

BANKING FRAUDS IN INDIA: A DETAILED STUDY OF PUBLIC SECTOR BANKS

Dr. Srinivas Barla¹, Dr. Gaddam Naresh Reddy²

*¹Assistant Professor, Part Time Faculty, Department of Commerce,
Dr. B. R. Ambedkar Open University, Hyderabad, Telangana State, India.*

Mail: srinivas.twinkle69@gmail.com

² Professor of Commerce,

*University College of Commerce & Business Management, Osmania University, Hyderabad-500
007,*

Mail: gaddamnareshreddy@osmania.ac.in

ABSTRACT**Introduction:**

Public Sector Banks (PSBs) in India are critical to the country's financial system, particularly in rural and semi-urban regions. Despite their extensive reach and role in national development, PSBs have been increasingly vulnerable to frauds, undermining their operational efficiency and public trust.

Objective of the study:

This study aims to analyze the trends, patterns, and systemic vulnerabilities of banking frauds across Indian PSBs from 2017 to 2024. It investigates the causes of such frauds, evaluates their financial impact, and assesses the effectiveness of existing fraud mitigation strategies.

Findings:

The data reveals a concerning rise in fraud cases in banks like Indian Overseas Bank, Bank of Baroda, and PNB, with CAGR values exceeding 60%. Conversely, Canara Bank and Bank of Maharashtra showed a decline, indicating effective fraud control. Regression and ANOVA analyses indicated that in most banks, the year was not a significant predictor of fraud amounts. However, a strong correlation between the number of frauds and the amount involved was observed in SBI and Canara Bank. The findings suggest varying levels of risk exposure and control efficiency across banks.

Conclusions:

The study underscores the urgent need for strengthened fraud management in PSBs through robust internal controls, technology integration, and employee accountability. Enhanced monitoring, predictive analytics, and sector-wide collaboration are essential to curb fraudulent activities and safeguard the integrity of India's public banking system.

Keywords: *Public Sector Banks, Banking Frauds, Indian Banking Sector, Fraud Detection.*

1. Introduction

Public sector banks (PSBs) in India play a pivotal role in the country's financial and economic ecosystem. These banks are majority-owned by the government and are responsible for implementing national economic policies, offering affordable banking services, and ensuring financial inclusion. As the backbone of India's banking sector, PSBs dominate in terms of deposits, lending, and branch network, particularly in rural and semi-urban areas where private

banks often have limited penetration.

Historically, the banking sector in India underwent significant changes after the nationalization of banks in 1969 and 1980. This move brought several major banks under government control, ensuring that financial services reached underserved regions. With a focus on priority sector lending, including agriculture, small industries, and weaker sections of society, PSBs have contributed significantly to India's socio-economic development.

However, public sector banks face numerous challenges, particularly in managing their large asset portfolios and maintaining operational efficiency. Issues like rising non-performing assets (NPAs), increasing competition from private and foreign banks, and technological advancements have placed immense pressure on these institutions. Additionally, they have been at the center of several high-profile banking frauds, such as the Punjab National Bank (PNB) scam and the ABG Shipyard fraud, which have exposed systemic vulnerabilities and lapses in governance.

Despite these challenges, public sector banks remain critical for implementing government programs like Pradhan Mantri Jan Dhan Yojana (PMJDY), financial literacy campaigns, and Direct Benefit Transfers (DBT). They have also played a vital role in supporting the economy during crises, such as the COVID-19 pandemic, by providing liquidity, restructuring loans, and financing small businesses.

Banking frauds have emerged as a significant concern in the financial sector, with far-reaching consequences for the economy, public trust, and regulatory frameworks. These fraudulent activities undermine the stability and credibility of financial institutions, particularly public sector banks, which form the backbone of the Indian economy. Over the years, various types of frauds—ranging from loan defaults and cybercrimes to trade finance and cheque manipulation—have been reported, exposing vulnerabilities in banking systems.

The primary causes of such frauds include laxity in internal controls, collusion between bank officials and fraudsters, inadequate due diligence during loan approvals, and poor post-disbursement monitoring. Rapid digitization has also opened new avenues for cybercrimes, with inadequate cybersecurity measures exacerbating the issue.

Frauds like the Punjab National Bank (PNB) scam, involving over ₹13,000 crore, have highlighted systemic lapses in banking practices. Similarly, high-profile cases like the Kingfisher Airlines loan default, Rotomac Global fraud, and the ABG Shipyard fraud have showcased the extent of financial mismanagement and unethical practices.

These incidents not only resulted in significant financial losses but also called into question the governance and operational efficiency of public sector banks.

The impact of such frauds is multifaceted, leading to financial instability, higher provisioning requirements, reputational damage, and loss of public confidence. As India continues to digitize its economy and banking systems, the need for robust fraud detection mechanisms, ethical governance, and technological advancements has become imperative. This study delves into the types, causes, and impacts of banking frauds, supported by notable case studies, to provide a comprehensive understanding of the issue and explore measures to mitigate such risks in the future.

2. Meaning and Definition

Reserve Bank of India (RBI): "A banking fraud is an act of omission or commission, intended to cause wrongful gain to one person and wrongful loss to another, either by concealment of facts or by use of false information."

Black's Law Dictionary: "Banking fraud is a dishonest misrepresentation of fact, intentional or reckless, made to induce another to part with something of value or to surrender a legal right."

Association of Certified Fraud Examiners (ACFE): "A banking fraud is a deliberate act or omission to deprive another of money, property, or a legal right through deceit, misrepresentation, or other unethical methods."

3. Review of Literature

The issue of banking frauds in India has attracted extensive scholarly attention, especially in light of increasing digitalization and financial inclusion. Srinivas (2023) highlighted a steady rise in fraud cases between 2018 and 2022, linking it to self-service banking vulnerabilities. Joshi (2022) emphasized the need for holistic measures including organizational culture and employee training to mitigate fraud. Similarly, Mishra and Jaiswal (2022) pointed out that while digitization has expanded financial access, it has also elevated digital fraud risks.

