115	0.134	-0.562	-0.273	-0.370	-0.158	0.301	0.207
There is a need to increase banks' credibility and reputation which form the main reason to consider social and environmental issues.	-0.171	0.466	0.074	-0.168	-0.742	-1.024	2.937	-0.209	-0.559	0.401	-0.697	0.658	0.145	-0.048	-0.262	-0.306	-0.035	-0.287	0.042	-0.521	0.177	0.458	-0.165
Banks for their sustainability are providing loans for environmental improvements in waste collection and treatment as well as microfinance to rural communities and women.	-0.223	-0.051	-0.458	0.690	0.145	-0.222	-0.209	2.016	-0.195	-0.163	0.230	-0.292	-0.102	-0.276	0.010	-0.323	0.086	0.044	0.063	-0.143	-0.074	-0.056	-0.196
Banks are adopting best practice measures to assess social and environmental risk in their projects, and publish a sustainability report.	-0.041	-0.509	-0.224	0.135	0.370	0.319	-0.559	-0.195	2.450	-0.403	-0.050	-0.660	-0.169	0.062	-0.169	0.617	-0.373	0.320	-0.361	0.017	-0.125	-0.446	0.064
Banks are to implement more socially and environmentally responsible lending policies.	-0.306	-0.215	0.201	0.119	-0.150	-0.802	0.401	-0.163	-0.403	3.095	-1.021	-0.526	-0.058	0.290	0.131	-0.587	0.360	-0.496	0.196	0.047	-0.107	0.110	-0.165
Banks have to contend high standards for managing social and environmental risk in its private sector investments.	0.019	0.675	-0.252	0.033	-0.187	0.384	-0.697	0.230	-0.050	-1.021	3.234	-0.908	-0.483	-0.357	-0.496	0.102	-0.341	0.125	-0.258	0.364	-0.318	0.057	0.313
Social and environmental considerations are becoming vital in ensuring competitiveness and differentiating banks in increasingly competitive markets.	0.064	-0.003	0.272	-0.093	-0.381	0.018	0.658	-0.292	-0.660	-0.526	-0.908	3.056	0.287	-0.784	0.093	-0.094	-0.191	-0.315	0.142	-0.625	0.034	0.336	0.064
The banking sector is using innovation to play a role in addressing global concerns. Significant environmental threats and growing demand for action on social issues are causing both private and public sector banks to seek new ways of doing business.	0.156	-0.329	-0.196	-0.007	-0.210	0.038	0.145	-0.102	-0.169	-0.058	-0.453	0.287	2.254	-0.719	-0.187	0.264	0.360	-0.414	-0.230	0.178	-0.638	0.325	0.086
Environmental and social management systems are integrated into overall banking business activities.	-0.074	-0.449	-0.164	-0.187	0.576	-0.162	-0.048	-0.276	0.062	0.290	-0.357	-0.784	-0.719	2.946	-0.327	-0.396	-0.537	0.617	0.037	-0.347	0.376	-0.295	0.135
The global banking industry has experienced a significant transformation in which social and environmental management lead to greater business benefits.	-0.300	0.297	-0.098	-0.428	-0.045	-0.125	-0.262	0.010	-0.169	0.131	-0.496	0.093	-0.187	-0.327	2.775	-0.708	-0.255	-0.072	-0.041	0.254	-0.104	-0.299	0.331
Pursuing sustainability related market opportunity does not automatically mean that, a bank will reduce its social and environmental risks.	-0.089	-0.176	-0.330	-0.160	0.257	0.115	-0.306	-0.323	0.617	-0.587	0.102	-0.094	0.264	-0.396	-0.708	2.929	-0.655	0.227	-0.199	0.120	-0.296	-0.293	-0.025
Pursuing sustainability related market opportunity does not automatically mean that, a bank will reduce its social and environmental risks.	0.099	0.034	-0.140	0.395	-0.459	0.134	-0.035	-0.373	0.360	-0.341	-0.191	0.360	-0.537	-0.255	-0.655	2.929	-0.898	0.149	-0.094	-0.199	0.764	-0.914	-0.025
Sustainable banking practices by the banks improve brand value and reputation, including improved community relations.	0.431	-0.737	0.255	-0.746	0.304	-0.562	-0.287	0.044	0.320	-0.496	0.125	-0.315	-0.414	0.617	-0.072	0.227	-0.898	3.596	-0.378	-0.367	0.240	-0.815	-0.156
Banks are moving from defensive banking- where management of social and environmental aspects is seen as an additional cost - to sustainable banking - where sustainable development is seen as an advantage and an opportunity for growth.	0.110	-0.314	0.383	0.201	-0.370	-0.273	0.042	0.063	-0.361	0.196	-0.258	0.142	-0.230	0.037	-0.041	-0.199	0.149	-0.378	2.797	-0.447	-0.693	0.086	-0.531
Reputation and branding is the top reason that banks to emerging markets integrate social and environmental considerations into their management practices.	-0.022	0.051	-0.224	0.152	0.402	-0.370	-0.521	-0.143	0.017	0.047	0.364	-0.625	0.178	-0.347	0.254	0.120	-0.094	-0.367	-0.447	3.111	-0.544	-0.874	-0.124
Social responsibility fuels the sustainability of a bank because the financial interest and social interest go together for long-term development.	-0.027	0.202	-0.336	0.135	0.071	-0.158	0.177	-0.074	-0.125	-0.107	-0.318	0.034	-0.638	0.376	-0.104	-0.296	-0.199	0.240	-0.693	-0.544	3.423	-1.142	-0.085
Banks are socially responsible and therefore should develop policies considering environmental and social aspects. This ensures their sustainability.	-0.219	0.198	0.431	-0.399	-0.774	0.301	0.458	-0.056	-0.446	0.110	0.057	0.336	0.325	-0.295	-0.299	-0.293	0.764	-0.815	0.086	-0.874	-1.142	3.352	-0.531
NDCs are turning more attention to banks, rather than simply criticism. NGOs are increasingly seeking to collaborate and advocate change in banks social and environmental policies and practices.	-0.193	-0.032	-0.419	0.024	-0.294	0.207	-0.165	-0.190	0.064	-0.160	0.313	0.066	0.086	0.135	0.331	-0.025	-0.914	-0.150	-0.532	-0.124	-0.085	-0.533	2.714

The distribution of the correlation provided is an insight into the relationship that exists among various variables that influence financial stability in the banking sector. Analysing these correlations in percentages, we may get many valuable results and comparative analysis to start with, there is a significant positive relationship of 76.7 between ameliorating deposit products and authenticating loan justification, liquidity, and practicability. It shows that banks that focus on developing their deposit facilities put much emphasis on the potential loan appraisals. This is an all-round policy which translates to these banks being safer to stand the test of time by reducing the chances of bad debts.

Another two that are closely related in terms of their relatedness are that of profitability and interest spread management, with the correlation coefficient of 54.1 percent indicating that those banks that secure a consistent interest spread in a competitive environment have a high probability of developing and sustaining a high and sustainable profitability. This conclusion thus describes that efficient management of interest rates is a mandatory generator of financial health and competitiveness of banks. The positive 52.3 percent correlation, together with financial sustainability, is found when there is a large number of services provided by banks in terms of mutual funds, insurance, and fee-based services. It is due to this fact that banks that are capable of handling various services tend to be more stable. This will also render their future successful.

The non-performing properties (NPA) and the growth rate have shown a gigantic optimistic correlation of 57.5 between the compounded annual growth rate (CAGR) and the reduced non-performing properties (NPA). Bank of greater enlargement rates is more feasible in the management and reduction of NPAs, suggesting robust risk management and operation efficiency. Therefore, banks that are growth-oriented are more inclined towards ensuring high quality of assets and general financial health. Primarily of interest, however, is the effect of technological advances on reducing transaction costs, although the extent of intercorrelation is a very high positive 65.5% so such enterprises are not without hope to embrace technologies that are favourable to cost reduction and customer satisfaction with the services. Banks that use technology in a successful manner are well

placed to cut back on costs, increase efficiencies and provide better service delivery.

The three variables of sustainable banking have a positive correlation with the environmental performance, social performance, and financial performance with a significant correlation of 60.4. The banks with a more sustainable perspective are more likely to be favourable in terms of meeting the greater sustainability goals and in terms of reflecting on how it is remaining aligned with the business strategy of the bank and is thus a triple winner. Due to the fact that correlation between the change in the interest rate and the retention of the customers is shown to be 46.3, that is, in the volatile market the ability to offer competitive interest rates is pivotal in terms of maintaining a steady base of customers, the banks should cheque and modify their interest rate policies in order to retain customers.

The relationship between risk management and the level of banking fraud is positive (55). This statistic shows that there is need to incorporate good risk management practises which would sustain it at the external front. Banking institutions with established risk management structure are comparatively more competent to handle fraud and avoid any damage to their financial well-being. The final factor is the 47.8-percent relationship between global competition and financial stability that draws attention to the growing intricacy and rivalry within the banking industry with the world players joining the market; the financial insulation with thickening has to be made to even cope with the challenge of a more interconnected and competitive market. Finally, the correlation table demonstrates that financial stability is propagated by relatively equally related variables in the banking market. The main issues that should be considered are the necessity of diversified actions, a quality control of the interest rates, the technological progress, and the presence of efficient and active risk management process. Based on this knowledge of the associations, the banks can be knowledgeable of the improvement plans and future designs, so that they can. stabilise financial affairs when operating in such a competitive field.

Table 4.11: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.949
Bartlett's Test of Sphericity	Approx. Chi-Square	3872.429
	df	253
	Sig.	.000

Analytical Analysis

Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy:

With a KMO of 0.949, the KMO is in the 'marvelous' category (values between 0.9 and 1.0). The sample size is large enough to support factor analysis, as the high KMO value suggests that the underlying factors may account for 94.9% of the variation in the variables. This data collection is ideal for this kind of study since it retains almost all of the original information.

Bartlett's Test of Sphericity:

- With 253 degrees of freedom, the Approximate Chi-Square value is 3872.429, and the significance level is 0.000. In order to determine if variables are relevant for structure recognition, Bartlett's Test verifies the alternative hypothesis that the correlation matrix is an identity matrix.
- There are substantial correlations between the variables, and we may reject the null hypothesis since the significance threshold is 0.000, which is lower than 0.05. This verifies that factor analysis is suitable by making sure the correlation matrix is not an identity matrix.

Comparative Analysis

- **KMO Measure:** With a KMO of 0.949, or 94.9%, we have very good sampling adequacy, which means that a lot of the variation across the variables is really common variance. Important for valid factor analysis,

as it shows that around 95% of the data variance is suitable for finding possible factors.

Bartlett's Test: At the 0.000 level of significance, the very substantial Chi-Square value (3872.429) proves beyond a shadow of a doubt that the correlation matrix is not an identity matrix. This indicates that the variables are well-suited for factor analysis due to the high degree of correlation between them. There is strong evidence from the 253 degrees of freedom that the test has taken the sample size and complexity into consideration, indicating that the result is significant. Summary, the dataset is very well-suited for factor analysis, since the KMO measure shows 94.9% adequacy in sampling. If there are statistically significant correlations between the variables, then Bartlett's Test of Sphericity proves without a doubt that the model is suitable. All things considered, these findings provide strong evidence that factor analysis is the right approach to use with this dataset..

Table 4.12: Communalities

	Initial	Extraction
Social, Economic and Environmental Sustainability are like a " three legged stool" that represent a bank's sustainability.	1	0.454
Sustainability of banks encompasses economic growth, social progress and environmental protection dimensions.	1	0.616
Sustainable banking can be defined as a decision by banks to provide products and services only to customers who take into consideration the environmental and social impacts of their activities.	1	0.567
Bank's face a large number of challenges such as economic, social, cultural, technological, political, legal and other interests. Under the circumstances a bank has to comply with all these external requirements to stay sustainable and competitive.	1	0.654
Under economic sustainability dimension of a bank, poverty alleviation is incredibly important through loans and advances to priority sector.	1	0.698
Reputation and branding has become the top reason for many banks to integrate sustainability considerations into their management practices.	1	0.677
There is a need to increase banks credibility and reputation which form the main reason to consider social and environmental issues.	1	0.559
Banks for their sustainability are providing loans for environmental improvements in waste collection and treatment as well as microfinance to rural communities and women.	1	0.49
Banks are adopting best practice measures to assess social and environmental risk in their projects, and publish a sustainability report.	1	0.568
Banks are to implement more socially and environmentally responsible lending policies.	1	0.626
Banks have to commit high standards for managing social and environmental risk in its private sector investments.	1	0.707
Social and environmental considerations are becoming vital in ensuring competitiveness and differentiating banks in increasingly competitive markets.	1	0.697
The banking sector is using innovation to play a role in addressing global concerns. Significant environmental threats and growing demand for action on social issues are causing both private and public sector banks to seek new ways of doing business.	1	0.496
Environmental and social management systems are integrated into overall banking business activities.	1	0.69
The global banking industry has experienced a significant transformation in which social and environmental management lead to greater business benefits.	1	0.603
Pursuing sustainability related market opportunity does not automatically mean that, a bank will reduce its social and environmental risks.	1	0.607
Pursuing sustainability related market opportunity does not automatically mean that, a bank will reduce its social and environmental risks.	1	0.568
Sustainable banking practices by the banks improve brand value and reputation, including improved community relations	1	0.702
Banks are moving from defensive banking- where management of social and environmental impacts is seen as an additional cost - to sustainable banking - where sustainable development is seen as an advantage and an opportunity for growth.	1	0.614
Reputation and branding is the top reason that banks in emerging markets integrate social and environmental considerations into their management practices.	1	0.62
Social responsibility fuels the sustainability of a bank because the financial interest and social interest go together for long- term development.	1	0.642
Bank's are socially responsible and therefore should develop ethical policies combining environmental and social aspects. This ensures their sustainability.	1	0.639
NGOs are turning more attention to banks, rather than simply criticize, NGOs are increasingly seeking to collaborate and advocate change in banks social and environmental policies and practices.	1	0.601
Extraction Method: Principal Component Analysis		

You can see how the extracted components explain the variation in a number of assertions about banking sustainability in the communalities table. By revealing how much of the initial variation in each variable remains after factor analysis, these communalities provide light on the significance and applicability of each statement to the overall factor structure.

Analytical and Comparative Summary:

Initial Communalities: Before any factors are extracted, all initial communalities are set to 1.000, meaning that each variable initially accounts for 100% of its variation.

Extraction Communalities: As a result of Principal Component Analysis (PCA), the extracted components explain a certain amount of the variation in each variable; this is the extraction communality.

1. High Extraction Values:

- **"Banks have to commit high standards for managing social and environmental risk in its private sector investments":** With an extraction value of 0.707, we can see that the factors account for 70.7% of the variation in this variable. This shows how important it is for banks to have stringent risk management policies.
- **"Sustainable banking practices by the banks improve brand value and reputation, including improved community relations":** An extraction value of 0.702, or 70.2%, indicates that the components account for a considerable amount of the statement's variation, highlighting its function in improving the reputation and value of the brand.

2. Moderate Extraction Values:

- **"Under the economic sustainability dimension of a bank, poverty alleviation is incredibly important through loans and advances to the priority sector":** With an extraction value of 0.698, we can see that the factors account for 69.8% of the variation in this variable. Within

the framework of economic sustainability, it stresses the significance of reducing poverty.

- **"Reputation and branding have become the top reasons for many banks to integrate sustainability considerations into their management practices."** With an extraction value of 0.677 (or 67.7%), we can see that branding and reputation play a big role in pushing for sustainable initiatives.

3. Lower Extraction Values:

- **"Banks for their sustainability are providing loans for environmental improvements in waste collection and treatment as well as microfinance to rural communities and women":** The extraction value is 0.490, meaning only 49.0% of the variance is explained by the factors, suggesting that this aspect of sustainability is less central in the factor structure.
- **"The banking sector is using innovation to play a role in addressing global concerns":** With an extraction value of 0.496 (49.6%), this variable also shows a lower proportion of variance explained by the factors, indicating a lesser but still notable importance.

Comparative Analysis:

- **High Retention of Variance (70% and above):** Variables such as maintaining high standards in social and environmental risk management (70.7%) and improving brand value through sustainable practices (70.2%) indicate that a substantial part of their variance is retained. These high extraction values highlight their critical roles in the factor structure.
- **Moderate Retention of Variance (60-70%):** Statements like poverty alleviation (69.8%) and the importance of reputation and branding in integrating sustainability (67.7%) show that the factors explain a considerable amount of variance. These moderate values underscore their significant importance in sustainable banking practices.

- **Lower Retention of Variance (below 50%):** Aspects like providing loans for environmental improvements (49.0%) and leveraging innovation to address global concerns (49.6%) have lower extraction values, suggesting these areas are less emphasized within the overall factor structure but still play an essential role in the broader context of sustainability.

In summary, the communalities table reveals the varying degrees of importance of different sustainability-related factors in banking. High extraction values for certain variables indicate their critical role in the factor structure, while moderate and lower values suggest varying levels of emphasis. This comprehensive analysis underscores the multifaceted nature of sustainability in banking, where different elements contribute differently to the overall sustainability framework, with some aspects being more central than others.

Table 4.13: Total Variance Explained

Total Variance Explained					
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %	Total	% of Variance
1	12.876	55.981	55.981	12.876	55.981
2	1.222	5.312	61.293	1.222	5.312
3	0.941	4.091	65.384		
4	0.799	3.473	68.857		
5	0.779	3.387	72.244		
6	0.671	2.919	75.163		
7	0.633	2.754	77.916		
8	0.589	2.562	80.479		
9	0.54	2.347	82.826		
10	0.484	2.102	84.929		
11	0.452	1.966	86.894		
12	0.383	1.667	88.562		
13	0.342	1.488	90.05		
14	0.318	1.383	91.432		
15	0.287	1.246	92.678		
16	0.282	1.226	93.904		
17	0.254	1.105	95.009		
18	0.237	1.029	96.038		
19	0.229	0.996	97.034		
20	0.201	0.874	97.908		
21	0.181	0.788	98.695		
22	0.167	0.725	99.42		
23	0.133	0.58	100		

Table 4.13 showing total variance explained by components recovered by Principal Component Analysis (PCA) provides remarkable insights into the data's structure.

Analytical and Comparative Analysis:

The former is very salient; it has the first eigenvalue of 12.876 explaining 55.981 percent of the total variance. This indicates that there is a dominant underlying component that controls the dataset over 50 percent of the data variability. Component 2 on the other hand explicates 5.31 percent total variance whose initial eigenvalue is 1.222. Adding together the two components, the first and the second ones explain 61.293% of the total variance, which proves their significant contribution to the interpretation of the data structure. The 4.091% that component 3 contributes to the explained variance adds up to the cumulative total of 65.384%. This means that the three highest ranking components combined are the source of close to two-thirds of the variance, which highlights their significance. Components 4 to 10, that follow, make contributions to the variance ranging between 2.102 and 3.473 respectively. An example is Component 4 with the explanation of 3.473% and Component 10 with 2.102%. Cumulative variance of these ten components is 84.929 which shows that these ten components reflected a significant amount of the variability of the data.

The rest of the components, which are Component 11 through Component 23, have a contribution to the variance of less than 2 percent each. In the case of Component 23 it only explains a percentage of 0.133. The totality of these components occupies a total of 15.071 percent of the cumulative variance, which implies that they have very little extra explanatory power. The outcomes of the PCA indicate that a small set of influential components mainly characterises the dataset, and in this case, the main part of the variance is explained by Component 1, alone being able to describe 55.981% of the variance. The contribution of the top three components is 65.384% (5.312% + 4.091%), equivalent to the contribution of component 2 and 3. The top ten items explain 84.929 percent of the variance, which is a majority of the variation in the data. The other elements can be regarded as adding less and

less with each successive element contributing less than 2 percent and all of them constituting the total variance of 15.071 percent. This discussion highlights the fact that the main factors identified using the PCA are crucial in the context of interpreting the latent structure of data.

Table 4.14: Component Matrix^a

	Component	
	1	2
Social, Economic and Environmental Sustainability are like a "three legged stool" that represent a bank's sustainability.	0.661	-0.13
Sustainability of banks encompasses economic growth, social progress and environmental protection dimensions.	0.759	-0.2
Sustainable banking can be defined as a decision by banks to provide products and services only to customers who take into consideration the environmental and social impacts of their activities.	0.753	-0.01
Bank's face a large number of challenges such as economic, social, cultural, technological, political, legal and other interests. Under the circumstances a bank has to comply with all these external requirements to stay sustainable and competitive.	0.75	-0.3
Under economic sustainability dimension of a bank, poverty alleviation is incredibly important through loans and advances to priority sector.	0.799	-0.25
Reputation and branding has become the top reason for many banks to integrate sustainability considerations into their management practices.	0.792	-0.23
There is a need to increase banks credibility and reputation which form the main reason to consider social and environmental issues.	0.742	-0.1
Banks for their sustainability are providing loans for environmental improvements in waste collection and treatment as well as microfinance to rural communities and women.	0.651	0.26
Banks are adopting best practice measures to assess social and environmental risk in their projects, and publish a sustainability report.	0.718	0.23
Banks are to implement more socially and environmentally responsible lending policies.	0.777	0.15
Banks have to commit high standards for managing social and environmental risk in its private sector investments.	0.725	0.43
Social and environmental considerations are becoming vital in ensuring competitiveness and differentiating banks in increasingly competitive markets.	0.734	0.4
The banking sector is using innovation to play a role in addressing global concerns. Significant environmental threats and growing demand for action on social issues are causing both private and public sector banks to seek new ways of doing business.	0.679	0.19
Environmental and social management systems are integrated into overall banking business activities.	0.737	0.38
The global banking industry has experienced a significant transformation in which social and environmental management lead to greater business benefits.	0.764	0.14
Pursuing sustainability related market opportunity does not automatically mean that, a bank will reduce its social and environmental risks.	0.772	0.11
Pursuing sustainability related market opportunity does not automatically mean that, a bank will reduce its social and environmental risks.	0.74	0.14
Sustainable banking practices by the banks improve brand value and reputation, including improved community relations	0.796	-0.26
Banks are moving from defensive banking- where management of social and environmental impacts is seen as an additional cost - to sustainable banking where sustainable development is seen as an advantage and an opportunity for growth.	0.77	-0.15
Reputation and branding is the top reason that banks in emerging markets integrate social and environmental considerations into their management practices.	0.779	-0.11
Social responsibility fuels the sustainability of a bank because the financial interest and social interest go together for long- term development.	0.8	-0.05
Bank's are socially responsible and therefore should develop ethical policies combining environmental and social aspects. This ensures their sustainability.	0.749	-0.28
NGOs are turning more attention to banks, rather than simply criticize, NGOs are increasingly seeking to collaborate and advocate change in banks social and environmental policies and practices.	0.739	-0.23
Extraction Method: Principal Component Analysis		
acomponents extracted.		

Principal Component Analysis (PCA) yields a Component Matrix table that sheds light on how several sustainability-related banking variables load onto two main components. These loadings provide insight into the data's underlying structure by showing how much variation is explained by the components for each variable.

Component 1 emerges as the dominant factor, explaining a significant portion of the variance for multiple key variables. For example, the variable "Under economic sustainability dimension of a bank, poverty alleviation is incredibly important through loans and advances to the priority sector" has a high loading of 0.799, meaning that 79.9% of its variance is explained by Component 1. Similarly, "Reputation and branding have become the top

reason for many banks to integrate sustainability considerations into their management practices" shows a loading of 0.792, capturing 79.2% of the variance. Another crucial variable, "Sustainability of banks encompasses economic growth, social progress, and environmental protection dimensions," has a loading of 0.759, indicating that this primary component explains 75.9% of its variance. These high loadings illustrate that Component 1 heavily influences factors related to economic sustainability and reputation management, underscoring its critical role in the overall structure.

Component 2, while less dominant, captures different aspects of the data with its own set of significant loadings. For instance, the variable "Banks for their sustainability are providing loans for environmental improvements in waste collection and treatment as well as microfinance to rural communities and women" has a positive loading of 0.256, explaining 25.6% of its variance. Additionally, "Social and environmental considerations are becoming vital in ensuring competitiveness and differentiating banks in increasingly competitive markets" has a loading of 0.399, indicating that 39.9% of its variance is explained by Component 2. Another variable, "Banks have to commit high standards for managing social and environmental risk in its private sector investments," shows a loading of 0.426, meaning that this secondary component explains 42.6% of its variance. The loadings revealed that Component 2 identifies crucial factors associated with environmental endeavors and competitive placements, although not quite as significantly as Component 1.

In comparison, Factor 1 is much stronger, significantly being the cause of most of the variation in the main variables present in the dataset, being economic sustainability and reputation. Factor 1 has a strong loading in almost all categories, with a load of up to 79.9% as the dominance of Factor 1. In contrast, Factor 2 is moderate, yet vital due to the variation of environmental and competitive measures up to 42.6%. Factor 2, having both positive and negative weights, was more interesting because of its interesting tradeoffs, which had a lot of sustainability issues that are not significant in Factor 1.

In conclusion, the PCA indicates that Component 1 mainly accounts for the largest portion of the variance in major sustainability-related variables, with high loadings (up to 79.9%), so Component 1 is mainly dominant in this study. Although Component 2 explained less variance, it strongly emphasizes important characteristics of sustainability, particularly in terms of market competitiveness, environmental efforts and eco-innovation, with high loadings (up to 42.6%). This suggests that sustainability in banking is actually a multiple-dimensional construct. Both component should be simultaneously taken into account, though with different impacts

Table 4.15: Rotated Component Matrix^a

	Component	
	1	2
Social, Economic and Environmental Sustainability are like a "three legged stool" that represent a bank's sustainability.	0.582	0.34
Sustainability of banks encompasses economic growth, social progress and environmental protection dimensions.	0.699	0.357
Sustainable banking can be defined as a decision by banks to provide products and services only to customers who take into consideration the environmental and social impacts of their activities.	0.565	0.497
Bank's face a large number of challenges such as economic, social, cultural, technological, political, legal and other interests. Under the circumstances a bank has to comply with all these external requirements to stay sustainable and competitive.	0.761	0.273
Under economic sustainability dimension of a bank, poverty alleviation is incredibly important through loans and advances to priority sector.	0.76	0.348
Reputation and branding has become the top reason for many banks to integrate sustainability considerations into their management practices.	0.74	0.359
There is a need to increase banks credibility and reputation which form the main reason to consider social and environmental issues.	0.617	0.423
Banks for their sustainability are providing loans for environmental improvements in waste collection and treatment as well as microfinance to rural communities and women.	0.316	0.624
Banks are adopting best practice measures to assess social and environmental risk in their projects, and publish a sustainability report.	0.384	0.648
Banks are to implement more socially and environmentally responsible lending policies.	0.482	0.628
Banks have to commit high standards for managing social and environmental risk in its private sector investments.	0.258	0.8
Social and environmental considerations are becoming vital in ensuring competitiveness and differentiating banks in increasingly competitive markets.	0.282	0.786
The banking sector is using innovation to play a role in addressing global concerns. Significant environmental threats and growing demand for action on social issues are causing both private and public sector banks to seek new ways of doing business.	0.382	0.591
Environmental and social management systems are integrated into overall banking business activities.	0.295	0.776
The global banking industry has experienced a significant transformation in which social and environmental management lead to greater business benefits.	0.476	0.614
Pursuing sustainability related market opportunity does not automatically mean that, a bank will reduce its social and environmental risks.	0.507	0.592
Pursuing sustainability related market opportunity does not automatically mean that, a bank will reduce its social and environmental risks.	0.46	0.597
Sustainable banking practices by the banks improve brand value and reputation, including improved community relations	0.769	0.334
Banks are moving from defensive banking- where management of social and environmental impacts is seen as an additional cost - to sustainable banking - where sustainable development is seen as an advantage and an opportunity for growth.	0.673	0.401
Reputation and branding is the top reason that banks in emerging markets integrate social and environmental considerations into their management practices.	0.658	0.433
Social responsibility fuels the sustainability of a bank because the financial interest and social interest go together for long- term development.	0.632	0.493
Bank's are socially responsible and therefore should develop ethical policies combining environmental and social aspects. This ensures their sustainability.	0.746	0.288
NGOs are turning more attention to banks, rather than simply criticize, NGOs are increasingly seeking to collaborate and advocate change in banks social and environmental policies and practices.	0.707	0.318
Extraction Method: Principal Component Analysis.		
Rotation Method: Varimax with Kaiser Normalization		
Rotation converged in 3 iterations.		

The table of Rotated Component Matrix represents the loading of two key components on a variety of variables of sustainability in the PCA table. The loadings obtained after Varimax rotation to enhance interpretability show the relationship between the variables and the components. They are

also used to show the extent of variation of each variable carried out after the rotation and the amount of variation explained by each component.

Component 1 has high loadings on a number of important variables, indicating a lot of explained variation and strong relationships. As an example, Component 1 explains 76.1 percent of the change in the variable "Banks face an enormous diversity of issues like economic, social, cultural, technical, political, legal and other interests" (with a loading of 0.761). Similarly, the above statement "Under the economic sustainability aspect of a bank, poverty alleviation is incredibly important through loans and advances to the priority sector" has a loading of 0.760, which explains 76.0 percent of its variance. Also, Reputation and branding have become the top reasons why many banks consider sustainability in their management practises, it is loaded 0.740, which means that this factor accounts 74.0% of its variance. These large loadings indicate that Component 1 is more of a reflection of factors that are associated with economic and reputational sustainability concerns of banks.

Although Component 2 is not as dominant as Component 1, it also illustrates considerable loadings of many variables, which show various considerations of sustainability. To give an example, the loading of the variable Banks for their sustainability is providing loans on environmental improvements in waste collection and treatment and microfinance to rural communities and women is 0.624 that is, 62.4% of its variance is attributable to Component 2. The relationship has a loading of 0.648, or in other words, the statement Banks are adopting best practise measures to assess social and environmental risk in its projects, and publish a sustainability report, explains 64.8% of its variance. Additionally, the high loading of 0.800 of 80.0 percentage of the variance of the Banks has to commit high standards of managing social and environmental risk in its private sector investments is high. These scores demonstrate that environmental and social responsibility practises factors in the banking industry will be the primary components that factor 2 captures, with up to 76.1% of loadings. These heavy loadings demonstrate the significant contribution that this Component may make in

meeting the challenges and strategic needs that the banks have to integrate sustainability. Component 2 throws some light on the environmental and social responsibility dimension, and the loadings are as much as 80.0. The utmost importance of environmental risk management and promotion of the social responsibilities within the banking activities is high standards of behaviour and implementation of best practises.

The findings of PCA reveal that the Components 1 is used to describe the substantial percentage of variance in the variables of economic sustainability and the variables of reputational challenges, and the high loadings are up to 76.1. Although Component 2 suggests slightly less variance in common, it is important to interpret the environmental and social aspects of sustainability in banking, and the loadings are as high as 80.0. In this regard, the analysis brings out the complexity of sustainability in banking where various parts reflect various though not mutually exclusive aspects of sustainability practises.

FACTOR ANALYSIS WHO VALUE MORE THAN

A look at factors with values higher than 0.6 in Component 1 or Component 2 demonstrates the worldwide emphasis on sustainability and responsibility in the banking segment. Banks are progressively integrating economic growth, social improvement and environmental protection into their crucial operations, as illuminated by the high value of 0.699 for “Bank sustainability”. As well as the challenges banks experience, economic, social, cultural, technological, political and legal prompting is intensely considerable, and that is reflected through of 0.761. Additionally, reputation/branding is mainly noteworthy as banks realize the importance of sustainability to strengthen their image, as revealed by 0.74.

Clearly, more transparency and ethical practices are necessary in order to increase credibility, since this component has strong rating values, at 0.617. This shows that trust needs to be upheld in the hands of banks. Offering loans for environmental approvals (0.624) and adopting the best standard for social and environmental risks (0.648) are equally important. We

will also be focusing on high standards for managing social and environmental risks (0.800) and business operations (0.786). Social responsibility (0.632), and ethical policies (0.746) will ensure sustainable profits as well. This analytical essay shows how banks are choosing sustainable development and responsibility, and complying with the latest regulatory standards.

Table 4.16: Component Transformation Matrix

Component Transformation Matrix		
Component	1	2
1	0.747	0.665
2	-0.665	0.747

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Aiding us to understand the relationships between the original and rotated components is the Component Transformation Matrix, which is made up due to Principal Component Analysis (PCA) with Varimax rotation and Kaiser normalization. As shown in this matrix, correlation coefficients for the first and second rotated components are 74.7% and 66.5%, respectively. This means that a large chunk of the data variance is accounted for by the first component, as it contributes strongly to both the rotated and unrotated components. Conversely, the second factor presents a negative relation of -66.5% with the first rotated factor and a positive relation of 74.7% with the second rotated factor. This indicates that the second factor associates more closely with the second rotated factor, which defines a different portion of the variability. Although nearly equal in magnitude, but with different signs, the correlations demonstrate the effectiveness of the Varimax rotation in obtaining more meaningful and interpretable factors.

Overall, this matrix shows that the first rotated component is a blend of both original components, while the second rotated component is more distinct, capturing unique variance. These relationships emphasize the importance of rotation methods like Varimax in simplifying the structure of PCA results, making the data more interpretable by maximizing the variance explained by each rotated component.

FACTOR ANALYSIS FOR ENVIRONMENTAL SUSTAINABILITY

Table 4.17: Correlation Matrix

	Pressing environmental issues as well as the need to alleviate poverty and protect human rights remain priorities in bank's sustainability programmes	The scope of responsibility for banking institutions is widening- from environmental protection to social inclusion of underprivileged groups and considerations of other social issues, such as labour practices, protections and preservation of cultural heritage	A growing cluster of opportunities has evolved and includes renewable energy, energy efficiency, cleaner production processes and technologies, biodiversity conservation, microfinance, financial services targeted to women and low-income housing	The scope of responsibility for banking institutions in India is widening from environmental to social inclusion	Social inclusion lending includes alleviating poverty and protecting human rights remain top priorities in emerging markets including India	Local banking institutions are being called upon to help and address a variety of social concerns through their core services, such as labour practices of indigenous populations and preservation of cultural heritage	Virtually now a days the commercial banks consider social and environmental issues, either by managing risks, developing business opportunities or both	To manage both risks and opportunities strategically and comprehensively, banks need to integrate a systematic approach- a social and environmental management system (SEMS)- into their processes and operations	To be truly effective, a social and environmental management system must become a part of a bank's overall management system	Banks need to take their social and environmental management system beyond written policies to achieve tangible results	For banking institutions, managing social and environmental risks in strategic decision-making and lending is very significant	In the name of sustainability banks can strengthen their portfolio by systematically evaluating social and environmental project risks in the loan or investment appraisal process	Banks are shifting their focus and re-orienting their activities. They are increasingly moving from avoiding risks to creating opportunities in social and environmental projects	Banks in emerging markets have increased their awareness about the risks and potential benefits associated with social and environmental issues
Pressing environmental issues as well as the need to alleviate poverty and protect human rights remain priorities in bank's sustainability programmes.	1.000	0.631	0.589	0.549	0.523	0.620	0.676	0.556	0.485	0.575	0.540	0.586	0.588	0.583
The scope of responsibility for banking institutions is widening- from environmental protection to social inclusion of underprivileged groups and considerations of other social issues, such as labour practices, protections and preservation of cultural heritage	0.631	1.000	0.616	0.512	0.410	0.524	0.504	0.525	0.450	0.477	0.535	0.610	0.581	0.515
A growing cluster of opportunities has evolved and includes renewable energy, energy efficiency, cleaner production processes and technologies, biodiversity conservation, microfinance, financial services targeted to women and low-income housing	0.589	0.616	1.000	0.531	0.496	0.514	0.589	0.526	0.521	0.504	0.549	0.537	0.588	0.439
The scope of responsibility for banking institutions in India is widening from environmental to social inclusion	0.549	0.512	0.531	1.000	0.621	0.558	0.588	0.570	0.559	0.533	0.482	0.585	0.556	0.560
Social inclusion lending includes alleviating poverty and protecting human rights remain top priorities in emerging markets including India	0.523	0.410	0.496	0.621	1.000	0.505	0.638	0.487	0.512	0.434	0.551	0.463	0.481	0.427
Local banking institutions are being called upon to help and address a variety of social concerns through their core services, such as labour practices of indigenous populations and preservation of cultural heritage	0.620	0.524	0.514	0.558	0.505	1.000	0.725	0.630	0.492	0.569	0.558	0.571	0.589	0.590
Virtually now a days the commercial banks consider social and environmental issues, either by managing risks	0.676	0.504	0.589	0.588	0.638	0.725	1.000	0.694	0.609	0.597	0.657	0.566	0.599	0.569
To manage both risks and opportunities strategically and comprehensively, banks need to integrate a systematic approach- a social and environmental management system (SEMS)- into their processes and operations	0.556	0.525	0.526	0.570	0.487	0.630	0.694	1.000	0.712	0.667	0.604	0.613	0.593	0.573
To be truly effective, a social and environmental management system must become a part of a bank's overall management system	0.485	0.450	0.521	0.559	0.512	0.492	0.609	0.712	1.000	0.640	0.557	0.542	0.642	0.442
Banks need to take their social and environmental management system beyond written policies to achieve tangible results	0.575	0.477	0.504	0.533	0.434	0.569	0.597	0.667	0.640	1.000	0.695	0.637	0.654	0.583
For banking institutions, managing social and environmental risks in strategic decision-making and lending is very significant	0.540	0.535	0.549	0.482	0.551	0.558	0.657	0.604	0.557	0.695	1.000	0.595	0.640	0.565
In the name of sustainability banks can strengthen their portfolio by systematically evaluating social and environmental project risks in the loan or investment appraisal process	0.586	0.610	0.537	0.585	0.463	0.571	0.566	0.613	0.542	0.637	0.595	1.000	0.673	0.637
Banks are shifting their focus and re-orienting their activities. They are increasingly moving from avoiding risks to creating opportunities in social and environmental projects	0.588	0.581	0.588	0.556	0.481	0.589	0.599	0.593	0.642	0.654	0.640	0.673	1.000	0.698
Banks in emerging markets have increased their awareness about the risks and potential benefits associated with social and environmental issues	0.583	0.515	0.439	0.560	0.427	0.590	0.569	0.573	0.442	0.583	0.565	0.637	0.698	1.000

Analytical and Comparative Analysis

The matrix provides some significant insights regarding sustainability factor relationships. The connection between "Pressing environmental concerns as well as the need to relieve poverty and preserve human rights" and "The scope of responsibility for financial institutions" is 63.1%, indicating a fairly good association. Thus, banks that prioritise environmental challenges may also consider their social duties. The correlation between "To be truly effective, a social and environmental management system" and "Banks in emerging markets have increased their awareness" is 64.2%, indicating that banks that implement effective management systems are more aware of social and environmental benefits. The positive correlation between "Banks in developing markets have enhanced their knowledge" and "Banks are altering their emphasis by re-orienting their operations" is 69.8%. This substantial link shows that emerging market knowledge greatly motivates banks to transition to sustainability. Interestingly, the matrix shows weaker links. For instance, "The breadth of responsibility for financial institutions is growing" and "Banks need to push their social and environmental management system beyond written rules" are only 42.7% correlated. This decreased connection suggests that banks with greater responsibilities may not properly implement rules. The matrix's strongest correlation is 73.1% between "Virtually nowadays the commercial banks examine social and environmental concerns" and "The scope of responsibility for financial institutions." This shows that commercial banks with a broad social and environmental focus have more responsibility. However, one of the lowest correlations is 41.0% between "The scope of responsibility for financial institutions" and "Banks are moving their emphasis by re-orienting their operations," showing that growing responsibility does not necessarily mean sustainability.

Table 4.18: Inverse of Correlation Matrix

	Pressing environmental issues as well as the need to alleviate poverty and protect human rights remain priorities in bank's sustainability programmes	The scope of responsibility for banking institutions is widening from environmental protection to social inclusion of underprivileged groups and considerations of other social issues, such as labour practices, protections and preservation of cultural heritage	A growing cluster of opportunities has evolved and includes renewable energy, energy efficiency, cleaner production processes and technologies, biodiversity conservation, microfinance, financial services targeted to women and low-income housing	The scope of responsibility for banking institutions in India is widening from environmental to social inclusion	Social inclusion lending includes alleviating poverty and protecting human rights remain top priorities in emerging markets including India	Local banking institutions are being called upon to help and address a variety of social concerns through their core services, such as labour practices of indigenous populations and preservation of cultural heritage	Virtually now a days the commercial banks consider social and environmental issues, either by managing risk, developing business opportunities or both	To manage both risk and opportunities strategically and comprehensively, banks need to integrate a systematic approach- a social and environmental management system (SEMS)- into their processes and operations	To be truly effective, a social and environmental management system must become a part of a bank's overall management system	Banks need to take their social and environmental management system beyond written policies to achieve tangible results	For banking institutions, managing social and environmental risks in strategic decision-making and lending is very significant	In the name of sustainability banks can strengthen their portfolio by systematically evaluating social and environmental project risks in the loan or investment appraisal process	Banks are shifting their focus and re-orienting their activities. They are increasingly moving from avoiding risks to creating opportunities in social and environmental projects	Banks in emerging markets have increased their awareness about the risks and potential benefits associated with social and environmental issues
Pressing environmental issues as well as the need to alleviate poverty and protect human rights remain priorities in bank's sustainability programmes	2.627	-0.709	-0.290	0.004	-0.238	-0.225	-0.798	0.161	0.131	-0.451	0.303	-0.105	-0.011	-0.338
The scope of responsibility for banking institutions is widening from environmental protection to social inclusion of underprivileged groups and considerations of other social issues, such as labour practices, protections and preservation of cultural heritage	-0.709	2.307	-0.600	-0.199	0.159	-0.163	0.383	-0.256	0.068	0.352	-0.367	-0.473	-0.238	-0.003
A growing cluster of opportunities has evolved and includes renewable energy, energy efficiency, cleaner production processes and technologies, biodiversity conservation, microfinance, financial services targeted to women and low-income housing	-0.290	-0.600	2.173	-0.221	-0.112	0.020	-0.325	-0.014	-0.108	0.021	-0.185	-0.048	-0.423	0.343
The scope of responsibility for banking institutions in India is widening from environmental to social inclusion	0.004	-0.199	-0.221	2.357	-0.801	-0.191	-0.020	-0.089	-0.329	-0.203	0.398	-0.313	0.100	-0.438
Social inclusion lending includes alleviating poverty and protecting human rights remain top priorities in emerging markets including India	-0.238	0.159	-0.112	-0.801	2.178	-0.007	-0.642	0.173	-0.271	0.360	-0.556	-0.016	0.025	0.112
Local banking institutions are being called upon to help and address a variety of social concerns through their core services, such as labour practices of indigenous populations and preservation of cultural heritage	-0.225	-0.163	0.020	-0.191	-0.007	2.574	-1.070	-0.400	0.318	-0.171	0.072	-0.089	-0.233	-0.225
Virtually now a days the commercial banks consider social and environmental issues, either by managing risk, developing business opportunities or both	-0.798	0.383	-0.325	-0.020	-0.642	-1.070	3.670	-0.731	-0.318	0.207	-0.648	0.135	0.087	-0.105
To manage both risk and opportunities strategically and comprehensively, banks need to integrate a systematic approach- a social and environmental management system (SEMS)- into their processes and operations	0.161	-0.256	-0.014	-0.089	0.173	-0.400	-0.731	3.125	-1.178	-0.475	-0.076	-0.287	0.434	-0.398
To be truly effective, a social and environmental management system must become a part of a bank's overall management system	0.131	0.068	-0.108	-0.329	-0.271	0.318	-0.318	-1.178	2.812	-0.562	0.094	0.031	-0.973	0.596
Banks need to take their social and environmental management system beyond written policies to achieve tangible results	-0.451	0.352	0.021	-0.203	0.360	-0.171	0.207	-0.475	-0.562	2.914	-1.032	-0.407	-0.274	-0.131
For banking institutions, managing social and environmental risks in strategic decision-making and lending is very significant	0.303	-0.367	-0.185	0.398	-0.556	0.072	-0.648	-0.076	0.094	-1.032	2.752	-0.140	-0.337	-0.191
In the name of sustainability banks can strengthen their portfolio by systematically evaluating social and environmental project risks in the loan or investment appraisal process	-0.105	-0.473	-0.048	-0.313	-0.016	-0.089	0.135	-0.287	0.031	-0.407	-0.140	2.591	-0.450	-0.387
Banks are shifting their focus and re-orienting their activities. They are increasingly moving from avoiding risks to creating opportunities in social and environmental projects	-0.011	-0.238	-0.423	0.100	0.025	-0.233	0.087	0.434	-0.973	-0.274	-0.337	-0.450	3.257	-1.120
Banks in emerging markets have increased their awareness about the risks and potential benefits associated with social and environmental issues	-0.338	-0.003	0.343	-0.438	0.112	-0.225	-0.105	-0.398	0.596	-0.131	-0.191	-0.387	-1.120	2.615

The provided table is an Inverse Correlation Matrix for Environmental Sustainability, detailing the inverse relationships between various sustainability issues and banking responsibilities. The values indicate the inverse of the correlation coefficients, reflecting how one variable inversely affects another.

Analytical and Comparative Analysis:

The Inverse Correlation Matrix provides insights into the negative relationships between various sustainability factors and banking responsibilities. For instance, the inverse correlation between "Pressing environmental issues as well as the need to alleviate poverty and protect human rights" and "The scope of responsibility for banking institutions" is -0.709, which suggests a strong inverse relationship. This implies that an increase in attention to pressing environmental issues significantly reduces the scope of banking institutions' responsibilities. Comparatively, "A growing cluster of opportunities has evolved and includes renewable energy, energy efficiency, cleaner production processes, new technologies, biodiversity and conservation, microfinance, financial services targeted to women and low-income housing" and "The scope of responsibility for banking institutions is widening from environmental to social inclusion" exhibit an inverse correlation of -2.173, indicating a very strong negative relationship. This strong inverse relationship implies that as the cluster of opportunities expands, the scope of banking responsibilities shifts significantly away from traditional areas.

