



Review paper

Visualizing the Financial Performance of India's Largest Bank, the State Bank of India, Using Annual Report Data

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KEYWORDS	ABSTRACT
State Bank of India (SBI) Financial Performance Analysis Data Visualization	This report presents a comprehensive financial performance evaluation of the State Bank of India (SBI) using data sourced from the bank's public annual reports. The document is structured into two primary sections: Part A establishes a framework for financial data visualization, defining specific criteria for the application of various graphical tools such as line, bar, scatter, and surface charts. Part B applies these methodologies to analyze SBI's key performance indicators—including interest spreads, asset turnover, return on equity, and non-performing assets—and benchmarks these results against key industry competitors. This study demonstrates the efficacy of leveraging diverse data visualization techniques to interpret complex banking financials and derive actionable insights.

1. Introduction

In this task, the organization selected is State Bank of India (SBI), the number one bank in the country. Based on this organization two distinct tasks Part A & Part B have been undertaken. In Part A the list of generic evaluation criteria have been developed and presented as the critique valid practices for the visualizations, like chart, tables, etc. In the Part B, the criteria developed have been used to actually evaluate the suitability of such visualizations. The visualizations have been adopted from the SBI's publicly available Annual Reports.

1.1 Part A

Following criteria has been used:

- Line charts are used to analyze trends over time.
- Tabular data is used to compare other banks at a glance for competitive analysis
- Bar charts are used to ascertain the ratios and performance of the chosen organization. For instance Capital adequacy ratio is checked using the bar charts.
- Scatter plot is used so that we can check the dispersion of data and undertake relevant statistical analysis so as to check as to how the data is dispersed. For instance we can check the data on return on net worth (RONW).
- Column Chart is used to compare the group of competitors on the selected criteria. For instance we can verify the net Profit margins in the given period for a group of companies where SBI is a part.
- Pie charts are used to see at a glance the chunk or the quadrant of data at a glance. For instance the solvency ratio or the credit deposit ratio can be seen at a glance for various participating companies.



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- g. Area chart are used to see in the dashboard as to which company amongst the competitors is having the largest share. We can use this to evaluate the cash deposit ratio.
- h. Surface Chart can be used to see at a glance for the purpose of comparison of the performance of a group of companies. The liquidity ratio is used to compare the performance and it is useful for the investors.
- i. Doughnut can be used to see and compare the parts to the whole. We can use the data like quick ratio to see these comparisons.
- j. Bubble chart can be used to see the data points in the form of bubbles. Can be used in the financial analysis for econometrics like earnings per share (EPS).
- k. Radar can be used to monitor the Non performing Assets for the companies.
- l. X,Y Scatter is the scatter plot which connects all the points and has the ability to show the trend. The different trends can be shown and compared in one grid.
- m. Stacked column is another visualization which shows segmented bars instead of side by side bars.
- n. Histogram is another visualization which shows the frequency distribution.
- o. Box plot is another visualization which can be used to show the distribution of the data.
- p. Polygon is the visualization which shows the distribution of the data
- q. Summary table shows the summary data for the companies over the different years.
- r. Ordered array is the visualization that presents the data in the ordered form
- s. Stem-and-leaf display is quick and simple way to see distribution details in a data set.
- t. Frequency distribution is the summary table where data is arranged into numerically ordered classes or intervals

1.2 Part B

In this part we will use the criteria that were developed above and use them to evaluate the organization. We will present the criteria as well as the evaluation & visualizations.

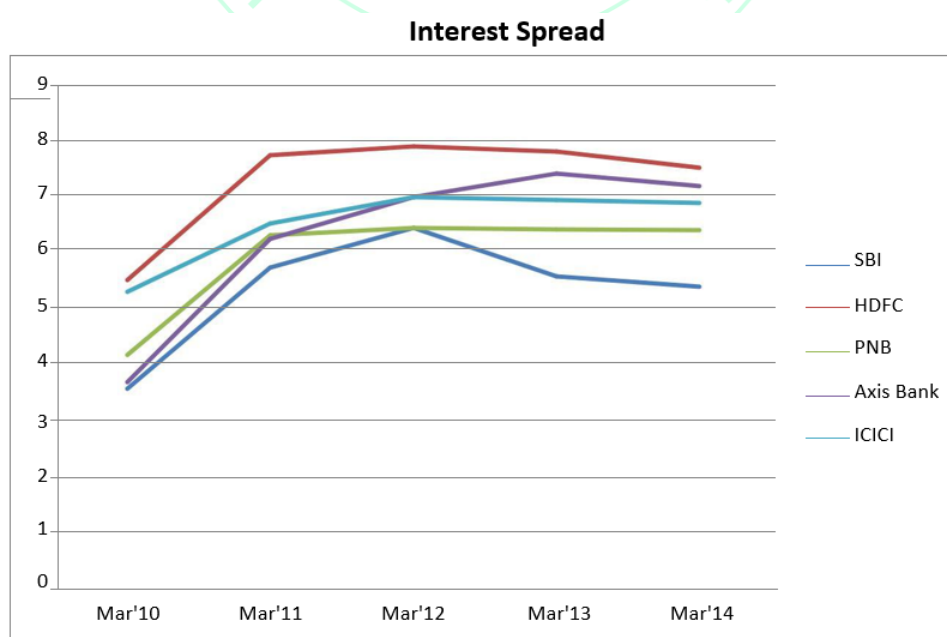
a. *Line charts are used to analyze trends over time.*