Legal and regulatory gaps were frequently noted. Rajpal (2022) argued that outdated legal systems fail to address modern fraud tactics, while Gupta (2021) lamented the absence of comprehensive fraud legislation. Studies by Sharma (2022) and Pardhey (2021) further asserted that public sector banks are particularly prone to scams due to internal weaknesses and poor monitoring, with systemic frauds worsened by implementation gaps in existing regulations.

On technological fronts, Sharma et al. (2020) and Sood et al. (2020) explored the integration of data analytics and IoT for fraud detection, urging banks to enhance forensic capabilities. Employee involvement also surfaced as a critical factor; Swain and Pani (2016) and Bhasin (2015) noted poor training, internal controls, and awareness as key contributors to fraud. Studies like those of Shetty (2019) and Vigneshwaran (2018) stressed proactive internal risk management and the development of a fraud-resilient culture. Overall, literature consistently emphasized a need for stronger legal frameworks, employee accountability, and the use of advanced technological tools to detect and prevent fraud. The Reserve Bank of India's (RBI) role was also widely discussed, with many calling for more proactive regulatory interventions and real-time monitoring systems (Neha Sharma et al., 2017; Dogra, 2018)

4. Research Gap

Despite the growing significance of studying banking frauds, prior research has primarily focused on specific cases or limited aspects of banking frauds, leaving critical gaps in understanding the broader picture. Most of the existing studies have either examined frauds in individual banks or focused on specific operational or sectoral categories, thereby failing to provide a comprehensive analysis of fraud trends across the entire public sector banking system.

This study bridges the gap by considering all **Public Sector Banks (PSBs)** in India, providing an extensive and holistic analysis of fraud cases over a specified period. Unlike earlier studies, which often highlighted isolated incidents or were confined to sector-specific or operational dimensions, this research encompasses data from all PSBs, thereby offering a unified view of the magnitude, patterns, and implications of banking frauds.

By addressing these limitations, the study aims to contribute to the existing body of knowledge with a thorough and all-encompassing exploration of fraud in India's public sector banking landscape. This comprehensive approach provides deeper insights into systemic vulnerabilities and highlights the need for effective preventive measures across the entire banking system.

5. Objectives of the Study

1. To analyse trends in banking frauds across Indian Public Sector Banks
2. To identify systemic vulnerabilities and assess the effectiveness of fraud mitigation measures in PSBs.

Hypotheses/Research Questions/Assumptions

- **Hypotheses**

Ho: There is no significant relationship frauds in PSBs.

- **Research Questions**

1. How have fraud trends evolved across different banks over time?

- **Research Assumptions**

- All data collected from PSBs is accurate and reflects actual fraud instances.
- The analysis captures representative patterns across the sector.

6. Research Methodology

The study focuses on Public Sector Banks (PSBs) across India. These banks were selected as they play a crucial role in the Indian banking and financial ecosystem, catering to the majority of the population and implementing government-led initiatives. The study encompasses PSBs' operations, governance mechanisms, and fraud management practices.

Sample

The sample consists of all Public Sector Banks (PSBs) in India, making it a comprehensive analysis of the sector. This total sample approach ensures that the study captures the entirety of fraud-related trends, challenges, and patterns across the public banking landscape.

Period of Study:

The period of study for this research spans from **2017 to 2024**, covering an 8-year timeframe. This duration was chosen to capture significant trends and developments in the occurrence and management of banking frauds within **Indian Public Sector Banks**.

Source of the data:

The study relies exclusively on **secondary data** for its analysis. The data has been collected from authentic and reliable sources such as:

- **Annual Reports** of all Indian Public Sector Banks (2017–2024).
- **Reserve Bank of India (RBI) Publications**, including reports on banking frauds and financial stability.
- **Government and Regulatory Reports** pertaining to banking operations and fraud management.

- **Public Disclosures and Audit Reports** issued by banks.
- **Research Papers and Articles** published in journals, newspapers, and financial magazines.

The use of secondary data ensures a detailed and broad-based understanding of banking frauds, drawing from already existing and verified information. This approach helps in identifying trends, patterns, and systemic issues while maintaining the reliability and authenticity of the findings.

CAGR (Compound Annual Growth Rate): Calculated to assess the growth trends in fraud cases and amounts over the study period.

Descriptive Statistics: Used to summarize key metrics, such as mean, standard deviation, minimum, and maximum values, to understand trends across banks.

ANOVA (Analysis of Variance): Employed to identify significant variations in fraud reporting and amounts among different banks.

Correlation Analysis: Explored relationships between factors like the number of fraud cases and the amounts involved.

Regression Analysis: Used to predict trends and understand the influence of time and operational factors on fraud cases.

7. Results and Discussion

The **Results and Discussion** section presents an in-depth analysis of the data collected, providing insights into the trends, patterns, and underlying causes of banking frauds in Indian Public Sector Banks (PSBs). By examining data spanning from **2017 to 2024**, the study highlights critical findings related to the number of frauds, the amount involved, and their distribution across various banks. Statistical tools such as CAGR analysis, descriptive statistics, correlation, and regression models have been employed to derive meaningful interpretatio

Table 1: CAGR analysis of Number of Frauds reported in Public sector banks

Year	SBI	Bank of Baroda	PNB	Indian Overseas Bank	Union Bank	Canara Bank	Indian Bank	UCO Bank	Bank of India	Central Bank	Bank of Maharashtra	Punjab & Sind Bank
2017	837		185	106	127		133	58	174	186	3893	16
2018	1789		213	74	121		728	74	170	209	4085	23
2019	2616	191	219	161	284	1236	168	99	211	650	167	41
2020	6964	350	509	207	415	2132	226	118	203	900	242	67
2021	5724	248	714	458	579	153	219	379	177	1026	804	144
2022	4192	280	431	312	638	90	211	114	216	1243	188	159
2023	2755	784	289	1017	366	158	429	219	208	533	105	132
2024	1586	12061	7112	8049	3168	157	6059	171	209	2399	472	245
CAGR	9.56%	80.80%	68.42%	85.62%	58.33%	-25.53%	72.56%	16.70%	2.65%	44.09%	-26.02%	47.67%