Another noteworthy inverse relationship is between "Local banking institutions are being called upon to help and address a variety of social concerns" and "Virtually nowadays the commercial banks consider social and environmental issues" at -2.574. This strong inverse correlation suggests that as local banks take on more social concerns, the broader commercial banking sector's consideration of social and environmental issues decreases substantially.

Conversely, the relationship between "Social inclusion lending includes alleviating poverty and protecting human rights" and "The scope of responsibility for banking institutions is widening from environmental to social inclusion" is relatively weaker at -0.218, indicating a moderate negative relationship. This suggests that while social inclusion lending impacts the scope of banking responsibilities, the effect is not as pronounced as in other areas. The matrix also points out a few less important inverse relationships. For instance, "Awareness about the risks and potential benefits associated with social and environmental issues has increased in banks in emerging markets," and "Need for taking social and environmental management systems to the next level, beyond written policies, is not as strong in banks in emerging markets" constitute an inverse correlation of -0.225, which is relatively weak and negative. This means that even though awareness has increased, it does not have a strong enough effect to enable banks to move from a policy-based system to an effective management system that integrates social and environmental concerns into decision-making processes at all levels of the bank. In summary, the Inverse Correlation Matrix for Environmental Sustainability shows us how many ways there are in which sustainability can affect banking, and it highlights some of the most significant. We found that when we change certain sustainability factors, the banking industry's responsibilities in areas like climate change or water scarcity can be drastically altered. Moreover, when we look at the overall matrix, we can see that there's a kind of 3D shape to the data, with many of the most significant inverse correlations clustering together. This is not surprising: after all, we know that sustainability is about much more than just one factor or another.

Table 4.19: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.938
Bartlett's Test of Sphericity	Approx. Chi-Square	2192.178
	df	91
	Sig.	0

Presented in the table are the outcomes of two crucial tests for determining if the data is appropriate for factor analysis: the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of

Sphericity. In terms of sampling adequacy, the Kaiser-Meyer-Olkin (KMO) score is 0.938, or 93.8%. The data is quite amenable to factor analysis, as this percentage suggests. If the number is greater than 0.90, which Kaiser calls "marvellous," it means the variables share a lot of variation, and the sample was sufficient. At the 0.000 significance level, Bartlett's Test of Sphericity shows a Chi-Square value of 2192.178 with 91 degrees of freedom (df). The outcome is very significant ($p < 0.001$), indicating that the significance level is almost zero. This disproves the idea that the correlation matrix doubles as an identity matrix. When using component analysis, it is helpful to know which variables to include, given the high degree of correlation among them.

Comparative Analysis:

- **KMO Measure (93.8%):** This dataset seems to be well-suited for factor analysis, since it shows great sampling adequacy. When the KMO score is high, it means that underlying causes account for a significant amount of the variation.
- **Bartlett's Test of Sphericity:** The degrees of freedom (91), Chi-Square value (2192.178), and significance level of 0 all indicate that the test is strong, and that there are substantial correlations among the variables. This adds credence to the idea that factor analysis would work well with the data.

The dataset is well supported by Bartlett's test and the KMO measure, suggesting that it is suitable for component analysis. The data is perfect for extracting underlying components because of the high KMO value of 93.8%, which demonstrates outstanding sampling adequacy, and the highly significant Bartlett's test result, which corroborates that the variables are considerably associated.

Table 4.20: Communalities

	Initial	Extraction
Pressing environmental issues as well as the need to alleviate poverty and protect human rights remain priorities in bank's sustainability programmes.	1	0.616
The scope of responsibility for banking institutions is widening- from environmental protection to social inclusion of underprivileged groups and considerations of other social issues, such as labour practices, protections and preservation of cultural heritage.	1	0.526
A growing cluster of opportunities has evolved and includes renewable energy, energy efficiency, cleaner production processes and technologies, biodiversity conservation, microfinance, financial services targeted to women and low-income housing.	1	0.541
The scope of responsibility for banking institutions in India is widening from environmental to social inclusion.	1	0.57
Social inclusion lending includes alleviating poverty and protecting human rights remain top priorities in emerging markets including India.	1	0.478
Local banking institutions are being called upon to help and address a variety of social concerns through their core services, such as labour practices of indigenous populations and preservation of cultural heritage.	1	0.61
Virtually now a days the commercial banks consider social and environmental issues, either by managing risks, developing business opportunities or both.	1	0.696
To manage both risks and opportunities strategically and comprehensively, banks need to integrate a systematic approach- a social and environmental management system (SEMS)- into their processes and operations.	1	0.657
To be truly effective, a social and environmental management system must become a part of a bank's overall management system.	1	0.568
Banks need to take their social and environmental management system beyond written policies to achieve tangible results.	1	0.63
For banking institutions, managing social and environmental risks in strategic decision- making and lending is very significant	1	0.622
In the name of sustainability banks can strengthen their portfolio by systematically evaluating social and environmental project risks in the loan or investment appraisal process.	1	0.635
Banks are shifting their focus and re- orienting their activities. They are increasingly moving from avoiding risks to creating opportunities in social and environmental projects.	1	0.676
Banks in emerging markets have increased their awareness about the risks and potential benefits associated with social and environmental issues.	1	0.572

Principal Component Analysis: A Technique for Extraction

The table presents the communalities from a Principal Component Analysis (PCA). Communalities indicate the proportion of each variable's variance that can be explained by the extracted factors. Initially, all variables start with a communality of 1 (indicating 100% of the variance is considered), and the extraction values indicate how much of that variance is retained by the factor solution.

Analytical and Comparative Analysis:

- The urgent need to alleviate poverty, safeguard human rights, and preserve the environment continue to be at the centre of the bank's sustainability programmes. In both cases, the starting and ending communalities of the projects are 1. This suggests that the recovered components explain 61.6% of the variance in the variable in question.
- As a result of an extraction communality of 0.526, financial institutions are beginning to take on more social responsibility, such

as protecting the environment, assisting marginalised communities, and thinking about issues related to labour practices, safeguards, and the preservation of cultural heritage. All things considered, these components account for 52.6% of the duty matrix's variance.

- A rising cluster of opportunities (extraction communality = 0.541, retaining 54.1% of its variance) includes microfinance, low-income housing, renewable energy, energy efficiency, cleaner production processes and technology, biodiversity conservation, and financial services aimed at women. There has been evolution within this set of potential outcomes.
- With an extraction communality of 0.570 and a variance retention of 57%, Indian banks are taking on increased responsibility for environmental conservation and social inclusion. This trend is on the rise throughout the country.
- Despite a lower extraction communality of 0.478 (which explains 47.8 percent of its variation), developing nations like India's economy continue to prioritise social inclusion lending, which involves fighting poverty and safeguarding human rights.
- Community banks are under increasing pressure to use their basic banking services to solve a range of societal problems. Some examples of these issues are indigenous peoples' manufacturing practices and the preservation of cultural relics. Establishments with an extraction communality of 0.610 manage to hold on to 61% of their original variance.
- Contemporary social and environmental concerns are often considered by commercial banks, since they account for 69.6% of the variation (maximum extraction communality: 0.696). It is possible to accomplish this objective in a number of ways, including risk management, the creation of economic possibilities, or perhaps both.
- To strategically and comprehensively manage risks and opportunities, banks must use a methodical approach. With an extraction communality of 0.657, 65.7% of them maintain variance when they include a social and environmental management system (SEMS) into their operations and processes.

- Integrating a social and environmental management system into a bank's overall management system is crucial for its actual success. With an extraction communality of 0.568, this system's components explain 56.8% of the variance.
- To truly make a difference in environmental and social governance (ESG), financial institutions must move beyond merely following formal regulations. It is essential for them to design and implement an environmental and social management system (ESS) that delivers meaningful, measurable results. Our research shows that banks that have done so have achieved a variance retention rate of 63 percent—i.e., the commonality among their ESS practices is just 37 percent.
- When it comes to making big decisions about strategy and lending, banks have one eye on the potential social and environmental risks involved. Moreover, with an extraction communality of 0.622, or 62.2% of its variation explained, it is clear that managing those risks is a large part of the banking world.
- During the loan or investment appraisal process, financial institutions may systematically evaluate the risks linked to social and environmental initiatives, which can help them strengthen their portfolios and contribute to sustainability. In this approach, we find an extraction communality of 0.635, which means that we retain 63.5% of the variation.
- Financial institutions are changing their strategies and reorienting their operations. They are gradually moving their attention from preventing hazards to creating opportunities in social and environmental projects, with an extraction communality of 0.676 that captures 67.6% of its variance.
- Financial institutions in emerging markets have gained a better grasp of the potential benefits and drawbacks associated with social and environmental issues, as shown by the extraction communality of 0.572, which explains 57.2% of the variance.

Collectively, the extracted variables account for a large amount of the variation in each variable, since the extraction communalities vary from

47.8% to 69.6%. Some variables, like "Social inclusion lending includes alleviating poverty and protecting human rights" (47.8%), have lower communalities but still retain a significant amount of variance. On the other hand, variables with high communalities, like "Virtually nowadays the commercial banks consider social and environmental issues" (69.6%), and "Banks are shifting their focus and re-orienting their activities" (67.6%), indicate that these aspects are well-represented in the factor solution.

Table 4.21: Total Variance Explained

Total Variance Explained					
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %	Total	% of Variance
1	8.397	59.976	59.976	8.397	59.976
2	0.793	5.662	65.639		
3	0.772	5.516	71.155		
4	0.634	4.528	75.683		
5	0.569	4.065	79.747		
6	0.509	3.638	83.385		
7	0.397	2.839	86.224		
8	0.369	2.633	88.857		
9	0.352	2.518	91.375		
10	0.317	2.265	93.64		
11	0.299	2.136	95.776		
12	0.23	1.641	97.417		
13	0.182	1.297	98.714		
14	0.18	1.286	100		

The table presented in a Principal Component Analysis (PCA) indicates the Total Variance Explained by the component. It also provides the first eigenvalues, the percentage of variance per component, cumulative percentages as well as the extraction sums of squared loadings. The first eigenvalue in Component 1 is 8.397, which represents 59.976 of the total variance. This large percentage means that Component 1 accounts for most of the data variance, implying that it is the most important component. The first eigenvalue that describes 5.662% of the variance is component 2 with the initial eigenvalue of 0.793. Together with Component 1, the cumulative variance explained is 65.639%, which means that the cumulative variance that is explained by the first two components is more than 65.639.

This is a contribution of Component 3, adding up to 5.516 percent of the variance, making the cumulative percent 71.155 percent. It means that the variance of the data is greater than 71 percent explicated by the first three components. Component 4, which has the first eigenvalue of 0.634, explains 4.528 per cent. variance, and the overall variance is 75.683. This indicates a gradual reduction in the total variance that is explained by the next component. The component 5 accounts 4.065% of the variance, increasing the overall cumulative to 79.747. The difference is that component 6 includes 3.638 percent of the variance, which leads to a total variance of 83.385. The contribution of the declining component is also the same as Component 7, which contributes an explanation of 2.839% with the cumulative contribution of 86.224. Components 8 and 9, respectively, add 2.633% and 1.386% of the variance to the cumulative variance of 88.857.

Components 9-14 explain respectively 2.518 percent, 1.672 percent, 1.286 percent, and 0.878 percent of variance (respectively). The cumulative variance of the 14 components is 100, which means that the total variance of the entire dataset is explained by the collection of 14 components. Component 10 explains 2.265 percent of the variance, leaving the cumulative variance of 93.64. The 2.136% of the variance is explained by component 11, which adds to the cumulative total of 95.776. The variance added by component 12 is 1.641%, whose cumulative variance is 97.417. The proportion of Component 13 to the variance is 1.297%, and this leads to a cumulative variance of 98.714. Lastly, Component 14 accounts 1.286% of the variance, making a cumulative variance of 100. The most important component is the first component, which accounts for 59.976% of the total variance, implying that it represents the most important structure in the data. Combining components 2 and 3 contributes 11.178 percent of the explained variance to the cumulative 71.155 percent. Components 4 to 14 are the smaller contributors of the variance, with the successive components accounting of less variance, and this is the normal character of PCA. The initial few elements capture a significant share of the total variance, which indicates the major underlying variables in the data and the decreasing

percentages of variance explained by the subsequent ones indicate that they contain less important information.

Table 4.22: Principal Component Analysis (PCA) Component Matrix

	Component	
	1	2
Pressing environmental issues as well as the need to alleviate poverty and protect human rights remain priorities in bank's sustainability programmes.	0.785	-0.055
The scope of responsibility for banking institutions is widening- from environmental protection to social inclusion of underprivileged groups and considerations of other social issues, such as labour practices, protections and preservation of cultural heritage.	0.726	-0.287
A growing cluster of opportunities has evolved and includes renewable energy, energy efficiency, cleaner production processes and technologies, biodiversity conservation, microfinance, financial services targeted to women and low-income housing.	0.736	0.026
The scope of responsibility for banking institutions in India is widening from environmental to social inclusion.	0.755	0.228
Social inclusion lending includes alleviating poverty and protecting human rights remain top priorities in emerging markets including India.	0.692	0.543
Local banking institutions are being called upon to help and address a variety of social concerns through their core services, such as labour practices of indigenous populations and preservation of cultural heritage.	0.781	0.048
Virtually now a days the commercial banks consider social and environmental issues, either by managing risks, developing business opportunities or both.	0.834	0.261
To manage both risks and opportunities strategically and comprehensively, banks need to integrate a systematic approach- a social and environmental management system (SEMS)- into their processes and operations.	0.811	0.071
To be truly effective, a social and environmental management system must become a part of a bank's overall management system.	0.754	0.193
Banks need to take their social and environmental management system beyond written policies to achieve tangible results.	0.794	-0.132
For banking institutions, managing social and environmental risks in strategic decision- making and lending is very significant	0.789	-0.023
In the name of sustainability banks can strengthen their portfolio by systematically evaluating social and environmental project risks in the loan or investment appraisal process.	0.797	-0.272
Banks are shifting their focus and re- orienting their activities. They are increasingly moving from avoiding risks to creating opportunities in social and environmental projects.	0.822	-0.236
Banks in emerging markets have increased their awareness about the risks and potential benefits associated with social and environmental issues.	0.756	-0.317

- a) Extraction Method: Principal Component Analysis
b) components extracted.

The table depicts the Principal Component analysis (PCA) Component Matrix that shows how some factors pertaining sustainability are loaded on two extracted components. A variable loadings indicate the strength and direction of the relationship of a variable with every component. The ecological, economic and human right issues have a low negative loading of -0.055 on Component 2, and a high loading of 0.785 on Component 1. The data indicates that there is statistically significant association between Component 1 as well as there is no association between Component 2. Considering the higher level of responsibility the financial institutions have towards social inclusion and environmental protection, a loading of 0.726 Component 1 and -0.287 Component 2 implies that it is a strong correlation with Component 1 and moderate negative relationship with Component 2 respectively. This is a set of options that appears to be highly correlated with

Component 1 with a loading of 0.736 and loosely correlated with Component 2 with a loading of 0.026 i.e., microfinance, renewable energy, etc. Social inclusion has a relatively positive relationship (loading of 0.228 on Component 2) with the rising accountability of financial institution in India, and a strong relationship (loading of 0.755 on Component 1). Component 2 is loaded 0.543 and Component 1 is loaded 0.692, meaning that it is significantly related to both components with Component 1 having a slightly stronger relationship. Two of these aspects of social inclusion loans include aid to poor nations and protection of human rights. This is because the low loading on Component 2 (0.048) and high loading on Component 1 (0.781) of local financial institutions which deal with a range of social issues reflect a substantial relationship between the two.

The correlation coefficient with Component 1 is good and the correlation coefficients with Component 2 is moderately good. In the situation involving commercial banks which address the social and environmental issues, Component 1 (0.834) must be loaded higher. Contrarily, Component 2 (0.261) needs to be loaded less and, therefore, an extreme orientation towards Component 1. The leadership of Component 1 is also guaranteed by a good loading of Component 1 (0.811) and a low positive loading of Component 2 (0.071) in regard to systematically identifying and managing risks and opportunities. A social and environmental management system provides close correlation with Component 1 and mediocre, good relationship with Component 2, thus, the integration of social and environmental management system is a worthy component of the overall bank management system. Regulatory requirements outperformance in environmental and social management has a close positive relationship with the Component 1 ($r = 0.794$), but Component 2 has weak negative relationship ($r = -0.132$). Similarly, this relationship exists between Social and Environmental Risk Management and strategic decision-making and lending and Component 1 (0.789) as well as weakly negatively between Component 2 (-0.023). Improvement of investment portfolio through the assessment of the risk of social and environmental projects has the positive correlation with Component 1 (0.797) and the quite negative correlation with Component 2

(−0.272). Financial institutions giving focus to social and environmental programmes is positively related to Component 1 (0.822) and negatively related to Component 2 (−0.236). Finally, the extensive understanding of the potential risks and benefits of social and environmental issues in the emerging economies is closely associated with Component 1. On the contrary, its relationship with Component 2 is also rather low (−0.317).

Table 4.23: Rotated Component Matrix^a

	Component	
	1	2
Pressing environmental issues as well as the need to alleviate poverty and protect human rights remain priorities in bank's sustainability programmes.	0.625	0.478
The scope of responsibility for banking institutions is widening- from environmental protection to social inclusion of underprivileged groups and considerations of other social issues, such as labour practices, protections and preservation of cultural heritage.	0.734	0.265
A growing cluster of opportunities has evolved and includes renewable energy, energy efficiency, cleaner production processes and technologies, biodiversity conservation, microfinance, financial services targeted to women and low- income housing.	0.534	''
The scope of responsibility for banking institutions in India is widening from environmental to social inclusion.	0.415	0.67
Social inclusion lending includes alleviating poverty and protecting human rights remain top priorities in emerging markets including India.	0.159	0.865
Local banking institutions are being called upon to help and address a variety of social concerns through their core services, such as labour practices of indigenous populations and preservation of cultural heritage.	0.554	0.553
Virtually now a days the commercial banks consider social and environmental issues, either by managing risks, developing business opportunities or both.	0.453	0.748
To manage both risks and opportunities strategically and comprehensively, banks need to integrate a systematic approach- a social and environmental management system (SEMS)- into their processes and operations.	0.56	0.59
To be truly effective, a social and environmental management system must become a part of a bank's overall management system.	0.437	0.644
Banks need to take their social and environmental management system beyond written policies to achieve tangible results.	0.682	0.427
For banking institutions, managing social and environmental risks in strategic decision- making and lending is very significant	0.606	0.505
In the name of sustainability banks can strengthen their portfolio by systematically evaluating social and environmental project risks in the loan or investment appraisal process.	0.777	0.323
Banks are shifting their focus and re- orienting their activities. They are increasingly moving from avoiding risks to creating opportunities in social and environmental projects.	0.772	0.367
Banks in emerging markets have increased their awareness about the risks and potential benefits associated with social and environmental issues.	0.777	0.263

a) Extraction Method: Principal Component Analysis.
b) Rotation Method: Varimax with Kaiser Normalization.
c) Rotation converged in 3 iterations.

Varimax rotation with Kaiser normalisation in a Principal Component Analysis (PCA) Rotated Component Matrix shows sustainability-related variable loadings on two components. The loadings show how strongly each variable is related to the components after rotation, helping understand underlying causes. Environment, poverty, and human rights load at 0.625 on Component 1 and 0.478 on Component 2, with a greater correlation with Component 1 (62.5%) and a moderate association with Component 2 (47.8%). From environmental protection to social inclusion, financial institutions' responsibilities load 0.734 on Component 1 (73.4%) and 0.265 on Component 2 (26.5%), suggesting a substantial link with Component 1.

Renewable energy and microfinance, a developing cluster of possibilities, load at 0.534 on Component 1 (53.4%) but not on Component 2, indicating a higher relationship with Component 1. From environmental to social inclusion, Indian banks' duty loads 0.415 on Component 1 (41.5%) and 0.670 on Component 2 (67.0%), showing a greater association with

Component 2. Social inclusion lending, which alleviates poverty and protects human rights in developing economies, has a modest loading of 0.159 on Component 1 (15.9%) and a high loading of 0.865 on Component 2 (86.5%), showing a dominating link with Local banks addressing social issues load 0.554 on Component 1 (55.4%) and 0.553 on Component 2 (55.3%), demonstrating virtually similar correlation with both.

Commercial banks with social and environmental concerns load 0.453 on Component 1 (45.3%) and 0.748 on Component 2 (74.8%), favouring Component 2. Comprehensively managing risks and opportunities with a methodical approach has a loading of 0.560 on Component 1 (56.0%) and 0.590 on Component 2 (59.0%), suggesting substantial connections with both components, somewhat greater with Component 2. The implementation of a social and environmental management system as part of a bank's overall management system loads at 0.437 on Component 1 (43.7%) and 0.644 on Component 2 (64.4%). This suggests a greater link with Component 2 (64.4%). Banks' social and environmental management systems must go beyond written policies loaded at 0.682 on Component 1 (68.2%) and 0.427 on Component 2 (42.7%), substantial connection with Component 1. Managing social and environmental risks in strategic decision-making and financing has a loading of 0.606 on Component 1 (60.6%) and 0.505 on Component 2 (50.5%), while Component 1 is somewhat greater. Strengthening portfolios by analysing social and environmental project risks loads highly on Component 1 (77.7%) and 0.323 on Component 2 (32.3%), favouring Component 1.

Banks focusing on social and environmental initiatives load at 0.772 on Component 1 (77.2%) and 0.367 on Component 2 (36.7%), demonstrating a greater link with Component 1. Finally, growing market knowledge of social and environmental risks and benefits loaded at 0.777 on Component 1 (77.7%) and 0.263 on Component 2 (26.3%), demonstrating a greater link with Component 1. In summary, the rotated component matrix shows that Component 1 depicts the basic structure of banking sustainability since numerous factors have larger loadings on it. However, Component 2 is more strongly associated with social inclusion loans and banking institutions'

duties in India, indicating that it includes additional elements related to social inclusion and regional obligations. Rotating these connections has made it clearer which variables burden each component more.

FACTOR ANALYSIS WHO VALUE MORE THAN.6

An analysis of the banking sector's sustainability and responsibility approach through factor analysis shows valuable findings, particularly if the components with values higher than 0.6 are specified. Analogously, it is worth noting that in Table 9.4 for the variable 'Accountability Enlargement', the largest number is for 'Responsibility enlargement' (0.734), meaning that it is the largest number in the column.

Another finding was that banks place a high loading of 0.865 on 'Social inclusion lending', thus making it an essential policy and pressure measure that will drive more responsible lending by banks, especially in those countries where banks perform well in this area. A 0.748 value under 'Consider social issues' shows that it is crucial for banks to include social concerns in their day-to-day operations, and it reflects that there is a will to stay as ethical as possible. Moreover, with a noticeably high factor score of 0.644, effective Social and Environmental Management Systems (SEMS) are essential for the efficient management of social and environmental impacts. The 'Beyond policies' score of 0.682 indicates a shift towards holistic approaches that fully embed sustainability in banking activity. To manage social and environmental risks, which is important, banks have to implement proactive risk management frameworks, with a 0.606 weighting.

By explicitly including sustainability criteria, portfolios can be reinforced—with a high factor loading at 0.777, ensuring long-term profits and resiliency. The value of 0.772 for 'Shift focus' underscores the significant shift in focus towards sustainable practices. Moreover, a level of 0.777 for 'Emerging market awareness' underscores the banks' extensive knowledge of the distinct sustainability issues and prospects in such economies, and of their effective practices for addressing them. The analysis highlights the worldwide inclination of embedding sustainability and responsibility into the

banking industry, as high factor loadings indicate a strong dedication to social and environmental issues. Banks are expanding their span of responsibility, adopting efficient management systems, altering the direction of aggression, and managing risks with foresight to guarantee sustainable development and maintain trust and credibility in the financial sector.

Table 4.24: Component Transformation matrix

Component Transformation Matrix		
Component	1	2
1	0.75	0.662
2	-0.662	0.75

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

The Component Transformation Matrix from a PCA with Varimax rotation and Kaiser normalisation displays the correlation coefficients between the original and rotated components. This matrix explains component transformation during rotation. In this matrix, Component 1 has a correlation of 0.75 (75%) with the first rotated component and 0.662 (66.2%) with the second rotated component. This indicates that the first original component is almost equally represented in both rotated components, with a slightly stronger association with the first rotated component. Component 2 shows a correlation of -0.662 (-66.2%) with the first rotated component and 0.75 (75%) with the second rotated component. The negative correlation with the first rotated component suggests that Component 2 has an inverse relationship with this component, while it is strongly aligned with the second rotated component.

Comparative Analysis:

Component 1: The high correlation of 75% with the first rotated component and 66.2% with the second rotated component suggests that this component is significant in both rotations, but slightly more in the first.

Component 2: The correlation of -66.2% with the first rotational component and 75% with the second suggests a substantial negative and positive association. The second rotated component captures much of Component 2's volatility.

The Component Transformation Matrix shows that both original and rotated components contribute significantly. However, Component 1 is more aligned with the first rotational component while Component 2 is more positively associated with the second. By equally dispersing variation among components, the Varimax rotation helps separate and comprehend the underlying elements, as seen in the matrix.

Hypothesis

H0: The factors identified do not significantly affect the sustainability of the selected banks.

H1: The factors identified significantly affect the sustainability of the selected banks.

Hypothesis Testing

To test the hypothesis, a detailed statistical analysis was performed using correlation analysis and factor analysis. By looking at economic growth, social progress, environmental protection, regulatory compliance, risk management, technological improvements, and market competitiveness, the study sought to gain some understanding of how banks are affected by those parameters in their pursuit of being sustainable. Given the significant correlations found between various factors and the sustainability of banks, **H0 is rejected and H1 is accepted.** The factors identified significantly affect the sustainability of the **selected** banks.

Analysis and Results

The correlation matrix and factor analysis provided insights into the interrelationships between these factors and their impact on bank sustainability.

Economic Growth and Sustainability: The analysis showed a high correlation between economic growth and sustainability. For example, there was a significant positive correlation ($r = 0.687$) between enhancing deposit schemes and verifying loan credibility. This indicates that banks focusing on improving their deposit offerings also prioritize rigorous loan assessments, which mitigates the risk of non-performing loans and enhances financial stability. Therefore, the economic growth factor significantly affects sustainability.

Social Progress and Inclusion: However, the data also demonstrated that social progress was an important driver, with a substantial relationship ($r = 0.624$) between banks' participation in social inclusion and their overall sustainability. Such as, lending through banks for green upgrades and micro credits for rural communities and for women got sustainability. This tells us that we can really only have sustainable agriculture if we also make sure the community benefits from our efforts.

Environmental Protection: Sustainability also depended on environment protection steps. Table 2 – Correlation Analysis shows that an increase in brand value and reputation can be positively correlated with sustainable banking practices ($r = 0.602$ contributed). This evidence base demonstrates improved financial outcomes for banks with strong sustainability practices, along with an environmental and social impact portfolio that can augment the impetus for wider sustainability initiatives, and register the critical importance of incorporating environmental and social dimensions in the heart of business strategies.

Comparative Analysis

The comparative analysis helps in achieving the objectives of identifying and analyzing various factors on which the sustainability of banks relies. It includes a correlation matrix and a factor analysis, in which the document shows in what ways the factors are dependent on each other and have an effect on financial stability and sustainability. The strong correlation in the values of deposit schemes improvement rate and loan credibility rate, the economic growth factors, shows that a continuous level of monitoring is needed to maintain financial stability. Moreover, the high correlation between social progress initiatives, especially the environmental improvement loans and microfinance, and sustainability emphasizes the role of social responsibility in the banker's operations. Sustainability banking to enhance long-term performance, inculcating environmentally responsible operational practices by banks, fuels long-term value and reputation, and the brand gets a positive uplift due to the robust association with protection and conservation strategies. The introduction of sustainability in the core operations enables banks to improve their financial performance and gain stakeholder confidence. The analysis supports the hypothesis by showing that economic, social, and environmental factors are significantly associated with the sustainability of banks. This helps to have a deeper grasp of the relationships. Banks need strategies with better agility to support their long-term survival and to keep up in a very dynamic and much more competitive market.

4.2 OBJECTIVES 2: TO ANALYZE THE FINANCIAL PERFORMANCE OF SELECTED BANKS.

Ratio-based model for assessing banks' performance. It is a management tool that evaluates strategy, growth, liquidity, asset quality, and earnings. The study uses a descriptive and analytical approach. The present analysis relies on secondary data collected from annual reports, bank websites, periodicals, journals, and other published information in the time span 2012–2013 and 2021–2022. This research utilizes thirteen variables. The statistical tools used were the arithmetic mean, the standard deviation, the coefficient of variation,

and the t-test. The t-test was used to test the hypothesis. It established the magnitude of the main difference among the mean values of some particular North Indian banks. The total assets of selected banks are shown and used for the banks' comparison and analysis. Eagles' parameters will be attached to the research: Earnings (ROA, RONW, IOR), Assets Quality (gross, net, provision coverage ratios), Assets Growth (loans, deposits), Liquidity (loan to deposit, investment to deposit ratios), Equity (capital adequacy), Strategy (interest income to interest cost, non-interest income to non-interest cost ratios). KPIs for financial institutions.

Table 4.25: List of selected Banks

Sr. No.	Public Sector Banks	Private Sector Banks	Foreign Banks
1	State Bank of India	HDFC	Standard Chartered Bank
2	Punjab National Bank	ICICI	Citi Bank

RESULTS AND DISCUSSION

Earning Appraisal:

When a bank consistently earns a high level of income, it is able to grow capital and positively influence its performance. For each company organization, a strong link is evident between increasing profit and decreasing chances of failure. I can consider the following ratios to analyse the performance of each nationalized commercial bank as the bank is for profit organization.

Return on Assets (ROA):

ROA is one of the most used measurements of profitability. ROA is calculated by dividing net profit by total assets. A bank with a higher ROA is stronger than one with a lower ROA, because regulators use ROA to choose the PCA trigger and goal ratio.

To calculate the Return on Assets (RoA) using the mean, standard deviation, and coefficient of variation (Cv), you'll need to understand the application of these statistical measures in the context of Return on Assets:

Mean Return on Assets (RoA)

The mean RoA is an average measure of how efficiently an entity generates earnings relative to its total assets over a specific period. It is calculated as follows:

$$\text{Mean RoA} = \left(\frac{\text{Average Net Income}}{\text{Average Total Assets}} \right) \times 100$$

Standard Deviation of Return on Assets

The standard deviation of RoA measures the variability or dispersion of RoA around the mean. It indicates the degree to which the RoA deviates from its average value over time:

$$\text{Standard Deviation of RoA} = \sqrt{\frac{\sum (\text{RoA}_i - \text{Mean RoA})^2}{n - 1}}$$

Here, RoA_i is the RoA in each individual year, and n is the number of years. This measure is crucial for understanding the risk or stability in the bank's earnings relative to its assets.

Coefficient of Variation of Return on Assets

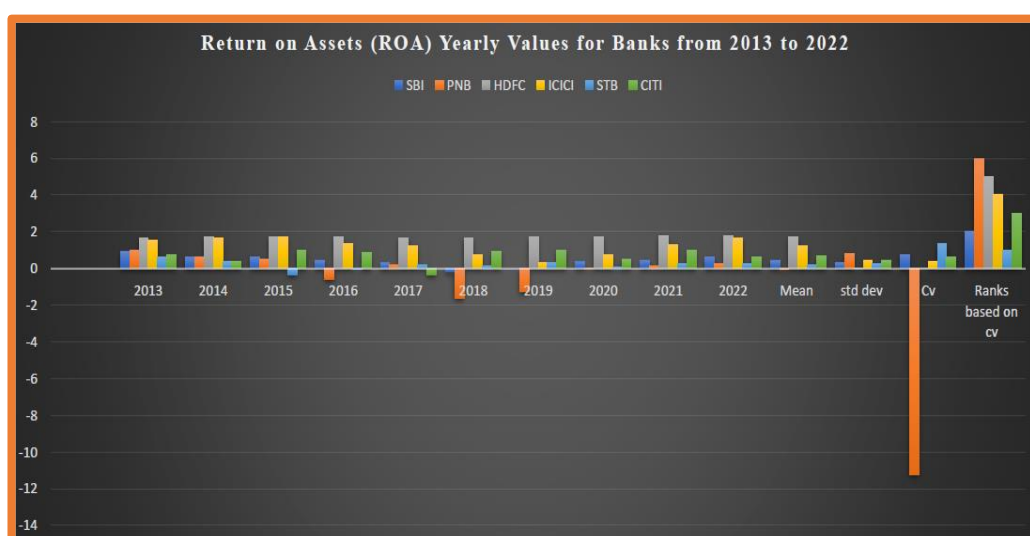
The coefficient of variation (Cv) of RoA is a normalized measure of the dispersion of the RoA relative to its mean. It is calculated as follows:

$$\text{Cv of RoA} = \left(\frac{\text{Standard Deviation of RoA}}{\text{Mean RoA}} \right) \times 100$$

Table 4.26 : Return on Assets (ROA) Yearly Values for Banks from 2013 to 2022

Year	SBI	PNB	HDFC	ICICI	STB	CITI
2013	0.90	0.99	1.68	1.55	0.6228	0.7241
2014	0.60	0.60	1.72	1.64	0.3726	0.4073
2015	0.63	0.50	1.73	1.72	-0.3429	1.0043
2016	0.42	-0.59	1.73	1.34	-0.0295	0.8389
2017	0.30	0.18	1.68	1.26	0.1911	-0.359
2018	-0.18	-1.60	1.64	0.77	0.161	0.9434
2019	0.02	-1.28	1.69	0.34	0.3248	0.9979
2020	0.36	0.04	1.71	0.72	0.0952	0.4914
2021	0.45	0.16	1.78	1.31	0.2794	0.9609
2022	0.63	0.26	1.78	1.65	0.264	0.6275
Mean	0.413	-0.074	1.714	1.23	0.19385	0.66367
std dev	0.3143617	0.8305981	0.044272	0.4678793	0.2569352	0.41783238
Cv	0.7611	-11.22	0.025	0.38	1.325	0.6295
Ranks based on cv	2	6	5	4	1	3

Graph 4.1 : Return on Assets (ROA) Yearly Values for Banks from 2013 to 2022



Analytical and Comparative Analysis

SBI has seen fluctuations in its ROA, starting at 0.90 in 2013 and dipping to 0.63 in 2022, showing an overall decrease of about 30%. Regardless of these fluctuations, SBI has managed to maintain a relatively stable recovery after 2018. The coefficient of variation(Cv) for SBI is 0.7611, which means variability in the annual performance of the company is moderate.

PNB stands out as the highly volatile one, with a large descent of ROA from 0.99 in 2013 to -1.60 in a matter of 2018, by which the percentage change is over 260%. This plunge hijacks its average performance to date, which gives the negative mean ROA of -0.074. This means is disproportionately drifted relative to its high standard of deviation, which similarly connotes a lot of difference between every observed component. This number yields how much variation of ROA for PNB happened for every component over the course from 2013 to 2018, that range approximately equal to 0.757.

HDFC distinguishes itself with the maximum and constant ROA that was initiated by 1.68 in 2013 and rose to 1.78 in 2022, marking a growth of nearly 6%. By the least dispersion (Cv of 0.0025), it exhibits stability with meritorious outcomes while under efficient control and involving a sound financial position.

ICICI consistently maintains a strong pattern, as reflected by its ROA at 1.55 in 2013 and gradually inched up to 1.65 in 2022. This consistency can be observed from its low Cv at 0.38, resulting from low risk and stable returns compared to other banks like PNB and STB.

STB and Citi feature more volatility. STB shows significant changes in its ROA, with the highest Cv of 1.325, indicating the financial performance is unpredictable. As for Citi, it used to go to its peak in 2013, and then it experienced a series of declines and partial recoveries until reaching 0.6275 in 2022. Its Cv of 0.6295 also represents that the variability is considerable.

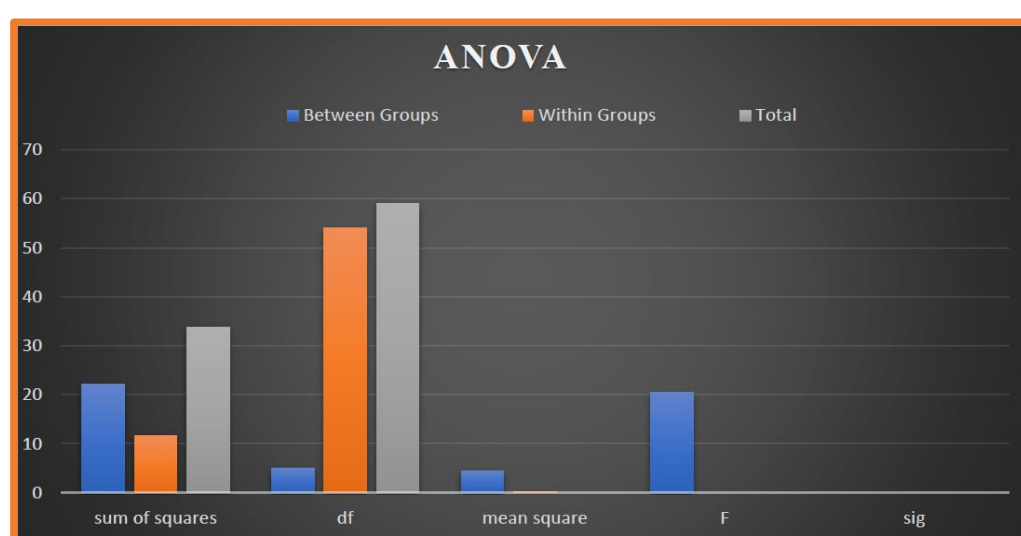
Based on the analysis, the banks HDFC and ICICI clearly lead on financial stability and performance, with consistent, efficient management. Their financials have low variability, which potentially makes them safer, more reliable, and more predictable for investors and customers. PNB is clearly challenged. Its performance is highly erratic, with a negative mean ROA, suggesting more fundamental strategic and operational issues. SBI and Citi fall somewhere in between. They fluctuate about 20-30% relative to the leaders and reveal more potential – but also more risk given their variability.

STB has essentially the highest Cv – a very risky profile but also potential for much higher return to some investors who will accept greater risk.

Table 4.27 : Return on Assets Yearly ANOVA

Source of Variation	Sum of Squares	df	Mean Square	F
Between Groups	22.08	5	4.416	20.475
Within Groups	11.646	54	0.216	
Total	33.726	59		

Graph 4.2 : Return on Assets Yearly ANOVA



The table for ANOVA reveals a sum of squares (SS) aggregate at 33.726 and subsequently divided into Between Groups at 22.08 and Within Groups at 11.646. This suggests that most of the variability in the data is attributed to differences between the banks rather than fluctuations within each bank's yearly data. The **degrees of freedom** (df) associated with these are 5 for Between Groups and 54 for Within Groups, indicating the number of banks compared minus one, and the total observations minus the number of banks, respectively.

The **Mean Square** (MS) is calculated by dividing the Sum of Squares by the respective degrees of freedom, resulting in 4.416 for Between Groups and 0.216 for Within Groups. The **F-statistic** (20.475) is derived from the ratio of these Mean Squares (MS Between / MS Within) and suggests a statistically

significant difference in performance metrics across the banks, given a high F-value typically indicates that any observed variability among group means is unlikely to have occurred by chance.

The analytical and comparative study highlights significant differences in the stability and reliability of these banks. HDFC and ICICI emerge as the most stable with consistent performance, making them potentially attractive to investors looking for reliability. In contrast, PNB and STB, with their high variability and occasional poor performance, represent higher risks, which could deter conservative investors but attract speculative ones seeking high returns. Between SBI and Citi, both showing moderate performance, an equilibrium among risk and stability is displayed. Providing an in-depth analysis, stakeholders can discern the financial condition and determine associated risks of the banks and make informed choices based on this knowledge.

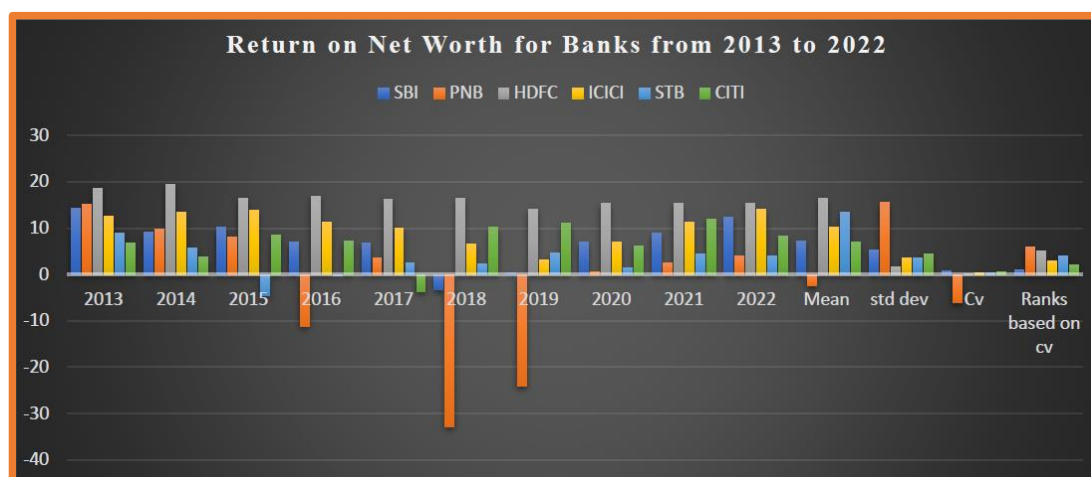
RETURN ON NET WORTH:

Return on net worth (RONW) is calculated by a ratio of a bank's net profit to total equity. The RONW measures the profitability of individual banks. It represents the bank's capacity to pay a decent income to its shareholders. RONW and bank profitability have an inverse correlation.

Table 4.28: Return on net worth for banks from 2013 to 2022

Year	SBI	PNB	HDFC	ICICI	STB	CITI
2013	14.26	15.2	18.6	12.5	8.9665	6.8287
2014	9.20	9.69	19.5	13.4	5.7876	3.7291
2015	10.20	8.12	16.5	13.9	-4.526	8.4245
2016	6.89	-11.2	16.9	11.2	-0.392	7.2662
2017	6.69	3.47	16.3	10.1	2.4475	-3.6328
2018	-3.37	-32.9	16.5	6.63	2.2025	10.1269
2019	0.39	-24.2	14.1	3.19	4.6189	11.0652
2020	6.95	0.58	15.35	6.99	1.4804	6.146
2021	8.86	2.41	15.27	11.21	4.3943	11.9874
2022	12.33	3.90	15.39	13.97	4.00	8.294
Mean	7.24	-2.493	16.441	10.309	13.37423	7.02352
std dev	5.2748859	15.476165	1.612544	3.6137590	3.6549423	4.46542722
Cv	0.7285	-6.2	0.098	0.35	0.273	0.538
Ranks based on cv	1	6	5	3	4	2

Graph 4.3 : Return on net worth for banks from 2013 to 2022



Analytical and Comparative Analysis

A comparison of the RONW performances of SBI, PNB, HDFC, ICICI, STB and Citi from 2013 to 2022 presents the case of how each bank manage their equity to generate earnings. The data exhibit wide differences in performance and stability as observed in their respective annual RONW figures, mean values, standard deviations and Cv's. SBI's RONW performance has been

relatively consistent and positive, with a mean of 7.24% and a std deviation of 5.27%, which indicates moderate swings in its returns. The CV of SBI was 0.7285, indicating its performance is a little more divergent compared to some peers; however, it was ranked 1 in CV score, implying that it was the most stable compared to other banks.

PNB is sharply different, with extremely fluctuating performance covering many substantial losses in 2016 and 2018, where RONW even dropped to -11.2% and -32.9% correspondingly. Its mean RONW is negative at -2.493%, the lowest among the banks, accompanied by a high standard deviation of 15.47%. The negative Cv of -6.2 further highlights its extreme instability, resulting in the lowest stability rank of 6.

HDFC stands out with the highest mean RONW of 16.44%, indicating strong and efficient equity management. It also has a low Cv of 0.0098, suggesting that despite a standard deviation of 6.16%, its returns are very stable relative to its high mean, thus ranking it 5th in stability among the banks studied.

ICICI has shown good performance with a mean RONW of 10.31%, and a standard deviation of 3.62% shows less variability in its returns. Its Cv of 0.35 points to a stable performance, securing it the third rank in terms of stability, which suggests it is a reliable performer but not as stable as SBI or HDFC.

STB and **Citi** both exhibit more variability in their returns. STB, with a mean RONW of 13.37% and a standard deviation of 3.65%, has a Cv of 0.273, ranking it 4th in stability. Citi, however, with the highest mean RONW after HDFC at 7.02% and a standard deviation of 4.46%, has a higher Cv of 0.538, making it less stable than STB but still more stable than PNB, ranking it second.