Interest spread is one such analysis for the organization where this criteria has been used.

Interest Spread

The difference between the average yield a financial institution receives from loans and other interest-accruing activities and the average rate it pays on deposits and borrowings. The net interest rate spread is a key determinant of a financial institution's profitability (or lack thereof).

$$\text{Interest Spread} = \text{Interest charged on Loans} - \text{Interest offered on Deposits}$$



Evaluation: Analysis Based on Data

Net Interest Spread is a measure of profit margin for financial institutions. The greater the spread the higher is the profitability of the institution; the lower the spread less is the profitability of the institution. The net interest spread of SBI has been on an increasing trend from FY2009-10 to FY2011-12. From then there has been an decreasing trend which affected the profitability of the institution. The banking sector as a whole witnessed a decreasing trend in the net interest margins.

b. *Tabular data is used to compare other banks at a glance for competitive analysis.*

Assets Turnover Ratio

The amount of sales or revenues generated per dollar of assets. The Asset Turnover ratio is an indicator of the efficiency with which a company is deploying its assets.

$$\text{Asset Turnover} = \text{Sales or Revenues} / \text{Total Assets}$$

The higher the ratio, the better it is, since it implies the company is generating more revenues per dollar of assets. But since this ratio varies widely from one industry to the next, comparisons are only meaningful when they are made for different companies in the same sector.

	Mar'10	Mar'11	Mar'12	Mar'13	Mar'14
SBI	0.09	0.08	0.09	0.09	0.09
ICICI	0.08	0.08	0.08	0.07	0.10
HDFC	0.11	0.09	0.10	0.11	0.10
PNB	0.10	0.08	0.09	0.09	0.09
Axis Bank	0.10	0.07	0.09	0.09	0.09

c. *Bar charts are used to ascertain the ratios and performance of the chosen organization. For instance Capital adequacy ratio is checked using the bar charts.*

Interest Income and Fee Based Income

Interest Income and Fee Based Income are one of the Key performance Indicators of the banking industry. The present scenario shows a shift in the income from interest based to fee based as banks diversify their operations from just lending and depositing money.

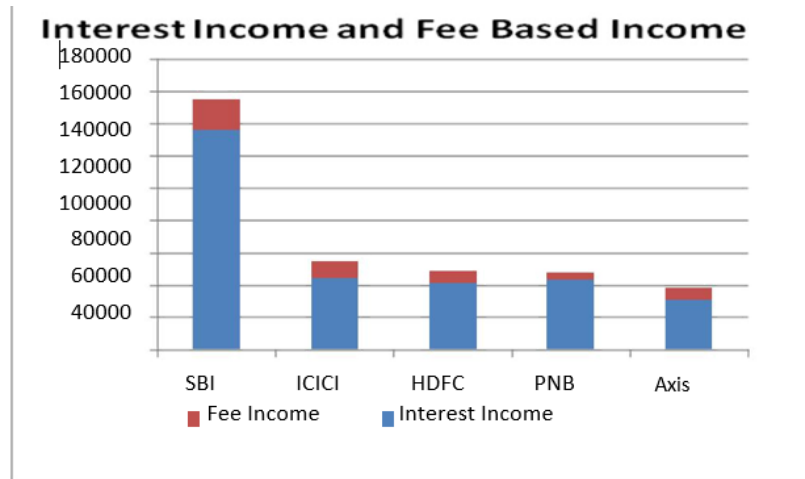
Interest Income is the income generated by lending out customers deposits in the form of short term loans, personal loans, mortgages etc, Fee based income is the income which the bank collects for account related activities like issuing of a new cheque book or statement or attestation of signature etc., Fee based income are forming a significant part of the total income for the banks.