The Compound Annual Growth Rate (CAGR) analysis from 2017 to 2024 reveals significant trends in fraud cases across public sector banks. **Indian Overseas Bank** saw the highest growth at 85.62%, highlighting concerns about internal control weaknesses. Similarly, **Bank of Baroda** (80.80%), **Indian Bank** (72.56%), and **Punjab National Bank** (68.42%) experienced sharp increases in fraud cases, indicating either rising fraud activity or enhanced detection due to regulatory pressure. **Union Bank** (58.33%) and **Central Bank** (44.09%) also showed significant rises, suggesting ongoing exposure to fraud risks. **State Bank of India** (9.56%) experienced a moderate increase, possibly due to better reporting mechanisms, while **UCO Bank** (16.70%) saw more gradual growth, indicating potential improvements in systems but continued risks. On the positive side, **Bank of India** showed minimal growth (2.65%), reflecting stability. Notably, **Canara Bank** and **Bank of Maharashtra** both reported negative CAGRs (-25.53% and -26.02%, respectively), suggesting successful efforts in fraud prevention, resulting in a decline in fraud cases over time. **Punjab & Sind Bank**(47.67%) had a steady rise, signaling persistent fraud management challenges.

Figure 1: Number of Frauds reported in Public Sector Banks form 2017 - 2024

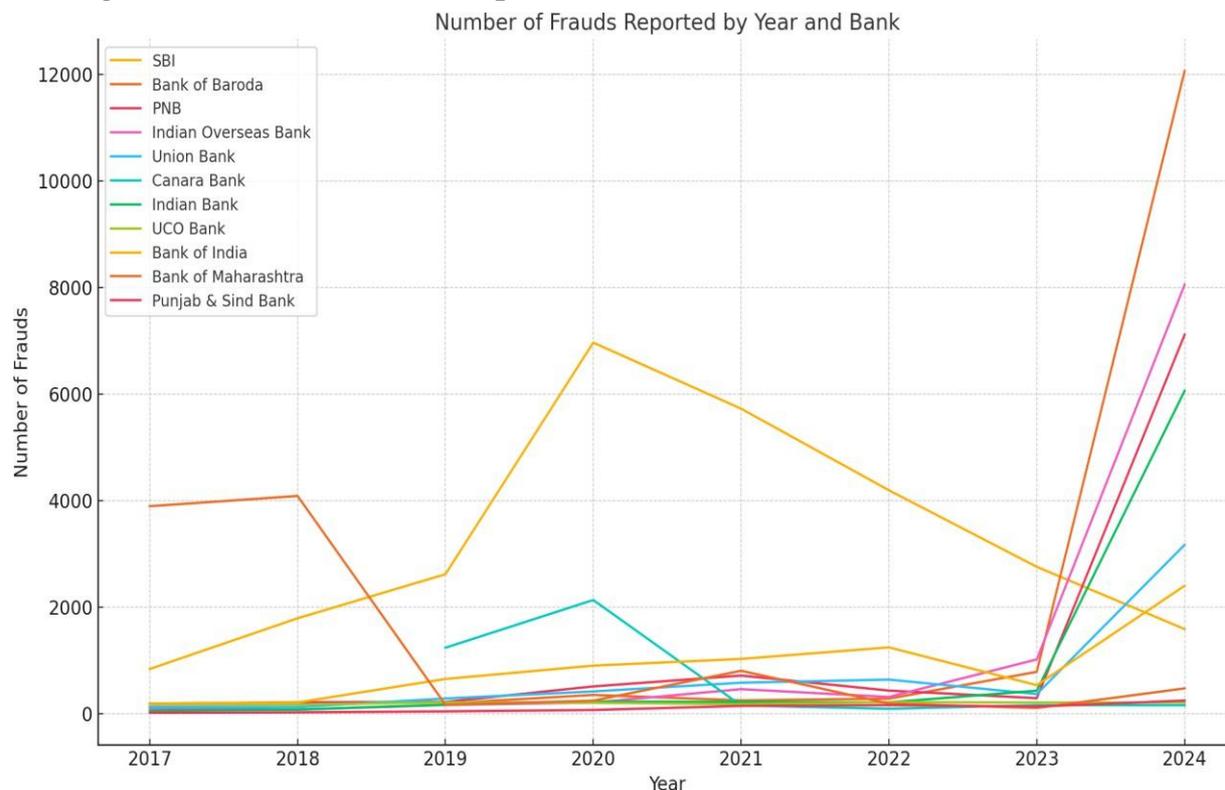


Figure 1: Graph Interpretation:

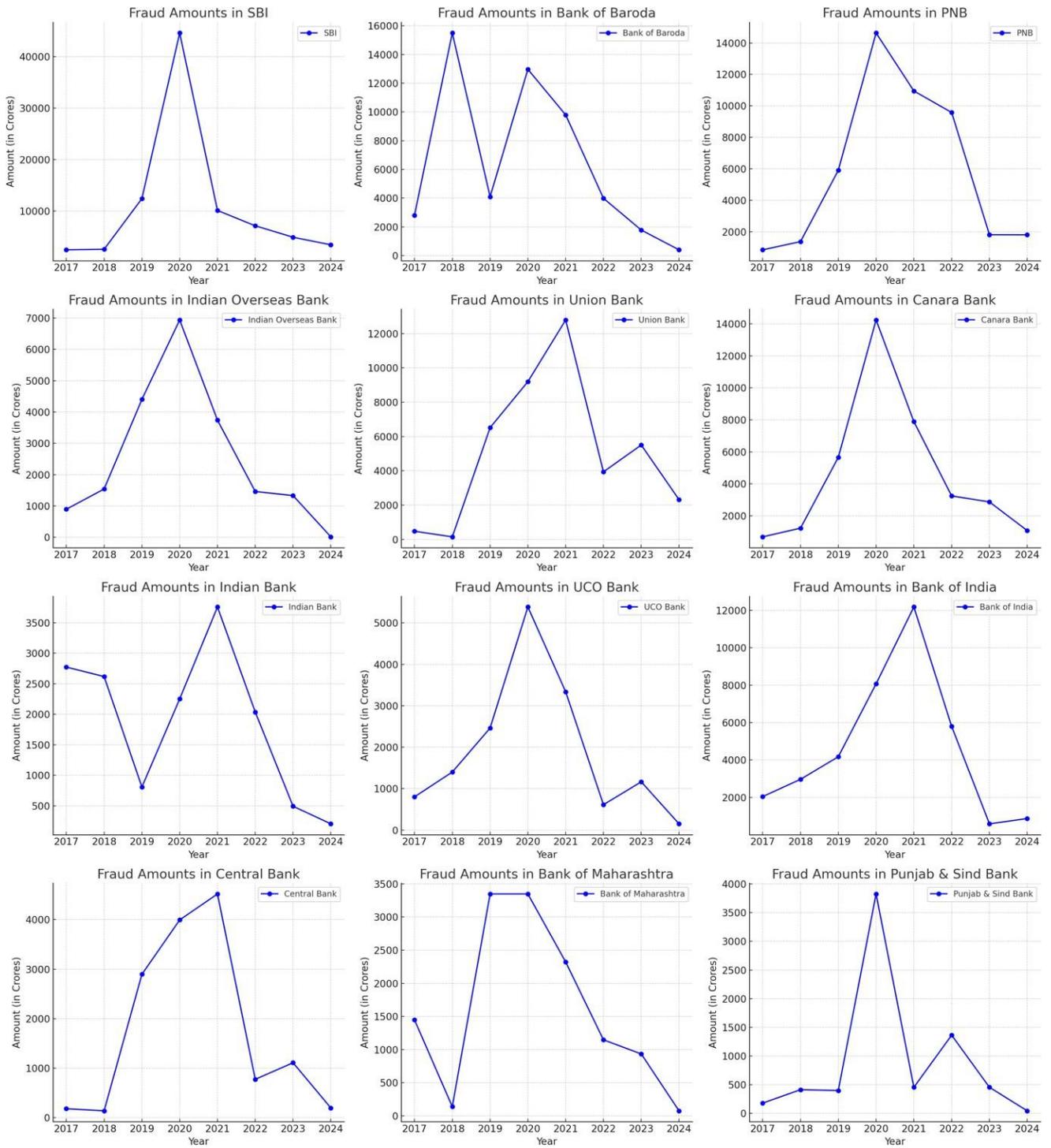
The graph illustrates the trends in reported fraud cases across various public sector banks from 2017 to 2024. The State Bank of India (SBI) experienced its peak in reported frauds in 2020, followed by a consistent decline, reaching its lowest level in 2024. In contrast, the Bank of Baroda witnessed an unprecedented surge in 2024, with over 12,000 reported cases—far exceeding all other banks—indicating either an exceptional reporting year or significant irregularities. Similarly, Punjab National Bank (PNB) showed fluctuating fraud numbers over the years but recorded a notable increase in 2024, exceeding 7,000 cases. Both Indian Overseas Bank and Union Bank registered sharp rises in fraud cases in 2024, with Indian Overseas Bank crossing 8,000 cases and Union Bank reporting over 3,000. Canara Bank and Indian Bank maintained relatively lower fraud levels overall; however, Canara Bank had a noticeable spike in 2019, while Indian Bank saw a surge in 2024. UCO Bank and Bank of India reported moderate fraud numbers throughout the observed period, with Bank of India also experiencing an increase in 2024. Lastly, Bank of Maharashtra reported a high number of fraud cases during 2017–2018, whereas Punjab & Sind Bank, despite having fewer overall cases, displayed a gradual rise in recent year.

Table 2: CAGR of Amount involved in frauds in Public Sector Banks

Year	SBI	Bank of Baroda	PNB	Indian Overseas Bank	Union Bank	Canara Bank	Indian Bank	UCO Bank	Bank of India	Central Bank	Bank of Maharashtra	Punjab & Sind Bank
2017	2424.74		2809.31	850.45	896.42		480.45	688.69	2774.06	801.54	2041.46	178.78
2018	2532.24		15501.65	1372.9	1542.12		154.06	1232.78	2619.07	1399.93	2963	136.6
2019	12387.13	4099.66	5903.19	4403.69	6516.88	5655.22	808.38	2461.36	4172.17	2895.13	1447.99	412.27
2020	44622.45	12971.14	14633.27	6939.82	9196.98	14237.27	2252.1	5384.48	8071.23	3993.76	3348.29	397.28
2021	10085.92	9796.31	10947.51	3740.78	12791.43	7885.25	3759.68	3336.96	12184.32	4518.31	2321.91	3825.86
2022	7100.65	3990.12	9579	1462.33	3942.37	3245.18	2036.71	611.53	5793.22	773.36	1146.19	454.59
2023	4878.18	1780.99	1809.1	1332.14	5504.38	2871.01	493.31	1163.45	582.59	1108.57	933.27	1363.22
2024	3406.87	402.42	1803.59	15.09	2321.61	1079.31	204.91	149.47	866.7	195.24	74.06	43.55
CAGR	4.98%	-28.22%	-6.13%	-43.78%	14.56%	-21.07%	-11.46%	-19.61%	-15.31%	-18.27%	-37.74%	-18.27%

The **CAGR analysis** of the amount involved in frauds across public sector banks from 2017 to 2024 reveals diverse trends. **SBI** saw a positive growth of **4.98%**, and **Union Bank** experienced a notable increase of **14.56%**, suggesting rising fraud amounts due to larger fraud cases or possibly insufficient controls. On the other hand, **Indian Overseas Bank** had a significant decline of **-43.78%**, **Bank of Maharashtra** decreased by **-37.74%**, and **Bank of Baroda** dropped by **-28.22%**, indicating successful efforts in reducing fraud amounts. Additionally, **PNB** (-6.13%), **Canara Bank** (-21.07%), and **Central Bank** (-18.27%) showed moderate declines, likely due to better fraud detection and prevention. While most banks are improving in managing fraud risks, **Union Bank's** significant increase in fraud amounts remains a concern, highlighting ongoing challenges in its fraud prevention efforts