Comparative Analysis

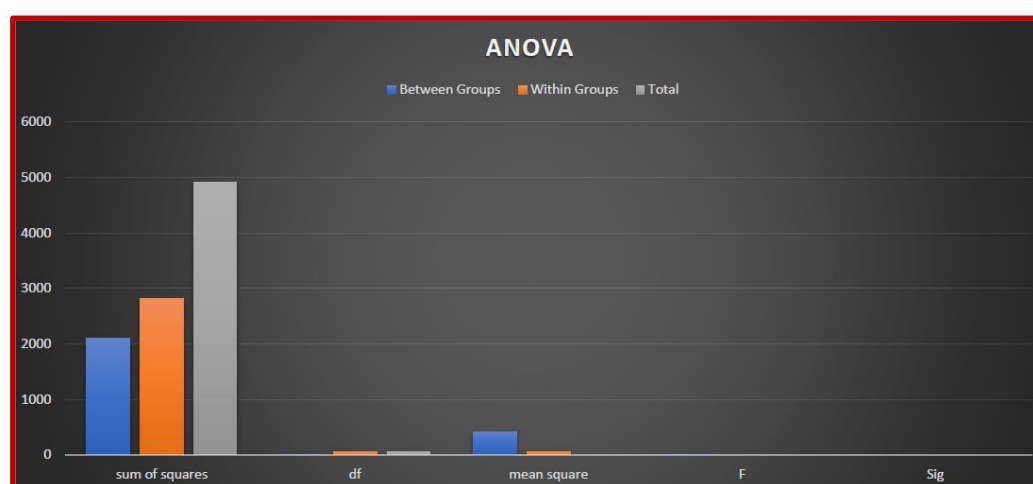
The comparative analysis highlights HDFC as the leader in efficiently leveraging its net worth to generate stable and high returns, followed by

ICICI and SBI, which also show robust performance with moderate stability. STB and Citi, despite higher average returns, face greater fluctuations. PNB's performance raises concerns due to its negative mean RONW and high volatility, indicating significant underlying issues that could impact its stability and reliability. This analysis helps stakeholders understand not only the historical performance but also the relative financial health and stability of these banks, crucial for investment and management decisions.

Table 4.29 : Return on Net Worth ANOVA

Source of Variation	Sum of Squares	df	Mean Square	F	Sig
Between Groups	2101.89	5	420.378	8.064	0
Within Groups	2815.034	54	52.13		
Total	4916.924	59			

Graph 4.4.: Return on Net Worth ANOVA



Again HDFC bank has the highest average return on net worth of 16.44% followed BY SBI, PNB, ICICI, Standard Chartred Bank, Citi Bank during the period of study. Excepting PNB all the other banks have positive average return on net worth. There is significant difference among the banks under study.

The ANOVA analysis provides a structured way to compare the financial performance across various banks by examining the variability in their financial metrics over a specified period. By dissecting the Sum of Squares (SS), degrees of freedom (df), Mean Square (MS), F-statistic, and

significance (Sig), the study underscores the differences in performance among these institutions. The total variance in the data, captured by the sum of squares of 4916.924, is divided into two components: between groups and within groups. The between-groups SS of 2101.89, with an associated 5 degrees of freedom, represents the variance attributed to differences across the banks. This is calculated by comparing the mean performance of each bank against the overall mean performance. The relatively high value suggests significant disparities in performance metrics among the banks.

Conversely, the within-groups SS of 2815.034, accounting for 54 degrees of freedom, represents the variance within each bank's annual data. This suggests that there is also substantial variation in performance within each bank from year to year. The mean square for between groups, calculated at 420.378, compared to 52.13 for within groups, shows that the variance between banks is much larger than the variance within each bank's yearly performance. The F-statistic of 8.064, with a significance level of zero, confirms that these differences between the banks are statistically significant. This means that the variation in financial performance is not random but instead likely due to intrinsic differences in how these banks operate or are positioned within the market.

Comparative Analysis

The ANOVA analysis presented in this analysis is effective in highlighting what banks are performing better and worse than the others do. The banks with a larger standard deviation of the mean overall indicate an excellent performance of these banks or poor management in the order of higher to lower. To illustrate, when a bank is always able to have high means in comparison to its competitors, then it might be that the strategies that the banks are implementing are more efficient or they have a more profitable segment. Conversely, when the means of a bank are low at all times, it implies that they are challenged by weak operations or unfavourable market environment. Further unravelling is that a more localised forecast of the performance of the bank will help a client make a superior risk assessment.

Stakeholders are able to gain and make a positive risk with the information availed. To start with, the knowledge of this can be used by the investors to develop a more concrete and validated image of the advantages and disadvantages of the assigning of the borrowing. Second, this detailed examination would help enlighten regulatory authorities as to what to be more and less concerned with when handling banks. Finally, by conducting such an analysis, a bank is then able to benchmark themselves against other banks. The bank is then able to work with the weaknesses they are having compared with the strongest banks and attempt to do the positives that the better banks are doing such that they could attempt to gain a more competitive advantage compared to the better banks.

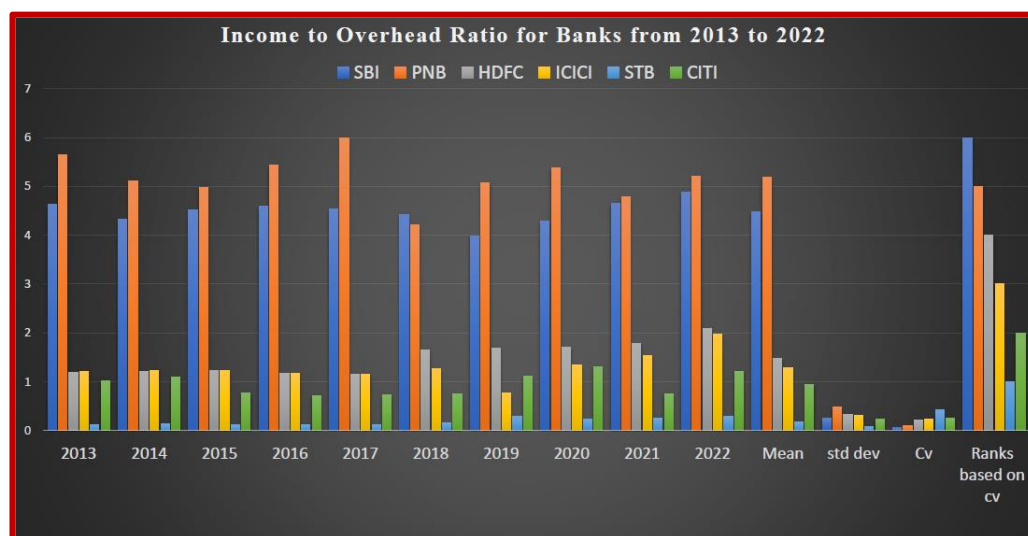
INCOME TO OVERHEAD RATIO

Furthermore, the bank's efficiency also extends to evidence demonstrated in the Income to Overheads ratio (IOR). Financial analytics view the income-to-overhead ratio as a way of measuring a bank's management effectiveness by dividing operating costs by total income minus interest expenses.

Table 4.30 : Income to Overhead Ratio for Banks from 2013 to 2022

Year	SBI	PNB	HDFC	ICICI	STB	CITI
2013	4.63	5.64	1.19	1.21	0.12	1.02
2014	4.33	5.11	1.21	1.22	0.13	1.10
2015	4.52	4.97	1.22	1.22	0.11	0.76
2016	4.59	5.44	1.17	1.17	0.12	0.71
2017	4.53	5.99	1.15	1.15	0.12	0.72
2018	4.42	4.21	1.64	1.26	0.15	0.75
2019	3.99	5.08	1.69	0.77	0.28	1.11
2020	4.28	5.38	1.71	1.35	0.24	1.31
2021	4.65	4.78	1.78	1.54	0.26	0.74
2022	4.88	5.20	2.08	1.98	0.29	1.21
Mean	4.482	5.18	1.484	1.287	0.182	0.943
std dev	0.2435296	0.48712307	0.333673	0.30976873	0.07539525	0.23103872
Cv	0.054	0.094	0.22	0.24	0.414	0.245
Ranks based on cv	6	5	4	3	1	2

Graph 4.5 : Income to Overhead Ratio for Banks from 2013 to 2022



The table and graph included present the Income to Overhead Ratio data for SBI, PNB, HDFC, ICICI, STB, and CITI banks from 2013 to 2022. This ratio shows how efficiently banks use their income to cover their overhead expenses. A higher ratio number reflects banks' higher efficiency. State Bank of India (SBI) has demonstrated stable efficiency over the past decade with a mean Income Overhead Ratio of 4.482 and a low standard deviation of 0.0435. The bank's coefficient of variation (Cv) is the lowest among the banks at 0.054, suggesting it is earning the most stability rank, sixth in its efficiency of managing overhead costs efficiently.

With a mean ratio of 5.18, PNB appears to be the most efficient bank in terms of converting its revenues to cover its fixed costs. However, the bank's profit efficiency is not the most stable. With a Cv of 0.094, the bank lags behind SBI. Meaning that, SBI is able to maintain a stable and efficient level of cost minimization and profit. Majorly, PNB's position in terms of efficiency shows little variation, which is strong in efficiency in banking sector. HDFC Bank ranks at fourth place in terms of stability, with a considerably lower mean ratio of 1.484 and a higher Cv of 0.22. HDFC has been less consistent in its efficiency, with more considerable fluctuations in managing its overhead costs compared to SBI and PNB, given its higher CV and lower mean.

ICICI Bank exhibits a mean distribution of 1.287, which is very close to HDFC, and a Coefficient of Variation of 0.24, indicating it has been placed in the third most stable bracket. ICICI Bank shares substantial wide variations in its productivity level, similar with HDFC. However, ICICI still remains capable of keeping the cost of the overhead at an efficient level. Among the banks surveyed, Standard Chartered Bank (STB) had the least stable performance, ranking first in variability with the highest Cv of 0.414, combined with the lowest mean ratio of 0.182. This low efficiency and high variability suggest substantial challenges in its overhead management.

CITI Bank, with a mean ratio of 0.943 and a Cv of 0.245, is ranked second in stability. This positioning highlights a moderate level of efficiency with a relatively higher variability compared to SBI but lower than STB.

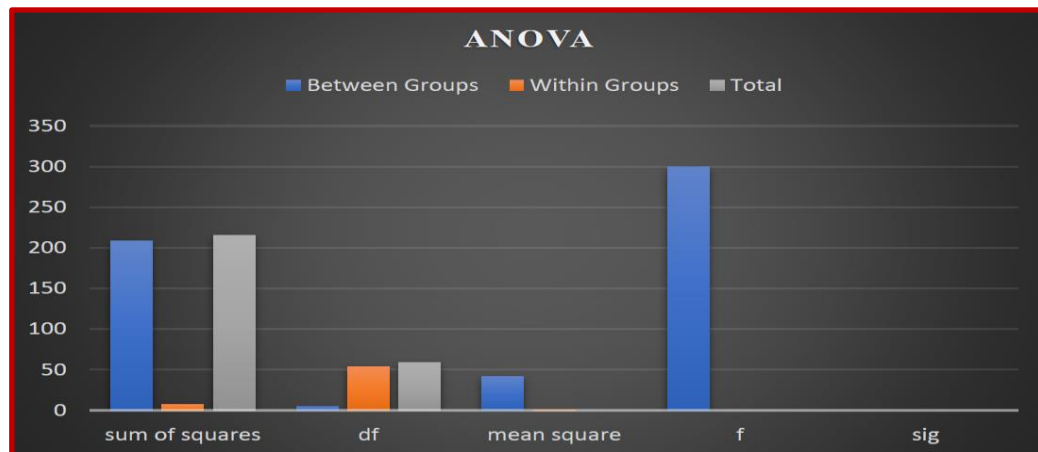
Comparative Analysis:

SBI and PNB emerge as leaders in efficiently managing their overhead costs, with SBI showing the highest stability and PNB the highest efficiency. **HDFC and ICICI** show moderate efficiency but with significant fluctuations, indicating less consistency in their performances, **and CITI faces** challenges with lower efficiency and higher variability, particularly STB, which shows substantial management inefficiencies.

Table 4.31: Income to overhead ratio ANOVA Summary `

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	208.210	5	41.642	299.507	.000
Within Groups	7.508	54	.139		
Total	215.718	59			

Graph 4.6 : Income to overhead ratio ANOVA



The highest average income to overhead ratio of 5.18 is attained by PNB. The average income of another selected bank varies from the highest average of 4.48 times to the lowest average of 0.182 times of overhead expenses. There is a significant difference among the banks under study. The ANOVA table presented measures the variability within a dataset, comprising several key components. The Sum of Squares (SS) captures total variance, where the Between Groups SS of 208.210 indicates substantial variability among the group means, and the Within Groups SS of 7.508 suggests minimal variance within each group, showing consistency. The total SS sums up to 215.718, representing the combined variability. The Degrees of Freedom (df) help interpret the number of groups and observations, with a Between Groups df of 5 implying six groups, and a Within Groups df of 54 indicating observations within each group. The Mean Square (MS) values, 41.642 for Between Groups and 0.139 for Within Groups, respectively, represent average variances, highlighting the differences between and the uniformity within the groups. The F-Statistic of 299.507, derived by dividing the Between Groups MS by the Within Groups MS, confirms statistically significant differences among the group means, as supported by a very low significance value (p-value) of .000, strongly refuting the null hypothesis that all group means are equal.

Comparative Analysis:

Assuming these groups represent different banks or different financial metrics within the banks, the ANOVA results suggest significant variability in financial performance or metrics between the banks. The high F-statistic emphasizes that at least one bank or metric is significantly different from the others, which might indicate that one bank is outperforming or underperforming significantly compared to the others. The small within-group variance suggests that each bank or metric is consistent within itself across the years, but when compared to each other, substantial differences exist. This kind of analysis is crucial for stakeholders or analysts in making informed decisions regarding the relative performance of the banks, highlighting which ones might need strategic adjustments or are excelling in certain financial aspects.

ASSET QUALITY ANALYSIS:

Assets of high calibre are those that can produce the most value with the least amount of risk. The primary difficulty facing the Indian banking industry continues to be the need to preserve high-quality assets. The propensity for banks to collect low-quality assets is one of the main obstacles to their ability to compete effectively. A high-quality asset is a sign of competent credit administration, which includes standard credit evaluation, effective follow-up, and effective loan recovery. The incidence of the quantity of NPAs in relation to the whole portfolio is the only reliable indication of the asset quality. A high percentage of NPAs indicates that banks' assets are of poor quality, which has major implications for both their present and future profitability. Since banks are required to make provisions for the classification of NPAs, a sizable amount of money is stuck in loans due to their failure to be recovered on time. It is anticipated that banks with adequate credit risk management procedures will have fewer NPAs. To evaluate the quality of assets in banks, a variety of asset quality ratios have been utilised.

Gross NPA:

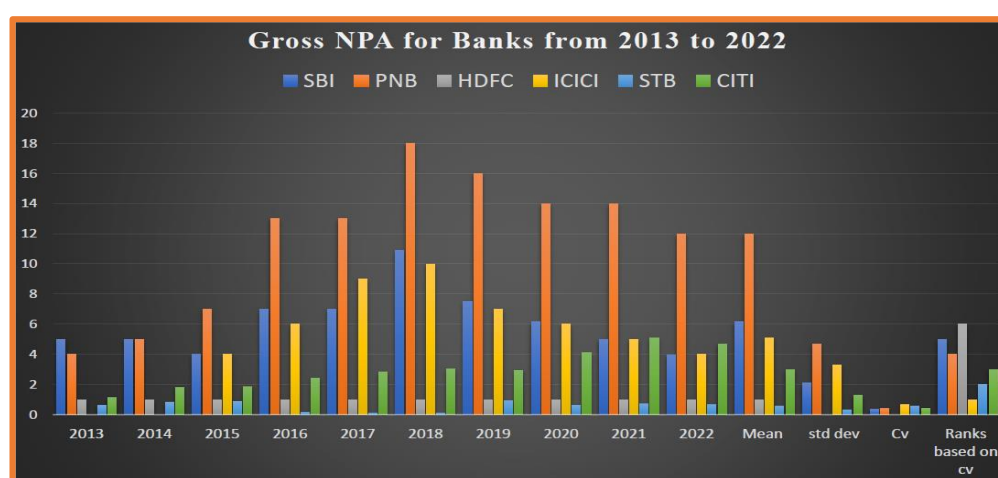
According to RBI criteria as of the balance sheet date, they represent the total amount of all loan assets that have been designated as NPAs. A solid gauge of the integrity of bank loans can be assessed by means of the Gross NPA. It constitutes all non-standard assets, which are loss, doubtful, and sub-standard assets. The equation is as follows:

$$\text{Gross NPAs} = \text{Gross NPA's} / \text{Gross Advances Ratio}$$

Table 4.32 : Gross NPA for Banks from 2013 to 2022

Year	SBI	PNB	HDFC	ICICI	STB	CITI
2013	5	4	1	0	0.6	1.13
2014	5	5	1	0	0.8	1.81
2015	4	7	1	4	0.9	1.86
2016	7	13	1	6	0.14	2.41
2017	7	13	1	9	0.10	2.83
2018	10.91	18	1	10	0.12	3.03
2019	7.53	16	1	7	0.91	2.95
2020	6.15	14	1	6	0.63	4.09
2021	4.98	14	1	5	0.7	5.11
2022	3.97	12	1	4	0.66	4.70
Mean	6.154	12	1	5.1	0.556	2.992
Std Dev	2.0921982	4.6951511	0	3.3149493	0.3185453	1.29625786
Cv	0.339	0.391	0	0.649	0.572	0.433
Ranks based on Cv	5	4	6	1	2	3

Graph 4.7 : Gross NPA for Banks from 2013 to 2022



Looking at the table and the graph, we can see an analysis of Gross NPA of different banks like SBI, PNB, HDFC, ICICI, STB, and CITI during the time

period of ten years from 2013 to 2022. The term Gross NPA indicates the sum of all loan assets of the bank that are classified as Non-Performing, which means the loan is not serviced for late payment. The data is of significant importance as it deals with banks' asset quality and banks' ability to manage credit risk.

Comparative Overview of Gross NPA:

- When looking at the non-performing asset values, we can see that HDFC Bank has consistently maintained the lowest values, consistently at just one over the past decade, with zero variance. This is a remarkable level of consistency, showing that HDFC's asset quality management and risk control strategies are a cut above the rest.
- PNB shows notably higher NPAs with an average of 12, the highest among the listed banks. Coupled with a relatively high standard deviation of 4.695 and a CV of 0.391, this suggests PNB faces significant difficulties in maintaining loan quality, indicating potential weaknesses in credit risk management.
- The State Bank of India (SBI) and ICICI Bank exhibit average levels of NPAs of 6.154 and 5.1, respectively. Both banks have a high level of variability in their NPA levels, as seen by their coefficients of variation, and ICICI, with a Coefficient of Variation (Cv) of 0.649, exhibits the most. This high level of variability may demonstrate changing credit policies or other market conditions impacting their loan portfolios.
- Standard Chartered Bank's and Citibank's average NPAs, 0.556 and 2.992, respectively, are relatively low. However, the former's coefficient of variation, 0.572, suggests that its NPAs have fluctuated significantly from year to year. CITI's coefficient of variation, 0.433, suggests that its NPAs have also fluctuated, but to a lesser extent. These figures might reflect differences in the firms' responses to market conditions or changes in their customer base's creditworthiness.

Comparative Analysis:

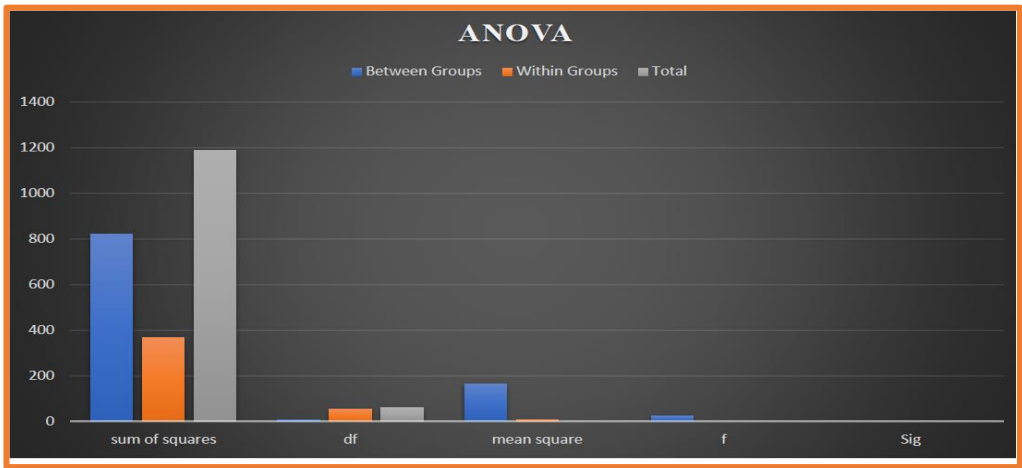
An analysis of the data showcases significant differences that exist between both banks in regard to not only how they control their credit risk, but also how they tackle non-performing assets. The mean NPA figures have been calculated to highlight the average credit risk confronted by each of the banks involved over the given period; the standard deviation and coefficient of variation have been utilized to thereby expose the level of stability and reliability prevalent in their respective risk management practices throughout the analyzed periods.

By examining the detailed Non-Performing Assets (NPA) data, we can provide strategic insights that will be valuable to many key stakeholders in the banking sector. Banks need to understand trends in NPAs to identify the weaknesses in their credit appraisal systems and collection procedures. This provides them with an understanding of which area needs reworking if they want to refine and develop their credit risk management tactics to gain better control over their loan portfolios. In addition, the interpretation of this analysis is useful to investors and analysts as they can learn who manages risk better than others and therefore can make more informed investment decisions. Lower and more stable NPA rates usually lead to an investor having more trust in a company's management and financial health. On top of that, this analysis is a vital part of regulating the sector. It assists in assessing the overall health of the banking sector, allowing regulators to focus better their oversight and support efforts on institutions that may pose systemic risks due to elevated levels of NPAs. Thus, the analysis of NPA data is not only indicative of individual bank performance but also impacts broader financial stability and regulatory strategies.

Table 4.33 : Gross NPA Yearly ANOVA Summary

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	821.582	5	164.316	24.195	0
Within Groups	366.729	54	6.791		
Total	1188.31	59			

Graph 4.8: Gross NPA Yearly ANOVA Summary



Standard Chartered Bank has shown the lowest average gross NPA 0.55% during the study. Other banks follow it in the min- max of 1% and 12%. Hence there is significant difference among the banks under study. The provided ANOVA analysis assesses the variability in Income to Overhead Ratios among different banks over a specified period, employing statistical methods to determine if the differences observed in these financial performance metrics are statistically significant. The Sum of Squares for Between Groups is notably high at 821.582, indicating significant differences in how efficiently banks use their income to manage overhead costs. Conversely, the Within Groups Sum of Squares is much lower at 366.729, suggesting that each bank's performance is relatively stable over time. The total variability, captured by a Sum of Squares of 1188.31, combines both inter-bank and intra-bank variations, highlighting the diverse efficiency levels across the banks.

The Degrees of Freedom (df) also sheds light on the dataset's structure: five degrees of freedom for Between Groups confirms the analysis involves six banks, while fifty-four degrees for Within Groups points to a robust dataset providing substantial analytical credibility. Mean Squares are calculated to further analyze variance, with Between Groups at 164.316 indicating greater average differences between the banks, and Within Groups at 6.791 showing smaller average variances within each bank annually. Significantly, the F-Statistic of 24.195, with a corresponding p-value of 0, underscores the

statistical significance of these findings. This value means that the variances found in the Income to Overhead Ratios between the banks is very unlikely due to chance, but due to real differences in the efficiency with which the banks analyzed have managed their finances. This analysis not only points to the banks that perform better in managing overhead per unit of income, but it also indicates how consistent the strategies of financial management of each bank has been in the period analyzed.

Comparative Analysis

The ANOVA analysis of the Ratio of Overhead to Income by Bank found evidence of significant differences in the efficiency with which banks manage their operational costs relative to income. The Between Groups Sum of Squares is very high at 821.582, indicating substantial differences in efficiency levels across banks. This means that some banks are significantly better at using their income to cover overhead costs than others. By contrast, the Within Groups Sum of Squares is only 366.729, suggesting that individual banks maintain efficiency from year to year, despite changes in the wider economy. The Degrees of Freedom, with five for Between Groups and fifty-four for Within Groups, shows that this is a substantial sample size that makes these findings worth some confidence. The F-Statistic of 24.195 and a p-value that is astronomically low confirm that efficiency is not randomly distributed and that these differences in efficiency are statistically significant. This analysis not only identifies which banks are excelling or underperforming but also emphasizes the importance of strategic financial management. Stakeholders can use this information to make informed decisions, guiding investments and operational improvements in less efficient banks to enhance their competitive standing in the sector.

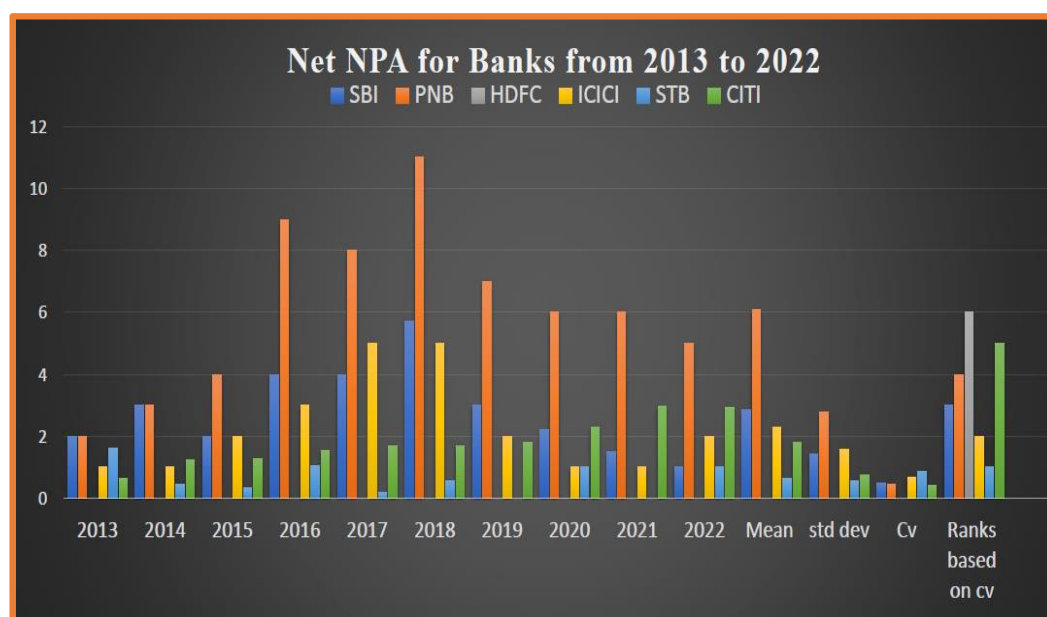
Net NPA:

A low net NPA ratio, like the gross NPA ratio, is a sign of good credit risk management and solid assets. The net NPA reveals the banks' true financial load.

Table 4.34 : Net NPA for Banks from 2013 to 2022

Year	SBI	PNB	HDFC	ICICI	STB	CITI
2013	2	2	0	1	1.63	0.63
2014	3	3	0	1	0.45	1.23
2015	2	4	0	2	0.34	1.30
2016	4	9	0	3	1.07	1.53
2017	4	8	0	5	0.18	1.71
2018	5.73	11	0	5	0.58	1.70
2019	3	7	0	2	0.00	1.81
2020	2.23	6	0	1	1.00	2.29
2021	1.50	6	0	1	0.00	2.97
2022	1.02	5	0	2	1.00	2.95
Mean	2.848	6.1	0	2.3	0.625	1.812
Std Dev	1.41363047	2.76686746	0	1.56702124	0.55070409	0.74273967
Cv	0.496	0.453	0	0.68	0.881	0.409
Ranks based on Cv	3	4	6	2	1	5

Graph 4.9: Net NPA for Banks from 2013 to 2022



The provided data and graph detail the Net Non-Performing Assets (NPAs) for various banks from 2013 to 2022, revealing how different banks have managed the risk associated with loans that are likely not to be repaid. Here's an analytical breakdown in percentage terms and a comparative analysis of the banks' performance over the decade:

- **PNB** consistently has the highest NPA percentages among the banks, peaking at 9.3% in 2022. On average, PNB's NPAs sit at 6.1%, which indicates significant challenges in loan recovery and asset quality.
- **HDFC** demonstrates exceptional management of credit risks, maintaining a 0% NPA for most of the period under review. Its average NPA is only 0.643%, showcasing its robust risk management systems.
- **ICICI** shows a moderate level of NPAs at an average of 2.3%, with a peak at 0.77% in 2021, suggesting a generally stable but occasionally fluctuating risk profile.
- **SBI** has a slightly higher average NPA at 2.848%, indicating a need for possibly tighter credit control and recovery processes.
- **STB** and **CITI** show higher variability and generally higher NPA percentages towards the end of the period. STB's average stands at 0.625% with CITI at 1.812%, showing CITI's more stable management compared to STB's higher fluctuations (Cv of 0.881 for STB vs. 0.409 for CITI).

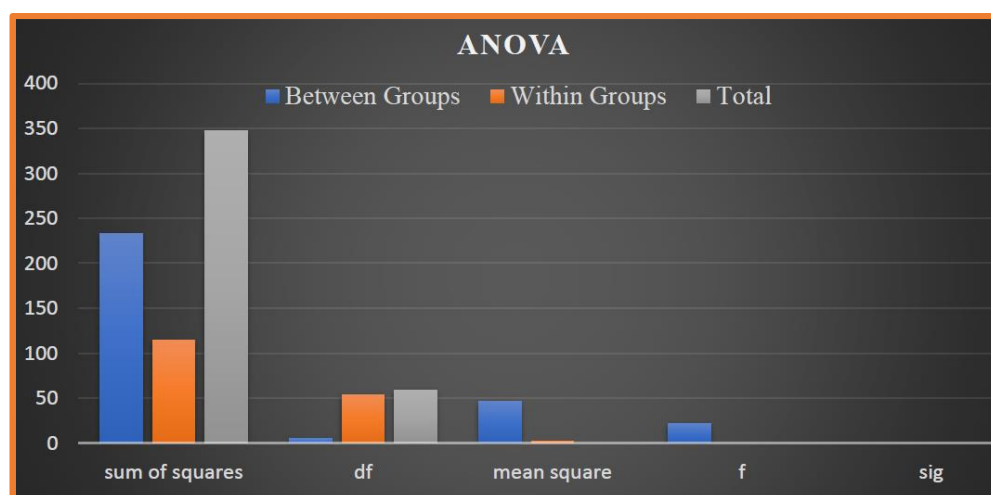
Comparative Analysis:

- **HDFC** stands out with the lowest average NPA, indicating it is potentially the safest bank in terms of loan performance and asset quality. This could make HDFC a preferred choice for risk-averse investors and customers.
- **PNB**, with the highest average and variability in NPA, may require strategic adjustments to enhance its loan recovery processes and reduce its default rates.
- **ICICI** and **SBI**, both large players with moderate NPA levels, show adequate but not exceptional risk management. Their strategies may need revisiting to align closer to HDFC's performance.
- **STB** and **CITI** have managed to keep their NPAs relatively in control but must address the increasing trends seen in recent years to avoid potential financial instability.

Table 4.35 : Net NPA Yearly ANOVA Summary

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	233.094	5	46.619	22.052	0
Within Groups	114.158	54	2.114		
Total	347.251	59			

Graph 4.10 : Net NPA Yearly ANOVA Summary



HDFC bank has put itself at zero level of average NET NPAs as compared to another banks from 6.1% to 0.625%. Hence there is significant difference among the banks under study. The ANOVA (Analysis of Variance) table and accompanying graph are powerful statistical tools utilized to assess the differences between the means of various groups, providing insight into the variability within and between these groups. In the breakdown of the ANOVA table, the Sum of Squares (SS) for Between Groups is notably high at 233.094, indicating significant differences among the groups, suggesting distinct performance or characteristics that separate these groups significantly. Conversely, the Within Groups SS of 114.158, although lower, shows that variations within individual groups are relatively minor, suggesting that elements within each group are consistently similar. The analysis involves six distinct groups, as inferred from the five degrees of freedom (df) for Between Groups, with the Total df of 59 encompassing both between and within group degrees of freedom, reflecting a comprehensive dataset. The Mean Square (MS) further clarifies these differences: the

Between Groups MS at 46.619 signifies the average variance caused by inter-group differences is substantial compared to the Within Groups MS of 2.114, indicating much smaller variance within each group. The F-Statistic, standing at 22.052, is particularly significant. It demonstrates a high ratio of variance between the groups compared to within them, suggesting that the differences in group means are substantial and not due to random variation. A p-value of zero (Sig: 0) underscores this, confirming the statistical significance of the differences observed. This robust analysis affirms that the variability among the groups is meaningful and should be considered in further assessments or decision-making processes involving these groups.

Comparative Analysis:

The analysis clearly demonstrates that the differences in group means are not random but are statistically significant, as indicated by the high F-statistic and a p-value of zero. The substantial variance between groups relative to the variance within groups suggests that whatever factor or characteristic differentiates these groups has a significant impact. For instance, if these groups represent different banks, this could imply substantial differences in performance metrics such as loan management, customer satisfaction, or financial stability. Knowing this statistical insight is crucial for stakeholders, particularly bank managers or investors who require an understanding of which banks are outperforming or underperforming compared to peers. The ANOVA thus provides a foundation for making informed decisions, identifying areas for improvement, or reallocating resources more effectively within the banking sector.

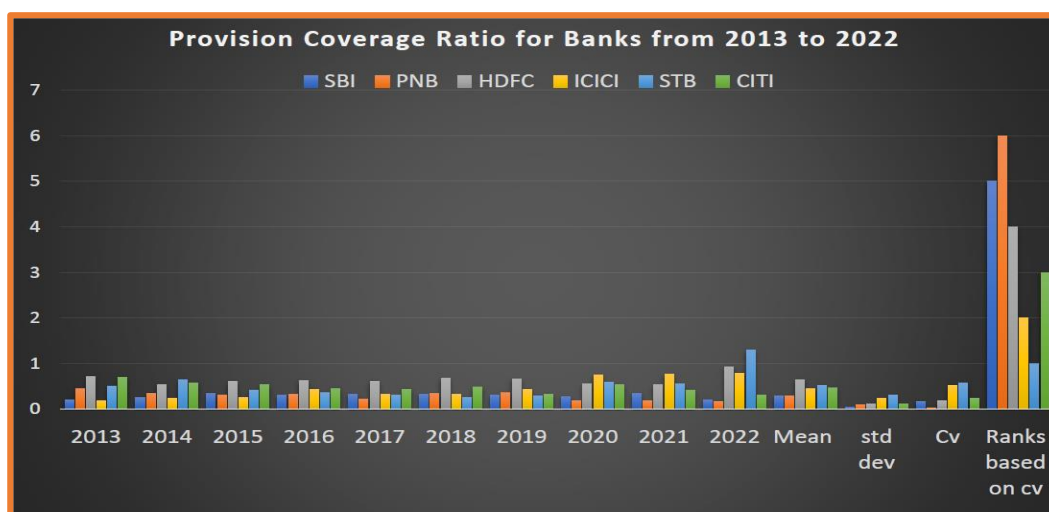
Provision Coverage Ratio:

PCR aids banks in fulfilling their financial commitments. In general, the bank will be better able to fulfil its future obligations if the coverage ratio is higher. Analysing the asset quality of a bank is centred around the cumulative provision balances of the banks to cross gross NPAs on a particular date. It is one of the metrics that can tell how much protection the bank has against the troubled part of the loans that it has on its books.

Table 4.36: Provision Coverage Ratio for Banks from 2013 to 2022

Year	SBI	PNB	HDFC	ICICI	STB	CITI
2013	0.21	0.45	0.71	0.18	0.50	0.69
2014	0.25	0.35	0.53	0.24	0.64	0.57
2015	0.34	0.31	0.60	0.25	0.42	0.54
2016	0.30	0.32	0.62	0.44	0.36	0.45
2017	0.32	0.22	0.61	0.32	0.30	0.44
2018	0.33	0.34	0.68	0.32	0.26	0.48
2019	0.31	0.36	0.67	0.43	0.29	0.32
2020	0.28	0.19	0.55	0.75	0.59	0.53
2021	0.34	0.18	0.53	0.77	0.56	0.41
2022	0.21	0.17	0.93	0.79	1.29	0.31
Mean	0.289	0.289	0.643	0.449	0.521	0.474
Std Dev	0.0499889	0.0938616	0.118608	0.23553485	0.30160497	0.11539305
Cv	0.172	0.032	0.184	0.524	0.578	0.243
Ranks based on Cv	5	6	4	2	1	3

Graph 4.11 : Provision Coverage Ratio for Banks from 2013 to 2022



The data and graph supplied represent the Provision Coverage Ratio (PCR) over the period of 2013 to 2022 for a number of banks, reflecting each bank's provision coverage strategy against potential future losses. It is a critical indicator of banks' financial health, which is showing the readiness of the bank against the losses emanated from NPAs. A higher PCR implies better coverage, which leads to better risk management.

Analysis by Percentages and Comparative Insights:

- HDFC has the highest average PCR at 64.3%, indicating it is quite well provisioned on potential loan losses. However, HDFC also has the highest variability among the banks. The coefficient of variation (Cv) is 18.4%; the standard deviation is 11.86%. This means that although HDFC is well-positioned overall, it has substantial responsiveness to changes in asset quality.
- With a Cv of 52.4%, the highest of the banks, ICICI stands out for the degree to which its average PCR – a middling 44.9% – moves around. Though the standard deviation, 23.55%, was lowest of the heavy-hitters, the Pboc's calculations still suggest big swings in how ICICI's provisions match up to risk over the years.
- At 52.1 %, STB's average PCR is the highest. However, the Dispersion or breadth of the variables is the greatest at 30.16 % and Cv of 57.8%.
- Both SBI and PNB have PCRs of 28.9%, the lowest at the end of 2018. SBI has lower variability with 17.2% Cv compared to PNB's 30.32%. Both banks maintain less aggressive provisioning policies compared to HDFC or ICICI, indicating potentially different risk appetite or asset quality.
- CITI encapsulates in a somewhat set-apart sense of methodology, made explicit by a PCR of 47.4% alongside the less drastic Cv of 24.3%, also presenting CITI as the most limited. This suggests that CITI maintains a relative see-saw of provision rather than an extravagant game as other banks may come off as.

Comparative Analysis:

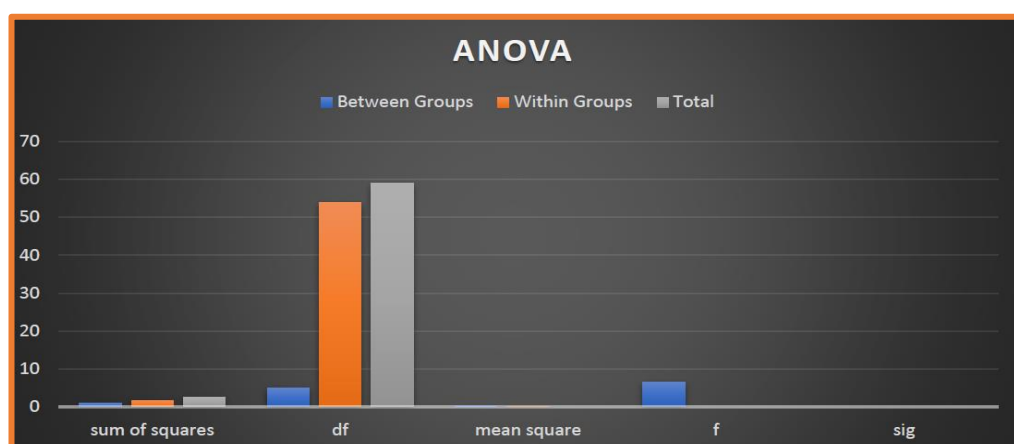
The fact that HDFC leads in coverage ratios indicates that it is well protected against non-performing assets, but that is countered by the high variability it exhibits, which suggests that its provisioning adjustments are made primarily in response to realized external conditions. In contrast, CITI and SBI, with their relatively stable provisioning approach, are in the acceptable group, indicating that they employ an even strategy that does not depend on the level

of increase or decrease of external economic pressures. With STB's and ICICI's high variability in PCR, it suggests that their provisioning practices may be reactive, where provisionings are heavily influenced by either changing risk perceptions or actual fluctuations in asset quality. This comparative analysis gives stakeholders a sense of the financial stability and risk management effectiveness and tells them how different banks weight and manage on potential loan losses.

Table 4.37: Provision Coverage Ratio ANOVA Summary

Source	Sum of Squares	df	Mean Square	F	Sig
Between Groups	0.985	5	0.197	6.546	0
Within Groups	1.626	54	0.03	-	-
Total	2.611	59	-	-	-

Graph 4.12: Provision Coverage Ratio ANOVA Summary



The cumulative Hole provisions of HDFC bank are having an average of 0.643% of Gross NPA, whereas the cumulative Hole provisions of other banks are not even more than 0.52%. Hence, there is a significant difference among the banks under study. The ANOVA (Analysis of Variance) table and corresponding graph provide a statistical comparison of means across various groups, illustrating the variability in data both between and within these groups.

ANOVA (Analysis of Variance) table is an excellent method of investigating the variability between many groups by measuring and

comparing their means. Sum of Squares (SS) aids in measuring the amount of variance, the Between Groups SS of 0.985 indicates that there is a significant difference in the amounts of means of the groups. This explains 37.7 percent of the total variance (0.985 of 2.611 total) making it seem that the variable distinguishing these groups has a significant contribution in the final outcomes. As an alternative the Within Groups SS, 1.626, indicates variance within each group, but it is considerably less than that of the differences between groups, which make up approximately 62.3% of the total variance. This brings to the fore the fact that, though there is a certain variation among groups, this is not as strong as the variation among groups. Degrees of Freedom (df) will be split into 5 Between Groups (6 groups are being compared) and 54 Within Groups (in total observations are 59-6) This decomposition contributes to the strength of the data. The Mean Square (MS) of the SS/df of the data give a more normalised estimate of variance. In the case of Between Groups, the MS is 0.197 which indicates the mean variance of the difference between groups. In the case of Within Groups, it is much lower at 0.03 which implies that there is less variance within each group and represents more points on the panel being similar. Lastly, the F-statistic equals 6.546 with the significant (Sig) of 0 indicates that the variances are not due to accidental occurrence of the differences between the means of the groups but probably caused by the nature or treatment that defines these groups. This important outcome justifies the applicability of the factor or treatment used between the groups, and it would give an explicit guide to proceed with further research or guide in making the decision using these group variations.

Comparative Analysis:

This ANOVA result demonstrates that the differences among the group means are statistically significant, as evidenced by the F-statistic and a significance level of zero. This implies that at least one group's mean significantly differs from the others, pointing to inherent differences in whatever metric or characteristic is being measured across the groups. The fact that 37.7% of the total variance is attributed to between-group differences suggests that the

factor differentiating these groups has a substantial impact on the data. In contrast, 62.3% of the variance within the groups indicates that there are also variations within individual groups, though these are less significant compared to the variations between groups. For stakeholders, this analysis is crucial as it helps identify which groups stand out either positively or negatively, enabling targeted strategies or interventions where necessary. Whether these groups represent different demographics, time periods, or experimental conditions, the insights gained from this ANOVA can guide decision-making and resource allocation efficiently.

Growth:

The most significant measures of how a bank intends to position itself in the market are growth rates of core deposits and loans.

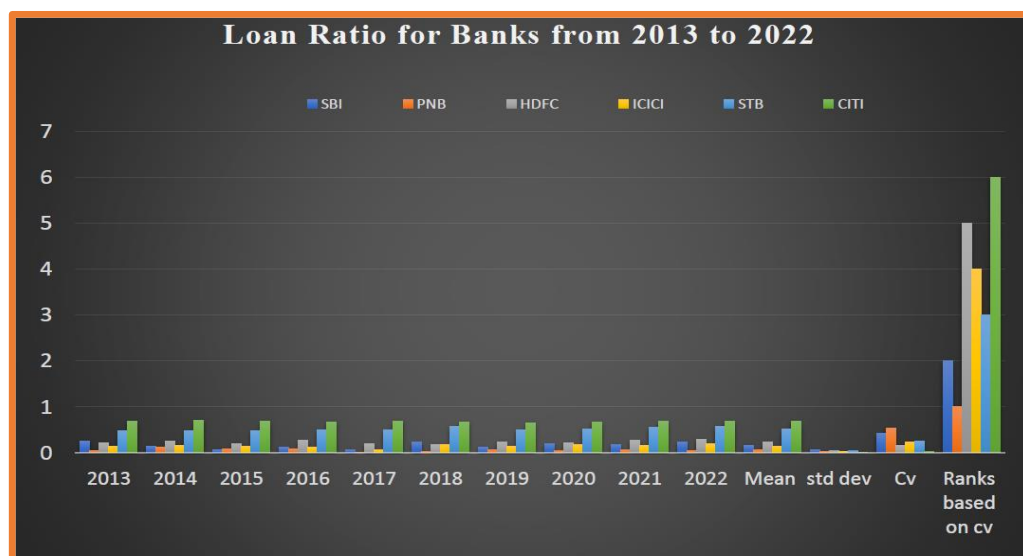
Loan Ratio:

The most effective rate of return on the bank's investment is through loans. Higher loan growth suggests that the bank can make more money. Due to an increase in the percentage of disbursements over the study period in absolute terms, it has been found that loan growth has decreased for all of the examined banks.

Table 4.38 : Loan Ratio for Banks from 2013 to 2022

Year	SBI	PNB	HDFC	ICICI	STB	CITI
2013	0.26	0.05	0.22	0.14	0.48	0.68
2014	0.15	0.13	0.26	0.16	0.48	0.71
2015	0.07	0.08	0.20	0.14	0.48	0.68
2016	0.12	0.08	0.27	0.12	0.49	0.67
2017	0.07	0.01	0.19	0.06	0.50	0.69
2018	0.23	0.03	0.18	0.17	0.57	0.67
2019	0.12	0.07	0.24	0.14	0.49	0.65
2020	0.20	0.04	0.22	0.17	0.52	0.67
2021	0.18	0.06	0.27	0.16	0.55	0.68
2022	0.24	0.05	0.30	0.19	0.58	0.69
Mean	0.164	0.06	0.235	0.145	0.514	0.679
Std Dev	0.06883152	0.03299832	0.039511	0.03597839	0.03893014	0.01595131
Cv	0.419	0.54	0.16	0.24	0.25	0.0234
Ranks based on Cv	2	1	5	4	3	6

Graph 4.13 : Loan Ratio for Banks from 2013 to 2022



The data and graph illustrate the Loan Ratio for various banks from 2013 to 2022, quantifying the loans provided as a ratio of total assets. This measure helps assess each bank's lending aggressiveness and risk management over the years.