Interest Income % in Total income

	Mar'10	Mar'11	Mar'12	Mar'13	Mar'14
SBI	98.79	83.72	88.13	88.18	88.02
ICICI	69.87	65.13	48.84	87	60.49
HDFC	99.91	82.13	83.88	83.65	83.86
PNB	98.25	88.19	89.66	90.86	90.43
Axis Bank	98.70	7659	80.23	80.58	80.54

Fee Based Income % in Total Income

	Mar'10	Mar'11	Mar'12	Mar'13	Mar'14
SBI	1.21	16.28	11.87	11.82	11.98
ICICI	30.13	34.87	51.16	13	39.51
HDFC	0.09	17.87	16.12	16.35	16.14
PNB	1.75	11.81	10.34	9.14	9.57
Axis Bank	1.30	23.41	19.77	19.42	19.46



- d. Scatter plot is used so that we can check the dispersion of data and undertake relevant statistical analysis so as to check as to how the data is dispersed. For instance we can check the data on return on net worth (RONW).

Return on Equity

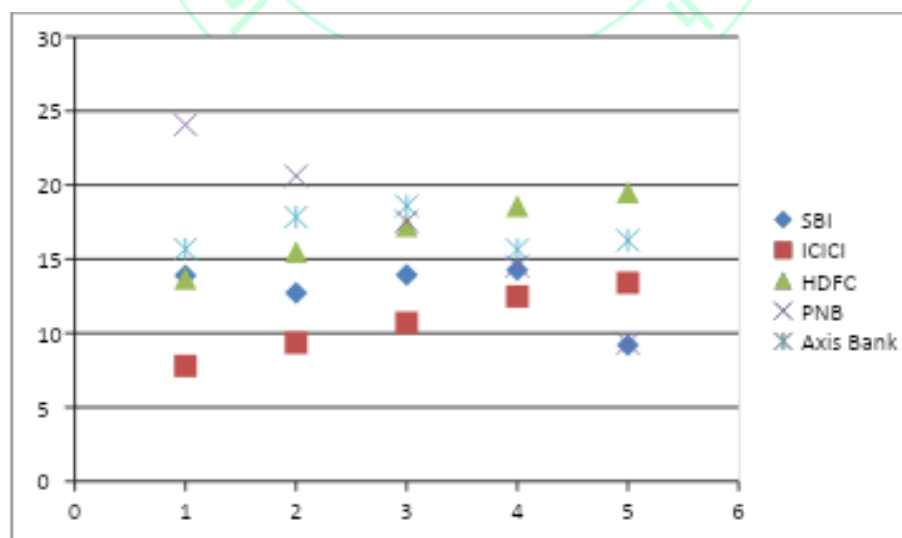
The Amount of net income returned as a percentage of shareholders equity. Return on equity measures a corporations' profitability by revealing how much profit a company generates with the money shareholders have invested. ROE is expressed as a percentage and calculated as:

$$\text{Return on Equity} = \text{Net Income} / \text{Shareholder's Equity}$$

Net income is for the full fiscal year (before dividends paid to common stock holders but after dividends to preferred stock.) Shareholder's equity does not include preferred shares.

Also known as "return on net worth" (RONW).

	Mar'10	Mar'11	Mar'12	Mar'13	Mar'14
SBI	13.89	12.71	13.94	14.26	9.20
ICICI	7.79	9.35	10.70	12.48	13.40
HDFC	13.70	15.47	17.26	18.57	19.50
PNB	24.06	20.61	17.55	14.52	9.31
Axis Bank	15.67	17.83	18.59	15.64	16.26



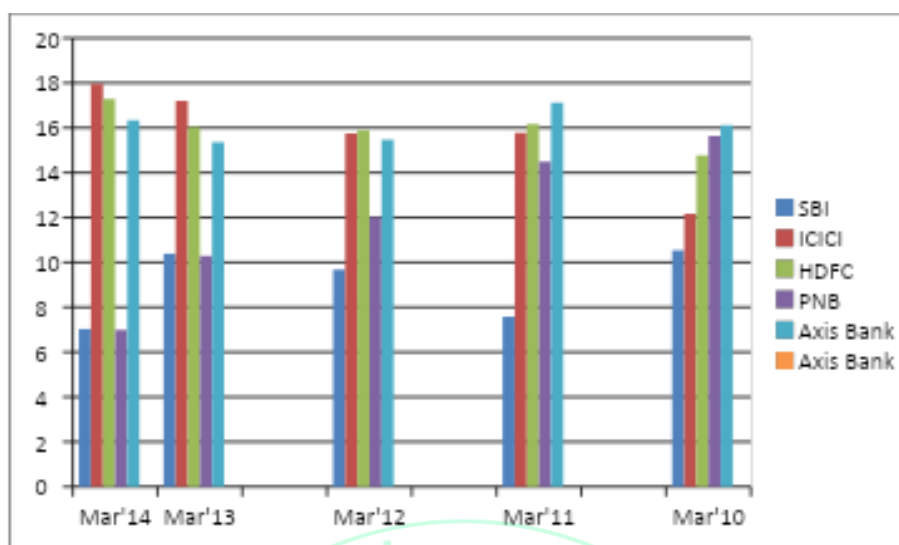
- e. Column Chart is used to compare the group of competitors on the selected criteria. For instance we can verify the net Profit margins in the given period for a group of companies where SBI is a part.