Figure 2: Bank wise amount involved in frauds



**Table 19 Descriptive Statistics of Amount involved in Frauds
(In Crores)**

	N	Minimum	Maximum	Mean	Std. Deviation
SBI	8	2425	44622	10929.77	14085.274
Bank of Baroda	6	402	12971	5506.77	4864.833
PNB	8	1804	15502	7873.33	5598.346
Indian Overseas Bank	8	15	6940	2514.65	2313.953
Union Bank	8	896	12791	5339.02	4089.106
Canara Bank	6	1079	14237	5828.87	4752.741
Indian Bank	8	154	3760	1273.70	1285.648
UCO Bank	8	149	5384	1878.59	1760.576
Bank of India	8	583	12184	4632.92	3937.090
Central Bank	8	195	4518	1960.73	1623.872
Bank of Maharashtra	8	74	3348	1784.52	1092.835
Punjab & Sind Bank	8	44	3826	851.52	1269.526

The descriptive statistics of the amount involved in frauds across public sector banks highlight significant variations. SBI has the highest mean (₹10,929.77 crores) and maximum (₹44,622 crores), indicating its exposure to large-scale frauds. Banks like PNB (mean: ₹7873.33 crores) and Canara Bank (mean: ₹5828.87 crores) also report high average fraud amounts, with considerable standard deviations reflecting large fluctuations. In contrast, smaller banks like Punjab & Sind Bank (mean: ₹851.52 crores) and Indian Bank (mean: ₹1273.70 crores) report lower averages, suggesting relatively smaller fraud cases. The high variability across banks highlights differing risk exposures and fraud control measures.

Table 3: Regression model of to Predict Amount involved in Frauds in Public Sector Banks

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
SBI	.066 ^a	.004	-.162	15180.847
Bank of Baroda	.636 ^a	.404	.255	4198.299
PNB	.355 ^a	.126	-.020	5652.963
Indian Overseas Bank	.228 ^a	.052	-.106	2433.656
Union Bank	.183 ^a	.033	-.128	4342.171
Canara Bank	.693 ^a	.480	.350	3830.873
Indian Bank	.113 ^a	.013	-.152	1379.842
UCO Bank	.194 ^a	.038	-.123	1865.477
Bank of India	.108 ^a	.012	-.153	4227.751
Central Bank	.207 ^a	.043	-.117	1715.897
Bank of Maharashtra	.690 ^a	.476	.389	854.577
Punjab & Sind Bank	.201 ^a	.040	-.120	1343.315

a. Predictors: (Constant), Year

b. Dependent Variable: Amount involved in Frauds

The regression analysis of fraud amounts across public sector banks reveals significant variation in model strength and predictive reliability. The State Bank of India (SBI) exhibits an extremely weak relationship between the year and the amount involved in frauds, with an R² of just 0.004 and a high standard error of ₹15,180.85 crores, indicating virtually no predictive power. Similarly, Punjab National Bank (PNB), Indian Overseas Bank, Union Bank, Indian Bank, UCO Bank, Bank of India, Central Bank, and Punjab & Sind Bank all show poor model fits, with R² values ranging from 0.012 to 0.052, negative adjusted R² values, and high standard errors, reflecting weak or no predictive capability.

In contrast, Bank of Baroda demonstrates moderate predictive strength, with an R² of 0.404 and an adjusted R² of 0.255, supported by a relatively lower standard error of ₹4198.30 crores. Canara Bank and Bank of Maharashtra stand out with the most robust regression models among the banks analysed. Canara Bank achieves an R² of 0.480 and adjusted R² of 0.350, while Bank of Maharashtra records an R² of 0.476 and adjusted R² of 0.389. Both models exhibit moderate-to-high explanatory power and better predictive accuracy, as confirmed by their lower standard errors of ₹3830.87 crores and ₹854.58 crores, respectively. These findings suggest that only a few banks demonstrate meaningful patterns in the annual variation of fraud amounts, while most show random or unstructured trends that resist reliable modelling.

Table 4: Analysis of Variance (ANOVA) Table for Predicting the Amount Involved in Banking Frauds with Year as the Predictor Variable

		Sum of Squares	df	Mean Square	F	Sig.
SBI	Regression	6016015.301	1	6016015.301	.026	.877 ^b
	Residual	1382748622.587	6	230458103.765		
	Total	1388764637.889	7			
Bank of Baroda	Regression	47830117.898	1	47830117.898	2.714	.175 ^b
	Residual	70502866.316	4	17625716.579		
	Total	118332984.214	5			
PNB	Regression	27654394.522	1	27654394.522	.865	.388 ^b
	Residual	191735932.466	6	31955988.744		
	Total	219390326.988	7			
Indian Overseas Bank	Regression	1944555.841	1	1944555.841	.328	.587 ^b
	Residual	35536102.765	6	5922683.794		
	Total	37480658.606	7			
Union Bank	Regression	3918816.596	1	3918816.596	.208	.664 ^b
	Residual	113126690.384	6	18854448.397		
	Total	117045506.979	7			
Canara Bank	Regression	54240388.837	1	54240388.837	3.696	.127 ^b
	Residual	58702364.740	4	14675591.185		
	Total	112942753.576	5			
Indian Bank	Regression	146440.457	1	146440.457	.077	.791 ^b
	Residual	11423789.534	6	1903964.922		
	Total	11570229.991	7			
UCO Bank	Regression	817358.400	1	817358.400	.235	.645 ^b
	Residual	20880025.025	6	3480004.171		
	Total	21697383.426	7			
Bank of India	Regression	1261464.565	1	1261464.565	.071	.799 ^b
	Residual	107243278.223	6	17873879.704		
	Total	108504742.788	7			
Central Bank	Regression	792916.164	1	792916.164	.269	.622 ^b
	Residual	17665810.852	6	2944301.809		
	Total	18458727.016	7			
Bank of Maharashtra	Regression	3978201.167	1	3978201.167	5.447	.058 ^b
	Residual	4381814.336	6	730302.389		
	Total	8360015.503	7			
Punjab & Sind Bank	Regression	454899.336	1	454899.336	.252	.633 ^b
	Residual	10826969.189	6	1804494.865		
	Total	11281868.525	7			

a. Predictors: (Constant), Year

b. Dependent Variable: Amount involved in Frauds

The ANOVA results across public sector banks reveal that the year is generally not a statistically significant predictor of the amount involved in frauds. Most banks exhibit high p-values (greater

than 0.05), indicating weak or no significant relationship between time and fraud amounts. For instance, the State Bank of India (SBI) reports an F-statistic of 0.026 with a p-value of 0.877, making the model statistically insignificant. Similar outcomes are seen for Punjab National Bank ($p = 0.388$), Indian Overseas Bank ($p = 0.587$), Union Bank ($p = 0.664$), Indian Bank ($p = 0.791$), UCO Bank ($p = 0.645$), Bank of India ($p = 0.799$), Central Bank ($p = 0.622$), and Punjab & Sind Bank ($p = 0.633$), all confirming that year does not significantly explain fraud variations in these banks.