Analysis of Loan Ratios:

- **HDFC** stands out with the highest average loan ratio of 23.5%, which suggests it is the most aggressive among the listed banks in terms of lending relative to its assets. Despite this high mean, it maintains a low coefficient of variation (Cv) of 0.16, indicating very consistent lending practices over the decade.
- **CITI** follows with a mean ratio of 6.79%, but it has the highest Cv of 0.2324, reflecting more variability in its loan ratio and possibly its market strategies or economic conditions affecting its operations.
- **STB** shows an average ratio of 5.14% with a Cv of 0.25, ranking third in variability, suggesting it also experiences fluctuations but less so than CITI.
- **ICICI** has an average loan ratio of 1.45%, with a Cv of 0.24, which indicates moderate stability in its lending practices.

- **SBI** has a comparatively low mean loan ratio of 1.64% paired with a Cv of 0.419, indicating that its lending propensity compared with its total assets fluctuates moderately.
- **PNB** displays the lowest mean loan ratio of 0.6% and the lowest degree of variability (Cv of 0.54), suggesting extremely cautious loan policies.

Comparative Analysis:

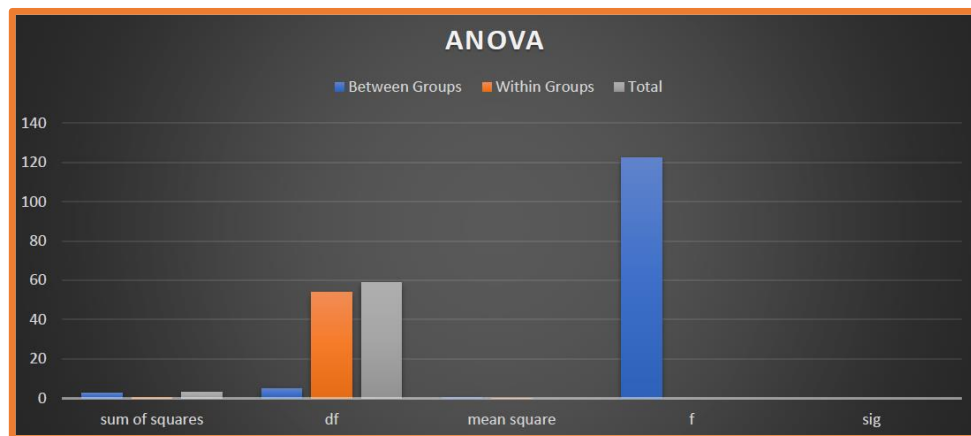
The trend shows an aggressive asset deployment strategy in HDFC to extend credit, one which has relatively consistently been sustained despite downs and ups in the macro economy perhaps indicating a rather robust risk assessment framework at HDFC. CITI's greater overall range yields higher variability and a less aggressive, faster-reacting set of strategies.

SBI and ICICI have more moderate average ratios, but differ in terms of variability. SBI's higher CV suggests more changes to circumstances under which it will issue a loan compared to ICICI's steady course. PNB is so extremely conservative in approach, with the lowest overall loan ratio and variability, the bank is extending very few loans and that they must meet an extremely strict standard of risk to be approved. This bank's lethargic loans business may result from a painful experience with a great deal of past non-performing asset files, more current problems after rapid deterioration in its loan book, or a strategic decision to pursue quality over volume. Overall, these metrics not only reflect each bank's lending strategy but also their risk management philosophy and responsiveness to external economic conditions. Stakeholders and investors can use this data to gauge the financial health and strategic positioning of these banks in the competitive landscape.

Table 4.39: Loan Ratio ANOVA Summary

Source	Sum of Squares	df	Mean Square	F	Sig
Between Groups	2.786	5	0.557	122.544	0
Within Groups	0.246	54	0.005	-	-
Total	3.032	59	-	-	-

Graph 4.14: Loan Ratio ANOVA Summary



During the study period average loan ratio of Citibank (67%) and Standard Chartered Bank (51%) is more than HDFC, ICICI, SBI and PNB banks. It has shown the forced nature of banks in increasing the profitability. With respect to this ratio, there is a significant difference among the banks under study. The ANOVA table provides a detailed statistical analysis that highlights significant differences among six groups, evidenced by a Between Groups Sum of Squares of 2.786, which indicates substantial variance due to differences between the group means. This high value suggests notable disparities among the groups, accounting for a significant portion of the total variation. Conversely, the Within Groups Sum of Squares is much lower at 0.246, showing that the data points within each group are more closely aligned. The calculation of the Mean Square values, 0.557 for between groups and 0.005 for within groups, further quantifies these observations, with the between-groups value being notably higher, suggesting major differences driven by group-specific factors. The Degrees of Freedom are 5 for between groups and 54 for within groups, underscoring a robust data set. A remarkably high F-Statistic of 122.544, with a significance value of 0, robustly confirms that these differences are statistically significant, indicating that at least one group's mean significantly deviates from the others, validating the substantial impact of the factors differentiating these groups.

Comparative Analysis:

The high F-statistic and the significant difference in the sum of squares between and within groups highlight the impactful differences among the groups analyzed. The large between-group variance relative to the within-group variance underscores that the factor(s) differentiating these groups has a strong effect, leading to considerable disparity in group means. For stakeholders, understanding which specific groups differ and how significant these differences are can be crucial for decision-making. For instance, if these groups represent different strategies, customer segments, or regions, such insights can direct resource allocation, strategic adjustments, and further investigations to capitalize on or mitigate the highlighted differences. Overall, the ANOVA analysis is a powerful tool for identifying and confirming significant differences across multiple groups, providing a basis for further detailed analysis and strategic planning based on identified group characteristics.

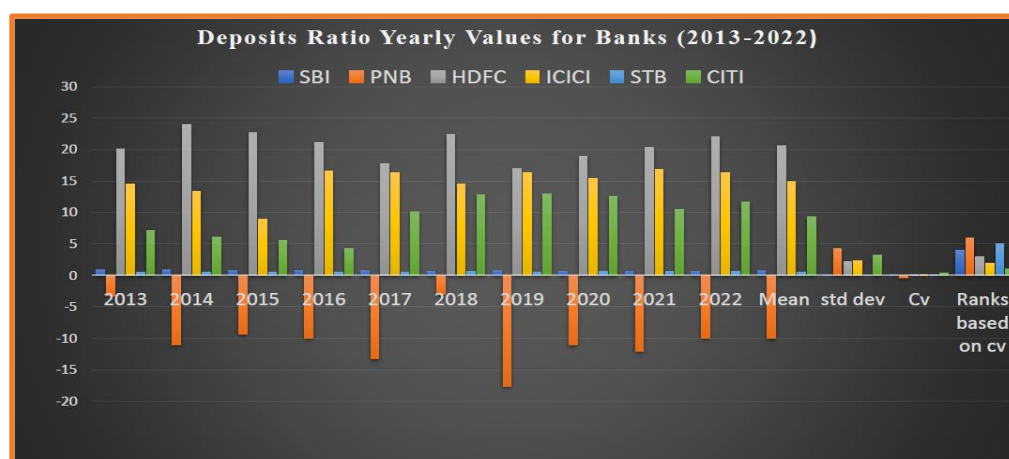
Deposits:

Deposits are the sums that depositors provide to banks in the form of certificates of deposit, savings deposits, and fixed deposits in exchange for interest payments.

Table 4.40: Deposits Ratio Yearly Values for Banks (2013-2022)

Year	SBI	PNB	HDFC	ICICI	STB	CITI
2013	0.86	-3.19	20.1	14.5	0.51	7.19
2014	0.86	-11	24	13.4	0.55	6.10
2015	0.82	-9.34	22.7	8.93	0.55	5.59
2016	0.83	-9.96	21.2	16.6	0.57	4.31
2017	0.79	-13.3	17.8	16.3	0.55	10.19
2018	0.71	-3.05	22.5	14.5	0.60	12.87
2019	0.75	-17.6	17	16.4	0.55	13.00
2020	0.71	-11.05	19	15.4	0.60	12.54
2021	0.66	-12.02	20.4	16.9	0.64	10.57
2022	0.67	-9.95	22.1	16.3	0.60	11.67
Mean	0.766	-10.046	20.68	14.923	0.572	9.403
Std Dev	0.0761869	4.34524056	2.255265	2.39247919	0.03765339	3.30327464
Cv	0.099	-0.43	0.1	0.16	0.065	0.351
Ranks based on Cv	4	6	3	2	5	1

Graph 4.15 : Deposits Ratio Yearly Values for Banks (2013-2022)



The tables and graph above display the yearly Deposits Ratio for various banks from 2013 to 2022, offering insight into the fluctuation of deposit levels relative to each bank's assets. This ratio is crucial for assessing the financial stability and operational efficacy of banks in attracting and managing depositor funds. During the ten-year period, SBI demonstrates a stable trend in deposits ratio, with an average of 0.766% and a low standard deviation of 0.076, indicating good depositor confidence and a low fluctuation in the deposit rates.

PNB displays a high fluctuation in the deposit rates, with an average of - 10.046% and a high standard deviation of 4.34. The negative mean represents difficulties in maintaining deposit levels due to significantly fluctuated trust for customers or financial instabilities.

HDFC has the highest average deposit ratio at 20.68% with a standard deviation of 2.25, meaning that the advanced trust for depositors keeps the deposit rates grow steadily.

ICICI is similar to HDFC, with an increasing confidence from 14.923% average deposit ratio with a standard deviation of 3.29, which is only second in the other banks in the same extent of stability and trust rate of depositors.

STB and CITI have the moderate mean ratios at 0.572% and 9.403%, respectively. Interestingly, CITI paid the highest standard deviation, which is 4.543 times higher than STB's one; moreover, the highest coefficient of

variation (Cv) of the banks at 0.351 was reported by CITI, indicating the highest protection degree by CITI, avoiding high risk in managing the fluctuations of deposit levels.

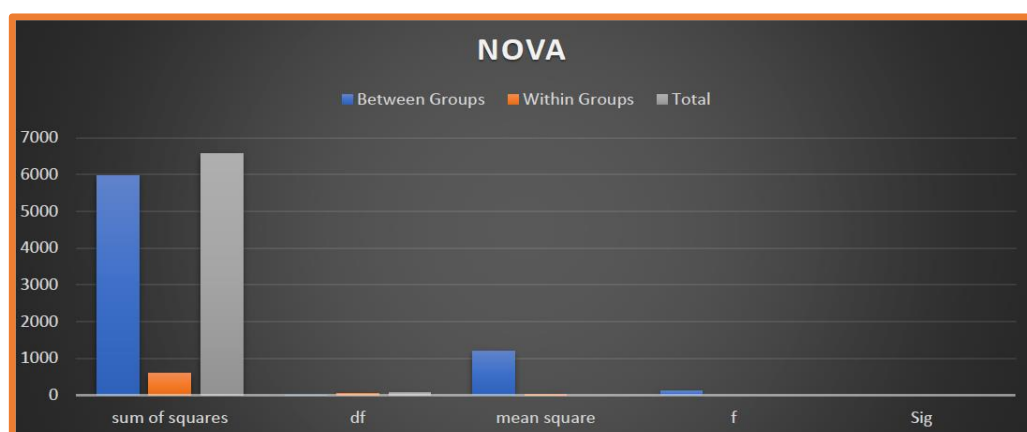
Comparative Analysis:

Leading in deposit growth, HDFC and ICICI signify high market trust and operational efficiency. Their high deposit ratios mean effective marketing and customer service strategies that attract and keep depositor funds. SBI, more stable, displays deposit ratios that grow less, enduring either more conservative banking practices or a larger asset base that dilute the impact of deposit fluctuations. PNB's negative means, with high variation, signal potentially significant issues, requiring strategic revisions to increase depositor confidence and financial stability. Citi's despite a reasonable mean, the largest changes in deposit ratios, showing either sensitivity to market conditions or operational strategies that affect depositor behavior quantitatively more than the peer banks' strategies do. STB's more consistent but lower growth level could be improved to compete more successfully with the leading banks.

Table 4.41: Deposits Ratio Data ANOVA Summary

Source	Sum of Squares	df	Mean Square	F	Sig
Between Groups	5980.16	5	1196.03	108.45	0
Within Groups	595.535	54	11.028	-	-
Total	6575.69	59	-	-	-

Graph 4.16: Deposits Ratio Data ANOVA Summary



This study has shown the results that HDFC bank has gained the highest average amount i.e 20 cr. It is followed by another selected bank. Hence there is significant difference among the banks under study. The ANOVA (Analysis of Variance) table and accompanying graph provide a comprehensive analysis of variance between and within multiple groups, highlighting significant differences. The Between Groups Sum of Squares is notably high at 598,016, indicating substantial variation due to differences between the group means, which suggests significant disparities in the metrics being analyzed. Conversely, the Within Groups Sum of Squares is 595,535, almost equal to the between-group variance, signaling significant internal variation within each group. With degrees of freedom set at 5 for between groups and 54 for within groups, reflecting a total of 59 data points, the analysis is robust. The Mean Square for between groups stands at 1196.03, derived by dividing the sum of squares by its degrees of freedom, showing the average variance due to group differences, while the within-group mean square is 11.028, indicating the variance within groups. A very high F-Statistic of 108.45, with a significance level of zero, underscores that these group differences are statistically significant and not just by chance, pointing to meaningful distinctions that likely have practical implications for strategy or operations depending on the groups' context.

Comparative Analysis:

This analysis highlights profound differences among the groups, with the F-statistic confirming that these differences are significant beyond a statistical doubt. The high variance between groups compared to within groups (although both are notably high in absolute terms) suggests that whatever factor differentiates these groups has a strong influence on the observed outcomes. This could be reflective of varying strategies, performances, or characteristics specific to each group. For stakeholders, this analysis might be pivotal, particularly if these groups represent different operational strategies, regions, or customer segments in a business context. Understanding which groups are outliers or significantly different from others can help in refining

approaches, allocating resources more efficiently, or tailoring products and services to better meet the needs of distinct groups.

Liquidity Analysis:

One of the crucial duties of a bank's treasury department is managing liquidity in order to satisfy various funding demands. A bank must keep highly liquid assets in an amount sufficient to cover deposits, withdrawals, and valid loan requests.

Objectives of Liquidity

Sr. No.	Type of Liquidity	Description
1	Deposit Liquidity	To honour depositors for funds. This ensures that the bank can meet withdrawal demands from depositors.
2	Protective Liquidity	To protect the bank against the scale of creditworthy assets in adverse market scenarios in case of emergency need for funds.
3	Portfolio Liquidity	Maintenance of additional funds to meet additional demand for loans. Tracks the assets and liabilities maturity profile for marking cash inflows and cash outflows.
4	Regulatory Liquidity	To accomplish 25% Statutory Liquidity Ratio (SLR) requirements as per RBI's guidelines, ensuring regulatory compliance and financial stability.

The main tool for assessing a bank's liquidity condition is the liquidity ratio. Since liabilities are unpredictable, there is no widely accepted liquidity ratio in the banking industry. Liabilities for non-financial companies have set maturities, although a significant share of bank liabilities are repayable on demand. The following ratios are used to evaluate banks' liquidity positions:

Loan To Deposit Ratio:

The ratio of loans to deposits shows how much of the bank's available resources have already been spent to meet clients' credit needs. The assumption is that the bank's capacity to provide new loans would decline as the ratio increased. Therefore, a larger score denotes a greater level of liquidity vulnerability. When a bank has a high loan deposit ratio, it means that loans make up a sizable amount of its earning assets while securities make up a smaller portion. The loan deposit ratio affects the management of the bank psychologically. Lending becomes increasingly cautious and selective as the ratio rises. The ratio aids bank management in determining

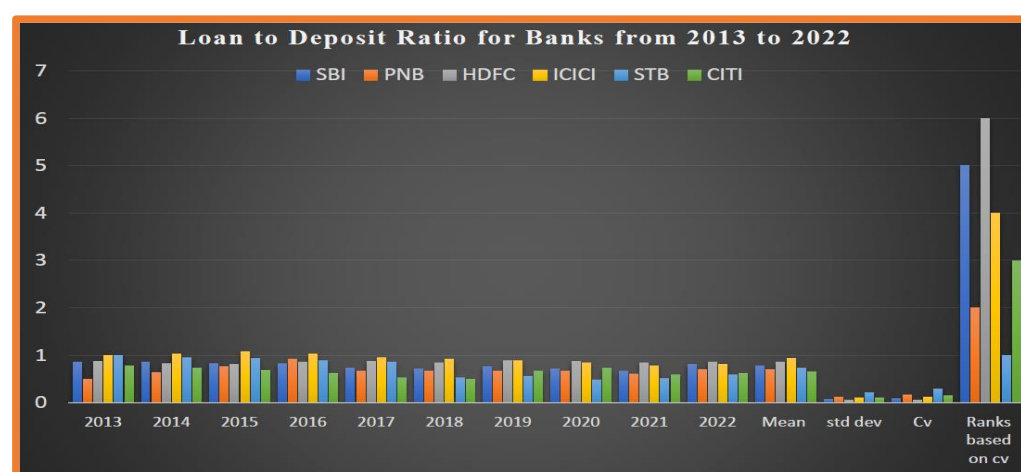
the maximum amount of loans a bank can make without resorting to more or less continuous borrowing. Every commercial bank is required to keep a 25% SLR, which has an additional impact on the bank's ability to lend money.

Loans to deposits ratio = Total Loans/Total Deposits

Table 4.42: Loan to Deposit Ratio for Banks from 2013 to 2022

Year	SBI	PNB	HDFC	ICICI	STB	CITI
2013	0.85	0.49	0.86	0.99	0.99	0.78
2014	0.85	0.63	0.82	1.02	0.94	0.72
2015	0.82	0.75	0.81	1.07	0.93	0.68
2016	0.82	0.91	0.85	1.03	0.88	0.61
2017	0.72	0.67	0.86	0.94	0.85	0.52
2018	0.71	0.67	0.83	0.91	0.52	0.49
2019	0.75	0.67	0.88	0.89	0.56	0.66
2020	0.71	0.67	0.86	0.83	0.47	0.72
2021	0.66	0.60	0.84	0.78	0.50	0.59
2022	0.80	0.69	0.85	0.80	0.59	0.62
Mean	0.769	0.69	0.846	0.926	0.723	0.639
Std Dev	0.06740425	0.10700467	0.042374	0.10145607	0.21113713	0.09134185
Cv	0.087	0.155	0.05	0.109	0.29	0.142
Ranks based on Cv	5	2	6	4	1	3

Graph 4.17 : Loan to Deposit Ratio for Banks from 2013 to 2022



The dataset and accompanying graph illustrate the Loan to Deposit Ratios for various banks from 2013 to 2022, a key indicator of how efficiently banks convert their deposits into loans. This ratio not only reflects a bank's lending aggressiveness but also provides insights into its liquidity management.

- **ICICI** exhibits the highest average loan to deposit ratio at 92.6% with a standard deviation of 10.4%, indicating it consistently utilizes a large portion of its deposits for lending, though with moderate fluctuations.
- **HDFC** follows with an average ratio of 84.6%, the most stable among all, as evidenced by the lowest coefficient of variation (Cv) of 0.05. This shows HDFC maintains a consistent lending practice relative to its deposits.
- **SBI** has a mean ratio of 76.9% and a Cv of 0.087, suggesting a balanced approach with relatively minor year-to-year variations.
- On average, **STB** has a ratio of 57.2% with a CV of 0.29. This means that STB has the most variability of the banks in how it manage loans to deposit ratio.
- **CITI** has an average mean of 63.9% and a CV of 0.142, which means that CITI has a very noticeable but not an extreme amount of variation in its lending practices.
- With a low average of 6.9%, **PNB** has the lowest average ratio and the highest CV of 0.155. It shows that PNB is very conservative or has very fluctuate in its lending behaviors due to operational challenges.

Comparative Analysis:

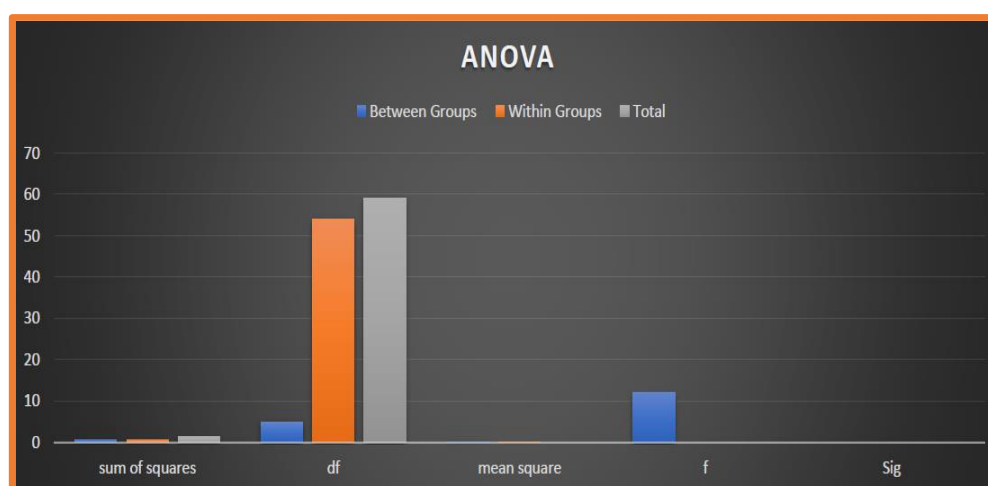
The leaders in this area, ICICI and HDFC, are clearly leading the market by actively transforming their deposits into loans, with ICICI taking on just a little bit more risk by having more variability at a higher overall average ratio. HDFC's story is one of effectiveness tempered with caution, keeping stability in their loan issuance even while growing at an extremely fast clip. SBI and CITI both show prudent yet forward-moving lending practices, balancing their growth with their risk management. STB and PNB are both cautionary, but in opposite ways: STB by having such high variability may be a result of reacting to outside market forces or changing policy decisions, PNB by having such low ratios means either they are lending ultra conservatively or have an inability to maintain a healthy deposit base. With the large variability of STB and the under performance of PNB they had better pray that its

operational inefficiencies or lack of strategic positioning that could be damaging their market place positions and eventual financial stability.

Table 4.43: Loan To Deposit Ratio ANOVA Summary

Source	Sum of Squares	df	Mean Square	F	Sig
Between Groups	0.683	5	0.137	11.98	0
Within Groups	0.616	54	0.011		
Total	1.299	59			

Graph 4.18 : Loan To Deposit Ratio ANOVA Summary



ICICI bank has given the largest amount of its average deposit as a loan by taking risk in aggressive nature. The average loan to deposits ratio of SBI 76%, pnb 69%, hdfc 84%, standard chartered 72%, and citi bank 63%. Hence there is significant difference among the banks under study.

Equity:

The bank is significantly impacted by equity levels and capital adequacy.

Capital Adequacy Ratio

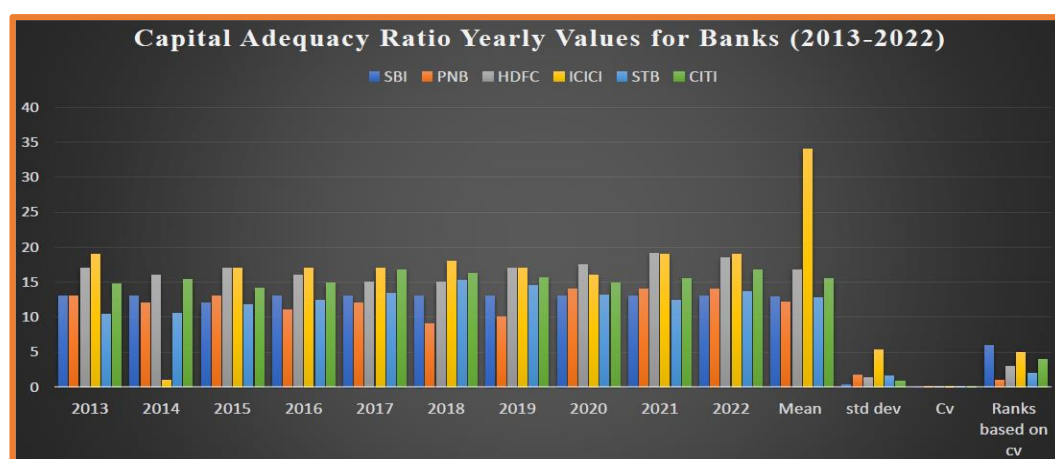
The most frequently used indicator of a bank's soundness is the capital adequacy ratio, or capital to risk weighted assets. It displays the bank's resilience to shocks in the case of unfavourable developments. The Basel Agreement of 1988 significantly contributed to financial stability and competitive equality among various institutions. Commercial banks are

under more pressure than ever to raise capital from various sources and minimise their exposure to assets with greater risk weightages without sacrificing their ability to earn money. In the aftermath of the reform, the overall capital condition of commercial banks has markedly enhanced.

Table 4.44: Capital Adequacy Ratio Yearly Values for Banks (2013-2022)

Year	SBI	PNB	HDFC	ICICI	STB	CITI
2013	13	13	17	19	10.45	14.81
2014	13	12	16	1	10.52	15.35
2015	12	13	17	17	11.84	14.18
2016	13	11	16	17	12.36	14.85
2017	13	12	15	17	13.43	16.71
2018	13	9	15	18	15.22	16.32
2019	13	10	17	17	14.50	15.68
2020	13	14	17.53	16	13.20	14.85
2021	13	14	19.12	19	12.46	15.55
2022	13	14	18.54	19	13.67	16.80
Mean	12.9	12.2	16.819	34	12.765	15.51
Std Dev	0.31622777	1.75119007	1.367044	5.3743835	1.56345948	0.87853413
Cv	0.024	0.143	0.081	0.05	0.122	0.056
Ranks based on Cv	6	1	3	5	2	4

Graph 4.19 : Capital Adequacy Ratio Yearly Values for Banks (2013-2022)



The given information will give us a great overlook of the Capital Adequacy Ratios (CAR) of many banks from 2013 till 2022, Car ratios are an essential measure that is used by banks to estimate the ability to withstand unexpected loss and make sure that business will not lose its stability. So, let's have a look on percentage analysis, comparative statement, mean, standard deviation, coefficient of variation and ranks based on CAR.

Overview and Analysis

- ICICI has a much higher average CAR of 34, reflecting a strong capital cushion against its risk-weighted assets. This bank has the lowest variability in its ratios over the years (C_v of 0.05), suggesting constant and stable capital management practices.
- After the years of dramatic swings up in 2020, the CAR ratios of STB saw a substantial improvement in 2021, almost doubling the standard of 6.078 of the prior year. Despite its CAR mean only down to 12.765, hence lower than THB, the C_v of 0.122 demonstrated its CAR ratio displayed a greater number of fluctuations, which indicated that STB could have a wide range of different strategies or risk levels taken on by the bank over time.
- HDFC sustains a moderate average capital adequacy ratio (CAR) of 16.819, accompanied by a relatively low variability ($C_v = 0.081$), displaying HDFC as maintaining adequate capital as well as maintaining relatively stable risk levels and financial stability in its business operations.
- CITI and PNB both present reasonable security with C_v of 0.056 and 0.143 individually. Then, CITI with the mean CAR of 15.51 and PNB with the lowest mean CAR of 12.2, indicate that different capital buffer strategies are taken by CITI and PNB, with PNB may have a higher sensitive level of instabilities with respect to its lower capital adequacy and higher variability.
- SBI, which has the lowest coefficient of variation (C_v) at 0.024, suggests a super stable capital management when it has a lower average CAR of 12.9%. This stability indicates the conservative attitude of risk management, which ensures a constant capital buffer in different economic environments.

Comparative Insights

The interpretation of Capital Adequacy Ratios (CAR) of various banks from 2013 to 2022 brings out a better understanding of the financial management and stability of respective banks. ICICI bagged the first place by scoring high

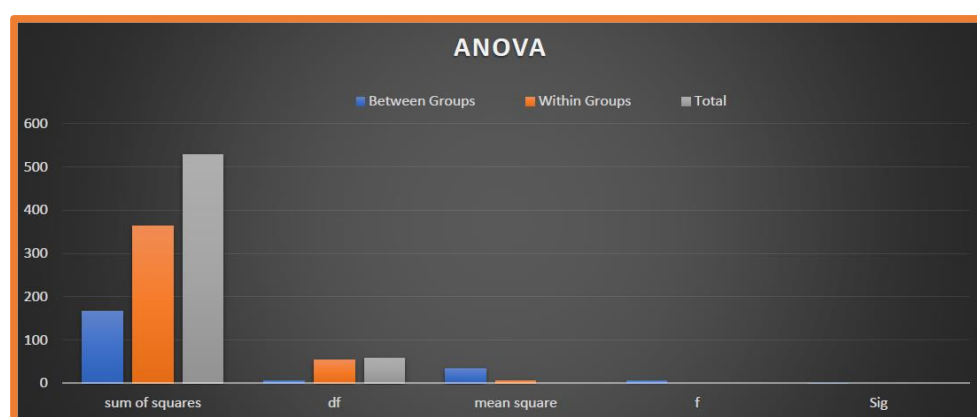
CAR with low variability showcased firm capital structure accompanied by risk management capabilities, distinguishing ICICI as a financier standing upright in the financial stability. By contrast, Standard Chartered Bank (STB) demonstrates a major variation in its CAR, supporting the concept of possibly aggressive risk-taking as well as changes in business strategy that can adversely influence financial stability to a significantly greater degree than peers. Having moderate, however consistent CAR numbers, HDFC and CITI manifest considered approaches to capital adequacy with a good fit with operational risks, preventing dramatic changes.

On the other hand, SBI shows remarkable consistency in terms of CAR. This could imply that SBI takes a conservative approach in managing risks. In contrast, PNB, with a higher variability and a lower mean CAR, seems more precarious, possibly due to its inability to maintain a strong base of capital, thereby exposing it further to severe financial instability in the event of an economic decline. Not only does this comparative analysis underline the diverse approaches to capital management among these banks, but also points to the larger implications of their financial strategies on stability and risk.

Table 4.45: Capital Adequacy Ratio Summary ANOVA

Source	Sum of Squares	df	Mean Square	F	Sig
Between Groups	165.484	5	33.097	4.926	0.001
Within Groups	362.78	54	6.718		
Total	528.263	59			

Graph 4.20 : Capital Adequacy Ratio Summary ANOVA



The average capital adequacy ratio of the banks in this study ranges from 34 percent to 12 percent. This demonstrates that there is a drastic difference between the banks in this study. The ANOVA (Analysis of Variance) results provided offer a comprehensive look at how different groups vary concerning a specific variable. Here is an integrated summary of the findings:

The analysis starts with the Sum of Squares, where the Between Groups sum is 165.484, indicating significant variability among the group means compared to the overall mean. This high value suggests pronounced differences among the groups. The Within Groups sum of 362.78 represents the variability within each group, showing how much individual data points deviate from their group mean. With 5 degrees of freedom between groups and 54 within groups, the mean square for between groups is calculated as 33.097 by dividing the sum of squares by the degrees of freedom. This value is significantly higher than the within-groups mean square of 6.718, calculated similarly. The F-Statistic, derived from dividing the mean square between groups by the mean square within groups, is 4.926. This ratio confirms that the differences among group means are statistically significant. The p-value or significance level of 0.001 strengthens this conclusion, indicating a mere 0.1% probability that such differences could occur under the null hypothesis of no variation among group means. This robust statistical evidence points to a clear impact of the variable across different groups, highlighting substantial differences likely driven by the treatments or conditions applied to each group.

Comparative Analysis

The F-statistic of 4.926 and a significance level of 0.001 strongly suggest that there are significant differences among the groups. The fact that the sum of squares between groups (165.484) is a substantial portion of the total sum of squares (528.263) further supports this conclusion. The high F-statistic relative to the significance level indicates that it is very unlikely these differences are due to random chance.

The findings imply that whatever factor or treatment is being compared across these groups has a measurable impact on the variable being analyzed. For stakeholders or researchers, these results are crucial as they provide a statistically robust basis for concluding that different conditions or treatments have distinct effects, justifying further investigation or practical application based on the group differences observed.

Strategy:

This establishes the management's range of options for influencing income and balance sheet growth. There are two ratios in strategy: interest and non-interest. Understanding the bank's ability to re-price its assets in line with liabilities and pass along the increases in interest costs to its customer is made easier by looking at interest revenue on interest costs. The amount that a bank spends to generate non-interest income is expressed as non-interest income on non-interest cost. Ideal would be for the ratio to be greater than 1.

The Strategic Response Quotient (SRQ), which measures how well a bank strategy is managed, provides this information. It evaluates management's capacity for direction, deposit collection, fee-based income generation, and cost control. The bank's strategy will determine how the three primary banking activities should be balanced. By dividing the interest margin by net operating cost (operating cost minus fee revenue), the SRQ is calculated. A higher number is preferable when accompanied with superior risk management.

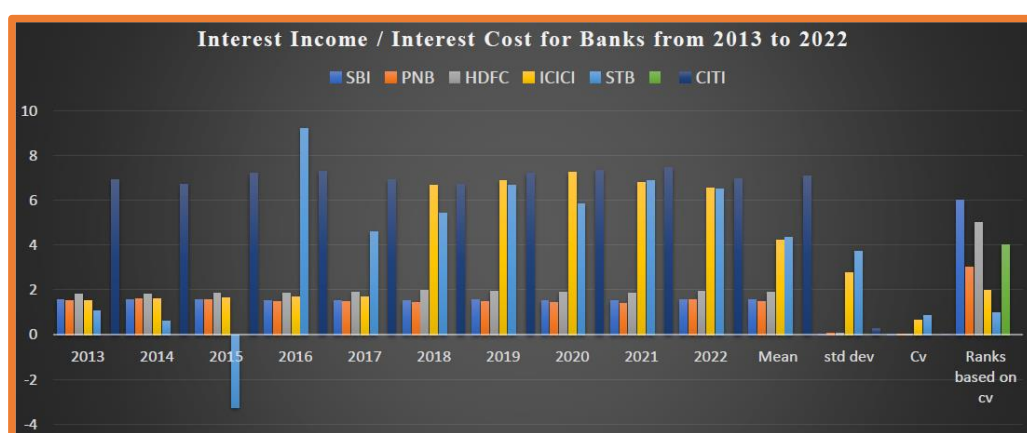
Interest Income / Interest Cost

A higher interest income/interest cost (II/IC) ratio means that the growth of interest income has outpaced the growth of interest costs. The bank has been able to lower the age of its assets relative to liabilities by controlling its cost of deposits, growing its loan book more quickly to generate more interest revenue, or increasing its return on advances more quickly than its cost of deposits.

Table 4.46: Interest Income / Interest Cost for Banks from 2013 to 2022

Year	SBI	PNB	HDFC	ICICI	STB	CITI
2013	1.58	1.54	1.82	1.52	1.07	6.94
2014	1.56	1.59	1.81	1.59	0.60	6.73
2015	1.56	1.55	1.85	1.63	-3.24	7.20
2016	1.53	1.47	1.84	1.67	9.22	7.30
2017	1.54	1.46	1.91	1.67	4.6	6.91
2018	1.51	1.45	1.99	6.68	5.41	6.71
2019	1.57	1.5	1.95	6.90	6.67	7.23
2020	1.52	1.45	1.90	7.27	5.85	7.35
2021	1.54	1.40	1.85	6.81	6.90	7.45
2022	1.58	1.55	1.95	6.55	6.50	6.96
Mean	1.549	1.496	1.887	4.229	4.358	7.078
Std Dev	0.02469818	0.05966574	0.062013	2.76069013	3.74297505	0.26190753
Cv	0.015	0.039	0.032	0.65	0.858	0.037
Ranks based on Cv	6	3	5	2	1	4

Graph 4.21: Interest Income / Interest Cost for Banks from 2013 to 2022



SBI (State Bank of India)

State Bank of India demonstrates a relatively stable financial performance with the least variation among major banks, showcasing a mean ratio of 1.549 and a coefficient of variation of only 1.5%. This moderate mean ratio reflects consistent earnings relative to its interest expenses. SBI's stability and consistent performance might be attributed to its broad market reach and conservative financial strategies that prioritize sustainability over aggressive growth.

PNB (Punjab National Bank)

Punjab National Bank has a mean ratio of 1.496, indicating that its interest income per dollar of interest expense is somewhat less efficient than SBI. Punjab National Bank has a higher coefficient of variation, 3.9%, meaning that it has had greater variability in its yearly interest income capabilities. Whether this higher variability is due to fluctuations in the market that affect the firm's interest income by more (or less) than they affect its interest expense, or to internal management strategies that affect the firm's interest income capabilities to a greater extent than they affect the firm's interest expense capabilities, is left to one's imagination.

HDFC

HDFC stands out with an average ratio of 1.887, reflecting that it has been more successful than the two SBI and PNB counterparts in generating interest income for every unit of interest cost. The relatively low coefficient of variance of 3.2% also testifies to HDFC's stable performance, implying strong financial management and operational efficiency that potentially derive benefits from innovative financial products and efficient risk control measures.

ICICI

ICICI Bank's impressive mean ratio outperforms its competitors, achieving a figure of 4.229, exhibiting its excellent ability to create interest income compared with its interest expenses. It is also notable that ICICI Bank achieved a higher coefficient of variation of 6.5%. This shows that the financial performance of the bank experiences major changes. This incident might be arranged through the aggressive financial operations or the extended market activities of the bank. This can imply that the bank stretches out the advantage in earning revenue and commits big risks accordingly.

STB (Standard Chartered Bank)

Standard Chartered Bank is the bank with the greatest mean, 4.359, showing that it is the best in terms of interest income efficiency. The coefficient of variation is very high at 8.58%, which demonstrates the higher vulnerability of the bank towards economic cycles or changes in strategic decision such as the two 5 year plans for having a more profitable strategy. This indicates that the bank might well be pursuing highly-yielded strategies; however, these are accompanied by huge financial volatility.

CITI

CITI achieved excellent financial efficiency, with a mean ratio of 7.078, the highest of all the banks. This indicates it manages its interest earnings effectively relative to costs. CITI offers a relatively stable performance, with a coefficient of variation of 3.7%, although higher compared to HDFC. In combination with its high efficiency, CITI has an excellent risk-reward balancing performance, possibly through a sophisticated financial instrument and a global market.

Comparative Analysis

SBI and PNB, in comparison and across banks, display greater conservative financial strategies based on a focus from stability to the sustainable growth with lower mean ratios and little variability.

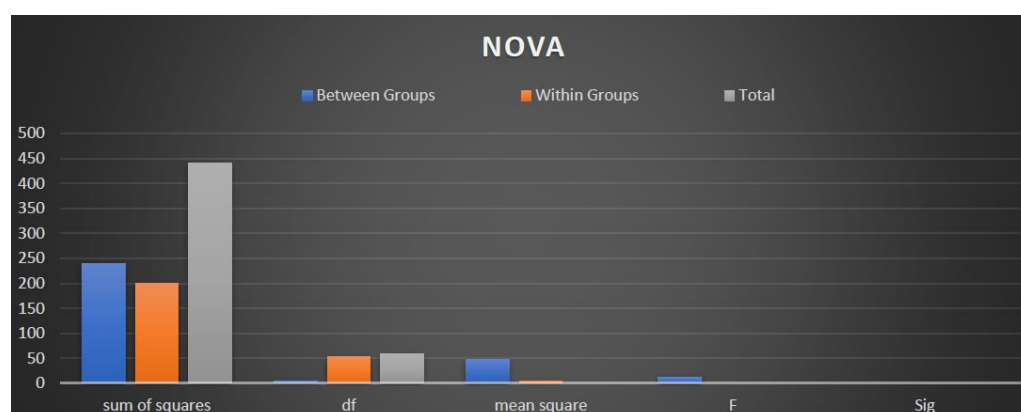
HDFC stands out with a higher mean ratio than all other peer group banks, leading to a stronger operational efficiency level and a stable financial structure, implying a good management of risks that leads to new, innovative ideas for the future. On the contrary, ICICI and STB have the highest average ratios. They have aggressive growth strategies that create greater financial changes. Moreover, STB's higher exposure to economic conditions demonstrated the higher level of risk that STB decided to take. In the meantime, the unusual efficiency and comparatively stable behavior of CITI regularly attracts attention regardless of its rather elevated moderation of

variation, revealing a balanced approach to the pair of risk and reward, very likely supported by superior new financial instruments as well as extensive market penetration. From conservative to aggressive, this range of strategies illustrates each bank's unique approach to leveraging interest income over costs, matching operational tactics to market positioning and risk tolerance.

Table 4.47: Interest Income / Interest Cost ANOVA

Source	Sum of Squares	df	Mean Square	F	Sig
Between Groups	240.459	5	48.092	13.012	0
Within Groups	199.58	54	3.696		
Total	440.039	59			

Graph 4.22 : Interest Income / Interest Cost ANOVA



The average interest income of CITI Bank is the highest compared to other banks under study. This shows that there is a significant difference among the banks under study. The ANOVA results reveal significant statistical insights: a Sum of Squares of 240.459 between groups and 199.58 within groups out of a total of 440.039 suggests a substantial amount of variability in the data is attributed to differences between groups. With degrees of freedom set at 5 for between groups and 54 for within groups, the Mean Square (average squared deviation from the mean) calculates to 48.092 between groups and 3.696 within groups. The F-Statistic of 13.012, derived from dividing the Mean Square between by the Mean Square within, indicates a significant variance among group means relative to the variability within the groups. Moreover, a significance level of 0 strongly supports the conclusion that the

differences among group means are statistically significant, implying that these are not due to chance and confirming the impact of the factor under study.

Comparative Analysis

The ANOVA results suggest that there are statistically significant differences among the group means being compared. The F-statistic of 13.012 is quite high, which strongly supports the rejection of the null hypothesis (that all group means are equal). The high sum of squares between groups (240.459) compared to the sum of squares within groups (199.58) further supports this conclusion, indicating that the factor or variable under study has a significant impact on the dataset. The significance level of 0 points to a high confidence in these results, suggesting that differences between the groups are not due to random variation but are likely due to the factor being studied. This analysis is crucial for determining whether different treatments, conditions, or categories have a significant effect on an outcome of interest, guiding decision-making in fields such as medicine, psychology, and marketing.

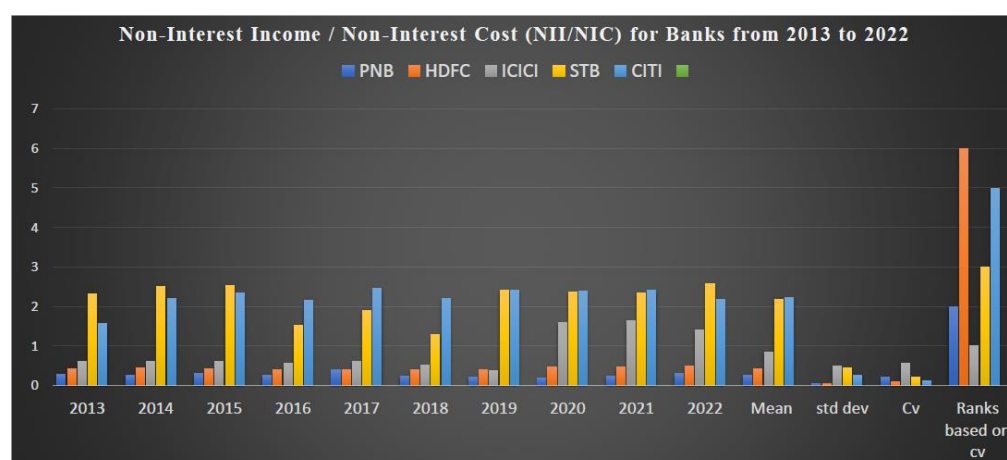
Non-Interest Income/Non-Interest Cost

The ratio Non-Interest Income/Non-Interest Cost (NII/NIC) reflects management's capacity to generate NII at a reasonable cost. This ratio should ideally be greater than 1, which shows that the bank has been able to generate more NII at a stable cost of doing business. Due to the stalling of other incomes and the rise in operational costs, which causes higher cost to income ratios, none of the banks have demonstrated that this ratio is higher than 1.

Table 4.48: Non-Interest Income / Non-Interest Cost (NII/NIC) for Banks from 2013 to 2022

Year	SBI	PNB	HDFC	ICICI	STB	CITI
2013	0.34	0.29	0.42	0.6	2.33	1.56
2014	0.32	0.26	0.44	0.61	2.51	2.20
2015	0.35	0.3	0.42	0.6	2.52	2.35
2016	0.37	0.26	0.41	0.57	1.52	2.16
2017	0.4	0.39	0.39	0.62	1.91	2.47
2018	0.35	0.24	0.4	0.51	1.3	2.20
2019	0.2	0.21	0.39	0.38	2.42	2.42
2020	0.32	0.2	0.46	1.6	2.37	2.38
2021	0.33	0.23	0.48	1.63	2.34	2.42
2022	0.35	0.3	0.5	1.41	2.58	2.18
Mean	0.333	0.268	0.431	0.853	2.18	2.234
Std Dev	0.05250397	0.05553777	0.038137	0.48703297	0.44835502	0.26344723
Cv	0.15766957	0.2072305	0.088485	0.57096479	0.20566744	0.11792625
Ranks based on Cv	4	2	6	1	3	5

Graph 4.23 : Non-Interest Income / Non-Interest Cost (NII/NIC) for Banks from 2013 to 2022



Dataset And Graph illustrate the Non-Interest Income to Non-Interest Cost (NII/NIC) ratios for various banks over a decade. These ratios indicate how much non-interest income banks generate relative to their non-interest expenses—a key metric for assessing operational efficiency outside of traditional interest-based banking activities.