Net Profit Margin

A ratio of profitability calculated as net income divided by revenues, or net profits divided by sales. It measures how much out of every dollar of sales a company actually keeps in earnings.

$$\text{Net Margins} = \frac{\text{Net Profit}}{\text{Revenue}}$$

, where Net Profit = Revenue - COGS - Operating Expenses - Interest and Taxes



Evaluation: Analysis Based on Data

Net Margin of SBI has declined as compared to that of its last year's values due to the higher provisions made towards mounting bad debts. But it performed marginally better as compared to other banks in the same sector. The net profit of the industry as whole has been affected by mounting bad debts with almost all banks except few exceptions like Axis bank reporting a decline in their net profits. The net profits of SBI has declined by 32% as compared to FY 2012-13.

f. Pie charts are used to see at a glance the chunk or the quadrant of data at a glance. For instance the solvency ratio or the credit deposit ratio can be seen at a glance for various participating companies.

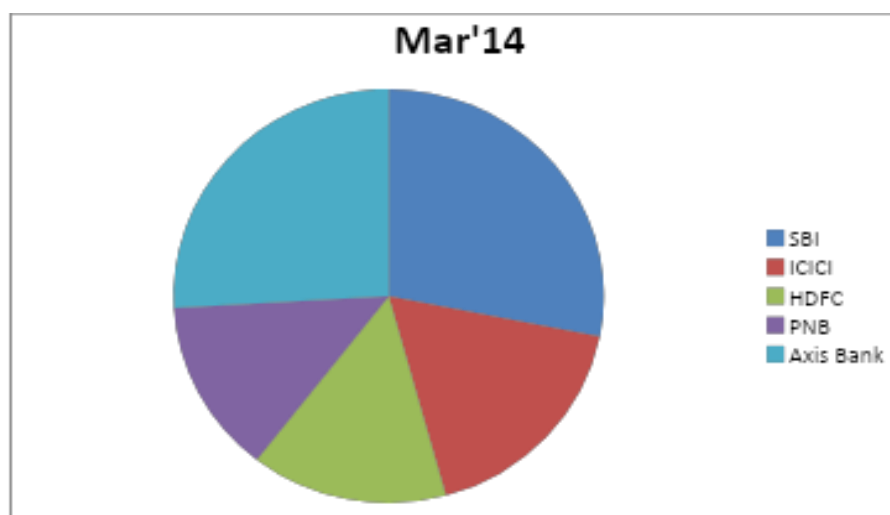
Solvency Ratios

Loan to Deposit Ratio or Credit Deposit Ratio

It is a commonly used statistic to calculate the liquidity of banks by dividing the total amount of loans by total number of deposits. This number is either called as Loan to Deposit ratio or Credit Deposit ratio and is usually expressed as a percentage.

$$\text{Credit Deposit Ratio} = \frac{\text{Total Loans}}{\text{Total Deposits}}$$