Even among banks with relatively stronger models, statistical significance remains elusive. Bank of Baroda shows a moderate F-statistic (2.714) but a non-significant p-value of 0.175, while Canara Bank has an F-statistic of 3.696 and a p-value of 0.127, indicating potential but insufficient evidence of time-based influence on fraud amounts. The only exception with borderline significance is Bank of Maharashtra, which reports an F-statistic of 5.447 and a p-value of 0.058. Though slightly above the conventional 0.05 threshold, this result suggests a relatively stronger—but still marginal—impact of the year on fraud amounts. Overall, these ANOVA results reinforce that temporal trends alone do not adequately account for the variance in fraud amounts, and other external or operational variables likely play a more significant role.

Table 5: Regression model of Amount Involved in Frauds Predictor with Number of Frauds Reported

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
SBI	.790 ^a	.623	.561	9337.242
Bank of Baroda	.529 ^a	.280	.100	4614.836
PNB	.409 ^a	.167	.028	5519.355
Indian Overseas Bank	.453 ^a	.205	.072	2228.502
Union Bank	.179 ^a	.032	-.129	4345.709
Canara Bank	.824 ^a	.679	.599	3010.801
Indian Bank	.374 ^a	.140	-.003	1287.859
UCO Bank	.241 ^a	.058	-.099	1845.692
Bank of India	.206 ^a	.042	-.117	4161.401
Central Bank	.177 ^a	.031	-.130	1726.234
Bank of Maharashtra	.425 ^a	.180	.044	1068.727
•Punjab & Sind Bank	.224 ^a	.050	-.108	1336.552

- a. Dependent Variable: Amount involved in frauds
- b. Predictors: (Constant), Number of frauds reported

The regression analysis evaluating the relationship between the number of frauds reported and the amount involved reveals varying predictive strengths across public sector banks. The **State Bank of India (SBI)** demonstrates a strong model with an R^2 of 0.623, meaning 62.3% of the variance in fraud amounts is explained by the number of frauds. The adjusted R^2 of 0.561 and a standard error of ₹9337.242 crores indicate a reliable and moderately accurate model. **Canara Bank** performs even better, with the highest R^2 of 0.679 and adjusted R^2 of 0.599, suggesting that nearly 68% of the fraud amount variation can be predicted from fraud count, alongside a relatively low standard error, affirming high predictive accuracy.

On the other hand, **Bank of Baroda** and **Indian Overseas Bank** show moderate performance. Bank of Baroda has an R^2 of 0.280, but a low adjusted R^2 of 0.100 weakens the model's reliability. Indian Overseas Bank reports a slightly better R^2 of 0.205, though the adjusted R^2 of 0.072 still points to a weak model. Similarly, **Bank of Maharashtra** shows modest potential with R^2 of 0.180 and adjusted R^2 of 0.044, but limited predictive strength.

In contrast, several banks have regression models with poor fit and low predictive value. **Punjab National Bank (PNB)** ($R^2 = 0.167$), **Indian Bank** ($R^2 = 0.140$), and **UCO Bank** ($R^2 = 0.058$) all show that less than 20% of the variance in fraud amounts can be explained by fraud counts, and their adjusted R^2 values (mostly negative) confirm weak model reliability. **Union Bank, Bank of India, Central Bank, and Punjab & Sind Bank** fare the worst, with R^2 values all below 0.05 and negative adjusted R^2 , signifying minimal to no explanatory power. These banks' high standard errors further support the unreliability of the models for predictive purposes.

Table 6: Analysis of Variance (ANOVA) Table for Predicting the Amount Involved in Banking Frauds with the Number of Frauds Reported as the Predictor Variable

		Sum of Squares	df	Mean Square	F	Sig.
SBI	Regression	865660091.065	1	865660091.065	9.929	.020 ^b
	Residual	523104546.823	6	87184091.137		
	Total	1388764637.889	7			
Bank of Baroda	Regression	33146125.782	1	33146125.782	1.556	.280 ^b
	Residual	85186858.432	4	21296714.608		
	Total	118332984.214	5			
PNB	Regression	36610671.090	1	36610671.090	1.202	.315 ^b
	Residual	182779655.898	6	30463275.983		
	Total	219390326.988	7			
Indian Overseas Bank	Regression	7683339.107	1	7683339.107	1.547	.260 ^b
	Residual	29797319.499	6	4966219.917		
	Total	37480658.606	7			
	Regression	3734378.297	1	3734378.297	.198	.672 ^b

Union Bank	Residual	113311128.683	6	18885188.114		
	Total	117045506.979	7			
Canara Bank	Regression	76683068.883	1	76683068.883	8.459	.044 ^b
	Residual	36259684.693	4	9064921.173		
	Total	112942753.576	5			
Indian Bank	Regression	1618752.236	1	1618752.236	.976	.361 ^b
	Residual	9951477.755	6	1658579.626		
	Total	11570229.991	7			
UCO Bank	Regression	1257917.213	1	1257917.213	.369	.566 ^b
	Residual	20439466.212	6	3406577.702		
	Total	21697383.426	7			
Bank of India	Regression	4601197.789	1	4601197.789	.266	.625 ^b
	Residual	103903544.999	6	17317257.500		