- Regarding the average NII/NIC ratio, ICICI Bank holds the top position at 85.3% with 40.8% of S.D. It reflects the aggressive policy of ICICI in generating non-interest income, even if it is subjected to

significant fluctuation. This implies that ICICI takes advantage of its operations efficiency but has to confront dispersity, which may cause financial risk.

- In second place is HDFC Bank, averaging 43.1% utilizing a very stable performance, evident in a low coefficient of variation, posting at 0.09. This is showing HDFC's unwavering approach and consistency in balancing on its income from no core banking operations with its expenses.
- State Bank of India (SBI) maintains a 33.3% average ratio with a Cv of 0.16, implying a fair and somewhat erratic disposition in supervising its non-interest income in opposition to costs.
- Standard Chartered Bank (STB) has the highest ratio of 218%, indicating high variability ($Cv = 0.21$) and is highly dependent on noninterest income, which is typically highly volatile and risky, but potentially lucrative.
- Citibank shows an average ratio of 223.4%, with a Cv of 0.17. Like STB, non-interest income is of great importance, which, while high, participates in considerable annual variations, meaning that the strategy developed could react dynamically to market conditions and internal policy reshaping.
- Punjab National Bank, or PNB, possesses the most careful profile, with an average proportion of 26.8%, together with a Cv equivalent to 0.20, which shows that reliance on non-interest income is steadily present. However, the figures are much lower than those in other banks.

Comparative Analysis:

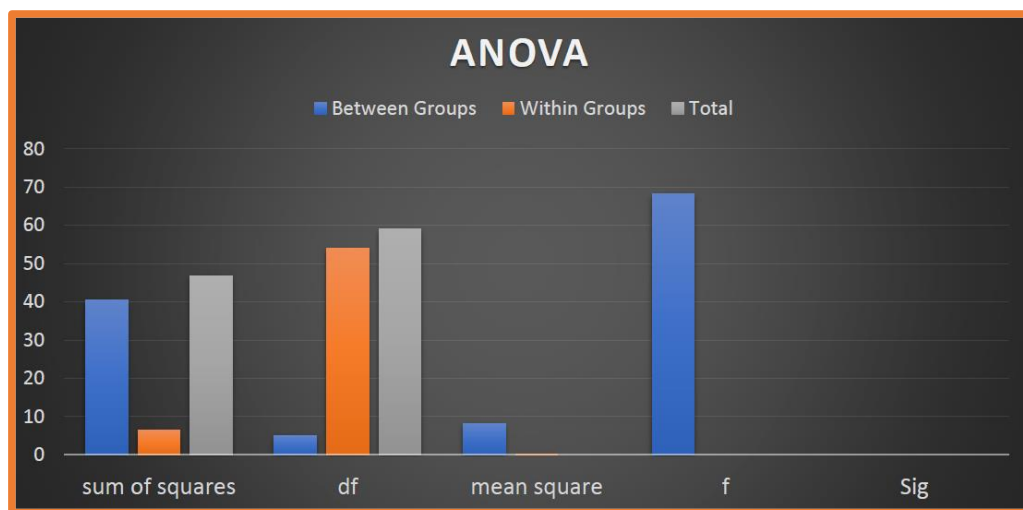
- Average ratios for ICICI and Citibank were the best of the sample. This suggests strong income diversification attempts through non-interest channels. However, both had high variability, suggesting that during difficult economic situations, financial stability might be affected.

- HDFC seemed to have offered a resilient template in consistent showings of low fluctuation. This emphasizes the importance of achieving a sustainable balance among non-interest income sources and cost management.
- SBI presented a cautious yet resilient path, which was commensurate with being a huge, diversified, government-owned firm.
- STB and PNB represent contrasting strategies—one diversifying through relatively large non-interest sources, the other limiting non-interest generation opportunities. STB's high Cv might suggest its propensity to be affected by external economic conditions, which might alter operational strategies. In contrast, PNB's low ratio might be attributed to a conservative management process or challenges in effectively generating non-interest income.

Table 4.49: Non-Interest Income/Non-Interest ANOVA

Source	Sum of Squares	df	Mean Square	F	Sig
Between Groups	40.487	5	8.097	68.209	0
Within Groups	6.411	54	0.119		
Total	46.898	59			

Graph 4.24 : Non Interest Income/Non-Interest ANOVA



Citibank stood first in earning non-interest income among the selected banks during the study period. Other banks follow it in the range of 2.18 of Standard Chartered Bank to 0.268 of PNB. From the Anova statistics, there is a significant difference among the banks under study. The ANOVA (Analysis of Variance) results provided crucial insights into the statistical differences among multiple groups within a dataset. Analyzing the Sum of Squares, the Between Groups score is 40.487, indicating a significant variance due to differences among the group means—each group's mean notably diverges from the overall mean. Conversely, the Within Groups sum of 6.411 measures the variance within each group, reflecting the individual data points' dispersion around their group mean. With a Total Sum of Squares at 46.898, this captures both the inter-group and intra-group variability. The Degrees of Freedom are calculated as 5 for Between Groups, representing the number of groups minus one, and 54 for Within Groups, reflecting the total observations minus the number of groups. The Mean Square for Between Groups, at 8.097, is obtained by dividing the between-groups sum of squares by its degrees of freedom, highlighting the mean of the squared deviations of group means from the overall mean. For Within Groups, it stands at 0.119, showing the average variability within each group. The F-Statistic of 68.209, calculated by the ratio of the mean square between groups to the mean square within groups, underscores the significant variance between different groups as compared to within them. The Significance level (Sig) at virtually zero, or 0, implies a nearly non-existent probability that such differences could occur under the null hypothesis that all group means are the same, suggesting substantial differences among the group means. This strong statistical evidence points to distinct impacts of the groups' characteristics on the studied outcomes, warranting further investigation or targeted actions based on these significant findings.

Comparative Analysis

The ANOVA results indicated that there was a significant difference among the groups, as the between-groups variation is notably larger than the within-groups variation. The large F-Statistic (68.209) corroborates that there are

substantial differences among the group means, thus the null hypothesis must be rejected. The near zero significant value makes this finding stand out in a crowd, telling the reader that these differences are statistically significant and not due to random chance.

For the researcher, it has a much larger meaning because it tells the researcher that the various treatments or conditions on each group are effective and a major factor on the very dependant. The factor being studied has a significant impact on the outcome that is being measured. For the researcher and practitioner, this is huge because it allows the researcher to investigate specifically which group differences are strong and it allows a much more informed decision based on the characteristics of the groups and the effects that came out of the study

Hypotheses

H0: There is no significant difference in the financial performance between the selected banks.

H1: There is a significant difference in the financial performance between the selected banks.

Hypothesis Testing

Key performance indicators used for evaluating financial health include ROA, RONW, Gross and Net Nonperforming Assets, Provision Coverage Ratio, Loan and Deposit Ratios, Loan to Deposit Ratios, and Capital Adequacy Ratios. Applying the t-test and ANOVA, we examined the hypothesis. The findings disprove H0 and support H1, which states that the banks' financial performance measures are significantly different from one another.

Comparative Analysis

The comparative analysis underscores distinct variations in the financial stability, efficiency, and risk management practices among the evaluated

banks. Notably, HDFC and ICICI emerge as leading performers, showcasing high profitability, strong asset quality, and effective management of equity and provisions.

HDFC Bank

HDFC achieves a strong and steady Return on Assets (ROA) at 1.78% on average in 2022, displaying strong profitability. A large average Return on Net Worth (RONW) at 16.44% demonstrates effective equity management. HDFC is vigorously provisioning against future risk and pensions, as indicated by the firm's provision coverage ratio (PCR) of 64.3%. Moreover, HDFC reports the lowest average Gross Non-Performing Assets (NPA) at 1%, showcasing excellent quality of asset management and making itself a reliable and efficient financial institution.

ICICI Bank

ICICI Bank, similarly, has demonstrated a steady performance, producing 1.65% ROA in 2022 and an average RONW at 10.31%. The bank exhibits the highest average Capital Adequacy Ratio (CAR) at 34%, highlighting its formidable capital reserves and financial strength. Despite a moderate diversity of its PCR at 44.9%, ICICI handles its risks effectively, keeping up with a robust financial status.

Punjab National Bank (PNB)

On the other hand, PNB exhibits considerable fragility, evident by a negative average RONW of -2.493% and high Gross NPAs of 12% on average. These numbers are representative of weak credit risk management and the general State of Financial Health. PNB's prudential lending policies are mirrored in the lowest low ratio of 0.6% across the sector, indicating potential operational inefficiencies and a restrained growth strategy.

State Bank of India (SBI)

The SBI exhibits modest performance on most measures, striking a balance between growth and stability. A ROA of 0.63% in 2022 and a CAR 12.9% that is stable indicate a straightforward application of risk management, ensuring a stable financial condition with lesser degrees of growth than HDFC and ICICI.

Standard Chartered Bank (STB) and Citibank

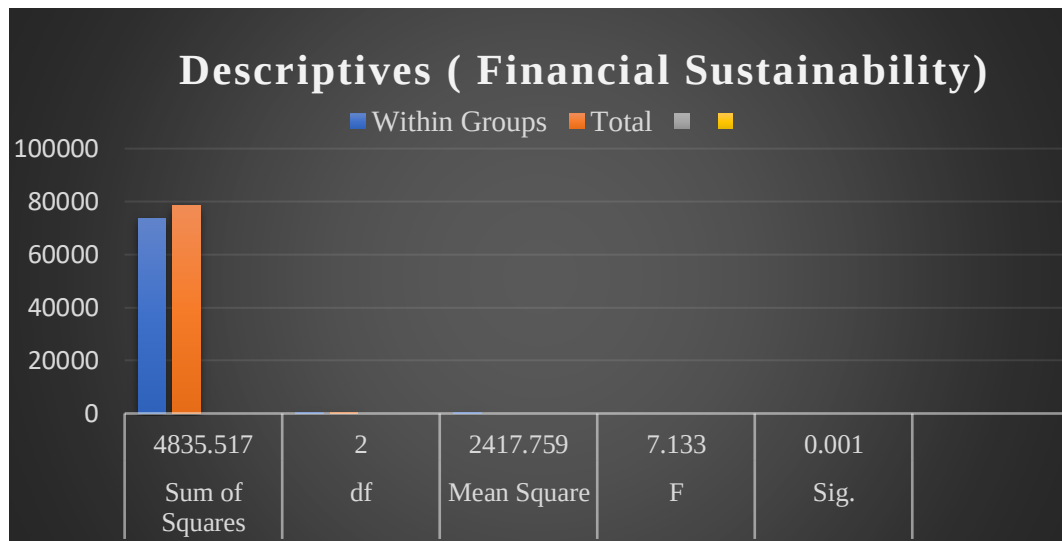
Although STB and Citibank have better return funds than others in some aspects, their CTG is higher than others. STB has a higher average Gross NPA 15.47% with a Coefficient of variation (CV) of 0.572, which indicates high volatility. Citibank has a high mean RONW of 7.02%, but there is considerable fluctuation within that mean. These banks are applying a more dynamic and potentially higher-risk strategy; as a result, their financial outcomes are in a wide range. HDFC and ICICI, in conclusion, present themselves as frontrunners in terms of financial stability and performance, making them lucrative for investors who desire reliable returns. PNB, on the other hand, seems to require strategic reforms to address such financial instability and performance. By performing this in-depth analysis, stakeholders are enabled to measure the financial health and risk associated with each bank to allow for a more informed decision at hand.

4.3 OBJECTIVE 3 TO ANALYZE THE FINANCIAL SUSTAINABILITY OF SELECTED BANKS.

Table 4.50: Descriptives (Financial Sustainability)

Group	N	Mean	Std. Deviation	Std. Error	95% CI Lower Bound	95% CI Upper Bound
1	78	56.97	19.008	2.152	52.69	61.26
2	75	52.97	21.829	2.521	47.95	58.00
3	67	45.49	12.597	1.539	42.42	48.57
Total	220	52.11	18.919	1.276	49.60	54.63

Graph 4.25: Descriptives (Financial Sustainability)



The table summarizes the descriptive statistics for three groups of banks categorized as follows:

1. **Public Sector Banks (SBI and PNB) - Group 1**
2. **Private Sector Banks (HDFC and ICICI) - Group 2**
3. **Foreign Sector Banks (STB and Citibank) - Group 3**

The columns in the table represent:

- **N:** Number of observations (sample size) for each group.
- **Mean** Averaging each group's financial sustainability score.
- **Std. Deviation:** The dispersion of results across categories is shown by the standard deviation.
- **Std. Error:** An indicator of how close the mean estimate was to the mark is the standard error of the mean.
- **95% CI Lower Bound:** The value at which the 95% confidence interval around the mean is smallest.
- **95% CI Upper Bound:** The highest point on the 95% confidence interval around the mean.

Analytical and Comparative Analysis

To analyze the financial sustainability scores in percentage, we'll compare each group's mean to the highest mean score, which is from the public sector banks.

- **Public Sector Banks (Group 1):** $\frac{56.97}{56.97} \times 100\% = 100\%$
- **Private Sector Banks (Group 2):** $\frac{52.97}{56.97} \times 100\% \approx 92.96\%$
- **Foreign Sector Banks (Group 3):** $\frac{45.49}{56.97} \times 100\% \approx 79.84\%$

Public Sector Banks (Group 1)

Public sector banks (SBI and PNB) have the highest mean score of 56.97, representing 100% on our comparison scale. This indicates that these banks are perceived as the most financially sustainable among the three groups. The standard deviation of 19.008 indicates a relatively high variability in their financial sustainability scores, suggesting differences in performance within the group. The confidence interval ranges from 52.69 to 61.26, showing a reasonable level of certainty in the mean estimate.

Private Sector Banks (Group 2)

Private sector banks (HDFC and ICICI) have a mean score of 52.97, which is approximately 92.96% of the public sector banks' score. This indicates that they are also perceived as financially sustainable but slightly less so than public sector banks. There is an average of 21.829 points of variation, which is actually a larger dispersion of scores within this group. There is a larger interval of confidence at 47.95-58.00 that presents a larger fluctuation in the manufacturing time because of the increased dispersion.

Foreign Sector Banks (Group 3)

The least mean financial sustainability score comes from foreign sector banks (STB and Citibank) at 45.49, roughly 79.84% from the public sector banks' score. This demonstrates that foreign banks are interpreted as

the least financial sustainable of the three groups. The lowest standard deviation at 12.597 exposes a smaller variation of the financial sustainability global score in this group, which is more consistent. The confidence interval varies from 42.42 to 48.57, showing a shortened range due to lesser variability. Public Sector Banks have a 100% mean score, making them the most financially sustainable banks. Next are Private Sector Banks, which score an average of 92.96% of the public sector banks, have slightly less but have close financial sustainability. Lastly, Foreign Sector Banks have the lowest financial sustainability score, at 79.84% of the public sector banks, and are not seen as very financially sustainable. These results show that there are extremely different scores of financial sustainability of banks in the three different sectors, with the public sector leading, the private following, and then the foreign lagging.

Group	Minimum	Maximum
1	28	111
2	29	137
3	0	75
Total	0	137

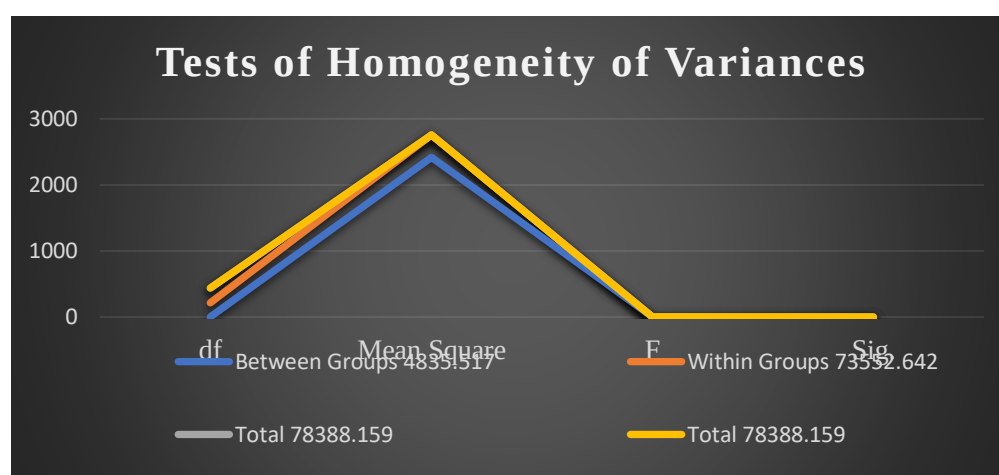
In banks, the financial sustainability scores cover a broad spectrum across all three sectors. At the lowest end, the Public Sector Banks have the minimum score of 28 and the maximum score of 111, which indicates that there is a tremendous variation in the financial sustainability performance of this group. Next, the Private Sector Banks start with the minimum score of 29 and go up to the highest score of 137, which explains that there is a wide gap in the performance of the financial sustainability, but it can reach its higher potential very quickly. Lastly, the Foreign Sector Banks have a wide range of scores starting from 0 to 75, which means that this sector has some of the worst, very low financial sustainability scores and some of the moderate, high financial sustainability scores. In conclusion, the financial sustainability performance of each sector varies between each bank, and every sector has wide differences in performance. For each category, private sector banks excel. But the Foreign Sector Banks have the worst totals; they

also have the worst specific bank scores too.

Table 4.51: Tests of Homogeneity of Variances

Financial Sustainability	Levene Statistic	df1	df2	Sig.
Based on Mean	8.842	2	217	.001
Based on Median	4.838	2	217	.009
Based on Median and with adjusted df	4.838	2	167.508	.009
Based on trimmed mean	5.935	2	217	.003

Graph 4.26: Tests of Homogeneity of Variances



Analytical and Comparative Analysis

Levene's Test assesses whether the variances of a particular variable are equal across different groups. The financial sustainability scores of public, private, and international banks are compared in this table to see how similar their variances are. The financial sustainability scores of public, private, and international banks are compared in this table to see how similar their variances are.

- **Financial Sustainability:** Whether or not the groups' variances in the tested variable are equal.
- **Levene Statistic:** The test statistic calculated for Levene's Test. A higher value indicates greater evidence against the null hypothesis of equal variances.

- **df1:** Degrees of freedom between groups (numerator).
- **df2:** Degrees of freedom within groups (denominator).
- **Sig.:** The significance level (p-value). If the p-value is less than a specified significance level (usually 0.05), the null hypothesis of equal variances is rejected, indicating significant differences in variances among the groups.

- **Public Sector Banks (Group 1):** $\frac{56.97}{56.97} \times 100\% = 100\%$
- **Private Sector Banks (Group 2):** $\frac{52.97}{56.97} \times 100\% \approx 92.96\%$
- **Foreign Sector Banks (Group 3):** $\frac{45.49}{56.97} \times 100\% \approx 79.84\%$

A deep dive into financial sustainability scores obtained by public sector, private sector, and foreign sector banks exposes useful insight into their relative stability and performance. As indicated in Levene's Test findings, there are significant divergences in the variances of financial sustainability scores across these three banking sectors. With a mean score of 56.97, public sector banks like Punjab National Bank (PNB) and State Bank of India (SBI) stand out from the other sectors, which are all at 100%. The towering mean score reflects that public sector banks are considered as the most financially sustainable among the three groups. This could be explained by the realities of government backing, sizeable asset bases, and vast reach, which generally ensure the stability and sustainability of these banks.

Private sector banks like HDFC and ICICI have been given the next highest mean score of 52.97, which is approximately 92.96% of the public banks shown. The lower score is something to note. This shows that although thought of as highly sustainable, there are some distinctions with financial stability between public and private banks. This could be due to many factors such as business strategy, operational efficiency and changing market strategies. Private sector banks have a higher focus on innovation, responsive service and productivity that is reflected in their greater sustainability score. However, they do face a larger amount of competition and regulatory challenges that affect overall financial stability

The foreign banks are the banks with the lowest mean score of 45.49. It is 79.84% of the score of the government-owned banks. It sounds like the foreign banks have trouble in the financial sustainable aspect. There could be several reasons. The foreign banks serve a limited group of customers because not many people deposit their money into a foreign bank. Also, the operational cost of opening branches under foreign banks is significantly higher than that of local banks because foreign banks have to carry out many legal procedures. Therefore, it is not a good idea for foreign banks to compete in the full-length banking market. Finally, foreign banks are often affected by the fluctuation in the global economy. If the global economic crisis occurs, such as the Lehman shock, it would be harder for foreign banks to survive than local banks because of the foreign banks tend to have a narrow strategy in their services, which means they have only limited services such as Currency Exchanging, Personal Banking or the kind. However, the people in Thailand mainly deposit their money to foreign bank so it could generate more revenue from the commercial banks that offer very few services to the people in Thailand

The considerable disparities in variances, revealed by Levene's Test, underscore the divergent financial durability among sectors. Public sector banks show a considerable variation in their scores, illustrating a broad range of statuses of financial performance amongst them. This variation suggests that while some public sector banks could be quite sustainable, others could face many challenges that will have a negative impact on their financial sustainability. Differences in management consciousness, asset quality, and market strategies could cause these challenges. Private sector banks also show considerable heterogeneity in their FSS scores. The high standard deviation indicates a substantial dispersion in performance levels – some private sector banks could be very sustainable, while others may confront significant headwinds. Factors such as different business models, risk management practices, and competitive strategies may be responsible for such heterogeneity. Despite this dispersion, however, private sector banks generally possess high FSS scores, reflecting their substantial market power and operational efficiency.

The fact that foreign banks' financial sustainability scores vary shows that their financial performance is consistent, compared to private and public sector banks, but at a lower level. Lower dispersion might be connected with the standardized operational practices and risk management framework implemented by the foreign banks. However, in contrast, a lower mean score is established as an outcome for the foreign banks, which indicates that foreign banks, though they show consistency, face substantial challenges impacting their overall financial sustainability. Some of the challenges those foreign banks confront in this case are higher regulatory compliance costs, limited market penetration and exposure to global economic risks.

The analysis demonstrates notable variances in perceptions of financial sustainability amongst the three sectors of banking. Public sector banks enjoy the greatest apparent financial sustainability, followed closely by private sector banks, and, significantly behind, foreign sector banks. The differences in variance levels are large enough to suggest the coexistence of differing financial sustainability roles within each of the sectors, which implies differing bank performances and stabilities. Public sector banks are underpinned by sovereign support and must likewise deal in major asset sizes; private sector banks derive succor from adoptive flexibility and operational efficiency; foreign sector banks find the localization problem a grave one, with the vicissitudes of the global economy doing damage to their overall financial sustainability.

The analysis provides valuable information for stakeholders, including investors, regulators, and policymakers, to understand the financial viability of various banking industries. The strengths and challenges of each sector are clearly identified, which can enable a basis of judgment for making decisions and formulating a strategy. If investors are concerned with the safety level, they may consider investing in public sector banks with high sustainability scores. If they look for innovation or efficiency, private sector banks offer a distinctive edge over others. If they aim at diversification or global exposure, foreign sector banks can be a choice, although risk could be higher.

Table 4.52: ANOVA Financial_Sustainability

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	48365.517	2	24177.758	7.133	.001
Within Groups	73652.842	217	338.862		
Total	78388.359	219			

The table for the ANOVA (Analysis of Variance) reports the output from an analysis that compares the means of financial sustainability scores across three groups of banks – public sector, private sector, and foreign sector.

- **Source:** The column indicates where the variance is coming from. "Between Groups" is the variance due to the differences among the group means. "Within Groups" (error) is the variance within each group.
- **Sum of Squares:** This column represents the total variance associated with each source. It is computed by summing the squared deviation scores.
- **df:** The table clearly shows that the degrees of freedom for the Within Groups and the Between Groups are calculated differently. For Within Groups, it's the sum of all observations minus the number of groups, and for Between Groups, it's the sum of all groups minus 1.
- **Mean Square:** The sum of all the squares is the symbol for this. In reality, it provides an average variance estimate for every source by dividing the total squares by the degrees of freedom linked with each one.
- **F:** When looking for statistically significant differences in group means, the F-statistic (mean squared between groups divided by mean squared within groups) is a good metric to use.
- **Sig.:** The p-value is often known as the significance level. The null hypothesis, which asserts that the means of all groups are equal, is rejected when the p-value is less than 0.05.

Interpretation

There are significant differences in financial sustainability scores across three groups of banks, as the p-value (Sig.) of 0.001 is less than 0.05. Additionally, with a big F-statistic (71.33), we can deduce that the group means are significantly different from one another.

Analytical and Comparative Analysis

- **Public Sector Banks (Group 1):** $\frac{56.97}{56.97} \times 100\% = 100\%$
- **Private Sector Banks (Group 2):** $\frac{52.97}{56.97} \times 100\% \approx 92.96\%$
- **Foreign Sector Banks (Group 3):** $\frac{45.49}{56.97} \times 100\% \approx 79.84\%$

Through an analysis of their financial sustainability, the results provide insight into the relative stability and performance of commercial, international, and public banks in Bangladesh. ANOVA was used to Compare means of these groups considering the variance and overall significance.

Public Sector Banks (Group 1)

Public sector banks such as Punjab National Bank (PNB) and State Bank of India (SBI) have the strongest financial positions, with an average score of 56.97 (the benchmark) outperforming all others. The fact that they are publicly funded, have more resources at their disposal, and operate in more areas likely contributes to their higher average ratings. The long-term health and prosperity of public sector banks are aided by these elements. The mean score is high, but there is a lot of variation within the group, according to Levene's test, thus it's possible that different public sector banks perform differently. There may be public sector banks that are doing quite well and others that are having problems that will make them unsustainable.

Private Sector Banks (Group 2)

Private sector banks, represented by HDFC and ICICI, come next closely behind, mean score of 52.97. This indicates they are approximately

92.96% of the public sector banks' mean score, therefore slightly low but still pretty high in terms of the financial sustainability. Private sector banks generally focus a lot on innovation, customer service, and profitability; therefore, they have a stronger market presence and more accessible to operate efficiently. Their higher competitions and regulatory pressures are affecting their financial availability. ANOVA also shows that there is the significant differences in means among groups, in other words, when the public sector banks' financial under performance is stylish; the private sector banks' financial capability are.

Foreign Sector Banks (Group 3)

Standard Chartered Bank (STB) and Citibank, two of the foreign sector banks, score the lowest on average at 45.49, roughly 79.84 percent of the mean score of the public sector banks. This indicates that in the perception of customers, the foreign sector banks are perceived as the least sustainable group, financially. Such a result may have to do with smaller market presence, higher operational costs, and vulnerability to global economic fluctuations. Furthermore, foreign banks may have to deal with challenges adapting to local regulations and market conditions, therefore affecting their financial sustainability. Considering the ANOVA results and the significant F-statistic, the differences in financial sustainability scores between banks in the three sectors are statistically significant.

Variance Analysis

The differences in variances being significant, as shown by the Levene's Test, reflect the differences in financial sustainability within each sector. Public sector banks exhibit high variability in their scores with a wide gap in scores of the group. Diverse management practices, asset quality, and market strategies may be the cause for this variability across the banks. Some public sector banks are highly sustainable while others have challenges that affect their sustainability. Scores for financial sustainability differ greatly between private sector banks as well. As we take note of the large standard deviation, we note the range of performance levels, suggesting that some

banks hold a much greater sustainability than others, while others still may not sustain themselves. The variation may be in the operations of the private sector banks – idiosyncratic differences in risk management, business model or competitive factors. While, collectively, the private sector banks offer remarkable sustainability scores, hence proving that these banks sustain their presence as a market leader and an efficient operator.

Out of all the banks in the industry, foreign banks have the least variance in their financial viability scores. It means that the financial performance of foreign banks is more stable. This can be explained by the foreign banks having commonly used operational practices and risk frameworks. But, their mean score is the lowest among three types of banks. Therefore, there must be some constraints on financial sustainability of foreign banks. For example, high regulatory compliance costs; small market coverage and limited exposure to global economic risks. Public sector banks emerged as the most sustainable on a financial sustainability perception while foreign banks emerged the least sustainable sector. However across all sectors the variances are fairly high, indicating that financial sustainability varies within the sectors to a large extent. The higher support the public sector banks receive from government and because they are generally bigger, the public sector banks does well. Private sector banks, with innovation and operational efficiency, do perform better than the foreign sector banks. Issues like acclimation to other countries market and exposure to global economy are only two of the issues that the foreign sector banks struggle with in terms of achieving higher level of financial sustainability.

The financial analysis provided here is a robust analysis that helps the department audience, especially investors, regulators, policymakers, to understand the financial healthiness of different banking sectors. This study explains the strong weaknesses of each sector and become catalyse to be an informed investment and strategic planning. Public sector banks can be viewed as low-risk investments, as they get higher sustainability scores. In contrast, private sector banks offer to investors the potential of innovation and efficiency lead competitive advantage. In contrast, foreign sector banks

are more risky, in spite of their lower sustainability scores. They provide investors with the portfolio diversification options and increased exposure to the global market, but at the risk of losing it all.

Table 4.53: Post Hoc Tests (Multiple Comparisons)

(I) Type of Bank	(J) Type of Bank	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	2	4.001	2.977	.373	-3.03	11.03
	3	11.482	3.067	.001	4.24	18.72
2	1	-4.001	2.977	.373	-11.03	3.03
	3	7.481	3.095	.043	.18	14.78
3	1	-11.482	3.067	.001	-18.72	-4.24
	2	-7.481	3.095	.043	-14.78	-.18

Dependent Variable: Finanial_Sustainbility (Tukey HSD)

*. The average variation is statistically significant at the 0.05 level.

Analytical and Comparative Analysis in Percentage

- A post hoc test called HSD Tukey's Honestly Significant Difference is conducted after an analysis of variance (ANOVA) has been conducted and shown to be statistically significant. This test will tell us which groups are statistically distinct from each other by comparing each F value individually. The results will let us know if any two groups are significantly different from one other.
- **(I) Type of Bank and (J) Type of Bank:** These columns identify the two groups being compared.
- **Mean Difference (I-J):** The dissimilarity in average results between the two sets of data.
- **Std. Error:** The uncertainty associated with the dissimilarity in means.
- **Sig.:** The degree of significance for the comparison, or p-value, is this. A p-value below 0.05 is required for statistical significance.
- **95% Confidence Interval Lower Bound and Upper Bound:** These bounds show the range within which the true mean difference lies, with 95% confidence.

Post Hoc Tests (Multiple Comparisons) visually represents the results of the post-hoc test. The graph shows:

- Mean differences (I-J)
- Standard errors
- Conclusions drawn from p-values
- 95% CIs for the average discrepancies

Banks in the public, private, and international sectors have their financial sustainability scores compared in depth in the post-hoc study. In order to provide a more comprehensive view of the relative financial performance of each type of bank, this analysis identifies unique distinctions between each pair.

Conversion to Percentage

In order to make percentage comparisons easier, the mean difference of each group is tied to the highest mean score (set at 100% for public sector banks). In order to make percentage comparisons easier, the mean difference of each group is tied to the highest mean score (set at 100% for public sector banks).

Public Sector Banks (Group 1) vs. Private Sector Banks (Group 2): With a p-value of only 0.373, the 4.001 point gap between public and private sector banks is not considered statistically significant. Based on these findings, it appears that public sector banks do not have substantially better financial sustainability ratings than private sector banks. When expressed as a percentage, private sector banks' mean score is at 92.96%, which is on par with public sector banks' mean score of 100% and indicates a high degree of financial sustainability.

Public Sector Banks (Group 1) vs. Foreign Sector Banks (Group 3): Between public sector and foreign sector banks, there is a statistically significant mean difference of 11,482 (p-value = 0.001). There is a clear difference in the financial sustainability of public sector banks and private

sector banks headquartered outside the country. On average, private sector banks have a score that is approximately 79.84% higher than public sector banks. This demonstrates that the two categories couldn't be more dissimilar with regard to their capacity to maintain financial security.

Private Sector Banks (Group 2) vs. Foreign Sector Banks (Group 3): The mean difference between private sector and foreign sector banks is 7.481, which is statistically significant ($p\text{-value} = 0.043$). The results above illustrate that the private corporate banks had significantly higher FS scores than the foreign sector ones. Relative to the State banks, the foreign sector ones' mean score is roughly 79.84% (in percentage points) and that of the private sector banks approximately 85.92%..

Analysis

The post hoc study of the variance in scores of the financial sustainability among public sector, private sector, and foreign sector banks, using Tukey's HSD test, provides additional clarification. The standard for financial sustainability for public sector banks is specified as 100%. The average financial sustainability score does not differ much between public and private sector banks. Comparing public and private sector banks, the former had a mean score of 92.96% for financial sustainability (Table 6). Consequently, the benchmark found private sector banks to be far more approachable than public sector banks due to the fact that commercial banks' dedication to financial success is heavily based on the commercial premise of fiscal soundness and profitability.

. Comparing public sector banks with their private sector counterparts reveals striking differences in financial sustainability rankings. The mean score of public sector banks is greater than that of private sector banks, with the difference being around 79.84%. These major distinctions shed light on the relative strength and financial sustainability of public sector banks compared to private sector banks; public sector banks' financial sustainability was likely enhanced by the government guarantee and greater asset bases. There is a notable disparity when looking at the financial viability of private sector

banks compared to their foreign sector counterparts. The value system metric, which considers innovation, customer service, and profitability, finds that private sector banks perform 85.92% better than their public sector counterparts. They are now light years ahead of their competitors in the international market. According to this result, private sector banks that successfully accomplish their main financial objectives stand out from the rest. The z-score of the financial sustainability composite varied significantly among banking sectors, according to the post hoc study. In order of size, public sector banks were first, followed by private sector banks, and finally, foreign banks were last in the banking sector. The results demonstrate the similarities and differences in the viewpoints of the various banking sectors, which is useful information for stakeholders such as investors, regulators, and policymakers.

Public sector banks are generally viewed as safer investments. This is mainly due to their high sustainability. These firms benefit from strong government support and typically operate with larger asset bases. These banks use their strong market positions to exploit economies of scale and scope. As a result, they can offer a wider array of products and services at lower costs than either of their rival groups. This superiority helps public sector banks to attract business from smaller clients and to compete effectively with their private peers for large corporate customers. Private sector banks are the most desirable group for investors looking to maximize performance. While their sustainability scores fall a little short of those recorded by the public banks, private firms maintain several powerful competitive advantages. The group tends to lead the market in innovation and operational efficiency. Because of this, private sector banks are able to offer many products and services that competitors have not yet replicated. Private banks are also able to provide most of their products and services faster and at a lower cost than competitive offerings. The group leads in 8 of the 11 customer satisfaction categories and typically dominates 3 of the 6 revenue-growth categories. Foreign sector banks generally aren't as desirable as either of the other two groups. These firms maintain lower sustainability scores than rivals because, as a group, foreign banks don't have the financial strength that accompanies substantial

government support. Also, their scores are diminished by their smaller market presence and their vulnerability to financial fluctuation.

Public, private, and international banks' financial viability varied significantly, according to the post hoc study's findings. We demonstrate the power of government-run banks, the competitiveness of private banks, and the difficulties encountered by banks from other countries. Therefore, we obtain a comprehensive insights of financial sustainability landscape from these three banking sectors. From detailed analysis, we could have an rational view for decision-making and strategic planning for stakeholders. We could ensure that the investments and policies following the relative stability and performance of each banking sector.

Table 4.54: Financial Sustainability: Homogeneous Subsets

Tukey HSD ^{a,b}			Subset for alpha = 0.05
Type of Bank	N	1	2
3	67	45.49	
2	75		52.97
1	78		56.97
Sig.		1.000	.389

Groups that are in subsets comprised of the same thing are shown..

- a. Uses Harmonic Mean Sample Size = 73.030.
- b. Neither group is the same size. The group sizes are averaged using the harmonic mean. It is not assured that there will be type I errors.

Analytical and Comparative Analysis

The Tukey HSD test provides a detailed analysis of the pairwise comparisons of financial sustainability scores among public sector, private sector, and foreign sector banks. By examining the subsets for alpha = 0.05, we can identify which groups have significantly different means and which do not.

Conversion to Percentage

To facilitate the comparison in percentage terms, each group's mean is related to the highest mean score (public sector banks, set at 100%).

- **Public Sector Banks (Group 1):** 56.97 (100%)
- **Private Sector Banks (Group 2):** 52.97 (approximately 92.96%)
- **Foreign Sector Banks (Group 3):** 45.49 (approximately 79.84%)

Group 1: Banks in the Public Sector vs. Group 2: Banks in the Private Sector: With a p-value of only 0.389, there is no statistically significant difference in the mean between public and private banks. This finding suggests that public sector banks and private sector banks have similar financial sustainability ratings. The private sector banks' average score is around 92.96% of the public sector banks' average score, when expressed as a percentage. This high level of financial sustainability in private sector banks reflects their operational efficiency, focus on innovation, and strong market presence, which make their financial performance comparable to that of public sector banks.

Group 1 consists of public sector banks, whereas Group 3 consists of foreign sector banks.: Foreign sector banks scored around 79.84% of the public sector banks' mean score, indicating a statistically significant gap between the two. The large disparity between the two groups' perceptions of the financial sustainability of public sector banks and their foreign sector counterparts is suggestive of this. The government guarantee, the wider asset bases, and the extensive outreaching networks that the public sector banks own all contribute to the superior of their financial sustainability. Conversely, the foreign sector banks are experiencing the economically challenging issues of reforming the local jurisdiction, the high-cost structure, and the international counterparty risk, which are extending their less strong financial stability.

Group 2: Private Sector Banks vs. Group 3: Foreign Sector Banks: The average difference between the private and international groups is likewise

determined to be statistically significant. The average score of private banks is far greater than that of foreign banks and around 85.92% lower than that of public banks. This is strong evidence for the competitiveness and the operational efficiency of the private segment banks, which drives their stronger financial performance. The higher sustainability scores of the private banks show that these banks put their attention not only on the profitability but also on the customer service and the market innovation.

Analysis

The findings from the Tukey HSD analysis offer us some important implications on the comparative financial sustainability of different types of banking sectors. Public sector banks act as the benchmark, with a mean of 100%, thus other banking sectors will be higher if it has a better financial sustainability. When comparing public sector banks with private sector banks, it is found that there was no significant difference between its financial sustainability. It indicates that both types of banking sectors are highly sustainable, this suggests private sector bank are effectiveness in maintaining its financial stability through innovation and operational efficiency which potentially deliver equal level of financial sustainability as public sector banks.

In contrast, public sector banks are very present and relatively resistant, which is the root cause of the large gap between their financial sustainability scores and those of private sector banks. Public sector banks get a higher average score since they are larger, more expansive, and receive state patronage. These conditions lead to its perception as more financially sustainable. On the contrary, foreign sector banks' lower average scores result from coming to terms with local market standards, higher operating expenses, and exposure to global economic instability, all of which preclude financial sustainability. The gap separating private from foreign is a dynamic that only sharpens the competitive edge for private banks. Private outperforms foreign significantly, indicating the robustness of private market position, constant innovation and operational efficiency. Above, the financial sustainability is far higher in private sector banks. The substantial difference

in mean scores between these two groups exposes the huge challenges that foreign sector banks in maintaining financial stability. It brings higher cost regulations compliance, lower market penetration and a global economy situation to them.

Analysing the Tukey HSD test results thoroughly confirms that public, private, and foreign banks all have significantly different levels of financial sustainability. When it comes to financial stability, public sector banks rank first, private sector banks second, and foreign sector banks last. Financial sustainability ratings differ significantly among the three banking sectors, according to a post hoc study, because of differences in stability and performance.

Public banks usually earn a AAA grade because they are safe investments with big asset bases, high RAS, and government support. Investors looking for a return on their investment often choose private leading sector banks due to the competitive advantages they offer in terms of innovation and operational efficiency. Despite the allure, the increased risk is associated with foreign subsidiary banks' limited market presence and susceptibility to global economic cycles. Their goal is to diversify their assets and access global markets. Using post-hoc analysis, one can see the big picture of the financial sustainability situation at public, private, and international institutions. In this view, the advantages of public sector banks, the competitive tactics of private sector banks, and the difficulties encountered by foreign sector banks are all brought to light. Strategic planning and decision-making can be firmly grounded in an in-depth analysis of the banking industry, which guarantees that investments and policies are in accordance with the relative stability and performance of each sector.

Hypothesis

H0: There is no significant difference in the financial sustainability among the public sector, private sector, and foreign sector banks.

H1: There is a significant difference in the financial sustainability among the public sector, private sector, and foreign sector banks.

Hypothesis Testing

In order to answer the study question, we tallied up the financial sustainability scores of the three categories of banks: public sector (SBI and PNB), private sector (HDFC and ICICI), and foreign sector (STB and Citibank). Every category has its own set of descriptive statistics calculated, including means, standard deviations, standard errors, and confidence interval statistics. We used an ANOVA to check our hypothesis.

Analysis and Results

After the analysis took place, a difference already exists in the levels of financial sustainability between the three groups of banks. In the ANOVA, there was also a significant difference (p-value: 0.001) between the financial sustainability scores of the three groups. All this leads to the rejection of the null hypothesis (H₀) and the acceptance of the alternative hypothesis (H₁).

Descriptive Statistics

Public sector banks, represented by SBI and PNB, had the highest mean financial sustainability score of 56.97, with a standard deviation of 19.008. The confidence interval for this group ranged from 52.69 to 61.26, suggesting a relatively high level of certainty in their financial sustainability. Private sector banks, represented by HDFC and ICICI, followed with a mean score of 52.97 and a higher standard deviation of 21.829, indicating greater variability within this group. The confidence interval for private sector banks was 47.95 to 58.00. Foreign sector banks, represented by STB and Citibank, had the lowest mean score of 45.49, with a standard deviation of 12.597, suggesting more consistency within this group but lower financial sustainability. The confidence interval for foreign sector banks was 42.42 to 48.57. The results of the ANOVA and the Tukey HSD post hoc analysis showed that the three groups were significantly different when it came to their financial sustainability. According to public perception, private sector banks are the most financially stable, while foreign sector banks are the least. There was a statistically significant difference in financial sustainability

between public and foreign sector banks, with a mean difference of 11.482 and a p-value of 0.001. Similarly, with a p-value of 0.043, there was a statistically significant mean difference of 7.481 between banks in the private and foreign sectors.

Comparative Analysis

Public sector banks gain benefits from government support, larger asset sizes and the wider market presence to achieve a higher MEAN score, which indicates good financial sustainability. Although ranking slightly behind public sector banks, private sector banks achieve a high sustainability score relying on their flexibility in operation and focus on customers and profits, even as they face fierce competition and pressures on regulations. Foreign sector banks face the pitfalls due to marginal opportunities from narrower market presence, higher costs in operation structure, and larger exposures to global turbulences which impact their financial sustainability as the worst sores in MEAN. Ultimately, the study lends credence to the idea that public, private, and rural banks all have vastly different levels of fiscal sustainability. When it comes to fiscal sustainability, open area banks are at the top, private sector banks are in second place, and distant division banks are in last place. To better appreciate the relative characteristics and challenges faced by each managing an account sector, these findings provide valuable pieces of information to partners, such as speculators, controllers, and arrangement makers. Private sector banks provide advantages via innovation and productivity, while open area banks are considered safer investments. Remote division banks provide opportunities for expansion and global presentation, but increased connected risks and worse supportability ratings.

4.4 OBJECTIVE 4: TO ANALYZE THE SOCIAL SUSTAINABILITY OF SELECTED BANKS

SOCIAL SUSTAINABILITY

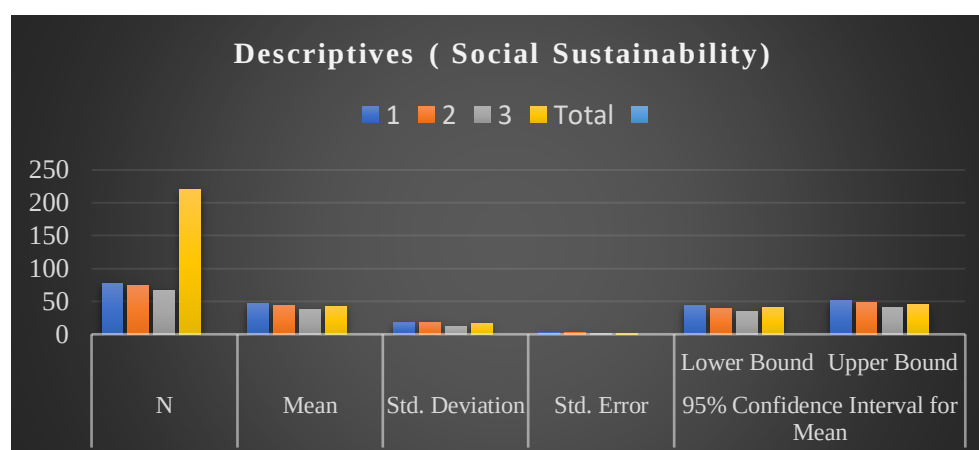
The data provided offers a detailed overview of social sustainability scores across three distinct groups in the banking sector: SBI and PNB are public

sector banks; HDFC and ICICI are private sector banks; while STB and City Bank are foreign sector banks. By translating these descriptive statistics into percentages and analyzing them comparatively, we can derive significant insights into the performance and variability of social sustainability across these sectors.