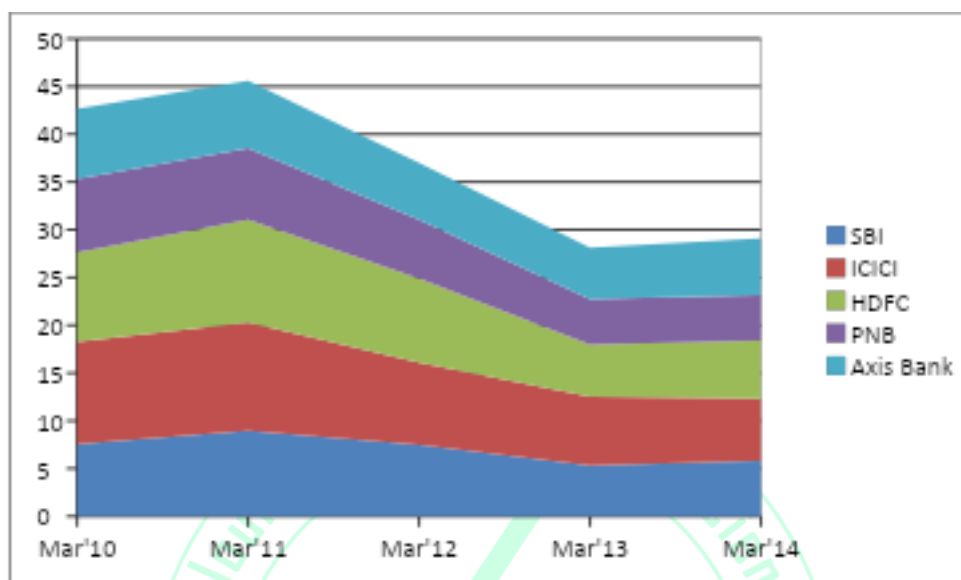
If the ratio is too high then the bank has its funds tied up in loans and do not have enough liquidity to cover any unforeseen requirements. On the other hand if the ratio is too low then the banks have idle funds at their hands on which they are not earning any profit.



- g. Area chart are used to see in the dashboard as to which company amongst the competitors is having the largest share. We can use this to evaluate the cash deposit ratio.

Cash Deposit Ratio

Cash Deposit ratio is defined as the minimum amount of cash that is to be maintained on hand from the depositor's balances maintained at bank. This is a requirement which is regulated by the federal bank, Reserve Bank of India. This ratio affects the amount of cash available for the banks to invest or lend and also affects the total money supply in the country.

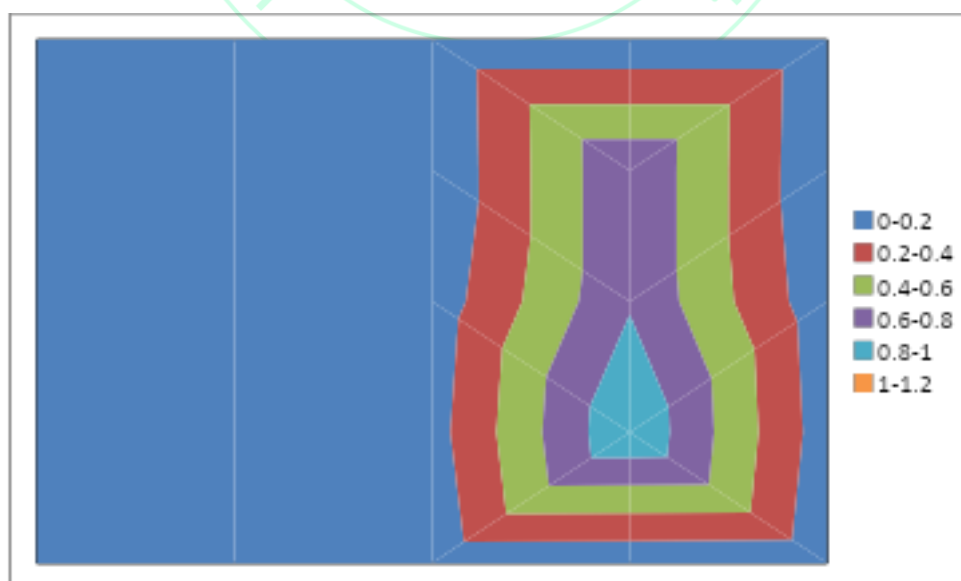


- h. Surface Chart can be used to see at a glance for the purpose of comparison of the performance of a group of companies. The liquidity ratio is used to compare the performance and it is useful for the investors.

Liquidity Ratios

Current Ratio

Current ratio measures a company's ability to pay its short-term obligations. The ratio is mainly used to give an idea of the company's ability to pay back its short-term liabilities (debt and payables) with its short-term assets (cash, inventory, receivables).



Evaluation: Analysis Based on Data

State bank of India's current ratio has been low and consistent as compared to its peers like ICICI. Though most of the banks have a similar low current ratio, a low current ratio can pose a problem of liquidity to the company causing trouble in terms of payment of short-term debts.

- i. Doughnut can be used to see and compare the parts to the whole. We can use the data like quick ratio to see these comparisons.

Quick Ratio

Quick Ratio is an indicator of a company's short-term liquidity. The quick ratio measures a company's ability to meet its short-term obligations with its most liquid assets.