	Total	108504742.788	7			
Central Bank	Regression	579427.639	1	579427.639	.194	.675 ^b
	Residual	17879299.377	6	2979883.229		
	Total	18458727.016	7			
Bank of Maharashtra	Regression	1506945.991	1	1506945.991	1.319	.294 ^b
	Residual	6853069.512	6	1142178.252		
	Total	8360015.503	7			
Punjab & Sind Bank	Regression	563636.584	1	563636.584	.316	.595 ^b
	Residual	10718231.941	6	1786371.990		
	Total	11281868.525	7			

- a. Dependent Variable: Amount involved in frauds
b. Predictors: (Constant), Number of frauds reported

The analysis of variance (ANOVA) results examined whether the number of frauds reported in each public sector bank significantly explains the amount involved in those frauds. Among all the banks considered, only the State Bank of India (SBI) and Canara Bank demonstrated statistically significant regression models. SBI showed an F-statistic of 9.929 with a p-value of 0.020, which is well below the 0.05 threshold. This indicates that the number of frauds reported has a meaningful and statistically significant influence on the amount involved in frauds for SBI. Similarly, Canara Bank displayed an F-statistic of 8.459 with a p-value of 0.044, also indicating a significant relationship between the number of frauds reported and the amount involved.

For the remaining banks—Bank of Baroda, Punjab National Bank (PNB), Indian Overseas Bank, Union Bank, Indian Bank, UCO Bank, Bank of India, Central Bank, Bank of Maharashtra, and Punjab & Sind Bank—the regression models were not statistically significant. In each of these cases, the p-values were greater than 0.05, suggesting that the number of frauds reported does not significantly explain the variance in fraud amounts. For example, PNB had a p-value of 0.315, and Bank of Baroda had 0.280, both of which are too high to support a meaningful relationship. These results imply that in most banks, other factors beyond fraud count are likely influencing the amount involved in frauds.

This finding aligns with the earlier regression diagnostics, where SBI and Canara Bank also showed the strongest R^2 and adjusted R^2 values, indicating better model fit and predictive power. Specifically, Canara Bank had an R^2 of 0.679 and an adjusted R^2 of 0.599, making it the most robust model in the dataset. SBI followed closely with an R^2 of 0.623 and an adjusted R^2 of 0.561. In contrast, most other banks had very low R^2 values, with some even showing negative adjusted R^2 scores, signaling poor model fit and low reliability of predictions based on fraud count.

8. Conclusion

The data analysis underscores a critical need for improved fraud management strategies within public sector banks. The alarming CAGR figures for several banks indicate that heightened awareness and robust controls are essential to mitigate risks associated with fraudulent activities. While some banks have successfully reduced fraud incidents, others must address underlying vulnerabilities to enhance their operational resilience. The strong correlations among certain banks suggest that systemic issues may contribute to similar fraud patterns, warranting collaborative efforts in developing best practices for fraud detection and prevention. Overall, the findings emphasize the importance of continuous monitoring, enhanced reporting mechanisms, and strategic interventions to combat fraud effectively across the banking sector. Overall, the findings from this data analysis emphasize the importance of continuous monitoring, enhanced reporting mechanisms, and strategic interventions to combat fraud effectively across the banking sector. The significant variations in reported fraud cases across public sector banks underscore an urgent need for improved management strategies tailored to address specific vulnerabilities within each institution.

By adopting a proactive approach that includes collaboration among banks, investment in technology, and strengthening internal controls, public sector banks can significantly enhance their operational resilience against fraudulent activities. Addressing these challenges is not only vital for safeguarding financial assets but also essential for maintaining customer trust and confidence in the banking system as a whole.

As we move forward into 2025 and beyond, it is crucial that public sector banks prioritize these strategies to create a more secure banking environment that effectively mitigates the risks associated with fraud while fostering transparency and accountability within their operations.

9. Limitations

1. Focus on Public Sector Banks Only:

This study exclusively focuses on Indian Public Sector Banks and does not include data or analysis from private sector banks. As a result, the findings may not provide a holistic view of banking frauds across the entire banking industry in India.

2. Exclusion of Operation-Wise Analysis:

The research does not delve into an operation-wise breakdown of frauds, such as specific areas like credit frauds, cyber frauds, or trade finance frauds. This limits the granularity of the insights into the nature of fraudulent activities.

10. Reference:

1. Dr.B.Srinivas (2023) "A Study on Frauds In Indian Banking Sector." Central European Management Journal Vol. 31 ISSN,. 2 (2023) ISSN:2336-2693 | E-ISSN:2336-4890.
2. Dr. Rohan Joshi (2022) "An In-Depth Exploration Of Factors Influencing Bank Employees' Perspectives In Gujarat" International Journal of Creative Research Thoughts (IJCRT), ISSN: 2320-2882, Volume 10, Issue 10.
3. Diksha Mishra & Dr. Brijesh Kumar Jaiswal (2022) "An Empirical study on banking frauds in India" International Journal for Research Trends and Innovation, ISSN: 2456-3315, Volume 7, Issue 12.
4. Richa Rajpal (2022) "Frauds in Banking Sector in India: Analysis and Preventive Measures" Indian Journal of Integrated Research in Law Volume II Issue II | ISSN: 2583-0538.