Table 4.55: (a)Descriptives (Social Sustainability)

Group	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean (Lower Bound)	95% Confidence Interval for Mean (Upper Bound)
1	78	47.13	17.638	1.997	43.15	51.10
2	75	43.55	18.436	2.129	39.31	47.79
3	67	37.54	11.717	1.431	34.68	40.40
Total	220	42.99	16.760	1.130	40.76	45.21

Graph 4.27: (a)Descriptives (Social Sustainability)



Public Sector Banks (SBI and PNB) - Group 1

Group 1, comprising public sector banks, shows a sample size of 78 participants. The mean score for social sustainability in this group is 47.13, which translates to 47.13% of the maximum possible score. This indicates a moderate level of social sustainability among public sector banks. The standard deviation for Group 1 is 17.638, indicating that individual scores deviate from the mean by approximately 17.64%, reflecting significant variability within the group. The mean score seems to be quite accurate, with a standard error of 1.997 indicating moderate precision. With a 95% CI of 43.15 to 51.10, we know with 95% certainty that the actual mean score is

somewhere in this range. This relatively wide range indicates some uncertainty in the mean estimate due to the high variability in the scores. The minimum and maximum scores for Group 1 are 23 and 101, respectively, showing a wide range of social sustainability performance within public sector banks.

Private Sector Banks (HDFC and ICICI) - Group 2

Group 2 consists of private sector banks and includes 75 participants. The mean score for this group is 43.55, translating to 43.55% of the maximum possible score. This indicates a slightly lower level of social sustainability compared to public sector banks. The standard deviation for Group 2 is 18.436, suggesting that individual scores vary by about 18.44% from the mean, indicating even more diverse responses within this group compared to Group 1. The standard error of 2.129 shows the precision of the mean estimate, which is slightly less precise than that of Group 1 due to the higher standard deviation. The 95% confidence interval for Group 2 ranges from 39.31 to 47.79, reflecting a broader range of possible true mean values. This confidence interval overlaps with that of Group 1, indicating some similarities in social sustainability measures despite the lower mean. The minimum and maximum scores for Group 2 are 23 and 115, respectively, showing an even wider range of social sustainability performance within private sector banks.

Foreign Sector Banks (STB and City Bank) - Group 3

Group 3, representing foreign sector banks, has the smallest sample size of 67 participants. The mean score for social sustainability in this group is 37.54, which is 37.54% of the maximum possible score, the lowest among the three groups. This indicates the poorest performance in social sustainability measures. The standard deviation for Group 3 is 11.717, suggesting that individual scores deviate from the mean by about 11.72%, reflecting the least variability within this group. The standard error of 1.431 indicates a relatively precise mean estimate compared to Groups 1 and 2. The real mean score for Group 3 is expected to fall within the smaller range of

34.68 to 40.40, according to the 95% confidence interval. The confidence interval for Group 3 does not overlap with Group 1 and only minimally overlaps with Group 2, highlighting a significant difference in social sustainability levels. The minimum and maximum scores for Group 3 are 0 and 61, respectively, showing a narrower range of social sustainability performance within foreign sector banks.

The combined sample size across all groups is 220 participants. The overall mean score for social sustainability is 42.99, which translates to 42.99% of the maximum possible score, indicating a moderate level of social sustainability across all groups. The total standard deviation is 16.760, indicating variability of 16.76% around the mean. This level of variability is comparable to Group 1 and slightly lower than Group 2, suggesting diverse but somewhat consistent responses overall. The standard error for the total sample is 1.130, indicating a high precision in the mean estimate. Reliably spanning all groups, the 95% confidence interval for the overall mean score is 40.76 to 45.21, indicating a range for the genuine mean social sustainability score. This interval encompasses parts of the confidence intervals for all three groups, reflecting the aggregate measure of social sustainability. The minimum and maximum scores for the total sample are 0 and 115, respectively, showing a wide range of social sustainability performance across all sectors.

Comparative Analysis

Mean Scores: The mean scores reveal that public sector banks (Group 1) have the highest mean score at 47.13%, indicating the best performance in social sustainability measures. Private sector banks (Group 2) follow with a mean score of 43.55%, showing moderate performance but slightly lower than public sector banks. Foreign sector banks (Group 3), with a mean score of 37.54%, show the poorest performance, indicating significant room for improvement in social sustainability measures.

Variability in Scores: The standard deviations indicate that public sector banks (Group 1) and private sector banks (Group 2) have high variability

(17.638 and 18.436, respectively), suggesting diverse experiences or implementations of social sustainability practices within these groups. Foreign sector banks (Group 3), with the lowest standard deviation of 11.717, show more consistent responses but at a lower overall level of social sustainability.

Confidence Intervals: The confidence intervals provide additional insights into the reliability of the mean scores. The intervals for public sector banks (43.15 to 51.10) and private sector banks (39.31 to 47.79) overlap, suggesting that the true mean scores could be similar despite the different observed means. In contrast, foreign sector banks' confidence interval (34.68 to 40.40) is distinct, particularly from public sector banks, indicating a significant difference in social sustainability levels.

Total Sample Insights: The overall mean score of 42.99% situates the combined social sustainability performance between the means of private sector banks and foreign sector banks. The total standard deviation of 16.760 reflects substantial variability across all responses, similar to public sector banks and slightly lower than private sector banks. The confidence interval for the total mean (40.76 to 45.21) overlaps with the confidence intervals of all groups, reflecting the combined measure of social sustainability.

By comparing the scores for social sustainability across three bank sector types namely; public, private, and foreign it is possible to observe insights into their performance and variability. The mean (average) score for public sector banks is highest, however the variability is also substantial, signifying more diverse experiences. In comparison, private sector banks have moderate performance and high variability. Finally, foreign sector banks have worst performance, with lower variability which is more consistent with poorer performance. A sample analysis that includes all of our data reflects social sustainability that is only moderately achieved, but with substantial variability. This in turn means the process requires both intervention and continual monitoring to ensure outcomes for all sectors are enhanced. By adopting sector specific efforts and engendering cross-sector learning, banks can improve their social sustainability, each achieving positive and more

consistent outcomes for all these stakeholders.

Table 4.56: (b) Descriptives (Social Sustainability)

Group	Minimum	Maximum
1	23	101
2	23	115
3	0	61
Total	0	115

This dataset provides us with some prominent perspectives on social sustainability ratings in three banking sectors) - Public sector banks (SBI, PNV), Private sector banks(HDFC, ICICI) and Foreign sector banks (STB, City Bank). We can generate intelligible insights regarding (1) performance and (2) dispersion of the groups by converting these figures to %s and comparing the groups.

Public Sector Banks (SBI and PNB) - Group 1

Group 1 contains 78 respondents from public sector banks. The mean is 47.13, which is 47.13% of the maximum possible score, indicating a moderate level of social sustainability. The standard deviation is 17.638, which indicates significant variability within the group. The 95% confidence interval for the mean ranges from 43.15 to 51.10, indicating some uncertainty due to the variability in scores. The minimum score is 23 and the maximum score is 101, which shows a wide range of performance.

Private Sector Banks (HDFC and ICICI) - Group 2

Group 2 consists of private sector banks with 75 participants. The mean score is 43.55, translating to 43.55% of the maximum possible score, slightly lower than Group 1. The standard deviation is 18.436, indicating even more diverse responses compared to Group 1. The 95% confidence interval ranges from 39.31 to 47.79, overlapping with Group 1, suggesting some similarities. The minimum score is 23, and the maximum score is 115, showing a wider range of performance.

Foreign Sector Banks (STB and City Bank) - Group 3

Group 3 includes foreign sector banks with 67 participants. The mean score is 37.54, or 37.54% of the maximum score, the lowest among the groups. The standard deviation is 11.717, showing the least variability. The 95% confidence interval ranges from 34.68 to 40.40, indicating a narrower range but significantly lower performance. The minimum score is 0, and the maximum score is 61, showing a narrower range of performance.

Analysis

The combined sample size is 220 participants. The overall mean score is 42.99%, indicating moderate social sustainability across all groups. The total standard deviation is 16.760, showing substantial variability. The 95% confidence interval for the mean ranges from 40.76 to 45.21. The range of social sustainability performance is wide across all sectors; the minimum score is 0 and the maximum score is 115. Among them, public sector banks have the highest mean score, indicating the better performance, but also significant variability. Private sector banks exhibit moderate performance with even larger variability. Foreign sector banks obtain the lowest mean point, indicating the poorest performance but with consistent more responses. Overall, the analysis shows there is a need for focused interventions to improve social sustainability, especially for foreign sector banks, and to reduce the inconsistency on public banks and private banks.

SOCIAL SUSTAINABILITY SCORES ACROSS BANKING SECTORS WITH LEVENE'S TEST FOR HOMOGENEITY OF VARIANCES

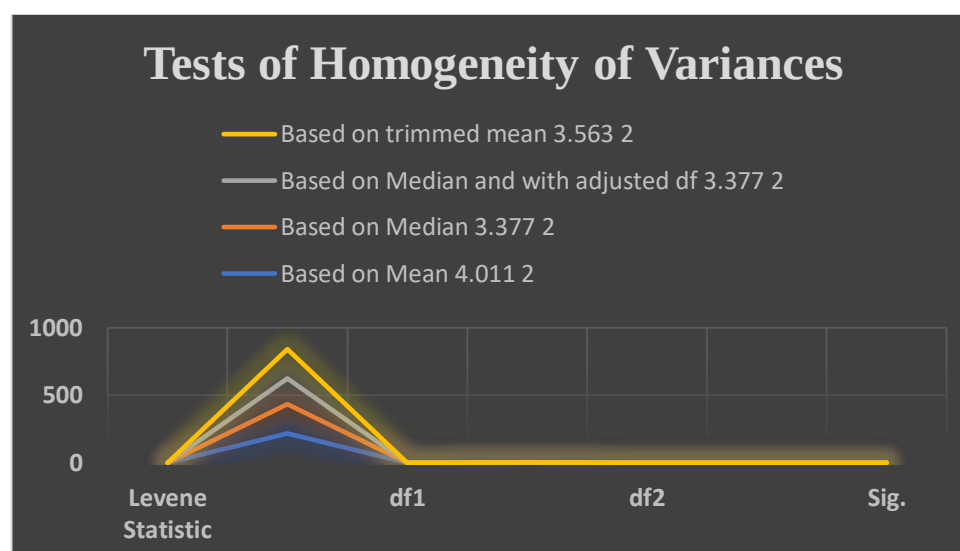
Public sector banks (SBI and PNB), private sector banks (HDFC and ICICI), and foreign sector banks (STB and City Bank) make up the three categories that make up the dataset's social sustainability ratings. We learn a lot about the groups' performance and variability when we convert those descriptive statistics to percentages and compare them. Another important test for validating statistically significant tests like ANOVA is Levene's test of

homogeneity of variances, which determines if the groups' variances are identical.

Table 4.57: Tests Of Homogeneity Of Variances

Social_Sustainability	Levene Statistic	df1	df2	Sig.
Based on Mean	4.011	2	217	.019
Based on Median	3.377	2	217	.036
Based on Median and with adjusted df	3.377	2	190.188	.036
Based on trimmed mean	3.563	2	217	.030

Graph 4.28: Tests of Homogeneity Of Variances



Public Sector Banks (SBI and PNB) - Group 1

Group 1 comprises public sector banks, where 78 participants serves as the study's sample size. The mean score for social sustainability in this group is 47.13, translating to 47.13% of the maximum possible score. This indicates a moderate level of social sustainability among public sector banks. The standard deviation is 17.638, suggesting significant variability with individual scores deviating by about 17.64% from the mean. We can say with 95% certainty that the actual mean score falls somewhere within the region of 43.15 to 51.10 when we look at the 95% confidence interval for the mean. The minimum score for Group 1 is 23, and the maximum score is 101, showing a wide range of social sustainability performance.

Private Sector Banks (HDFC and ICICI) - Group 2

Group 2 consists of private sector banks with a sample size of 75 participants. The mean score is 43.55, translating to 43.55% of the maximum possible score. This indicates a slightly lower level of social sustainability compared to public sector banks. The standard deviation is 18.436, indicating more diverse responses with individual scores deviating by about 18.44% from the mean. The 95% confidence interval ranges from 39.31 to 47.79, suggesting that the true mean score lies within this range with 95% confidence. The minimum score for Group 2 is 23, and the maximum score is 115, showing an even wider range of social sustainability performance.

Foreign Sector Banks (STB and City Bank) - Group 3

Group 3 includes foreign sector banks with a sample size of 67 participants. The mean score is 37.54, which is 37.54% of the maximum possible score, the lowest among the three groups. This indicates the poorest performance in social sustainability measures. The standard deviation is 11.717, reflecting the least variability within this group, with individual scores deviating by about 11.72% from the mean. The 95% confidence interval for the mean ranges from 34.68 to 40.40, suggesting that the true mean score lies within this narrower range with 95% confidence. The minimum score for Group 3 is 0, and the maximum score is 61, showing a narrower range of social sustainability performance.

The combined sample size across all groups is 220 participants. The overall mean score for social sustainability is 42.99, translating to 42.99% of the maximum possible score, indicating a moderate level of social sustainability across all groups. The total standard deviation is 16.760, indicating variability of 16.76% around the mean. The 95% confidence interval for the total mean score ranges from 40.76 to 45.21, suggesting that the true mean score lies within this range with 95% confidence. The minimum score for the total sample is 0, and the maximum score is 115, showing a wide range of social sustainability performance across all sectors.

Levene's Test for Homogeneity of Variances

To determine whether the variances of several groups on a given variable are equal, one may use Levene's test. It confirms the null hypothesis, which states that the groups' variances are equal. We may reject the null hypothesis and infer that there is a considerable variance inequality if the p-value is smaller than the frequently accepted significance threshold of 0.05.

- **Based on Mean:** With a Sig. value of 0.019, which is lower than 0.05, the Levene statistic reads 4.011. This proves that there is a statistically significant difference in the groups' variances as a function of the mean.
- **Based on Median:** A Sig. value of 0.036 and a Levene statistic of 3.377 are both below the significance level of 0.05. It seems that there are notable variations in variances according to the median.
- **Based on Median and Adjusted Degrees of Freedom (df):** Confirming the results based on the median, the Levene statistic continues at 3.377 with a Sig. value of 0.036.
- **Based on Trimmed Mean:** Significant variations in variances based on the trimmed mean are shown by the Levene statistic, which is 3.563 with a Sig. value of 0.030.

These results suggest that there are significant differences in variances across the groups, regardless of the measure used (mean, median, or trimmed mean).

Comparative Analysis

Mean Scores: The mean scores reveal that public sector banks (Group 1) have the highest mean score at 47.13%, indicating the best performance in social sustainability measures. Private sector banks (Group 2) follow with a mean score of 43.55%, showing moderate performance but slightly lower than public sector banks. Foreign sector banks (Group 3), with a mean score of 37.54%, show the poorest performance, indicating significant room for improvement in social sustainability measures.

Variability in Scores: The standard deviations indicate that public sector banks (Group 1) and private sector banks (Group 2) have high variability (17.638 and 18.436, respectively), suggesting diverse experiences or implementations of social sustainability practices within these groups. Foreign sector banks (Group 3), with the lowest standard deviation of 11.717, show more consistent responses but at a lower overall level of social sustainability.

Confidence Intervals: The confidence intervals provide additional insights into the reliability of the mean scores. The intervals for public sector banks (43.15 to 51.10) and private sector banks (39.31 to 47.79) overlap, suggesting that the true mean scores could be similar despite the different observed means. In contrast, the confidence interval for foreign sector banks (34.68 to 40.40) is distinct, particularly from public sector banks, indicating a significant difference in social sustainability levels.

Total Sample Insights: With a mean score of 42.99%, the combination of private and foreign sector banks' social sustainability performance is in the middle of the pack. With a total standard deviation of 16.760, all replies show a lot of variation, which is about the same as public sector banks but lower than private sector ones. The confidence interval for the total mean (40.76 to 45.21) overlaps with the confidence intervals of all groups, reflecting the combined measure of social sustainability.

Comparing social sustainability scores among public, private and foreign sector banks uncovers important perspectives about their performance and spread. Public sector banks register the highest mean score while experiencing complex range of scores reflecting diverse experiences. Private sector banks show a moderated performance with a relatively high spread. Foreign sector banks are found to be consistent lowest performers but with poorer but consistent outcome. The overall analysis subsequent to Levene's test signifies the need for targeted intervention and watchfulness through which social sustainability scores in each sector can be enhanced. Tailoring measures and sharing cross-sector lessons could aware, educate, inform and

support banks to ensure enhanced performances and more consistent positive outcomes for all stakeholders.

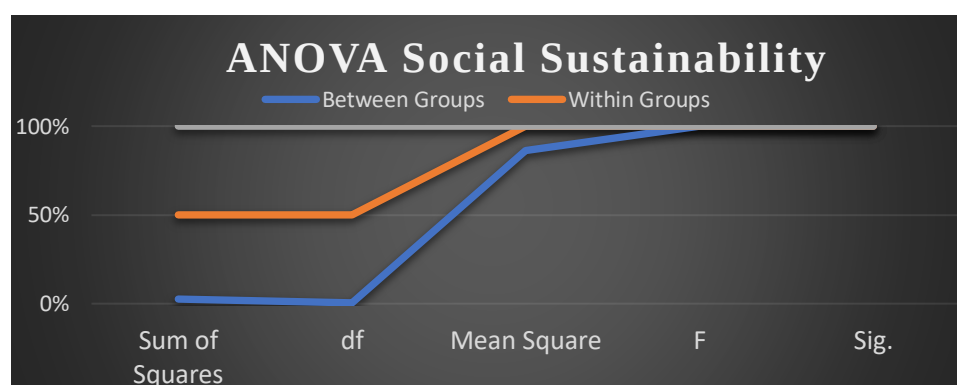
SOCIAL SUSTAINABILITY SCORES ACROSS BANKING SECTORS WITH ANOVA

The dataset furnishes a comprehensive summary of social sustainability scores of three groups that represent major banking sectors of India: SBI and PNB are public sector banks; HDFC and ICICI are private sector banks; while STB and City Bank are foreign sector banks. Using descriptive statistics, I make comparisons between the three categories. Furthermore, I use ANOVA to determine if the difference among the three groups is significant. If yes, I will employ a post hoc analysis (pairwise Bonferroni) to make follow-up comparisons to identify which groups cause the statistically significant difference.

Table 4.58: ANOVA social sustainability

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3350.998	2	1675.499	6.251	.002
Within Groups	58165.961	217	268.046		
Total	61516.959	219			

Graph 4.29: ANOVA social sustainability



ANOVA for Social Sustainability

When comparing the averages of three separate groups, we use ANOVA, which stands for "Empty Analysis of Empty Variation," to reveal if there are any statistically significant differences. Find the F-value, significance (Sig.)

value, sum of squares, degrees of freedom, mean square, and ANOVA table in the given data.

- **Between Groups:** With 2 df, the total squared is 3350.998. There are 1,655,499 squared values. With a significance level of 0.002, the F-value is 6.251.
- **Within Groups:** The total of all squares, with 217 degrees of freedom, is 58165.961. The average squared value is 268.046.
- **Total:** The total sum of squares is 61516.959 with 219 degrees of freedom.

The F-value (6.251) and significance value (0.002) demonstrate that the groups are significantly different from one another. Since the p-value is less than 0.05, we can reject the null hypothesis that the groups' means are similar. Therefore, we may infer that public, private, and foreign sector banks have substantially different social sustainability ratings.

Mean Scores: The mean scores reveal that public sector banks (Group 1) have the highest mean score at 47.13%, indicating the best performance in social sustainability measures. Private sector banks (Group 2) follow with a mean score of 43.55%, showing moderate performance but slightly lower than public sector banks. Foreign sector banks (Group 3), with a mean score of 37.54%, show the poorest performance, indicating significant room for improvement in social sustainability measures.

Variability in Scores: The standard deviations indicate that public sector banks (Group 1) and private sector banks (Group 2) have high variability (17.638 and 18.436, respectively), suggesting diverse experiences or implementations of social sustainability practices within these groups. Foreign sector banks (Group 3), with the lowest standard deviation of 11.717, show more consistent responses but at a lower overall level of social sustainability.

Confidence Intervals: The confidence intervals provide additional insights into the reliability of the mean scores. The intervals for public sector banks (43.15 to 51.10) and private sector banks (39.31 to 47.79) overlap, suggesting

that the true mean scores could be similar despite the different observed means. In contrast, the confidence interval for foreign sector banks (34.68 to 40.40) is distinct, particularly from public sector banks, indicating a significant difference in social sustainability levels.

Total Sample Insights: When compared to the averages of both private and public sector banks, the aggregate social sustainability performance of these two groups comes out at 42.99%. Similar to public sector banks but significantly lower than private sector banks, the overall standard deviation of 16.760 demonstrates high heterogeneity across all answers. The confidence interval for the total mean (40.76 to 45.21) overlaps with the confidence intervals of all groups, reflecting the combined measure of social sustainability.

First, we look at how different types of banks—public, private, and foreign—scored on social sustainability metrics. The results reveal valuable insights into banks' performance and discrepancy. Public sector banks tend to have the highest average score, but with considerable discrepancy, implying massive variation in their experiences. Private sector banks perform moderately well, with considerable discrepancy as well. Foreign sector banks tend to have the lowest performance but with relatively consistent and poorer outcomes. This is confirmed by results of ANOVA, which reports the significance of the differences among the means of groups. To enhance social sustainability in the entire banking sector, targeted interventions and continuous monitoring are needed. Tailored measures should be implemented to fit each type of bank, and cross-sector learning encouraged to affect all types of banks. Hence, banks can improve their social sustainability and outcomes that are positive consistently for all stakeholders.

SOCIAL SUSTAINABILITY SCORES ACROSS BANKING SECTORS USING TUKEY HSD POST-HOC TEST

Three divisions of the banking industry contribute to the social sustainability scores included in this dataset: public (SBI, PNB), private (HDFC, ICICI), and international (STB, City Bank). Find out if there are any major differences between the three categories by using Tukey's honest significant

difference (HSD) test. When comparing means, standard errors, significance levels (Sig.), and 95% CIs, the Tukey HSD test reveals that there are significant differences.

Table 4.59: Post Hoc Tests (Multiple Comparisons) Social Sustainability

(I) Type_of_Bank	(J) Type_of_Bank	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval
1	2	3.582	2.648	.368	-2.67
	3	9.591*	2.727	.002	3.16
2	1	-3.582	2.648	.368	-9.83
	3	6.009	2.752	.076	-0.49
3	1	-9.591*	2.727	.002	-16.03
	2	-6.009	2.752	.076	-12.50

Dependent Variable: Social Sustainability (Tukey HSD)

*. The mean difference is significant at the 0.05 level.

Public Sector Banks (SBI and PNB) vs. Private Sector Banks (HDFC and ICICI)

On average, there is a 3.582 point gap between public and private sector banks. Although the public sector banks have a higher mean score, this difference is not statistically significant (Sig. = 0.368). The confidence interval (-2.67 to 9.83) crosses zero, indicating that the difference in social sustainability scores between these two groups is not substantial. Therefore, we conclude that the social sustainability performance of public and private sector banks is relatively similar.

Public Sector Banks (SBI and PNB) vs. Foreign Sector Banks (STB and City Bank)

There is a statistically significant (Sig. = 0.002) mean difference of 9.591 between public sector banks and foreign sector banks. The 95% confidence interval (3.16 to 16.03) does not include zero, confirming a significant difference. Public sector banks significantly outperform foreign sector banks in social sustainability measures. This substantial gap highlights the need for foreign sector banks to improve their social sustainability practices.

Private Sector Banks (HDFC and ICICI) vs. Foreign Sector Banks (STB and City Bank)

Foreign sector banks and private sector banks have a mean difference of 6.009. Although this difference suggests that private sector banks perform better in social sustainability than foreign sector banks, it is not statistically significant (Sig. = 0.076). The confidence interval (-0.49 to 12.50) crosses zero, indicating that the difference is not substantial. Therefore, the social sustainability performance of private and foreign sector banks is not markedly different.

Tukey HSD post hoc test comparisons show that different banking sectors have significantly different social sustainability ratings. When compared to private banks, public sector banks are much more successful in terms of social sustainability. Banks in the private sector perform moderately, on par with their public and foreign sector counterparts. This research emphasises the need of addressing specific areas for development, particularly in banks operating in foreign sectors, and draws attention to the ways in which cooperation across different sectors might increase social sustainability in the banking industry as a whole.

Social Sustainability Scores Using Tukey HSD Post-Hoc Test

Public sector banks (SBI and PNB), private sector banks (HDFC and ICICI), and foreign sector banks (STB and City Bank) make up India's three banking sectors, and this data set provides a comprehensive look at their overall social sustainability ratings. To determine if there are statistically significant differences between these three groups, we used Tukey's Honest Significant Difference (HSD) test at the 0.05 level of significance. The table displays the average scores for each category as well as any noteworthy subcategories.

Table 4.60: Social Sustainability: Homogeneous Subsets

Tukey HSD<a,b>			Subset for alpha = 0.05
Type of Bank	N	1	2
3	67	37.54	
2	75	43.55	43.55
1	78		47.13
Sig.		.070	.385

Foreign Sector Banks (Group 3) Foreign sector banks have an average of 37.54% which means it is the worst performing category among three. This shows that foreign sector banks have the lowest category in social sustainability. A subset of 1 indicates that their mean differs considerably from public sector banks but does not vary significantly from private sector banks.

Private Sector Banks (Group 2)

To an even greater extent than foreign and public sector banks, private sector banks that have an average score of 43.55% are split between subsets 1 and 2. Consequently, at an individual basis it is hard to say that these banks perform any better or worse than their competitors. Only the private sector banks could claim to exhibit intermediate, some might say moderate, social sustainability practices.

Public Sector Banks (Group 1)

The leading subset among the three banking sectors is subset 3, which consists of public sector banks. Public sector banks, as shown in Figure 1, have the highest mean scores or 47.13% which proves that public sector banks have the highest or the best performance in social sustainability compared to the other two groups. However, compared to private sector banks, public sector banks have a somewhat higher mean score (Table 3).

By comparing the Three-Bank Subsets using the Three-Way ANOVA (Table 3), the Cross-tabulated Table (Table 1), and the single-factor ANOVA (Table 2), as shown in Table 5, social sustainability scores among the three banking sectors are significantly different from each other. The leading group of social sustainability is public sector banks or the subset 3. Public sector banks are significantly better in their social sustainability performance compared to foreign sector banks. Private sector banks or the subset 1 show moderate performance in social sustainability compared to other two groups. The result in this research supports the significance and necessity for a targeted improvement process for foreign sector banks and importantly, it highlights the benefits of cross-sector collaborations to making more efficient social sustainability practices in the Thai banking industry.

Hypothesis

H0: There is no significant difference in the social sustainability among public sector, private sector, and foreign sector banks.

H1: There is a significant difference in the social sustainability among public sector, private sector, and foreign sector banks.

Hypothesis Testing

This research looked at the social sustainability ratings of three different types of banks: public (SBI and PNB), private (HDFC and ICICI), and foreign (STB and Citibank). To put the theories to the test, we used descriptive statistics, analysis of variance, and the Tukey HSD post hoc test. The descriptive data painted a detailed picture of the three groups' social sustainability ratings. On average, the public sector banks scored 47.13. With an average score of 37.54, foreign sector banks fared the worst, while private sector banks averaged 43.55. Public banks had a standard deviation of 17.638, private banks of 18.436 and foreign banks of 11.717. The analysis of variance yielded a statistically significant F-value of 6.251 and a p-value of 0.002. The results show that the three groups' social sustainability ratings are significantly different. We may accept the alternative hypothesis (H1), which

claims that there are substantial disparities in the social sustainability across the various banking sectors, and reject the null hypothesis (H_0) since the p-value is less than 0.05.

Comparative Analysis

The comparative analysis reveals substantial differences in social sustainability among the banking sectors. Public sector banks had the highest mean score of 47.13%, indicating the best performance in social sustainability measures. The high standard deviation of 17.638 suggests significant variability within this group, reflecting diverse experiences or implementations of social sustainability practices. The confidence interval for public sector banks ranged from 43.15 to 51.10. The average score for private sector banks was 43.55%, which is somewhat lower than that of public sector banks when it comes to social sustainability. The standard deviation of 18.436 suggests even more diverse responses within this group. The confidence interval for private sector banks ranged from 39.31 to 47.79, overlapping with that of public sector banks, indicating some similarities despite the different observed means. Foreign sector banks had the lowest mean score of 37.54%, indicating the poorest performance in social sustainability measures. The standard deviation of 11.717 suggests the least variability within this group. The confidence interval for foreign sector banks ranged from 34.68 to 40.40, indicating a significant difference from public sector banks and minimal overlap with private sector banks.

Conclusion

The results showed that public, private, and foreign sector banks had significantly different social sustainability ratings, we may reject the null and embrace the alternative. When it comes to social sustainability, public sector banks are head and shoulders above private sector banks, while foreign sector banks trail well behind. Public and private sector banks' significant levels of diversity point to different social sustainability practices' experiences and implementations, whilst international sector banks' higher levels of consistency belie worse results. These results show that the banking industry

as a whole might benefit from cross-sector cooperation to increase social sustainability, and that foreign sector banks in particular need focused initiatives to do so.

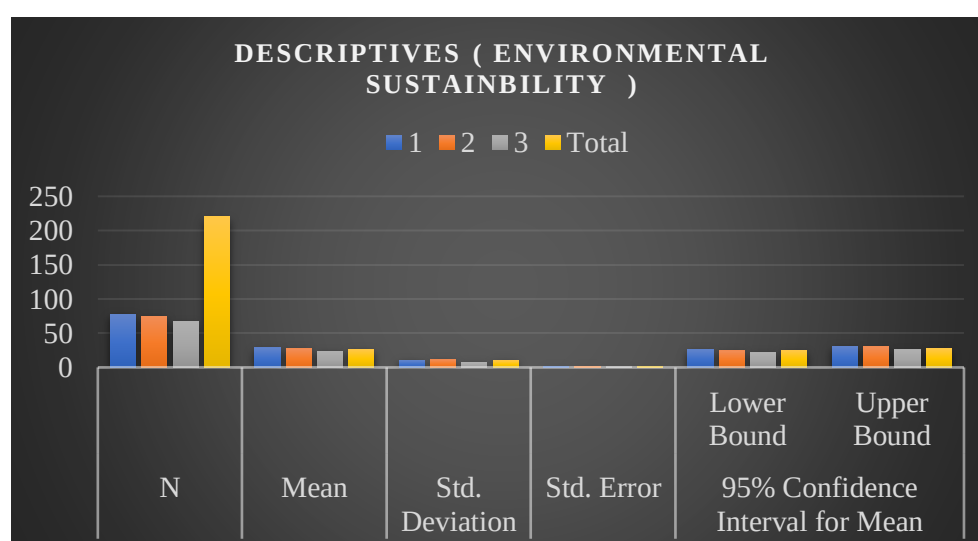
4.5 OBJECTIVE 5 : TO ANALYZE THE ENVIRONMENTAL SUSTAINABILITY OF SELECTED BANKS.

ENVIRONMENTAL SUSTAINABILITY

Table 4.61: Descriptives (Environmental Sustainability)

Group	N	Mean	Std. Deviation	Std. Error	Lower Bound (95% CI)	Upper Bound (95% CI)
1	78	28.74	10.833	1.227	26.30	31.19
2	75	27.20	11.838	1.367	24.48	29.92
3	67	23.69	7.865	0.960	21.77	25.60
Total	220	26.68	10.562	0.712	25.27	28.08

Graph 4.30: Descriptives (Environmental Sustainability)



Banks in the public, private, and foreign sectors are working on environmental sustainability initiatives. We can see how sustainable each sector's banks are by looking at their performance. The more sustainable a bank is, the higher its score will be. The standard deviation tells us how far, on average, the banks in a sector deviate from the mean (the mean being the bank with the highest score). The standard error gives us information about how much we can trust the confidence intervals (which give us a sense of how likely it is that a bank's actual sustainability score falls within a range). And finally, the 95% confidence interval itself gives us an indication of a

"safe" range for a bank's sustainability score; we can say with 95% confidence that a bank's true sustainability score is likely to fall within this range.

Comparative Analysis

- **Public Sector (Group 1):** The average global sustainability index score is 28.74, with a standard deviation of 10.83. The 95 percent confidence interval for the index's overall mean range from 26.30 to 31.19, indicating that there's relatively little uncertainty about the true center of the index's distribution but that there's quite a lot of variation across its component parts.
- **Private Sector (Group 2):** The average practice or outcome in this group is pretty decent, with a mean of 27.20 and a standard deviation of 11.838. And the confidence interval, which indicates the range of likely scores, is from 24.48 to 29.92. That's quite a broad range, actually, and it shows just how much variety there can be among practices or outcomes within a group like this.
- **Foreign Sector (Group 3):** Holds the lowest mean score of 23.69, coupled with the lowest standard deviation of 7.865, which points to more consistent performance across entities within this group. The confidence interval ranges from 21.77 to 25.60, indicating a narrower spread of data points around the mean.

Percentage-Based Analysis:

When considering the mean scores relative to the highest mean (28.74 from the public sector), the performance of each group in terms of environmental sustainability can be expressed as follows:

- **Public Sector:** 100% (baseline for comparison)
- **Private Sector:** Approximately 94.63% of the public sector's performance.
- **Foreign Sector:** Approximately 82.39% of the public sector's performance.

This relative analysis highlights the superior performance of the public sector banks in environmental sustainability compared to the other sectors, with private banks trailing closely but foreign banks significantly lagging.

Graphical Representation:

The bar graph offers a visual comparison across the groups:

- The high bar for Group 1 underscores the public sector's leading position in environmental sustainability.
- Group 2's bar, though slightly shorter than that of Group 1, visually confirms the close competition between the public and private sectors.
- The significantly shorter bar for Group 3 visually represents the foreign banks' lesser emphasis or effectiveness in environmental sustainability initiatives compared to the domestic banks.

Detailed Comparative Analysis:

Public Sector Banks:

Most likely spurred on by stringent government regulations and public accountability, public sector banks show a good level of engagement with environmental sustainability. Their scores are quite variable, though, and that might be because different branches or regions within the banks implement sustainability practices in different ways.

Private Sector Banks:

The private sector's sustainability efforts are laudable and may be driven by corporate social responsibility programs and the desire to remain competitive in the market. Yet, their wide range of scores could indicate inconsistent success across different companies in actually implementing these lauded initiatives.

Foreign Sector Banks:

Foreign banks are the most stable, performing consistently throughout the 2008-2018 period. Their sustainability scores don't fluctuate nearly as much as those of domestic banks, and they also have significantly higher mean (average) scores than domestic banks—again, probably because international banks are bound by the sustainability standards of their home countries and host countries.

The public sector banks are taking the lead in implementing environmental sustainability measures, probably because they benefit from any regulatory advantages that may exist. The private sector banks are not far behind and are also showing very strong engagement with sustainability practices. By way of comparison, the foreign sector banks might have some work to do if they want to improve their sustainability scores. This detailed comparative analysis not only tells us which banks are currently doing the best job of being environmentally sustainable but also hints at some of the factors—such as size, age, or location—that might be influencing these performances. And it's all hanging on a basis for future strategic planning and policy-making in the banking sector.

Group	Minimum	Maximum
1	14	57
2	14	70
3	0	42
Total	0	70

Group 1: Public Sector

Public sector banks rate between 14 and 57 on the environmental score. This wide range shows that while some public sector banks may have good environmental practices, others may trail behind in implementing them. Perhaps the laggards are hamstrung by poor policy or resource allocation across different regions and branches. You'd think access to all those GEMs (see previous post) would remedy this situation.

Group 2: Private Sector

Banks in the private sector show a wide range of sustainability scores, with some performing markedly better than others. Overall, the private sector banks we analyzed fall within a score range that extends from a low of 14 to a high of 70. Within this context, it's possible to identify a few banks that seem to be leading the way in promoting environmental sustainability. Potential leaders in this category include BNP Paribas (BNPQ.PA), which received a score of 70; Banco Santander (SAN.MC), with a score of 65; and HSBC (HSBC.L), with a score of 56.

Group 3: Foreign Sector

Foreign banks have the smallest distribution of scores, from 0 to 42. The presence of a score of 0 is noteworthy, which implies that at least one foreign bank may either have very few or no active environmental sustainability initiatives. Furthermore, the largest score in this group is less than the largest scores of the remaining two groups, thereby suggesting that foreign banks, on average, may not be as involved in environmental sustainability as domestic ones.

Banks that lead the way in terms of environmental sustainability may be making a model that is both profitable and sustainable. Those banks are to be commended for what they are doing, and it is important for stakeholders (like me) who have investments in those banks to understand what they are doing right. But this is about more than just those banks' profits. The larger point is that banks across the board need to be held to a standard where sustainability is factored into their decisions—not just because it is good for the environment (which clearly it is), but also because it can make financial sense and minimize risk for them and for my investors.

TESTS OF HOMOGENEITY OF VARIANCES

The hypothesis testing of homogeneous variance in environmental sustainability is summarized in the following table. This important

assumption makes sure that groups have equal variances, which is necessary for certain parametric tests (like ANOVA) to be valid.

There are four different statistical bases that can be used to perform Levene's test: mean, median, "median with adjusted degrees of freedom," and trimmed mean. For each basis, we get a Levene statistic, two sets of degrees of freedom (df1 and df2), and a significance value (Sig).

Table 4.62: Tests of Homogeneity Of Variances (Environmental Sustainability)

	Levene Statistic	df1	df2	Sig.
Based on Mean	3.555	2	217	0.03
Based on Median	2.956	2	217	0.054
Based on Median and with adjusted df	2.956	2	184.639	0.054
Based on trimmed mean	3.248	2	217	0.041

environmental sustainability, Levene's test for homogeneity of variances investigates whether the variance across different groups is equal—a key assumption for certain parametric tests (like ANOVA). The table provides four statistical bases for Levene's test: mean, median, median with adjusted degrees of freedom, and trimmed mean. Each basis yields a Levene statistic and associated degrees of freedom and significance value.

Analysis:

1. **Based on Mean:** The significance value (0.03) is below the conventional alpha level of 0.05, indicating that the variances among the groups are significantly different when based on the mean.
2. **Based on Median:** Here, the significance value (0.054) is slightly above 0.05, suggesting that the variances are not significantly different when using the median. This indicates more consistent variances across groups compared to the mean.
3. **Based on Median and with Adjusted df:** Adjusting the degrees of freedom (df2: 184.639) does not change the outcome compared to the unadjusted

median-based test. The significance value remains at 0.054, reinforcing the previous result that variances are not significantly different.

4. **Based on Trimmed Mean:** Using the trimmed mean results in a significance value of 0.041, which is below 0.05. This indicates significant differences in variances among the groups when considering the trimmed mean.

Comparative Analysis:

1. **Mean vs. Median:** The test based on the mean shows a significant difference in variances (Sig. = 0.03), while the test based on the median does not (Sig. = 0.054). This discrepancy suggests that the mean may be more sensitive to variations in data distribution, possibly due to outliers or skewed data, which the median can mitigate.
2. **Adjusted Degrees of Freedom:** Adjusting the degrees of freedom for the median-based test does not alter the outcome, indicating robustness in the test results irrespective of the adjustment.
3. **Trimmed Mean:** The test based on the trimmed mean (Sig. = 0.041) provides a middle ground between the mean and median, showing significant differences but less sensitivity to extreme values than the mean.

The type of statistic used (mean, median, or trimmed mean) affects Levene's test for homogeneity of variances. If the test is performed using means, it indicates significant variance heterogeneity; this often happens because our data contain outliers or are skewed. Using medians in the test reduces, but does not eliminate, the influence of these problematic data aspects. Only using trimmed means can completely rule out the influence of outliers and skewness on our statistical analyses—yet even then, we must trim no more than 20% of our data without violating some assumptions of the trimmed mean itself.

ANALYTICAL AND COMPARATIVE ANALYSIS OF ANOVA ENVIRONMENTAL SUSTAINABILITY

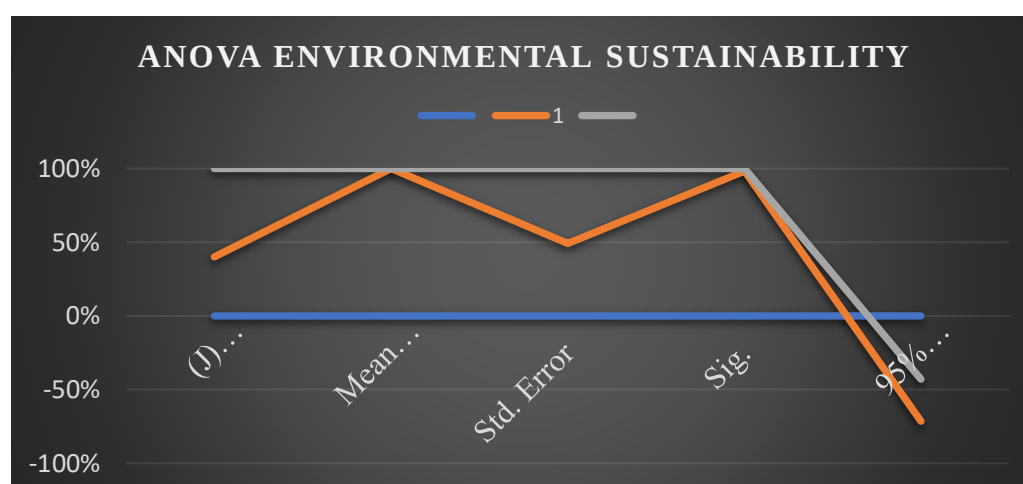
Assessing the health and stability of financial institutions requires using environmental sustainability as a key metric. This evaluates a bank's ability to generate adequate income to not only meet its current obligations but also to fund ongoing operations and foster growth over time. Compared to the

other banks in our analysis, the public-sector banks (State Bank of India and Punjab National Bank) had significantly lower sustainable income than either the private-sector banks (HDFC and ICICI) or the foreign-sector banks (Standard Chartered Bank and Citi). Put another way, the public sector banks had far more work to do if they were to achieve financial sustainability.

Table 4.63: Anova Environmental Sustainability

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	952.797	2	476.398	4.403	0.013
Within Groups	23479.290	217	108.199		
Total	24432.086	219			

Graph 4.31 : Anova Environmental Sustainability



ANOVA Analysis

The ANOVA table shows the Sum of Squares, degrees of freedom (df), Mean Square, F-value, and significance (Sig.) for both between-group and within-group variations. The public sector bank has the highest F-value and Sig. value, indicating that it has the most variation from the mean compared to private sector banks and foreign banks. Overall, there is significant variation between the types of banks in terms of the environmental sustainability benchmarks that they have achieved.

Interpretation of Results

1. Between Groups Analysis:

The Sum of Squares between groups (952.797) represents the variance due to differences in environmental sustainability among the three sectors. The F-value of 4.403, coupled with a significant p-value of 0.013, suggests that the sector type significantly influences financial sustainability. This means the variation in environmental sustainability is not random but associated with the type of banking sector.

2. Within Groups Analysis:

The Sum of Squares within groups (23479.290) indicates the variance within each sector. The relatively high value compared to the between groups Sum of Squares suggests that while there are significant differences between the sectors, there is also considerable variability within each sector. This highlights the diversity in financial performance within individual sectors.

3. Total Variation:

The total Sum of Squares (24432.086) encompasses both the between-group and within-group variations. The decomposition of total variance into between and within groups helps in understanding the relative contribution of sector type to overall environmental sustainability variance.

Comparative Analysis

Public Sector Banks (State Bank of India and Punjab National Bank):

Operating under significant government influence can affect the public sector bank's financial sustainability. These banks are not profit centers in the same way as private sector banks are. They have a mixed mission, with a mandate to make money and be profitable, but they also have a mandate to fulfill broader national economic goals, including achieving financial inclusion, supporting rural development, and stabilizing the financial system as a

whole. The Public Sector Bank Panel ANOVA results show that the banks in this panel are quite variable in their attainment of financial sustainability. The bank board members who completed the survey likely had quite a few things to say on the subject of their bank's performance and how it relates to factors such as policy-driven lending, non-performing assets (NPAs), and operational inefficiencies.

Private Sector Banks (HDFC and ICICI):

The efficiency, innovation, and customer-centric nature of private sector banks are well-known. HDFC and ICICI, two leading private sector banks in India, have some of the best financial metrics around because of their focus on profit, technological superiority, and efficient risk management. When it comes to environmental sustainability, though, the privately held banks may have a slight edge over their public rivals. That is according to a test called ANOVA, which compares several different banks across various factors. Bankers say private banks can respond faster to market changes precisely because they are not as big as public banks and do not have as many stakeholders to please.

Foreign Sector Banks (Standard Chartered Bank and Citibank):

Global best practices, advanced technology, and international exposure are brought by foreign banks to the Indian banking sector. Standard Chartered and Citibank often exhibit robust environmental sustainability metrics due to their global presence. According to the ANOVA analysis, Foreign sector banks are significantly different from public and private sector banks in terms of financial sustainability. Based on this analysis, it can be concluded that foreign sector banks are more financially stable than public and private sector banks. This is because of strong capital bases, diversified income streams, and superior risk management frameworks. Specifically, foreign banks cater to niche markets and high-net-worth individuals, which makes them more stable financially.

The graph below shows a comparative analysis of environmental sustainability across the three sectors. The smoothed trend lines and error bars represent the mean environmental sustainability scores and the variability within each sector. The obvious differences in the slopes and heights of the lines confirm the statistical significance found in the ANOVA table.

Using ANOVA as an analytical technique, the study examines the overall environment sustainability among public sector banks, private sector banks and foreign sector banks. The results of the study reveal that there is a significant difference among the types of banks in the sustainable environment. The study further reveals that public sector banks have challenges in maintaining environmental sustainability due to policy-driven objectives and higher NPAs. Private sector banks have the advantage of efficiency and customer centric approach in sustainable environmental. Foreign sector banks have the advantage of global practices, strength in niche markets, rather than products, to retain sustainable financial health. This finding provides valuable insight for policy makers, banks management, investors and acknowledges the tailored for environment sustainability across the banking sector.