Analysis Based on Data

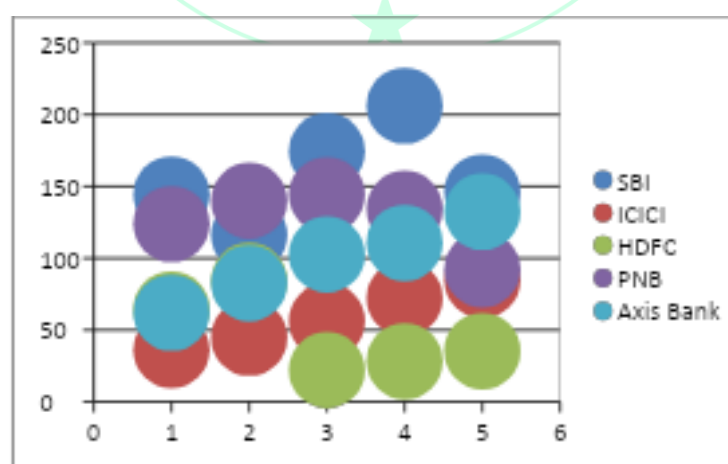
In terms of liquid assets, State bank of India fares better than others. The quick ratio of State bank of India has been on an increasing trend consistently which is advantageous in meeting short term liabilities.

- j. Bubble chart can be used to see the data points in the form of bubbles. Can be used in the financial analysis for econometrics like earnings per share (EPS)

Earnings Per Share

The Portion of a company's profit allocated to each outstanding share of common stock. Earnings per share serves as an indicator of a company's profitability.

$$\text{Calculated as:} = \frac{\text{Net Income} - \text{Dividends on Preferred Stock}}{\text{Average Outstanding Shares}}$$



Evaluation: Analysis Based on Data

Earnings per share is a key performance indicator of how a institution is performing. It is the single most variable which determines the share price of the institution. It is also an important component in calculating price to earnings valuation ratio. The earnings per share of SBI has been on an increasing trend from FY 2010-11 to FY 2012-13. There has been a decrease in the last financial year but it still performs better as compared to rest of the institutions in the sector.

k. Radar can be used to monitor the Non performing Assets for the companies

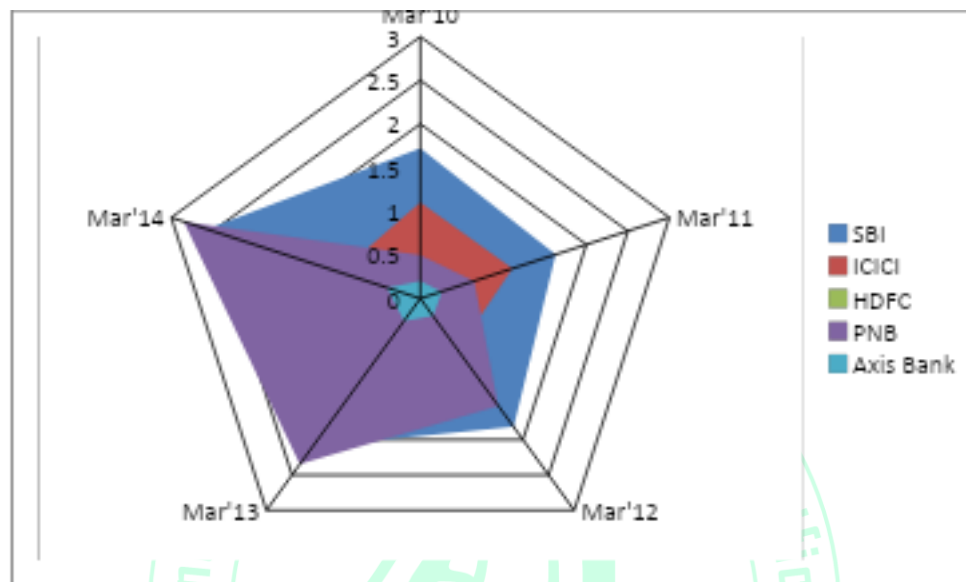
Non Performing Assets

NPAs refer to the loans that are in jeopardy of default. If the borrower fails to repay principal or interest for period of 90 days then the loan is considered as Non performing asset.

An asset which is considered as NPA for not more than 12 months is considered to be Sub standard assets for which banks have to maintain 20% of its reserves.

An asset which is considered as NPA for more than 12 months is called Doubtful asset for which banks have to maintain 30% of its reserves.

An asset where loss is identified by the bank but it is not written off is called loss asset for which banks have to maintain 100% of its reserves.