5. G.V.K.R.Sharma (2022) "An Empirical Study on Indian Banking Scams by Top Business Holders" *Journal of Internet Banking and Commerce*, December 2022, Vol.27, No.7.
6. Dr. C.P. Gupta 2021 "Banking Frauds in India: Trends and Legal challenges" ISSN: 2581-9925, Impact Factor: 6.340, Volume 03, No. 01, January - March, 2021, pp.276-280.
7. Dr. Sadyojathappa S (2021) 'A Study on Financial Frauds in Banking Sector in India' *International Journal of Research*, P-ISSN: 2348-6848 E-ISSN: 2348-795X Vol. 8 Issue 10 October 2021.
8. Ms. Nanda Pardhey (2021) "Financial Systemic Frauds in Banking Sector And Money Laundering Cataclysm: Indian Realism Wits" *NIU International Journal of Human Rights* ISSN: 2394 – 0298 Volume 8(VI), 2021
9. Dr. C.P. Gupta* & Abhilasha Sharma** (2021) "Banking Frauds in India: Trends And Legal Challenges" *International Journal of Education, Modern Management, Applied Science & Social Science (IJEMMASSS)* 276 ISSN: 2581-9925, Impact Factor: 6.340, Volume 03, No. 01, January - March, 2021, pp.276-280.
10. Baxi Minouti Kaivalya* Dr. Bhavik U. Swadia** (2021) "Study on Banking Frauds Scenario in India" *Journal of the Maharaja Sayajirao University of Baroda* ISSN: 0025-0422, Volume-55, No.1 (III).
11. Mrs Sunindita Pan 2020 "Analysis of Frauds in Indian Banking Sector" Volume 4 Issue 3, April 2020 Available Online: www.ijtsrd.com e-ISSN: 2456 – 6470.
12. P. Mary Jeyanthi1, 2020 "Significance of Fraud Analytics In Indian Banking Sectors" Vol 7, Issue 4, 2020, ISSN- 2394-5125.
13. Sood, Pallavi & Bhushan, Puneet. (2020). "A structured review and theme analysis of financial frauds in the banking industry". *Asian Journal of Business Ethics*. 9. 1-17. 10.1007/s13520- 020-00111-w.
14. N. Sharma, D. Sharma, Dhiraj and A. Aggarwal, "Internet of Things and Banking Frauds Friends or Foes? A Study of Indian Public and Private Sector Banks," *Journal of Computational and Theoretical Nanoscience*. Vol.17, pp.2596-2604. 2020.
15. Samuel Ngigi Nyakarimi* Samuel Nduati Kariuki Kenya Peter Wang'ombe Kariuki (2020) "Risk Assessment and Fraud Prevention in Banking Sector", *The Journal of Social Sciences Research* ISSN(e): 2411-9458, ISSN(p): 2413-6670 Vol. 6, Issue. 1, pp: 13-20, 2020.

16. Mrs Sunindita Pan (2020) "Analysis of Frauds in Indian Banking Sector" International Journal of Trend in Scientific Research and Development (IJTSRD) Volume 4 Issue 3..
17. Dr. P. Sai Rani 2019 "A Study on Financial Frauds in Banking Sector" Journal of Xi'an University of Architecture & Technology Volume XI, Issue XII, 2019, Issn No : 1006-7930.
18. Ainsley Granville Andre Jorge Bernard 2019 "Impact of Frauds on the Indian Banking Sector" International Journal of Innovative Technology and Exploring Engineering (IJITEE), ISSN: 2278-3075, Volume-8 Issue-7S2, May 2019.
19. Tauseef Ahmad 2019 Law and Policy Relating to Bank Fraud and its Prevention and Control" 2019 IJLMH | Volume 2, Issue 3 | ISSN: 2581-5369.
20. A. Shivakanth Shetty 2019 "Imperative of revisiting the operational risk control architecture in public sector banks (PSBs) in India: a qualitative analysis" Banks and Bank Systems, Volume 14, Issue 1, 2019
21. P. S. Rani, K. M. Rani, R. B. Nemani, "A study on financial frauds in Banking Sector," Journal of Xi'an University of Architecture & Technology, vol.11, No.12, 2019.
22. Kamaldeep Kaur¹, Amandeep Kaur², Suman Sharma³ (2019) "Financial Scams in Indian Banking Sector – A Review" Journal of Emerging Technologies and Innovative Research (JETIR), ISSN-2349-5162, Volume 6, Issue 5.
23. T.S.Vigneshwaran 2018 "A Study on Causes and Prevention of Fraud in Banking Industry" International Journal of Pure and Applied Mathematics, Volume 120 No. 5 2018, 311-321, ISSN: 1314-3395 (on-line version).
24. N. Sharma, D. Sharma, "Rising Toll of Frauds in Banking: A Threat for the Indian Economy," Journal of Technology Management for Growing Economies, Vol.9, No.1, pp.71- 89, 2018.
25. Dr. Mahadev Dattu Dongare (2018) "Banking Frauds in India: An Analytical Study" Pune Research Scholar, ISSN 2455-314X An International Multidisciplinary Journal Vol 4, Issue 5.
26. Dr. Anil Dogra (2018) "Banking Frauds in India: Case Studies of Nirav Modi and Vijay Mallya Case" International Journal of Creative Research Thoughts (IJCRT), ISSN: 2320-2882, Volume 6, Issue 1, P.P. 855-860.
27. T.S.Vigneshwaran*, M.Yokesh**(2018), "A Study On Causes And Prevention Of Fraud In Banking Industry" International Journal of Pure and Applied Mathematics, ISSN: 1314-3395, Volume 120 No. 5 2018, 311-321.

28. N. Sharma, N. and D. Sharma, “An Empirical Study on Banking Frauds in India- with a special reference to role of Employee Awareness in Banking frauds,” International journal of Business Management, 2017.
29. Dr. Sukhamaya Swain, Dr. Lalata K Pani (2016) “Frauds in Indian Banking: Aspects, Reasons, Trend-Analysis and Suggestive Measures” International Journal of Business and Management Invention ISSN (Online): 2319 – 8028, ISSN (Print): 2319 – 801X www.ijbmi.org || Volume 5 Issue 7 || July. 2016 || PP—01-09.
30. Dr. Madan Lal Bhasin (2015) “An Empirical Study of Frauds In The Banks”European Journal of Business and Social Sciences, ISSN: 2235 -767X, Vol. 4, No. 07, P.P. 1-12.

Websites:

- 1 State Bank of India (SBI) www.sbi.co.in
- 2 Punjab National Bank (PNB) www.pnbindia.in
- 3 Bank of Baroda www.bankofbaroda.in
- 4 Canara Bank www.canarabank.com
- 5 Union Bank of India www.unionbankofindia.co.in
- 6 Indian Bank www.indianbank.in
- 7 Indian Overseas Bank www.iob.in
- 8 UCO Bank www.ucobank.com
- 9 Bank of India www.bankofindia.co.in
- 10 Central Bank of India www.centralbankofindia.co.in
- 11 Bank of Maharashtra www.bankofmaharashtra.in
- 12 Punjab & Sind Bank www.psbindia.com