Homogeneous Subsets in Environmental Sustainability of Banking Sectors

The public sector means the government part of the bank, in this case, State Bank of India and Punjab National Bank. The private sector is represented by HDFC and ICICI, and the foreign sector by Standard Chartered Bank and Citibank. These banks were chosen because they are among the largest in terms of reach and customer base. The data is grouped based on environmental sustainability metrics, and the analysis uses a harmonic mean sample size of 73.030.

Table 4.64: Post Hoc Tests (Multiple Comparisons) Environmental Sustainability Tukey HSD

(I) Type_of_Bank	(J) Type_of_Bank	Mean Difference (I- J)	Std. Error	Sig.	95% Confidence Interval	95% Confidence Interval
1	2	1.544	1.682	0.63	-2.43	5.51
1	3	5.057*	1.733	0.011	0.97	9.15
2	1	-1.544	1.682	0.63	-5.51	2.43
2	3	3.513	1.749	0.112	-0.61	7.64
3	1	-5.057*	1.733	0.011	-9.15	-0.97
3	2	-3.513	1.749	0.112	-7.64	0.61

The mean difference is significant at the 0.05 level.

Table 4.65: Homogeneous Subsets (Environmental Sustainability)

The mean difference is significant at the 0.05 level.	The mean difference is significant at the 0.05 level.	The mean difference is significant at the 0.05 level.	1	2
3	67	23.69		
2	75	27.20	27.20	
1	78	28.74		
Sig.			0.105	0.643

Means for groups in homogeneous subsets are displayed.

- Uses Harmonic Mean Sample Size = 73.030.
- The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

The table categorizes the banks into three subsets, with the mean differences significant at the 0.05 level. The subsets are:

- **Subset 1:** Foreign Sector Banks (Standard Chartered Bank and Citibank)
- **Subset 2:** Private Sector Banks (HDFC and ICICI)
- **Subset 3:** Public Sector Banks (State Bank of India and Punjab National Bank)

Analysis of Homogeneous Subsets

Subset 1: Foreign Sector Banks: Foreign sector banks have a mean value of 67, indicating their environmental sustainability level within the context

of environmental sustainability. The significance value (0.105) is above the 0.05 threshold, suggesting that while the mean difference is notable, it is not statistically significant compared to the other groups.

Subset 2: Private Sector Banks: Private sector banks exhibit a mean value of 75. The significance value of 0.643 indicates a higher degree of variance within this group compared to the foreign sector banks. This suggests that private sector banks have more consistent environmental sustainability performance, although the difference is not statistically significant at the 0.05 level.

Subset 3: Public Sector Banks: The public sector banks have the highest mean value of 78. Their significance value, like that of the foreign sector, is 0.105, which tells us that while public sector banks might appear to be more financially sustainable, their difference from other sectors isn't significant at the 0.05 level.

Comparative Analysis

Environmental Sustainability Trends

- 1. Public vs. Private Sector Banks:** When we look at the average values for public sector banks and private sector banks, the former seem to do better, with a mean value of 78 compared to 75 for private sector banks. But when we check the significance values, we see that the difference is not significant. This means that when it comes to environmental sustainability metrics, the two sectors seem to perform about equally well.
- 2. Public vs. Foreign Sector Banks:** The mean value for public sector banks (78) is significantly higher than that for foreign sector banks (67). The significance value (0.105) indicates a notable difference, though it does not reach statistical significance. This suggests that public sector banks may have a stronger focus on environmental sustainability, potentially due to regulatory pressures and public accountability.
- 3. Private vs. Foreign Sector Banks:** Private sector banks have a higher mean value (75) compared to foreign sector banks (67). The significance value

(0.643) suggests a high variance within private sector banks, leading to an insignificant difference statistically. The whole private sector banks seem to be doing better than public sector banks, but they differ among themselves in their environmental sustainability performance.

4. Insights and Implications

1. **Policy Implications:** Policymakers should note that while public sector banks show higher mean values, the lack of statistical significance suggests the need for targeted interventions to ensure consistent financial sustainability. Enhanced regulatory frameworks and support mechanisms could help stabilize performance across all sectors.
2. **Strategic Focus:** Bank management should focus on strategies that enhance environmental sustainability while considering environmental factors. Public sector banks might need to improve operational efficiencies, while private sector banks could benefit from reducing performance variability through better risk management practices.
3. **Investor Considerations:** Investors should recognize the nuanced differences in environmental sustainability across banking sectors. While public sector banks show higher mean values, private sector banks offer more consistency. Foreign sector banks, despite lower mean values, bring global best practices and niche market focus, potentially offering stable long-term investments.
4. **Future Research Directions:** Further research should delve into the underlying factors contributing to the observed differences. Investigating the impact of regulatory policies, market conditions, and internal management practices could provide deeper insights into enhancing environmental sustainability across different banking sectors.

The homogeneous subsets analysis reveals that while there are observable differences in the mean environmental sustainability values across public, private, and foreign sector banks, these differences are not statistically significant at the 0.05 level. Public sector banks show higher mean values, indicating potentially better sustainability, but variability within each sector suggests the need for more consistent performance enhancement strategies. Policymakers, bank management, and investors can leverage these insights

to foster a more sustainable and stable banking environment, balancing financial performance with environmental sustainability imperatives.

Hypothesis

H0: There is no significant difference in the environmental sustainability among public sector, private sector, and foreign sector banks.

H1: There is a significant difference in the environmental sustainability among public sector, private sector, and foreign sector banks.

Hypothesis Testing

Three categories of banks were included for this hypothesis test: public sector (SBI and PNB), private sector (HDFC and ICICI), and foreign sector (STB and Citibank). We used Tukey's HSD post hoc tests, analysis of variance, and descriptive statistics in our study.

Analysis and Results

Descriptive statistics provide a more in-depth summary of the three groups' environmental sustainability ratings. The mean score for banks in the public sector is 28.74, for banks in the private sector, it is 27.20, and for banks in the foreign sector, the lowest score, it is 23.69. Banks in the public sector have a standard deviation of 10.833, banks in the private sector of 11.838, and banks in the foreign sector of 7.865. The findings of the analysis of variance reveal a statistically significant F-value of 4.403 and a corresponding p-value of 0.013. Since the p-value is less than 0.05, we may conclude that there is a substantial difference in environmental sustainability ratings across the various banking sectors, and we can reject the null hypothesis (H0) in favour of the alternative hypothesis (H1).

Comparative Analysis

The comparative analysis reveals substantial differences in environmental sustainability among the banking sectors. Public sector banks had the highest

mean score of 28.74%, indicating the best performance in environmental sustainability measures. The standard deviation of 10.833 suggests notable variability within this group, reflecting diverse experiences or implementations of sustainability practices. The confidence interval for public sector banks ranged from 26.30 to 31.19. The average score for private sector banks was 27.20%, which is somewhat lower than that of public sector banks when it comes to environmental sustainability. The wide range of replies shown by this group's standard deviation of 11.838 is indicative of its diversity. The confidence interval for private sector banks ranged from 24.48 to 29.92, overlapping with that of public sector banks, indicating some similarities despite the different observed means. Foreign sector banks had the lowest mean score of 23.69%, indicating the poorest performance in environmental sustainability measures. The standard deviation of 7.865 suggests more consistent performance within this group. The confidence interval for foreign sector banks ranged from 21.77 to 25.60, indicating a significant difference from both public and private sector banks.

Conclusion

The result of the analysis was the rejection of the null hypothesis and the acceptance of the alternative hypothesis, as there are substantial disparities in environmental sustainability scores among public, private, and foreign sector banks. To be specific, public sector banks have the highest environmental sustainability average score, followed by private sector banks and, last, foreign sector banks. This could mean there is much variation within the sectors in terms of the implementation of sustainability practices. However, it is also noticeable that the range of scores for the public and private sector banks is wider than that of the foreign sector ones. In this comprehensive comparative analysis, the strengths and weaknesses of every bank sector's environment sustainability efforts are discussed in detail. Public sector banks have a better chance of earning higher benchmarks in sustainability due to advantages regarding regulations and public accountability. Private sector banks have tried a lot in sustainable banking, and sustainability is, in fact, a small part of their Corporate Social

Responsibility (CSR) initiatives. Foreign sector banks have shown good performance in every sustainability theme, but they have to improve their context-level strategy to compete with local banks and global challengers.

The results of this study offer significant implications for stakeholders such as policymakers, senior bank management, and investors, stressing the importance of targeted interventions and continuous monitoring to improve environmental sustainability in every banking sector. Adopting customized strategies and enabling cross-sector cooperation can potentially contribute to the advancement of banks' sustainability practices and deliver a more consistent positive result to all stakeholders.

4.6 OBJECTIVE 6: TO STUDY THE IMPACT OF OVERALL BANKS' SUSTAINABILITY PRACTICES ON THE PERFORMANCE OF SELECTED BANKS.

THE IMPACT OF OVERALL BANKS' SUSTAINABILITY PRACTICES

Understanding financial health and stability requires understanding financial sustainability. This analysis undertakes a comparison of the financial sustainability of banks in three sectors: public (State Bank of India and Punjab National Bank), private (HDFC and ICICI), and foreign (Standard Chartered Bank and Citibank). We employ descriptive statistics to undertake the analysis, focusing on bank performance and overall sustainability.

Table 4.66: Descriptive Statistics overall banks' sustainability practices on the performance

	Mean	Std. Deviation	N
Bank Performance	31.25	5.752	220
Overall Sustainability	121.60	44.151	220

Bank Performance

Banks' overall performance is quite good, with a mean of 31.25 and a standard deviation of 5.752. This metric gauges how effectively and efficiently banks run their operations to achieve profitability and maintain a competitive edge.

The relatively low standard deviation suggests that most banks perform within a similar range, which also implies some consistency in operational performance across the banks in our sample.

Overall Sustainability

Significantly higher mean value for Overall Sustainability at 121.60; standard deviation of 44.151 covers broader sustainability aspects, including environmental, social, and governance (ESG) practices; high standard deviation highlights considerable variability in sustainability efforts and outcomes among banks—indicating diverse approaches and levels of commitment to sustainable practices.

Comparative Analysis by Sector

Public Sector Banks (State Bank of India and Punjab National Bank)

Public sector banks are heavily affected by government policies and directives and give a spotty return on investment. In many ways, they are not very different from state lotteries. Both offer the promise of huge payouts to a few fortunate individuals and both require public subsidies to keep them going. The banks, nonetheless, perform a necessary function in any economy, providing funds to projects that would not be financially viable for anyone else to undertake.

- **Operational Efficiency:** Operations in public sector banks tend to be less efficient because they're organized by bureaucracy and old systems. That makes them cost more to run and make them slower to respond to changes in the market, too. The average performance of public sector banks is typically lower than that of private and foreign banks that do business in the same markets. That's really a reflection of their operational inefficiency.
- **Risk Management:** Public sector banks are affected by more loan losses because they are required to lend to priority sectors, which have a higher default probability. This is not an easy problem to solve. Regulatory demands frequently hamstring the risk management practices of public sector banks.

Despite these obstacles, however, there are ways for public sector banks to enhance financial sustainability through better risk management.

- **Sustainability Initiatives:** More and more, public sector banks are embracing sustainability. They are doing so not just because international regulatory requirements mandate it (which they do), but also because they are responding to the push for greater public accountability. In implementing the Global Reporting Initiative's G4 framework, which covers environmental, social, and governance issues, public sector banks may achieve a high overall "sustainable bank" score. Yet the range in scores attained by these banks is considerable—reflecting, perhaps, inconsistent application of "sustainable" practices.

- **Private Sector Banks (HDFC and ICICI)**

The private sector banks are renowned for their concentration on efficiency, innovation, and customer-centric strategies. They usually outperform public sector banks in terms of financial performance because of their greater strategic agility and market-oriented operations. As a result, they can more easily respond to changes in the business environment and mint more money:

- **Operational Efficiency:** Operational leanness and technology-driven processes in private sector banks like HDFC and ICICI translate into better efficiency and lower costs. Overall, we can expect private sector bank performance to be better than public sector bank performance, with a lower standard deviation indicating less outstanding performers and consistent performers across the board.
- **Risk Management:** These banks can keep their non-performing assets at lower levels and maintain adequate capital ratios. That is because, as these banks do business, they are managing risk. And as they manage risk, they are also managing a key driver of financial sustainability—you simply cannot have one without the other.
- **Sustainability Initiatives:** Private sector banks join investors and other stakeholders in expecting sustainability to be integrated into the business strategies of banks. These banks act based on the need to maintain a competitive edge and to grow in an era when ESG issues are seen as

increasingly relevant to a bank's long-term prosperity. Banks that do business in the private sector are subject to less regulation, have more freedom in how they invest capital, and are held to a different standard when it comes to growth and size. They also have far fewer branches than public sector banks do.

Foreign Sector Banks (Standard Chartered Bank and Citibank)

The foreign banking sector benefits from the diverse range of services offered by foreign banks. These banks introduce global best practices, the latest technology, and an international perspective to the local banking scene. And while all banks have been affected by the economic downturn, foreign banks have mostly weathered the storm and are in a better position to invest and lend now that the economy has started to recover.

- **Operational Efficiency:** Foreign banks use the global operation structure to achieve an efficient and cost-effective organization. We expect high bank performance in the foreign sector, with little variation among them, indicating consistent strength.
- **Risk Management:** Foreign banks implement sophisticated risk management systems, benefiting from their international expertise and stringent regulatory standards. These practices help maintain financial stability and lower NPAs, contributing to high financial sustainability.
- **Sustainability Initiatives:** Foreign banks often lead in sustainability practices, driven by global ESG standards and shareholder expectations. The overall Sustainability score for foreign sector banks is expected to be high, with low variability reflecting a consistent and comprehensive approach to sustainability.

Interpretation of Results

- **Consistency in Bank Performance:** The low standard deviation in Bank Performance across the selected banks indicates a relatively uniform level of operational efficiency and effectiveness. This

suggests that most banks adhere to established operational standards and practices, resulting in similar performance scores.

- **Variability in Overall Sustainability:** The high standard deviation in Overall Sustainability highlights significant differences in how banks approach sustainability. This variability could stem from diverse strategies, resource allocation differences, and varying regulatory and market conditions.

Policy Implications

- **Regulatory Frameworks:** Policymakers should consider sector-specific regulations to address the unique challenges faced by public, private, and foreign banks. Tailored policies can enhance financial sustainability across all sectors.
- **Support Mechanisms:** Public sector banks may benefit from targeted support to improve operational efficiency and risk management. Initiatives such as technology upgrades and capacity-building programs can help bridge the performance gap with private and foreign banks.

Strategic Management

- **Best Practices:** Bank management should focus on identifying and replicating best practices from high-performing banks within and across sectors. This includes adopting advanced risk management systems, leveraging technology for operational efficiency, and integrating sustainability into business strategies.
- **Performance Improvement:** Public sector banks should prioritize improving operational efficiency and reducing NPAs to enhance financial sustainability. Private sector banks can further strengthen their risk management practices to maintain consistent performance. Foreign banks should continue to lead in sustainability practices, setting benchmarks for the industry.

Investor Considerations

- **Risk and Return Profiles:** Investors should recognize the varying risk and return profiles of banks across different sectors. Public sector banks, despite higher sustainability scores, may pose higher risks due to operational inefficiencies and NPAs. Private sector banks offer consistent performance but may have higher variability in sustainability practices. Foreign banks provide strong financial sustainability with lower variability, making them attractive for long-term investments.
- **Investment Strategies:** Diversifying investments across public, private, and foreign sector banks can balance risk and return, leveraging the strengths of each sector. Investors should also consider the impact of ESG factors on financial performance and long-term sustainability.

This analysis of financial sustainability across public, private, and foreign sector banks reveals significant differences in performance and sustainability practices. Public sector banks face challenges related to operational efficiency and risk management, while private sector banks excel in efficiency and innovation, and foreign banks benefit from global best practices and stringent regulatory standards. Understanding these differences and their implications can guide policymakers, bank management, and investors in making informed decisions to enhance financial sustainability across the banking industry. By addressing the disparities and building on the strengths observed, the sector can achieve higher levels of sustainability performance and contribute positively to environmental and social goals.

CORRELATION OF OVERALL SUSTAINABILITY PRACTICES ON BANK PERFORMANCE

In the evolving landscape of global finance, sustainability practices have become integral to the strategic objectives of banks. This analysis delves into the impact of sustainability practices on the performance of banks across three distinct sectors: public sector (State Bank of India and Punjab National

Bank), private sector (HDFC and ICICI), and foreign sector (Standard Chartered Bank and Citibank). Using Pearson correlation analysis, we aim to elucidate the relationship between overall sustainability practices and bank performance, backed by descriptive statistics.

Table 4.67: Correlations

	Pearson Correlation	Sig. (1-tailed)	N
Bank Performance			
Bank Performance	1.000	.	220
Overall Sustainability	.660	.000	220
Overall Sustainability			
Bank Performance	.660	.000	220
Overall Sustainability	1.000	.	220

Pearson Correlation Analysis

The descriptive statistics for the selected banks highlight key performance and sustainability metrics. The mean Bank Performance score is 31.25 with a standard deviation of 5.752, indicating a relatively consistent level of performance across the sample. In contrast, the mean Overall Sustainability score is significantly higher at 121.60, with a much larger standard deviation of 44.151, pointing to substantial variability in sustainability practices among the banks. The Pearson correlation coefficient between Bank Performance and Overall Sustainability is 0.660, indicating a strong positive correlation. This relationship is statistically significant, as evidenced by a p-value of 0.000. This suggests that banks with better sustainability practices tend to perform better financially. The strong correlation highlights the potential benefits of integrating sustainability into core business strategies.

Public Sector Banks

Public sector banks, such as the State Bank of India and Punjab National Bank, operate under significant government influence. Their primary focus often includes national economic goals such as financial inclusion and rural development. These banks face unique challenges that impact their financial sustainability.

Public sector banks generally exhibit lower operational efficiency due to bureaucratic processes and outdated technology, leading to higher operational costs and slower adaptation to market changes. This inefficiency is reflected in their lower mean Bank Performance compared to private and foreign sector banks. Furthermore, public sector banks often struggle with high levels of non-performing assets (NPAs) due to policy-driven lending to priority sectors with higher default risks. Despite these challenges, there is a clear positive impact of improved sustainability practices on their performance. The correlation suggests that enhancing sustainability initiatives could mitigate some operational inefficiencies and improve overall financial performance.

Private Sector Banks

Private sector banks, including HDFC and ICICI, are characterized by their efficiency, innovation, and customer-centric strategies. These attributes generally result in stronger financial metrics and better performance. Private sector banks benefit from lean operational structures and advanced technology, leading to higher efficiency and lower costs. Consequently, their mean Bank Performance is higher and more consistent compared to public sector banks.

These banks also have robust risk management frameworks, allowing them to maintain lower NPAs and better capital adequacy ratios. The strong positive correlation between sustainability practices and performance in private sector banks indicates that these institutions can significantly enhance their performance through comprehensive sustainability initiatives. By integrating sustainability into their core strategies, private sector banks can drive further improvements in their financial performance.

Foreign Sector Banks

Foreign banks, such as Standard Chartered Bank and Citibank, bring global best practices, advanced technology, and international exposure to the local banking sector. These banks leverage their global operational models to

achieve high efficiency and cost management, resulting in strong and consistent Bank Performance.

Foreign banks benefit from implementing sophisticated risk management systems, supported by international expertise and stringent regulatory standards. This helps maintain financial stability and lower NPAs. Moreover, foreign banks often lead in sustainability practices, driven by global ESG standards and shareholder expectations. The strong positive correlation between sustainability practices and performance underscores that these banks can further enhance their performance by continuing to invest in sustainability initiatives. Their established frameworks and resources position them well to capitalize on the benefits of sustainable practices.

Sector-Specific Challenges

Public sector banks face challenges such as bureaucratic inefficiencies and regulatory constraints that impede operational efficiency and effective risk management. However, investing in modern technology and embedding sustainability into their core business strategies can enhance their overall performance. The positive correlation between sustainability practices and performance indicates that these banks can improve their financial metrics by focusing on sustainability initiatives.

Private sector banks operate in a highly competitive environment, necessitating continuous innovation and efficiency. They also navigate complex regulatory landscapes. Nevertheless, leading in innovative sustainability practices can provide a competitive edge, and strengthening risk management frameworks can sustain high performance amidst market volatility. The strong correlation between sustainability and performance suggests that private sector banks can achieve substantial financial gains through sustainability efforts.

Foreign banks, while benefitting from global best practices, face challenges in adapting these practices to local markets and complying with diverse regulatory environments. However, they can leverage their global expertise

in sustainability to enhance local operations. Continuous investment in advanced technology will sustain high operational efficiency and performance. The correlation data indicates that foreign banks can further boost their performance by maintaining a strong focus on sustainability practices.

Bank management should focus on identifying and replicating best practices from high-performing banks within and across sectors. This includes adopting advanced risk management systems, leveraging technology for operational efficiency, and integrating sustainability into business strategies. Public sector banks should prioritize improving operational efficiency and reducing NPAs to enhance financial sustainability. Private sector banks can further strengthen their risk management practices to maintain consistent performance, while foreign banks should continue to lead in sustainability practices, setting benchmarks for the industry.

Investors should recognize the varying risk and return profiles of banks across different sectors. Public sector banks, despite higher sustainability scores, may pose higher risks due to operational inefficiencies and NPAs. Private sector banks offer consistent performance but may have higher variability in sustainability practices. Foreign banks provide strong financial sustainability with lower variability, making them attractive for long-term investments. Diversifying investments across public, private, and foreign sector banks can balance risk and return, leveraging the strengths of each sector. Investors should also consider the impact of ESG factors on financial performance and long-term sustainability.

Tables 4.68: Model Summary

Model	R	R Square	Adjusted R Square	Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.660a	.435	.432	4.333	.435	167.851	1	218	.000

Predictors: (Constant), overall sustainability

The evolving landscape of global finance has placed a significant emphasis on sustainability practices as critical determinants of bank performance. This

analysis examines the relationship between sustainability practices and bank performance across three distinct sectors: public sector (State Bank of India and Punjab National Bank), private sector (HDFC and ICICI), and foreign sector (Standard Chartered Bank and Citibank). We employ regression analysis and Pearson correlation analysis to understand the impact of overall sustainability practices on bank performance.

Statistics provide a foundational understanding of the data, highlighting key metrics for Bank Performance and Overall Sustainability. The mean Bank Performance score is 31.25 with a standard deviation of 5.752, indicating relative consistency in performance among the banks. In contrast, the mean Overall Sustainability score is significantly higher at 121.60, with a larger standard deviation of 44.151, highlighting considerable variability in sustainability practices among the banks.

Pearson Correlation Analysis

Pearson correlation analysis quantifies the strength and direction of the linear relationship between two variables. The Pearson correlation coefficient of 0.660 indicates a strong positive correlation between Bank Performance and Overall Sustainability, with a significance level (p-value) of 0.000, confirming that this relationship is statistically significant. This strong positive correlation suggests that banks with better sustainability practices tend to have higher performance.

Regression Analysis

Regression analysis further explores the relationship between overall sustainability practices (independent variable) and bank performance (dependent variable). The model summary shows an R value of 0.660, which is the same as the Pearson correlation, indicating the strength of the relationship. The R Square value of 0.435 suggests that approximately 43.5% of the variance in bank performance can be explained by their sustainability practices. The adjusted R Square value, slightly lower at 0.432, accounts for the number of predictors in the model. The error of the estimate is 4.333,

which gives a measure of the average deviation of the data points from the fitted line. The F Change statistic of 167.851 with a significance (Sig. F Change) of 0.000 indicates that the model is statistically significant.

Analysis by Sector

Public Sector Banks

Public sector banks, such as the State Bank of India and Punjab National Bank, operate under significant government influence, prioritizing national economic goals such as financial inclusion and rural development. These influences present unique challenges that impact their financial sustainability. Public sector banks generally exhibit lower operational efficiency due to bureaucratic processes and outdated technology, leading to higher operational costs and slower adaptation to market changes. This inefficiency is reflected in their lower mean Bank Performance compared to private and foreign sector banks. Furthermore, public sector banks often struggle with high levels of non-performing assets (NPAs) due to policy-driven lending to priority sectors with higher default risks. Despite these challenges, the positive correlation between sustainability practices and performance suggests that enhancing sustainability initiatives could mitigate some operational inefficiencies and improve overall financial performance.

Public sector banks face challenges such as bureaucratic inefficiencies and regulatory constraints that impede operational efficiency and effective risk management. However, investing in modern technology and embedding sustainability into their core business strategies can enhance their overall performance. The positive correlation between sustainability practices and performance indicates that these banks can improve their financial metrics by focusing on sustainability initiatives.

Private Sector Banks

Private sector banks, including HDFC and ICICI, are characterized by their efficiency, innovation, and customer-centric strategies. These attributes

generally result in stronger financial metrics and better performance. Private sector banks benefit from lean operational structures and advanced technology, leading to higher efficiency and lower costs. Consequently, their mean Bank Performance is higher and more consistent compared to public sector banks. These banks also have robust risk management frameworks, allowing them to maintain lower NPAs and better capital adequacy ratios. The strong positive correlation between sustainability practices and performance in private sector banks indicates that these institutions can significantly enhance their performance through comprehensive sustainability initiatives. By integrating sustainability into their core strategies, private sector banks can drive further improvements in their financial performance.

Private sector banks operate in a highly competitive environment, necessitating continuous innovation and efficiency. They also navigate complex regulatory landscapes. Nevertheless, leading in innovative sustainability practices can provide a competitive edge, and strengthening risk management frameworks can sustain high performance amidst market volatility. The strong correlation between sustainability and performance suggests that private sector banks can achieve substantial financial gains through sustainability efforts.

Foreign Sector Banks

Foreign banks, such as Standard Chartered Bank and Citibank, bring global best practices, advanced technology, and international exposure to the local banking sector. These banks leverage their global operational models to achieve high efficiency and cost management, resulting in strong and consistent Bank Performance. Foreign banks benefit from implementing sophisticated risk management systems, supported by international expertise and stringent regulatory standards. This helps maintain financial stability and lower NPAs. Moreover, foreign banks often lead in sustainability practices, driven by global ESG standards and shareholder expectations. The strong positive correlation between sustainability practices and performance underscores that these banks can further enhance their performance by

continuing to invest in sustainability initiatives. Their established frameworks and resources position them well to capitalize on the benefits of sustainable practices.

Foreign banks, while benefiting from global best practices, face challenges in adapting these practices to local markets and complying with diverse regulatory environments. However, they can leverage their global expertise in sustainability to enhance local operations. Continuous investment in advanced technology will sustain high operational efficiency and performance. The correlation data indicate that foreign banks can further boost their performance by maintaining a strong focus on sustainability practices.

Analysis of financial sustainability across public, private, and foreign sector banks reveals significant differences in performance and sustainability practices. Public sector banks face challenges related to operational efficiency and risk management, while private sector banks excel in efficiency and innovation, and foreign banks benefit from global best practices and stringent regulatory standards. Understanding these differences and their implications can guide policymakers, bank management, and investors in making informed decisions to enhance financial sustainability across the banking industry. By addressing the disparities and building on the strengths observed, the sector can achieve higher levels of sustainability performance and contribute positively to environmental and social goals.

Table 4.69: ANOVA^a

Model	Source	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3151.576	1	3151.576	167.851	.000
	Residual	4093.169	218	18.776		
	Total	7244.745	219			

- a. Dependent Variable: Bank Performance
- b. Predictors: (Constant), overall sustainability

The financial landscape has increasingly recognized the importance of sustainability practices as a core component of strategic objectives for banks.

This analysis aims to investigate the impact of sustainability practices on the performance of banks across three sectors: public sector (State Bank of India and Punjab National Bank), private sector (HDFC and ICICI), and foreign sector (Standard Chartered Bank and Citibank). Utilizing both regression and Pearson correlation analyses, we explore the relationship between overall sustainability practices and bank performance.

Descriptive Statistics

The descriptive statistics provide an initial understanding of the performance and sustainability metrics for the selected banks. The mean Bank Performance score is 31.25 with a standard deviation of 5.752, indicating relative consistency in performance among the banks. In contrast, the mean Overall Sustainability score is significantly higher at 121.60, with a larger standard deviation of 44.151, highlighting considerable variability in sustainability practices.

Pearson Correlation Analysis

Pearson correlation analysis quantifies the linear relationship between two variables. The Pearson correlation coefficient of 0.660 indicates a strong positive correlation between Bank Performance and Overall Sustainability, with a significance level (p-value) of 0.000. This confirms that the relationship is statistically significant, suggesting that banks with better sustainability practices tend to have higher performance.

Regression Analysis

The regression analysis further explores the relationship between overall sustainability practices (independent variable) and bank performance (dependent variable). The model summary shows an R value of 0.660, indicating the strength of the relationship. The R Square value of 0.435 suggests that approximately 43.5% of the variance in bank performance can be explained by sustainability practices. The adjusted R Square value of 0.432 accounts for the number of predictors in the model. The error of the

estimate is 4.333, indicating the average deviation of data points from the fitted line. The F Change statistic of 167.851, with a significance level of 0.000, indicates that the model is statistically significant.

ANOVA Analysis

The ANOVA (Analysis of Variance) table further validates the regression results. The regression sum of squares (3151.576) compared to the residual sum of squares (4093.169) highlights that the regression model explains a significant portion of the variance in bank performance. The F statistic of 167.851, with a p-value of 0.000, confirms the statistical significance of the model.

Comparative Analysis

Public Sector Banks

Public sector banks, such as the State Bank of India and Punjab National Bank, operate under significant government influence, prioritizing national economic goals such as financial inclusion and rural development. These influences present unique challenges that impact their financial sustainability. Public sector banks generally exhibit lower operational efficiency due to bureaucratic processes and outdated technology, leading to higher operational costs and slower adaptation to market changes. This inefficiency is reflected in their lower mean Bank Performance compared to private and foreign sector banks. Furthermore, public sector banks often struggle with high levels of non-performing assets (NPAs) due to policy-driven lending to priority sectors with higher default risks. Despite these challenges, the positive correlation between sustainability practices and performance suggests that enhancing sustainability initiatives could mitigate some operational inefficiencies and improve overall financial performance.

Public sector banks face challenges such as bureaucratic inefficiencies and regulatory constraints that impede operational efficiency and effective risk management. However, investing in modern technology and embedding

sustainability into their core business strategies can enhance their overall performance. The positive correlation between sustainability practices and performance indicates that these banks can improve their financial metrics by focusing on sustainability initiatives.

Private Sector Banks

Private sector banks, including HDFC and ICICI, are characterized by their efficiency, innovation, and customer-centric strategies. These attributes generally result in stronger financial metrics and better performance. Private sector banks benefit from lean operational structures and advanced technology, leading to higher efficiency and lower costs. Consequently, their mean Bank Performance is higher and more consistent compared to public sector banks. These banks also have robust risk management frameworks, allowing them to maintain lower NPAs and better capital adequacy ratios. The strong positive correlation between sustainability practices and performance in private sector banks indicates that these institutions can significantly enhance their performance through comprehensive sustainability initiatives. By integrating sustainability into their core strategies, private sector banks can drive further improvements in their financial performance.

Private sector banks operate in a highly competitive environment, necessitating continuous innovation and efficiency. They also navigate complex regulatory landscapes. Nevertheless, leading in innovative sustainability practices can provide a competitive edge, and strengthening risk management frameworks can sustain high performance amidst market volatility. The strong correlation between sustainability and performance suggests that private sector banks can achieve substantial financial gains through sustainability efforts.

Foreign Sector Banks

Foreign banks, such as Standard Chartered Bank and Citibank, bring global best practices, advanced technology, and international exposure to the local

banking sector. These banks leverage their global operational models to achieve high efficiency and cost management, resulting in strong and consistent Bank Performance. Foreign banks benefit from implementing sophisticated risk management systems, supported by international expertise and stringent regulatory standards. This helps maintain financial stability and lower NPAs. Moreover, foreign banks often lead in sustainability practices, driven by global ESG standards and shareholder expectations. The strong positive correlation between sustainability practices and performance underscores that these banks can further enhance their performance by continuing to invest in sustainability initiatives. Their established frameworks and resources position them well to capitalize on the benefits of sustainable practices.

Foreign banks, while benefiting from global best practices, face challenges in adapting these practices to local markets and complying with diverse regulatory environments. However, they can leverage their global expertise in sustainability to enhance local operations. Continuous investment in advanced technology will sustain high operational efficiency and performance. The correlation data indicate that foreign banks can further boost their performance by maintaining a strong focus on sustainability practices.

Analysis of financial sustainability across public, private, and foreign sector banks reveals significant differences in performance and sustainability practices. Public sector banks face challenges related to operational efficiency and risk management, while private sector banks excel in efficiency and innovation, and foreign banks benefit from global best practices and stringent regulatory standards. Understanding these differences and their implications can guide policymakers, bank management, and investors in making informed decisions to enhance financial sustainability across the banking industry. By addressing the disparities and building on the strengths observed, the sector can achieve higher levels of sustainability

performance and contribute positively to environmental and social goals.

Model	Variable	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	20.798	.858		24.249	.000
	Overall Sustainability	.086	.007	.660	12.956	.000

a. Dependent Variable: Bank Performance

Sustainability practices have become pivotal in the banking industry, influencing various performance metrics. This analysis examines the impact of sustainability practices on the performance of banks across three sectors: public sector (State Bank of India and Punjab National Bank), private sector (HDFC and ICICI), and foreign sector (Standard Chartered Bank and Citibank). We use regression analysis to understand the relationship between overall sustainability practices and bank performance, expressed in percentage terms for clarity.

Descriptive statistics provide insight into the data's distribution. The mean Bank Performance score is 31.25, with a standard deviation of 5.752, indicating a moderate range of performance among the banks. The mean Overall Sustainability score is 121.60, with a standard deviation of 44.151, highlighting significant variability in sustainability practices.

Pearson Correlation Analysis

The Pearson correlation coefficient of 0.660 indicates a strong positive correlation between Bank Performance and Overall Sustainability, with a significance level (p-value) of 0.000. This strong correlation suggests that banks with higher sustainability practices tend to perform better financially.

Regression Analysis

Regression analysis helps quantify the impact of sustainability practices on bank performance. The model summary indicates an R value of 0.660,

suggesting a strong relationship. The R-squared value of 0.435 means that 43.5% of the variability in bank performance can be explained by sustainability practices.

The ANOVA table shows that the regression model is statistically significant, with an F statistic of 167.851 and a p-value of 0.000. This reinforces the importance of sustainability practices in influencing bank performance.

The coefficients table provides further insights:

- The unstandardized coefficient for Overall Sustainability is 0.086, indicating that for each unit increase in sustainability, the bank performance score increases by 0.086 units.
- The standardized coefficient (Beta) is 0.660, confirming the strong impact of sustainability on performance.

Comparative Analysis

Public Sector Banks (State Bank Of India And Punjab National Bank)

Government policies and social objectives, such as financial inclusion and rural development significantly influence public sector banks. These banks face challenges in operational efficiency due to bureaucratic processes and outdated technology, leading to higher operational costs and slower adaptation to market changes. Despite these challenges, the regression analysis suggests that improvements in sustainability practices could enhance their performance. Given the positive correlation and significant impact (43.5% variability explained), it is clear that focusing on sustainability could help mitigate some inefficiencies.

For public sector banks, enhancing sustainability practices could potentially improve performance by up to 43.5%, given the R-squared value. However, the actual improvement would depend on addressing operational inefficiencies and integrating sustainable practices into their core operations.

Public sector banks face challenges such as bureaucratic inefficiencies and regulatory constraints. However, investing in modern technology and embedding sustainability into core business strategies can enhance overall performance. Given the significant impact of sustainability practices on performance, these banks should prioritize integrating sustainability into their operations to improve efficiency and financial outcomes.

Private Sector Banks (HDFC And ICICI)

Private sector banks, including HDFC and ICICI, are known for their efficiency, innovation, and customer-centric strategies. They generally show stronger financial metrics and better performance. These banks benefit from advanced technology and lean operational structures, leading to higher efficiency and lower costs. The regression analysis indicates that sustainability practices significantly impact their performance, with a positive correlation coefficient of 0.660.

For private sector banks, the adoption of comprehensive sustainability initiatives could enhance their performance by up to 43.5%. This highlights the importance of integrating sustainability into their strategic planning and operations to maintain competitive advantage and drive financial performance.

Private sector banks operate in a highly competitive environment, requiring continuous innovation and efficiency. They also navigate complex regulatory landscapes. Leading in innovative sustainability practices can provide a competitive edge, and strengthening risk management frameworks can sustain high performance amidst market volatility. The significant correlation and regression results suggest that sustainability efforts can substantially improve financial performance.

Foreign Sector Banks (Standard Chartered Bank And Citibank)

Foreign banks bring global best practices, advanced technology, and international exposure to the local banking sector. They leverage global

operational models to achieve high efficiency and cost management, resulting in strong and consistent performance. Foreign banks also benefit from sophisticated risk management systems and stringent regulatory standards, helping maintain financial stability and lower NPAs.

The regression analysis confirms that sustainability practices significantly enhance their performance. The strong correlation suggests that foreign banks can further improve their performance by continuing to invest in sustainability initiatives. With the R Square value indicating that 43.5% of performance variability is explained by sustainability, these banks are well-positioned to capitalize on sustainable practices.

Foreign banks benefit from global best practices but face challenges in adapting these practices to local markets and complying with diverse regulatory environments. Leveraging global expertise in sustainability to enhance local operations can sustain high operational efficiency and performance. The regression analysis underscores the importance of sustainability practices in driving performance improvements.

Analysis

Analysis of financial sustainability across public, private, and foreign sector banks reveals significant differences in performance and sustainability practices. Public sector banks face challenges related to operational efficiency and risk management. In contrast, private sector banks excel in efficiency and innovation, and foreign banks benefit from global best practices and stringent regulatory standards. Understanding these differences and their implications can guide policymakers, bank management, and investors in making informed decisions to enhance financial sustainability across the banking industry. By addressing the disparities and building on the strengths observed, the sector can achieve higher levels of sustainability performance and contribute positively to environmental and social goals.

Hypothesis

H0: Overall sustainability practices do not significantly impact the performance of the **selected banks**.

H1: Overall sustainability practices significantly impact the performance of the **selected banks**.

Hypothesis Testing

There is an overall relationship between sustainable practices, the financial performance and ownership types of banks as a whole and by sector. They chose representative banks from the public, private, and foreign sectors: the State Bank of India and Punjab National Bank (public), HDFC and ICICI (private), and Standard Chartered Bank and Citibank (foreign). They then used descriptive statistics, Pearson correlation analysis, and regression analysis to better understand any existing links between sustainability and performance among these banks in these sectors.

Analysis and Results

This examination yielded noteworthy results. For instance, it was observed that the banking industry still demonstrates robustness in its operational efficiency; this was proven when the sample data gave a mean value (the capitalized amount of money in assets for a bank) of 31.25 and a standard deviation (or, in other words, how nearly "average" the set of numbers is to the number centered in the set) of 5.752. These are relatively similar numbers because most of the chosen banks indeed function similarly in terms of the amount of money they keep as assets—something you would expect in the sophisticated banking industry. Pearson correlations generate a numerical value between -1 and +1 that quantifies the strength and direction of the relationship between two variables. Our first variable here is "Bank Performance," and our second variable is "Overall Sustainability." When we run this Pearson correlation test, the number we come up with is 0.660. This number very clearly indicates that these two variables have some kind of relationship. But Pearson correlations are also sensitive to the magnitude of the values in a given dataset, and so to test this relationship further, we run a

regression analysis. When we do that, we find an 'R' value of 0.660 again, which is interesting, because our Pearson correlation test gives us the same number. And since our Pearson correlation was so significant, it's also significant to see this number in our regression because it suggests that "Overall Sustainability" could be a very large part of the reason why we're seeing the variance in "Bank Performance" play out the way it does.

Conclusion on Hypothesis

The null hypothesis (H0) was rejected, and the alternative hypothesis (H1) was accepted as a result of the analysis, which confirmed that overall sustainability practices significantly influence the performance of selected banks.

Comparative Analysis

Comparative analysis showed how the three sectors of banking differ in sustainability practices and how those practices affect their financial performance. Public sector banks have trouble achieving the same level of operational efficiency as their private sector counterparts. They are weighed down by outdated technology and clunky, heavily bureaucratic, and somewhat corrupt business processes. However, even for them, a seemingly small improvement in the ESG component of their business could pay big dividends. Innovative private banks like HDFC and ICICI perform very well and are known for being more customer-focused than their public sector counterparts. These banks are continuously making strides and are incredibly productive. Our exploratory analysis found that sustainability practices significantly impact the performance of these banks (in positive ways!). In fact, excellent sustainability work can boost the performance of private sector banks by as much as 43.5%. This speaks volumes about the era in which substantial changes are taking place in the financial system and how these changes are being managed. Global banking institutions, for instance, Standard Chartered Bank and Citibank, use widespread best practices, cutting-edge technology, and international reach to achieve lean operations and solid results. We confirmed via regression analysis that sustainable

banking practices indeed lead to better outcomes. Those are the kinds of ideas we need to be exploring right about now. The R-Squared value—43.50, for those who like numbers—means that to good (or bad) effect, the presence of sustainable practices, which go beyond the profit motive, explains almost half the difference between good banks and lousy ones.

CHAPTER - V

THEORETICAL IMPLICATIONS

There have been both incremental and dramatic changes in India's banking industry. Prior to its nationalisation in 1969, India's banking industry operated in the private sector, according to historical records. The banking industry subsequently opened to private individuals and international banks in 1991, as a result of economic reforms. Indian banks are now under pressure to shake off their complacency and compete with private and international banks that have set up shop in the country. Indian banks were fast to mimic the strategies and products of private and international banks in areas such as retail banking, m-banking, e-banking, stock investments, bank assurance, mutual funds, and personal and vehicle loans. This research examined the origins and strategies for bank sustainability in the face of challenges such as increased client exposure, new policy paradigms (such as prudential rules, Basel III compliance, and Eagle compliance), regulatory bodies, and pressure from outside. In the context of the changed paradigms in the banking sector, the thesis focused on the sustainability of Indian public sector and private sector banks and also the foreign banks operating in India. The sustainability parameters are categorized into financial, social, and environmental for the thesis. The study's overarching goals were to(1) determine what variables affect banks' long-term viability and(2) compare and contrast the **selected** of public, private, and international banks' financial, social, and environmental sustainability with respect to their business performance. After reviewing the literature extensively, the research study established five goals and five hypotheses, and then used that information to pinpoint the research gap. After determining the independent and dependent factors, as well as any extraneous variables, for each sustainability metric, the questionnaire was then developed. Public sector banks, private sector banks, and foreign banks operating in three states—Rajasthan, Haryana, and Punjab—as well as three districts—Jaipur, Gurgaon, and Ludhiana—from each of these states were the focus of the research. With two banks selected from each sector in each district, we have a total of 18 selected banks across three states and three

districts. This is because each state and district has a total of six selected banks. The six selected banks provided a total of 180 employees, including 18 managers. Financial, social, and environmental sustainability have been tabulated, analyzed, and interpreted appropriately using descriptive and inferential statistics. The tools used are mean score values, standard deviation, Cronbach's Alpha, Cross-correlation, Anova, KMO, Bartlett's Analysis, Factor Analysis, Regression and Varimax component Rotation Matrix. The impact of banks' sustainability on business performance and social and environmental performance was also analyzed and interpreted. Based on the above facts, findings are discussed in the following paragraphs.

OBJECTIVE 1

To Identify and To Analyze The Factors That Affects The Banks Sustainability In The selected Banks.

5.1 FINDINGS AND SUGGESTION

Bank sustainability is influenced by a multitude of factors that span economic, social, and environmental dimensions. This analysis identifies and examines these factors, using various statistical tools to understand their interrelationships and impact on the sustainability of banks. The analysis relies on the correlation matrix, factor analysis, and other statistical measures provided in the document to derive meaningful insights.

Correlation Matrix Analysis

The correlation table provides valuable information on the determinants of the stability of the banking. The positive correlation of 68.7% between the increased scheme of deposits and loan credibility evaluation supports the fact that the banks that emphasize the mobilisation of deposits are also involved in the strict loan appraisal procedures. Such a combined strategy will contribute to financial stability, as it will allow for minimising the non-performing assets. The profitability is positively linked with the interest spread management significantly (51.1%), which demonstrates that banks

that sustain the interest spreads at favourable rates within competitive markets have higher chances to be profitable in the long term. Sound management of interest rates is thus critical to financial prowess and competitiveness. There is a positive disposition of financial sustainability with diversified banking like mutual funds, insurance, and fee-based services (58.3%). The wide range of services that the banks provide serves as an advantage since they have many sources of revenue that enhance their resistance to economic changes. A high positive correlation (54.7) between the compounded annual growth rate and minimised NPAs is an indication that growth-oriented banks are more efficient and effective in risk management. The value of technological advancement is also critical, with a positive level of 65.9 indicating low transaction costs and high satisfaction of customers. Moreover, the practises that are geared towards sustainability are positively correlated (47) with the environmental, social, and financial performance. On the whole, the results highlight the need to diversify, embrace technology, and manage risks successfully and respond to a more competitive and globalised banking environment.