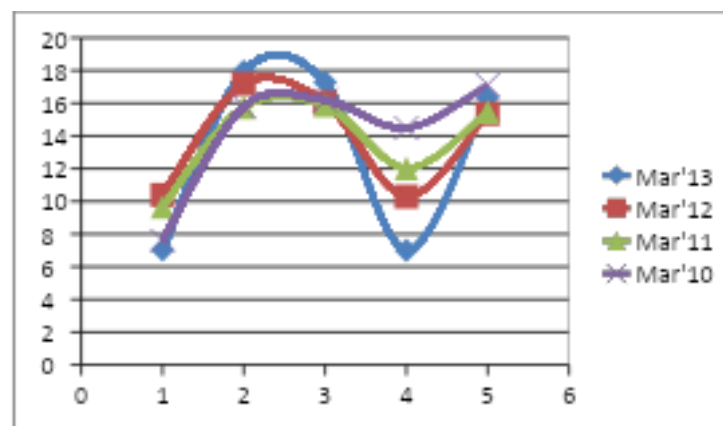
Evaluation: Analysis Based on Data

State Bank of India's net NPA % is on a increasing trend which is of a growing concern to both the investors and management. It is at second position in NPA when compared to the top 5 in the industry. So the bank should concentrate more on reducing the NPA so as to improve its credit portfolio and profits.

l. X,Y Scatter is the scatter plot which connects all the points and has the ability to show the trend. The different trends can be shown and compared in one grid.

Net Profits

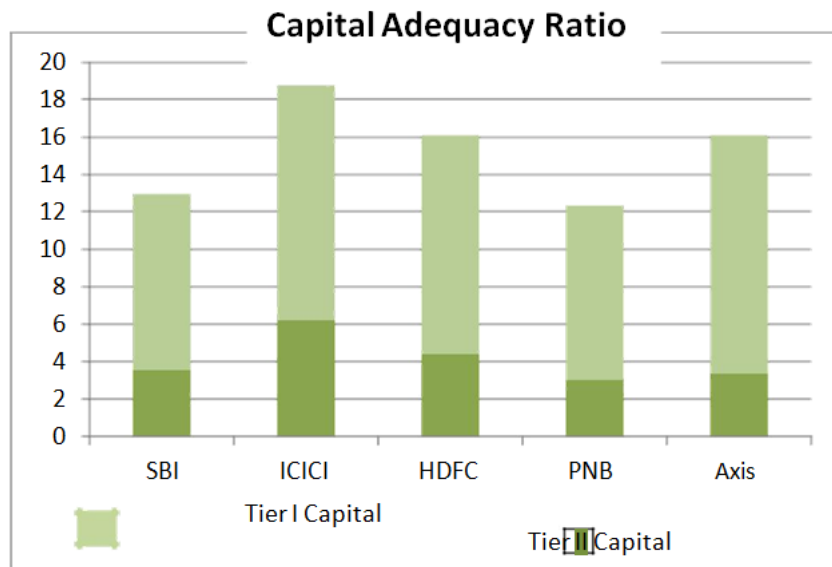
This metric is net income over revenues, and gives a comparatives on net earnings in the last few years as shown in the below graph:



m. Stacked column is another visualization which shows segmented bars instead of side by side bars.

Capital Adequacy Ratio

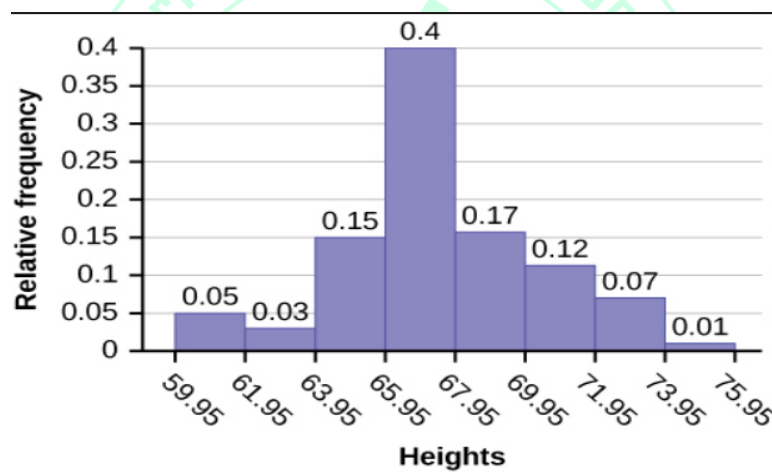
This metric shows bank capital and is an important performance indicator. It is shown in the below visualization:



n. Histogram is another visualization which shows the frequency distribution

Earnings Ratio

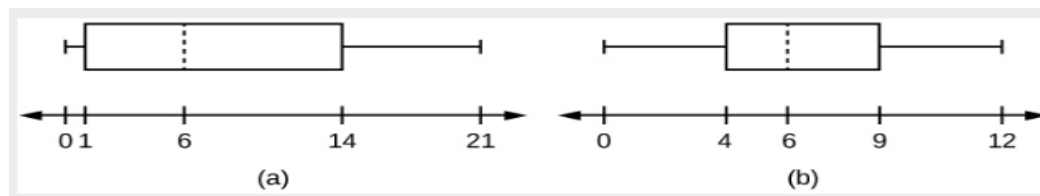
The earnings ratio over several years for different banks can be represented in the histogram as the ratio is clubbed over the histogram bucket and plotted to see the performance of the Banking industry.