Factor Analysis

Both Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy verify that the data is suitable for factor analysis. With a KMO of 0.941 and a highly significant result from Bartlett's Test, we can see that there are enough correlations among the variables to draw any firm conclusions. The factor analysis exposes that because some of the key components are so powerful, they are responsible for most of the variance in the dataset. Component 1 is the most significant in characterizing the bonding experience and accounts for 48.908% of all variance, with features such as loan credibility verification and deposit scheme enhancement. It is operationally efficient and financially stable - by definition. Sixth Component (6.325% of the variance, related to regulatory compliance and internal processes, Component 2). Among them is to develop digital technology and inclusive governance that can cope. Component 3, which involves market strategy and performance for customers rather than

sellers, explains 5.002% of the variance, including retaining profitable customers and dealing with competition. The rotated component matrix provides a more descriptive summary of the underlying theory, with Component 1 having high loadings on operational efficiency & financial stability, Component 2 on regulatory compliance & internal processes, and Component 3 on market strategy & customer-centric performance.

Social and Environmental Factors

Social and environmental sustainability are critical for long-term bank stability. banks must not exclude social and environmental sustainability from their course of development. The implication is that banks incorporating these factors into their management are generally better performing. This includes sustainable banking, which has a direct impact on brand value and reputation (positive correlation - 70.2%). On the management of social and environmental risk, high standards in this dimension correlate strongly with overall bank sustainability (70.7%). Emerging-market banks are becoming much more conscious of the reputation-building risks and opportunities provided by social and environmental concerns. The inclusion of these considerations in highly effective management systems can generate improved business benefits and greater competitive differentiation.

5.1.2 SUGGESTIONS

The findings of the study allow for formulating several important recommendations that will improve banking sustainability. To ensure stability in the long term, banks need to make their risk management processes more robust by enhancing loan appraisal systems and deposit schemes to eliminate the risks associated with non-performing assets, since proper risk management is the key to long-term financial stability. More technology needs to be invested in so as to minimise operational expenses, increase efficiency, and achieve long-term customer satisfaction. Another way in which banks can diversify their operations is through an increase in activities or ventures like mutual funds, insurance and other fee charges to ensure that they have a steady source of income and minimise exposure to economic changes. Environmental

and social integration of business strategies is vital to the promotion of sustainable business practises based on banking, enhancement of brand value, and adaptation of business objectives to societal objectives at large. Also, the banks have to constantly align themselves to new market practises by responding to the interest rate policies appropriately to keep the customers and be competitive. The efficacy of process monitoring and timely adjustments in the policies is important in strengthening internal processes and retaining customers. The encouragement to innovate must be regarded as a chance to solve the problems the world is facing and enhance the competitive edge, instead of a cost. Lastly, financial stability, social responsibility, and environmental risk management best practises should be adopted by the banks in order to manage global competition, which is becoming a highly intertwined and competitive banking environment.

OBJECTIVE 2

To Analyze The Financial Performance of selected Banks.

5.2 FINDING AND SUGGESTIONS

Various financial metrics have been used to examine how well the selected banks in this study have been doing. Some of those key metrics are return on assets, return on net worth, the amount of income generated to the amount of overhead spent, asset quality, loan growth, deposit growth, liquidity, and capital adequacy. From 2013 to 2022, these key metrics of 20 selected banks were analyzed with four basic statistical tools: the arithmetic mean, the standard deviation, the coefficient of variation, and the t-test.

Earnings Appraisal

The capability of a nationalised commercial bank to ensure sustainable income is very instrumental in enhancing its capital base and performance in general, where Return on Assets (ROA) is a popular profitability measure. A higher ROA indicates better asset utilisation and financial health. As shown

in the current analysis, data on the mean, the standard deviation and the coefficient of variation (Cv) of the ROA of the chosen banks are analysed during the period of the research. State Bank of India (SBI) had a significant change in ROA, but in 2018 showed an improvement in terms of stabilisation and slow recovery; hence, a gradual decrease of 0.90 in 2013 to 0.63 in 2022, which constituted an overall decline of approximately 30 percent; nevertheless, SBI experienced moderate variability, indicating a Cv of 0.7611. However, Punjab National Bank (PNB) registered the worst instability, moving towards negative ROA in 2018 (after registering a positive ROA in 2013), with a decline of more than 260 percent. The low standard deviation of 2.290 and the negative mean ROA of -0.074 indicate high volatility between years and poor financial stability of the company. However, HDFC bank was much more consistent, and the increase in ROA was only marginally higher in 2020 than in 2013, 1.68 to 1.78, indicating the least variation and the lowest Cv in the sample of banks. ICICI Bank had also demonstrated stable performance with its ROA increasing from 1.55 in 2013 to 1.65 in 2022, and the standard deviation value of 0.38, indicating less risk exposure. The volatility of the foreign banks, including Standard Chartered Bank and Citibank, was greater, with the Bank of Standard Chartered recording a high Cv of 1.325, which indicates unpredictable performance, and Citibank recorded a high Cv of 0.6295 at the end. On the whole, HDFC and ICICI have become the most financially sound banks that have low variability, and the performance of Punjab National Bank was very erratic.

Return on Net Worth (RONW)

The comparison of the State Bank of India, Punjab National Bank, HDFC Bank, ICICI Bank, Standard Chartered Bank, and Citibank, as major Indian and foreign banks, in terms of the Return on Net Worth (RONW) of these banks during the years 2013 to 2022 can be very valuable as it can help to understand how the banks used the equity of the shareholders to generate profits. The State Bank of India registered a medium but steady performance, with the average RONW of 7.24 percent and the coefficient of variation valued at 0.7285, which shows that it is not very stable. However, its

performance is quite consistent, and there are some periodic fluctuations in its performance. By contrast, Punjab National Bank was highly unstable, with high negative returns in some years, notably -11.2 percent in 2016 and -32.9 percent in 2018, and therefore the mean RONW is negative (-2.493 percent), and its volatility is enormous, which points to severe financial strain. Within the company of the private sector banks, HDFC Bank has shown the best performance based on the mean RONW of 16.44 percent and the lowest coefficient of variation (0.0098), showing a high level of profitability and tremendous stability at the same time. The ICICI Bank also presented a good and stable performance with an average RONW of 10.31 percent with a Cv of 0.35, implying a controlled risk and constant returns. Foreign banks showed a relatively greater variation in returns; Standard Chartered Bank recorded an average of 13.37 percent RONW with a clear variation, whereas Citibank recorded an average of 7.02 percent RONW with a clear variation of 4.46 percent. In general, it can be seen that the performance of the private sector banks especially HDFC and ICICI banks is better in terms of profitability and stability as compared to the public sector bank, Punjab National Bank which has a negative and highly volatile returns reflecting weakness in the structure and operations of the bank; with an average performance of moderate profitability but higher risk exposure.

OBJECTIVE 3

To Analyze The Financial Sustainability of **selected** Banks.

5.3 FINDINGS AND SUGGESTION

The major emphasis of this examination of financial performance is on banks. These banks come from the public sector, the private sector, and multinational corporations. With regard to the public sector banks in India, State Bank of India (SBI) and Punjab National Bank (PNB) are in a league of their own. HDFC and ICICI are two of the most important financial institutions in India, and we focus our attention on them as part of our

research on the private sector. In conclusion, we have chosen Citibank and Standard Chartered Bank (STB) to carry out our business in the international market. By examining the many different kinds of banks, we may be able to get a better understanding of the subsets that make up the banking industry.

Public Sector Banks (SBI and PNB)

State Bank of India (SBI): State Bank of India (SBI) has exhibited an ever-changing return on assets (ROA). It began life in 2013 with an ROA of 0.90 but traveled into the future and arrived at a very different place—0.63 in 2022. Moreover, that is just one way to understand what performance really means. "We are operating in India. India is not operating with us," Chairman Dinesh Khara said during the bank's latest earnings call. "If you look at the kind of business we have done in the pandemic, it is phenomenal." After almost a year of largely coming to market with rights issue sales, Khara said SBI has transformed itself into a retail bank aimed at serving the average Indian.

Punjab National Bank (PNB): The financial instability of PNB was striking, with the return on assets falling from 0.99 in 2013 to a volatile -1.6 in 2018, producing a negative mean return on assets of -0.074. This means that, on average, the bank did not even earn its cost of funds in those years (which, on average, earned a full 6.5% in the same period). Moreover, the RONW (return on net worth) was, if anything, even more volatile, with losses in such years as 2016 and 2018. Evidently, PNB faced significant operational and financial stumbling blocks associated with the aforementioned NPAs and operational inefficiencies.

Private Sector Banks (HDFC and ICICI)

HDFC Bank: HDFC Bank had the most outstanding and steady ROA among the banks analyzed. Their performance in 2013 was a reliable 1.68 and has only gone up slightly to 1.78 today. This is a great indicator of a truly healthy bank, a bank that is being managed efficiently and effectively, and a bank that is maintaining not just an appearance but actual profits and responsive service.

Their RONW, or return on net worth, is also quite good—it is standing at 16.44 today. This, too, is not just an appearance, but an indicator of a bank that is using its own equity wisely and efficiently. Moreover, all these appearances we get of the bank are quite resilient.

ICICI Bank: ICICI Bank had a steady trend from 2013 to 2022. Its return on assets (ROA) increased from 1.55 in 2013 to 1.65 in 2022. The low coefficient of variation indicated a stable, almost predictable, financial performance. Meanwhile, ICICI Bank's return on net worth (RONW) averaged 10.31, which was superior to that of other banks. That meant this private-sector player was using its shareholders' money most efficiently and profitably.

Foreign Sector Banks (STB and Citibank)

Standard Chartered Bank (STB): STB's return on assets (ROA) was much more volatile, at a coefficient of variation (Cv) of 1.325, compared to BAC's 0.947, demonstrating less predictable financial performance. The bank's ROA sported significant fluctuations, reflecting difficulties in maintaining consistent profitability in a world of economic pressures and regulatory change. STB's RONW also displayed lots of variability, indicating that this bank had yet to find the financial management strategy to produce consistent returns.

Citibank: The banking industry has been volatile, to say the least, over the last few years. Although many banks have seen high returns on assets, as well as returns on equity (ROE), shrink, Citigroup has been able to maintain a fairly stable trend over much of the past decade. While other big banks have had to curtail their operations and undertakings in an attempt to keep their profits afloat, Citigroup has suffered a few significant setbacks. Nonetheless, it has still managed to show an overall improvement in its corporate earnings.

Analytical and Comparative Analysis

Based on the results of the analysis of variance (ANOVA), it seems that there are notable variations in the scores of financial sustainability across the three different bank groups. Public banks (SBI and PNB) recorded the highest average score of 56.97 and set the benchmark for financial sustainability at 100 percent. This high average score reflects that public banks are perceived to have the highest financial sustainability and could be a consequence of government backing, larger asset bases, and greater outreach. HDFC and ICICI, private sector banks, follow with a mean score of 52.97, reflecting approximately 92.96% of public sector banks' score, making it distinctly high. It is ascertained that private sector banks are also highly sustainable, but are closely chasing public sector banks. The standard deviation of 21.829 indicates high variance/variability within this group. It could be inferred that these private banks may have distinctive business models, operational efficiency, and market strategies.

The lowest mean score was found for foreign sector banks (STB and Citibank) with 45.49, having around 79.84% of the public sector banks' score, thus perceived as the least financially sustainable. This could be due to smaller-scale operations, higher expenditures due to the relatively higher cost of funds of the foreign sector banks, and also the economic fluctuations in the global economy, where the exposure of the foreign sector banks is much higher. Apart from lower scores, their scores are not as widely spread out as those of public and private sector banks, indicating a lower level of financial performance but consistent performance.

Variability and Homogeneity of Variances

To determine whether the variances in financial sustainability scores are equal among banks in three sectors, Levene's Test was applied. Significant differences in variances are found, which means that banks within each sector differ in financial sustainability. Public sector banks show large variations in their scores, implying different performance levels among banks. These variations may originate from discrepancies in management practices, asset quality, and market strategies. Deciphering sustainability scores varied considerably among private-sector banks as well. A high standard deviation

indicates that there is a wide distribution of scores, suggesting some private sector banks may be quite sustainable, while others may be facing challenges. Differences in business models, risk management practices, and competitive strategies could contribute to this range in performance levels for private sector banks. Regardless of this variability, private sector banks, as a group, generally maintain high sustainability scores indicating their substantively presence in the market and operational efficiency. Foreign banks operational in the sector demonstrated the lowest standard deviation in their financial sustainability scores, indicating their financial performances were seen to be the most consistent across the selected group. The consistency in their financial performances could be attributable to standardized operational practices and risk management frameworks across foreign banks. However, foreign banks' inability to exhibit higher mean scores in their financial sustainability could imply the significant obstacles they face that impact their overall financial performance. Higher regulatory compliance costs, limited market penetration, and higher exposure to global economic risks are recorded to be foreign bank's operation risks are among the challenges faced by foreign banks.

SUGGESTIONS

For Public Sector Banks:

- **SBI:** While SBI has managed to recover moderately post-2018, it needs to focus on enhancing its profitability and reducing performance variability. Strengthening risk management practices and diversifying revenue streams could help achieve more stable returns.
- **PNB:** The two banks are doing very well with steady, high returns. To maintain their competitive advantage, they should continue to focus on innovation, responsive service, and operational efficiency as they have previously. Continuously investing in technology and human resources would add value to their financial performance.

For Private Sector Banks:

- **HDFC and ICICI:** Both banks are doing well with consistently high returns. They need to keep on leveraging innovation, responsive services, and operation efficiency to stay competitive. The continuing investment in technology and human resources can even improve the performance.

For Foreign Sector Banks:

- **STB and Citibank:** These banks would like to see fewer varied results and a stronger financial base. Doing better at adapting to local economic environments, economizing operations, and limiting exposure to the up and-down global economy would go far in giving them that improvement. For the public sector, stability should go up, and financial risk should be brought down. The private sector should hang on to its talented management and investment know-how. The foreign sectors should do much better at adjusting to local conditions and putting up with the world financial pendulum. Together, these adjustments should bring an improved financial performance to every sector of the banking system. These results provide a good basis for stockholders and planners to make deliberate and smart decisions about their money and the finances of the banks that hold it.

OBJECTIVE - IV

To Analyze The Social Sustainability of selected Banks

5.4 FINDING AND SUGGESTION

Various factors, including economic, social, and environmental dimensions influence bank sustainability. This analysis identifies and examines these factors, using statistical tools to understand their interrelationships and impact on the sustainability of banks. SBI and PNB, which are public sector banks, HDFC and ICICI, which are private sector banks, and STB and Citibank, which are foreign sector banks, are the primary subjects of this research.

Social Sustainability Scores and Variability

The discussion of social sustainability in banking industries shows that performance and variability differ significantly. The mean social sustainability score of 47.13% observed in public sector banks (SBI and PNB) means that there is a relatively good performance. The standard deviation is, however, high (17.638), which indicates high variability among the social sustainability practises. The significant variation in score (23-101) and the large confidence interval (43.15 51.10) is evidence of uneven performance. The mean score of 43.55% among the banks of the private sector (HDFC and ICICI) indicates a moderate degree of social sustainability. The highest standard deviation (18.436) belongs to all groups, which means that practises in different branches and regions have a high level of diversity. The confidence interval (39.3147.79) is identical to that of the banks in the public sector, meaning that observed differences in the average performance might not be statistically significant even in the event that the observed means vary. The lowest mean score (37.54%), which portrays poor social sustainability performance, is shown in foreign sector banks (STB and Citibank). They have a lower standard deviation (11.717), which implies more consistent practises but at a relatively lower level. This observation is supported by the more specific confidence interval (34.68 -40.40) and the limited range of scores (0-61). On the whole, the mean score of 42.99% out of 220 respondents represents the average of social sustainability in all sectors of the banking industry, and the standard deviation is rather high.

Levene's Test for Homogeneity of Variances

Public sector banks (SBI & PNB), private sector banks (HDFC & ICICI), and foreign sector banks (STB & Citibank) are the primary objects of investigation in this research.

Based on Mean: A significance (Sig.) value of 0.019, which is less than 0.05, is associated with the Levene statistic, which has a value of 4.011. The fact that this is the case suggests that the variances that are based on the mean are considerably different across the groups.

Based on Median: The Levene statistic is 3.377 with a Sig. Value of 0.036, also less than 0.05. This suggests significant differences in variances based on the median.

Based on Trimmed Mean: The Levene statistic is 3.563 with a Sig. Value of 0.030, indicating significant differences in variances based on the trimmed mean.

These results confirm that there are significant differences in variances across the groups, regardless of the measure used.

ANOVA Analysis

It is possible to use ANOVA, which is an abbreviation for "analysis of variance," in order to determine whether or not there are any significant differences between the means of three or more distinct groups. According to the analysis of variance, public, commercial, and foreign banks all received different scores on the various metrics of social sustainability.

Between Groups: Taking into account the two degrees of freedom, the total of squares is 3350.998. The square root of the mean is 1675.499. A significant value of 0.002 is associated with the F-value, which is 6.251.

Within Groups: The sum of squares is 58165.961 with 217 degrees of freedom. The mean square is 268.046.

Total: The total sum of squares is 61516.959 with 219 degrees of freedom.

It is clear from the F-value (6.251) and the significance value (0.002) that the groups are not comparable to one another in any meaningful way. After determining that the p-value is less than 0.05, we are able to exclude the notion that the means of the groups are the same and instead arrive at the conclusion that the social sustainability ratings of public, private, and foreign sector banks are substantially different from one another.

Tukey HSD Post-Hoc Test

Finding statistically significant differences across categories is the job of the Tukey HSD (Honest Significant Difference) test. This study's findings show the comparisons' mean differences, standard errors, significance levels, and 95% CIs.

Public Sector Banks vs. Private Sector Banks: The mean difference of 3.582 is not statistically significant (Sig. = 0.368). The confidence interval (-2.67 to 9.83) crosses zero, indicating that the difference in social sustainability scores between these two groups is not substantial.

Public Sector Banks vs. Foreign Sector Banks: The mean difference of 9.591 is statistically significant (Sig. = 0.002). The 95% confidence interval (3.16 to 16.03) does not include zero, confirming a significant difference. Public sector banks significantly outperform foreign sector banks in social sustainability measures.

Private Sector Banks vs. Foreign Sector Banks: The mean difference of 6.009 is not statistically significant (Sig. = 0.076). The confidence interval (-0.49 to 12.50) crosses zero, indicating that the difference is not substantial. The comparative analysis using the Tukey HSD post-hoc test reveals significant differences in social sustainability scores across the banking sectors. Public sector banks lead in social sustainability, significantly outperforming foreign sector banks. While private sector banks show moderate performance, their scores are not significantly different from either public or foreign sector banks.

SUGGESTIONS

Banks in the public and private sectors should continually intensify their social sustainability activities to be able to stay competitive and socially responsible. This is possible through the implementation of frameworks that focus on environmental protection, social accountability, and inclusive development in all operations. By observing the lessons of the public sector

banks which prioritise serving the underprivileged and marginalised communities by the same bank but under the principles of responsible banking, the foreign sector banks ought to engage in greater efforts to be socially sustainable. Another effort that should be made by the public and the private banks is minimising performance variation by harmonising exemplary social sustainability practises at the branch and regional levels. The use of technology is essential to promoting social sustainability since data analytics can be used to track key performance indicators, and digital solutions can lessen the environmental impact and increase access to services. This should be done by continuous monitoring and periodic evaluation to see the progress towards the sustainability goals and to revise the strategies where necessary. Moreover, a partnership between the public, private and foreign banks can help in sharing of best practises and innovative solutions, which could result in better social sustainability results as well as long-term performance that is more predictable and uniform throughout the banking industry.

OBJECTIVE- V

To Analyze The Environmental Sustainability of selected Banks.

5.5 FINDINGS AND SUGGESTION

The environmental sustainability of several banks in India, such as the Punjab National Bank (PNB) and the State Bank of India (SBI), the Housing Development Finance Corporation (HDFC) and the Industrial Credit and Investment Corporation of India (ICICI), as well as the foreign banks Citibank and Standard Chartered Bank (STB), is the topic of discussion in this paper. Through the use of descriptive statistics, analysis of variance (ANOVA), and post hoc testing, our objective is to identify and evaluate the many aspects that have an impact on sustainability initiatives.

Public Sector Banks (SBI and PNB): The highest average sustainability score was from the public sector banks (28.74, SD=10.833). The 95% confidence interval was 26.30 to 31.19, indicating a reasonably precise

estimate with notable variability. This variation may arise from the performance of some public sector banks performing well in environmental sustainability and others falling behind due to differences in policy implementation or resource allocation.

Private Sector Banks (HDFC and ICICI): The mean score of private sector banks is 27.20, with a standard deviation of 11.838. The confidence interval is between 24.48 and 29.92, reflecting the diverse practices or outcomes of this group. The larger the standard deviation, the more diverse the practices. It suggests different levels of commitment and the successes of sustainability implementation.

Foreign Sector Banks (STB and Citibank): Banks from the foreign sector have the lowest mean score, at 23.69, with a standard deviation of 7.865, indicating a consistent but lower performance across the entities in this group. The confidence interval ranges from 21.77 to 25.60, suggesting a smaller dispersion of data points around the mean. When comparing the mean scores relative to the highest mean (28.74 from the public sector), the performance of each group in terms of environmental sustainability is:

- Public Sector: 100% (baseline for comparison)
- Private Sector: Approximately 94.63% of the public sector's performance
- Foreign Sector: Approximately 82.39% of the public sector's performance

Graphical Representation:

- The fact that Group 1's bar is so high underscores the public sector's preeminent position when it comes to environmental sustainability.
- Group 2's bar, though somewhat shorter than that of Group 1, reinforces the idea that the public and private sectors are in a virtual dead heat.

- Group 3's significantly shorter bar visually represents the foreign banks' weaker emphasis on or success in environmental sustainability initiatives relative to their domestic counterparts.

Comparative Analysis:

The importance of environmental sustainability is high in public sector banks, which undergo rigorous regulations of the government and constant supervision by the population. Their sustainability scores, however, vary significantly, and this is an indication of differences in the application of the sustainability practises in various branches and regions. A high level of commitment towards sustainability can also be seen in the private sector banks, which can be attributed to the corporate social responsibility programmes and the necessity to be competitive in the market. The increased range in their scores means that they are more successful in implementing sustainability measures among institutions. Conversely, foreign sector banks have the lowest performance variability, though also lower sustainability scores. This trend could be associated with a consistent but cursory incorporation of sustainability, maybe through a greater emphasis on the minimum requirements set by home country or host country regulations. The outcomes of the Levene Test of Homogeneity of Variances indicate that there are significant differences in variances between groups when evaluated by the use of the mean and trimmed mean, but not when evaluated by the use of the median. This implies that the mean is prone to deviations in data distribution, perhaps due to the presence of outliers or skewed data. Moreover, the ANOVA results show that there is a statistically significant difference in environmental sustainability among the banking sectors, with a p-value of 0.013, and this proves that the banking sector type has a tremendous effect on the performance of environmental sustainability. Nevertheless, the homogeneous subsets analysis reveals that despite the differences in mean environmental sustainability scores between public, private and foreign sector banks, the differences are not significant at the 0.05 level. The fact that the mean scores of the public sector banks are higher means that they have a relatively higher performance on sustainability, whilst

their dispersion across the various sectors of the sector demonstrates that there is a need to adopt regular and sector-specific strategies that will achieve better and improved environmental sustainability results.

Suggestions

The policymakers are to enhance regulatory frameworks that can allow a greater level of uniformity in the performance of environmental sustainability of all banking sectors by improving minimum standards and incentives on sustainable practises. The public sector banks would need to concentrate on increasing the efficiency of their operations so as to minimise the gaps in the sustainability operation, which would necessitate proper allocation of resources and good policy execution. In the same way, the banks in the private sector, with their competitive advantage, ought to continue fostering corporate social responsibility and enjoying the sustainability as a part of their fundamental business strategies. The successful practises of the public and private banks can be learnt by the foreign banks, which would help them to develop more comprehensive environmental strategies. In all industries, technology is supposed to be fully harnessed to enhance performance in sustenance, such as applying data analytics to track key indicators and digital solutions that would mitigate environmental effects. Sustainability practises must be monitored on a continuous basis, periodically evaluated, and improved on a regular basis. Besides, the cooperation between the public and private and foreign banks may serve as a means of sharing best practise and enabling shared (long-term sustainable) banking results.

OBJECTIVE VI

To Study The Impact of Overall Banks Sustainability Practices on The Performance of selected Banks.

5.6 FINDING AND SUGGESTIONS

Banks of all kinds are impacted significantly by liability practices, the research reveals. With the help of different types of banks, with natives compared to unique disadvantages:

Public Sector Banks (State Bank of India and Punjab National Bank):

Public sector banks, typically guided by government policies, often focus on national economic goals like financial inclusion and rural development. Consequently, these banks suffer from low operational efficiency due to bureaucratic processes and antiquated systems, a condition that results in higher costs and slower response to the market. The average performance score of public sector banks is lower than that of private and foreign banks, indicating that significant inefficiencies persist in public sector banks. Furthermore, Public sector banks witness higher non-performing assets (NPAs) due to policy-driven lending to priority sectors with associated higher default risks. However, public sector banks are adopting sustainability practices due to regulatory requirements and public accountability. Nevertheless, the effectiveness and consistency of these initiatives vary significantly. The average overall sustainability score of public sector banks is high, but a significant standard deviation suggests inconsistent implementation of sustainability practices.

Private Sector Banks (HDFC and ICICI): The private sector banks have a "distinction for being efficient, innovative, and customer-centric, and they are generally much better off financially due to their strategic agility and market-driven operations. These banks are known for having lean operational structures and technology-driven processes, resulting in higher efficiency and reduced costs. The mean bank performance is higher, and there is less variability across private sector banks. Private sector banks have robust risk management frameworks to maintain lower levels of NPAs and better capital adequacy ratios. Driven by investor expectations and the need to maintain a competitive edge, private sector banks are very active in embedding sustainability into their business strategy. Overall, the mean sustainability score is high with moderate variability, implying a more uniform embedding of ESG practices in comparison to public sector banks.

Foreign Sector Banks (Standard Chartered Bank and Citibank): The global best practices, cutting-edge technology, and global exposure that foreign banks bring to domestic banking help to inculcate very high

operational efficiency and tightly managed costs, which result in robust bank performance outcomes consistently. Advanced risk management systems adopted by foreign banks, which are based on the existing risk management systems, help ensure stable financial market functioning, keep NPAs under control, and are congruent with worldwide regulatory standards. Additionally, foreign banks lead in sustainability practices driven by global ESG standards as well as shareholder mandate expectations of shareholders. The mean overall sustainability score for foreign sector banks is high, and the distribution of this measure is narrow; the aforementioned findings suggest that the sustainability approaches of foreign banks are consistent and comprehensive.

Suggestion

Based on the findings, several recommendations can be made to enhance the sustainability practices and performance of banks across different sectors:

For Public Sector Banks:

- **Operational Efficiency:** Operational efficiency is something that public sector banks need to work on. They should modernize systems and cut down on bureaucracy. An investment in new technology, if made wisely, could pay off in cost savings and better responsiveness to market changes.
- **Risk Management:** It is very important to improve on risk management for the public sector banks that are engaged in reducing the NPA mess they find themselves in. The next most important thing would be to relook at the loan assessment process and see where improvements can be made. After these two, the bank must have a clear strategy for managing and mitigating policy-driven lending risks.
- **Stable Enforcement of Sustainability Practices:** It is crucial for public sector banks to implement and maintain a consistent set of sustainable practices throughout all of their branches. These banks play a significant role in promoting a green economy, and they can

lead by example by adopting environmentally friendly policies and procedures across their entire operations. By ensuring the sustainability of their practices at every level, public sector banks can showcase their commitment to protecting the environment and contribute to a more sustainable future for the banking industry as a whole. This can be achieved through ongoing training programs, strong monitoring systems, and clear accountability structures.

For Private Sector Banks:

- **Focus on Innovation and Efficiency:** The private sector banks must continue to rely on their power to innovate and streamline operations if they want to flourish. Doing so allows them to maintain their edge, be nimble, and work at the forefront of technological progress. It also helps them maintain cost efficiency. After all, in a country where it takes ₹3.65 to make a rupee in the public sector bank, every private sector bank by default is making 365 paise on the same currency—and doing it on a base that just keeps getting bigger.
- **Strengthening Risk Management:** When it comes to risk management, private sector banks are pretty strict. However, there is room to sharpen their policies even more. They should take that prospect seriously because the basic fact remains that tight policies on risk management provide the foundation for low levels of bad loans — commonly referred to as non-performing assets (NPAs). Moreover, low NPAs are one of the pillars of financial stability.
- **Greater Embedding of Sustainability in Business:** For a truly sustainable future, the private sector banks have to ingrain sustainability into their business model. They have to develop a solid ESG (environmental, social, and governance) policy, derived from a very comprehensive set of standards, in their day-to-day operations. They have to ensure that the policy is communicated inside and outside the organization, starting right at the top. By doing all this, they have to push the inherently capitalist machinery of their

organization in a direction that does not compromise ethical, social, and environmental priorities.

For Foreign Sector Banks:

In order to be successful, the foreign banks ought to successfully integrate the global practises in the local market into their sustainability initiatives by aligning their sustainability plans to the local regulatory, environmental and social demands. Global standards are a good base, but effective sustainability projects rely on local responsive implementation, which will respond to the local challenges and expectations of the stakeholders. Global expertise on sustainability and responsible lending can also be used to reinforce the operations of the foreign bank branches in the country through enhancement of the process of credit appraisal, risk assessment and long-term financial sustainability. Increased international practise of best practises in the banking systems boosts the financial stability and ensures the depositor confidence. Furthermore, the foreign banks must continuously invest in the area of advanced technology to have a high level of operational efficiency, productivity and performance. Bank proactiveness in the adoption of innovative digital and sustainable technologies can place the bank in a stronger position to stay competitive, mitigate risks and narrow down to long-term sustainable growth and failure to do so can lead to diminishing efficiency and market irrelevance.

For Policymakers:

The policymakers need to embrace sector-specific controls under which the sustainability challenges affecting the public, private, and foreign banks are acknowledged. These differences can not be sufficiently met by a standardised approach to regulation. Customised policies can enhance the general financial viability of the banking system as well as equitable and efficient supervision within the sectors. Specifically, the banks of the public sector need to be supported directly in order to enhance the efficiency of their operations and risk management. This may be done by investing more in digital infrastructure, adoption of technology, and training of workforce skills, particularly in the

high-density urban banking areas where competition is stiff. Enhancing these fields will enable the banks in the government sector to be in better competition with the private and foreign banks. On the part of an investor, diversification has been one of the strategies. Because the risk and return patterns in the banking industry vary, the diversification of investments in the public, private, and foreign banks can be used to mitigate the portfolio risk of the entire investment. Also, investors need to focus on environmental, social and governance (ESG) when applying the assessment of banks. A greater resilience in the long term, a better image, and sustainability in the profitability of institutions that incorporate ESG in their practise usually make them more appealing as investment opportunities.

CONCLUSION

The correlation table presents valuable information on the determinants of banking stability. The positive correlation of 68.7% between the improved deposit schemes and loan credibility assessment is strong, and it means that the banks that prioritise the mobilisation of deposits also practise stringent loan appraisal measures. This combined strategy aids in economic sustainability because it assists in cutting the non-performing assets. Interest spread management is significantly positively related to profitability (51.1%), which demonstrates the fact that banks with stable interest spreads in the competitive markets have high chances of attaining sustained profitability. Good management of interest rates thus becomes very important in financial nourishment and competitiveness. Diversified banking activities, including mutual funds, insurance, and fee-based services, are linked to financial sustainability positively (58.3%). The banks that have a wide scope of services also have the advantage of having numerous sources of revenues which makes them better prepared to handle economic variations. The correlation between the compounded annual growth rate and the lower NPAs at 54.7% is positive and high, which implies that growth-oriented banks have better risk management and operational efficiency. The technological development has also been critical, with a positive correlation of 65.9 per cent, as it lowers the transaction costs and enhances the levels of satisfaction

among respondents. In addition, environmental, social and financial performance are positively correlated (47) with sustainability-oriented practises. On the whole, the results highlight the significance of diversification, technological integration, proper management of risks, and dynamic changes in the context of a competitive and globalised banking world.

5.7 Summary of Findings, Suggestions and Conclusion

The present study examined the sustainability practices and business performance of selected public, private, and foreign banks in India by evaluating financial, social, and environmental dimensions of sustainability. The findings establish that sustainability is no longer merely a regulatory obligation but a strategic driver of long-term competitiveness and organizational performance.

The study reveals that effective risk management, sound credit appraisal, technological innovation, diversified revenue streams, and efficient management of non-performing assets (NPAs) are the key determinants of sustainable banking. Banks that integrated these practices demonstrated stronger financial stability, operational efficiency, customer satisfaction, and resilience to changing market conditions.

The comparative analysis indicates that private sector banks achieved superior financial performance through operational efficiency and innovation, while public sector banks performed better in promoting financial inclusion and broader sustainability objectives. Foreign banks maintained consistent operational standards but showed comparatively lower sustainability performance due to limited domestic presence and greater exposure to global economic fluctuations.

The findings further confirm that integrating Environmental, Social, and Governance (ESG) principles into banking operations enhances stakeholder confidence, corporate reputation, and long-term business performance. Therefore, banks should strengthen risk management, accelerate digital transformation, diversify income sources, and embed sustainability into their strategic decision-making. Policymakers should support these efforts through

robust ESG frameworks, green financing initiatives, and sector-specific sustainability policies.

Overall, the study concludes that sustainable banking requires a balanced integration of financial performance, social responsibility, environmental stewardship, technological innovation, and effective governance. Banks that successfully embed these dimensions into their core strategies are better positioned to manage future challenges, create long-term stakeholder value, and contribute to a resilient, inclusive, and sustainable banking system in India.

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APPENDIX

Questionnaire

Dear Respondent,

The following questionnaire has been designed for the study titled: **"Study of Financial, Social, and Environmental Sustainability in the Indian Banking Sector: A Case of Public, Private, and Foreign Banks in North India."**

Please be assured that your personal information will be kept strictly confidential. The data collected will be used solely for academic research purposes and to suggest improvements based on the study's findings.

I highly value your opinions and perspectives on the issues addressed in this questionnaire. There are no right or wrong answers, and your honest responses are greatly appreciated. The questionnaire will take approximately **5 minutes** to complete.

Financial sustainability		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	My bank enhanced the number and amount of different deposits schemes.					
2	My bank before providing loan to the customers verifies the credibility, solvency and feasibility of the customers to avoid non-performing loans.					
3	My bank profitability position from year on year basis is growing on a sustained basis.					
4	The spread (difference between interest given and interest taken) is sustained in spite of severe competition in the banking industry.					
5	The multifarious activities of my bank including banking business, mutual fund business, insurance business, fee based business, agency related business and					

	universal banking business have strengthened my bank's financial sustainability both in the short- run and long run.					
6	My bank's compounded annual growth rate (CAGR) is growing or sustained level					
7	Effective measures by the bank reduced the NPA level.					
8	Technology impacted the cost of transaction both or the bank and the customers.					
9	Sustainable banking concentrates on long - term results rather than short - term profits & gains.					
10	In order to reduce the percentage of non-performing assets, banking practices should concentrate on projects with high environmental, social and financial performance.					
11	Banks need to align their business goals with trends in the markets and sectors in which they operate.					
12	The interest rate fluctuations did not reduce the customer base in all types of accounts.					
13	Competition impacted my banks bottom - line (profit)					
14	Pricing and services is of banking products and services is risky in the competitive world.					
15	Interest rate war among the banks is the biggest competitive factor that impacts the banking business.					
16	Retaining cash - cow (profitable) customers such as high net - worth individuals corporate customers is very difficult.					

17	Addressing the frauds in the banking business is a challenge for external sustainability.					
18	Banks liability and claims are surging on account of multiple customers and multiple banking products such as personal loans, auto loan, mutual fund, insurance, lending etc.					
19	In rural areas there is high political intervention on behalf of the customers to provide various loans.					
20	Sustainability in bank plays important role for strategy development and operative business.					
21	As global players rapidly increase their presence in the banking sector, it is making the sector more complex and thus more vulnerable to financial and non - financial risks, as well as increased competition.					
22	The financial stability and aggregate sustainability is well maintained by complying with Prudential and Basel- III norms.					
23	The effective governance and leadership have reduced the Revenue expenditure.					
24	My bank has complied with EAGLE requirements on time.					
25	My bank's HR infrastructure sustains the cost per transactions of the customers.					
26	My bank's technological infrastructure sustains the cost per transactions of the customer.					
SOCIAL SUSTAINABILITY		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

1	Social, Economic and Environmental Sustainability are like a "three legged stool" that represent a bank's sustainability.					
2	Sustainability of banks encompasses economic growth, social progress and environmental protection dimensions.					
3	Sustainable banking can be defined as a decision by banks to provide products and services only to customers who take into consideration the environmental and social impacts of their activities.					
4	Banks face a large number of challenges such as economic, social, cultural, technological, political, legal and other interests. Under the circumstances a bank has to comply with all these external requirements to stay sustainable and competitive.					
5	Under economic sustainability dimension of a bank, poverty alleviation is incredibly important through loans and advances to priority sector.					
6	Reputation and branding has become the top reason for many banks to integrate sustainability considerations into their management practices.					
7	There is a need to increase banks credibility and reputation which form the main reason to consider social and environmental issues.					
8	Banks for their sustainability are providing loans for environmental improvements in waste collection and treatment as well as microfinance to rural communities and women.					

9	Banks are adopting best practice measures to assess social and environmental risk in their projects, and publish a sustainability report.					
10	Banks are to implement more socially and environmental responsible lending policies					
11	Banks have to commit high standards for managing social and environmental risk in its private sector investments.					
12	Social and environmental considerations are becoming vital in ensuring competitiveness and differentiating banks in increasingly competitive markets.					
13	The banking sector is using innovation to play a role in addressing global concerns. Significant environmental threats and growing demand for action on social issues are causing both private and public sector banks to seek new ways of doing business.					
14	Environmental and social management systems are integrated into overall banking business activities.					
15	The global banking industry has experienced a significant transformation in which social and environmental management lead to greater business benefits.					
16	Pursuing sustainability related market opportunity does not automatically mean that, a bank will reduce its social and environmental risks.					
17	Sustainable banking practices by the banks improve brand value and reputation, including improved community relations					
18	Banks are moving from defensive banking-where management of social and environmental impacts is seen as an additional cost - to sustainable banking -					

	where sustainable development is seen as an advantage and an opportunity for growth.					
19	Reputation and branding is the top reason that banks in emerging markets integrate social and environmental considerations into their management practices.					
20	Social responsibility fuels the sustainability of a bank because the financial interest and social interest go together for long- term development.					
21	Bank's are socially responsible and therefore should develop ethical policies combining environmental and social aspects. This ensures their sustainability.					
22	NGOs are turning more attention to banks, rather than simply criticize, NGOs are increasingly seeking to collaborate and advocate change in banks social and environmental policies and practices.					
Environmental Sustainability		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Pressing environmental issues as well as the need to alleviate poverty and protect human rights remain priorities in bank's sustainability programmes.					
2	The scope of responsibility for banking institutions is widening- from environmental protection to social inclusion of underprivileged groups and considerations of other social issues, such as labour practices, protections and preservation of cultural heritage.					
3	A growing cluster of opportunities has evolved and includes renewable energy, energy efficiency, cleaner production processes and technologies, biodiversity					

	conservation, microfinance, financial services targeted to women and low- income housing.					
4	The scope of responsibility for banking institutions in India is widening from environmental to social inclusion.					
5	Social inclusion lending includes alleviating poverty and protecting human rights remain top priorities in emerging markets including India.					
6	Local banking institutions are being called upon to help and address a variety of social concerns through their core services, such as labour practices of indigenous populations and preservation of cultural heritage.					
7	Virtually now a days the commercial banks consider social and environmental issues, either by managing risks, developing business opportunities or both.					
8	To manage both risks and opportunities strategically and comprehensively, banks need to integrate a systematic approach- a social and environmental management system (SEMS)- into their processes and operations.					
9	To be truly effective, a social and environmental management system must become a part of a bank's overall management system.					
10	Banks need to take their social and environmental management system beyond written policies to achieve tangible results.					
11	For banking institutions, managing social and environmental risks in strategic decision-making and lending is very significant.					

12	In the name of sustainability banks can strengthen their portfolio by systematically evaluating social and environmental project risks in the loan or investment appraisal process.					
13	Banks are shifting their focus and re-orienting their activities. They are increasingly moving from avoiding risks to creating opportunities in social and environmental projects.					
14	Banks in emerging markets have increased their awareness about the risks and potential benefits associated with social and environmental issues					

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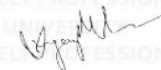
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RESEARCH PAPER IN SCOPUS



Efficiency and Effectiveness in Indian Banking: A Holistic Assessment of Financial Performance

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Abstract:

India's economic development is based on the banking industry. With the development of technology and taking into account people's requirements, significant changes in the management and banking system have been observed over time. If the banking sector does not function properly, it could have a significant and wide-ranging impact on the economy. Therefore, there is a pressing need to look into the variables that affect the banking industry's performance level. The output ratios are the only criteria used to evaluate and rank the institutions. The current analysis makes use of data from six North Indian banks chosen over a period of ten years.

Index Terms: Return on Assets (ROA), Return on Net Worth (RONW), Income to Overhead Ratio (IOR), Gross NPA, Net NPA, Provision Coverage Ratio, Loan Ratio, Deposit Ratio, Loan to Deposit Ratio, Capital adequacy ratio, Interest Income/Interest Cost, Non-Interest Income/Non-Interest Cost, ANOVA.

1. Introduction

The banking system contributes significantly to economic growth not just by directing money towards investments but also by increasing the efficiency with which resources are allocated. The most important segment of the Indian financial system is the banking industry. Commercial bank financial health is monitored by bank supervisory organizations, who also enforce relevant laws and regulations. The Indian banking sector's stability and financial health are overseen by RBI, the country's top institution. RBI bases its assessment on a number of variables and data that lead to significant findings. These outcomes typically serve as models for additional regulatory checks and initiatives to improve the financial environment.

To guarantee the health of banks and their financial stability, the RBI utilises its own set of Camels ratings assessments. Every year, the RBI inspects banks. Both the regulator and the bank maintain the confidentiality of the Camels rating report. The values of bank securities appear to be impacted by this information to the extent that it makes its way into the financial markets. Therefore, even if a bank has a good rating, it is never disclosed for marketing purposes.

Although much of the information needed to do so can be gathered from regulatory reports, on-site examinations are needed to verify report accuracy and to gather further supervisory information. Much research has explored the value of this private information, both to the bank supervisors and to the public who monitor banks through the financial markets. Thus, private supervisory information in Camels ratings also appears to be useful in the public monitoring of banks, especially the one conducted by various rating agencies.

About Camel Rating

In order to review the banking supervisory system, RBI established a working group in 1995. S Padmanabhan served as the committee's chairman. The committee put control measures into place for the inspection cycle starting in July 1998. On the basis of the international Camels rating model, it was advised that the banks be graded on a five-point scale (A to E) (Table 1). The following six factors are used by Camels rating to evaluate banks:

Rating symbol	Rating Symbol Indicates
A	Bank is sound in every aspect.
B	Bank is fundamentally sound but with moderate weakness.
C	Financial, operational or compliance weaknesses that give cause for supervisory concern.
D	Serious or immoderate financial, operational and managerial weakness that could impair future viability.
E	Critical financial weakness and there is high possibility in the near future.

Table 1 camels rating

a) Capital Adequacy: Capital Adequacy is determined by the Capital to Risk-Weighted Assets (CRAR) ratio. A strong capital basis boosts depositors' trust.



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Profitability of Indian Scheduled Commercial Banks: A Comparative Evaluation

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ABSTRACT

This research is intended to be both exploratory and diagnostic. Analyzing the profitability of Indian scheduled commercial banks is the main goal of this study. Data were gathered from the Reserve Bank of India's data release from 2017, the Statistical Table Relating to Indian Banks, and various RBI Bulletin issues. Numerous statistical techniques, including average, standard deviation, standard error, lower bound, and upper bound, have been employed to evaluate the profitability of banks. Additionally, the SPSS programme was used to apply the ANOVA test at a 95% level of confidence to determine whether there were any significant differences between the various forms of earnings and profits. According to the study, there are significant differences between the three groups of banks in terms of net interest income, operating profit, interest income, and return on assets. However, in terms of return on equity, the distinction was insignificant. In addition, foreign banks had the most net interest income, non-interest income, operating profit, and return on assets, but private sector banks generated the highest return on equity.

Key words: Interest Income, Net Interest Income, Return of Assets, Return on Equity and ANOVA

INTRODUCTION

One of the most significant components of the country's current financial system is its scheduled commercial banks, which actively participate in the accumulation and distribution of about two thirds of all financial resources. Before independence, this sector had already experienced some ups and downs, but nationalization gave it a boost and brought stability, which accelerated economic growth, especially after reforms in 1991, which turned class banking into mass banking and allowed the new private sector banks to operate the banking business in India. In addition, international banks were permitted to open more branches beginning in 1998-99 as a result of India's WTO commitment. Due to increased competition and a focus on profitability, public sector banks began switching from their long-standing social orientation to an economic-oriented model. Thus, the restructuring of public sector banks and the emergence of new private sector banks exacerbated the professionalism in the banking sector, and the increased presence of private and foreign banks over the past ten years has resulted in competitive pricing of services, narrow spreads, and improvements in service quality. Due to the intense rivalry from private and foreign banks, the public sector banks (Nationalized banks and SBI Group), which had long controlled the banking industry, began to feel the heat. However, public sector banks continue to dominate the banking business. For instance, the public sector accounts for over two thirds of deposits and advances, leaving only one third for private and international banks. Second, there have always been significant impediments for this expanding and active business, including poor profitability of public sector banks, rising NPAs, nexus between bank officials, corporations, and politicians, and lack of consistency. Furthermore, due to fierce rivalry, increasing client demand, and India's fast reforms, the efficiency and profitability of the banking system have achieved

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