o. Box plot is another visualization which can be used to show the distribution of the data.

Employee Performance

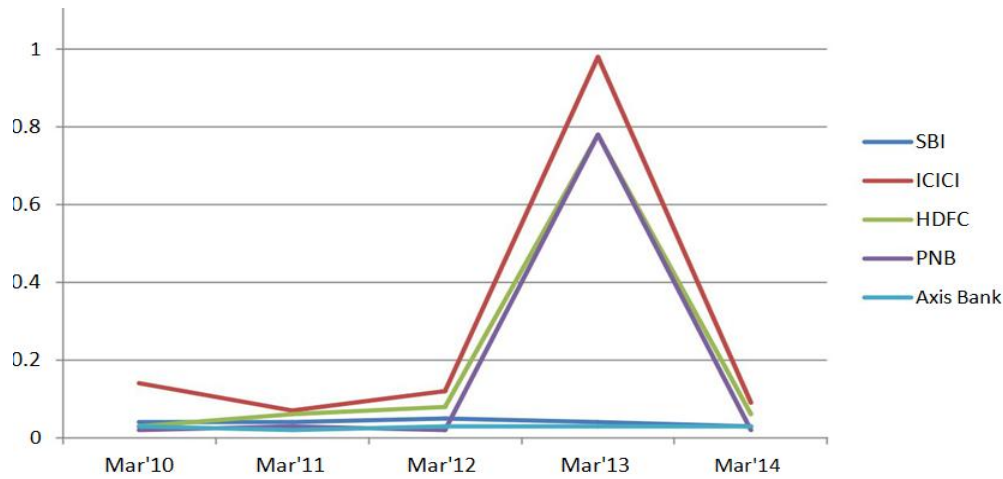
The employee performance at acceptable level for two consecutive years are shown in the below box plots. The employee performance which is not acceptable is seen as an outlier in the plots.



p. Polygon is the visualization which shows the distribution of the data.

Current cumulative ratio

This ratio shows the capability of the company to pay its debts over the years.



q. Summary table shows the summary data for the companies over the different years.

Solvency

The econometric shows the economic health of the companies at a glance. The data is summarized over the financial years.

	Mar'10	Mar'11	Mar'12	Mar'13	Mar'14
SBI	75.96	36.36	53.26	85.17	86.84
ICICI	90.04	90.45	97.71	85.51	54.23
HDFC	72.44	76.02	78.06	59.23	45.66
PNB	74.34	76.25	77.39	38.10	41.84
Axis Bank	71.87	74.65	76.26	77.58	80.03

r. Ordered array is the visualization that presents the data in the ordered form.

SBI earnings are sorted over the years and presented as the ordered array:

Mar'11	116.07
Mar'10	144.37
Mar'14	145.88
Mar'12	174.46
Mar'13	206.2

Earnings were lowest in years 2010-11 and highest for 2011-12 in the evaluation period.

s. Stem-and-leaf display is quick and simple way to see distribution details in a data set.

Investment Details

The investment details shows the data distribution related to investments in a quick and simple way. This is how SBI invested in different projects.

Stem	Leaves
9	0 3 8 8
8	0 2 3 3 5 5 7 8 8
7	0 2 2 2 2 5 7 7 7 8 8
6	0 5
5	3 7 7 8
4	5

- t. *Frequency distribution is the summary table where data is arranged into numerically ordered classes or intervals*

Liquidity ratio

The below visualization shows the liquidity ratio frequency distribution for the banking industry companies like SBI and others

Liquidity ratio	Number of companies
43.50 - 48.50	4
48.50 - 53.50	5
53.50 - 58.50	7
58.50 - 63.50	4
63.50 - 68.50	3
68.50 - 73.50	2
68.50 - 73.50	1

There are very less companies which maintain very high liquidity ratio.

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1. Annual Reports (2015). SBI. Retrieved from <https://www.sbi.co.in/portal/web/corporate-governance/annual-report-2016>
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