Research Paper

Financial Performance Estimation of Selected Indian Commercial Banks Using Key Performance Indicators (KPIs)

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ABSTRACT:
Banks are an essential part of financial sector which render services to people and businesses in financial matters. Its degree of action is increasing day by day. This give rise to the need of performance measurement to understand whether there are nonstop improvements in the efficiency and effectiveness of the banks and the banking sector. This study uses Key performance indicators (KPI) to evaluate financial performance of selected banks. Key Performance Indicators in the banking industry remain useful to enumerate objectives. These are measured frequently to replicate and quantify the strategic performance of a bank. The objectives of the study are to find correlation between ROA and the rest of the KPIs as well as between ROE and other KPIs and to examine relationship between ROA, ROE, and the rest of the KPIs. To fulfil the objectives selected banks are ranked based on KPIs. Correlation and regression analyses are also performed. It was concluded that KPIs are "Critical Success Factors" that are vital for the sustainable growth of banks.Keywords: Key Performance Indicators (KPIs), Return on Assets, Return on Equity, Commercial Banks, Regression.
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I. INTRODUCTION:

Financial sector is the pillar of every economy at globe. Specifically, India has a diversified economywhich is growing in terms of existing financial service firms and new entities are also entering the market. It functionsto achieve sustainable economic growth through the development of productive and societal useful infrastructure by providing well-organised monetary intermediation. Banks are an indispensableportion of financial sector which render services to people and business sector in financial matters.Its degree of action is increasing day by day. This springgrowth to the necessity of performance measurement to understand whether there are nonstopimprovements in the competency and efficiencyin the banking sector.Performance evaluation is the imperativestyle for enterprises to provideencouragement and curb to their operators and it is a significant channel for by business and non-business houses stakeholders to get the performance information (Sun, 2011).

The valuation of financial performance of banks is a significant for various stakeholderssuch as lenders, depositors, investors, top management, employees and regulators. The performance evaluation of a bank is usuallydone using the financial ratio method, as it provides a better pictureof a bank's financial performance in contrast with previous financial years. Many studies have shown different ways to measure the performance of banks. This study uses Key performance indicators (KPI) to evaluate financial performance of selected banks.Key PerformanceIndicators in the banking industry are useful to itemise objectives such as to measure operational efficiency and to understand the effective utilization of available financial resources. These are evaluatedregularly to reproduce and quantify the strategic execution of a bank.

II.   LITERATURE REVIEW

Nataraja NS, Nagaraja Rao Chilale and Ganesh L (2018) discussed the accomplishment of major three private sector banks using Return on Assets (ROA), Tobin's Q model (price/Book ratio) and return on equity (ROE) ratios to assess financial performance of the chosen private banks. Multiple regression technique is used to analyse the data and the outcomes of the study disclose that all the chosen ratios have an influence on financial performance of Private sector commercial banks.

Jilkova and Stranska (2017) concentrated on component of the performance and profitability of the banking sector using "Multiple linear regression model". They examined the whole strength of model and established independent variables having the greatest and the smallest effect on the distribution of the dependent variables. Their paper streamlines the composition of the Czech banking sector as well as compares with other country's banking sector.

Dominic Tetteh Sackitey (2016) conducted the study to discover the key financial performance indicators in the banking industry. The secondary data and various ratios were calculated like, Return on Assets (ROA), Return on Equity (ROE), Cost income ratio (CIR), Net loans to total assets (NLTA), etc. to quantifying the financial performance of Ecobank Ghana. The recommendation was that key performance indicators must be quantifiable, and a timeframe shall be determined for such indicators, with key obstacles at several intervals.

Narwal and Pathneja (2015) have analysed the performance of public and private sector commercial banks with respect to profitability and effectiveness in two separate time periods (2003-2009 and 2010-2014). Regression analysis was applied to ascertain the elements of diverse bank groups. The results indicate that private sector commercial banks are more productive than public sector commercial banks throughout the complete study period and also noticed that there is no significant disparity in the profitability of two bank groups.

Adam (2014) has attempted to scrutinize financial performance of Erbil Bank for Investment and Finance, Kurdistan Region of Iraq during the period of 2009-2013. He applied statistical tool for assessment purpose of few variables which influence the banking system to identify whether these variables are profoundly correlated with the financial performance of the bank. The findings of the analysis display the constructive behaviour of the financial position for Erbil Bank and several of their financial factor's variables influence the financial performance of the bank.

Gopinathan (2009) has found that as the percentage analysis measures numerous characteristics of the execution and assesses necessities of a company or an organization, it can indicate safer investment alternatives for investors.

Objectives
To find correlation between ROA and Other KPIs
To find Correlation between ROE and other KPIs
To examine relationshipof ROAwith other KPIs
To examine relationshipof ROEwith other KPIs
To measure the influenceof other KPIs on ROA and on ROE

III.   RESEARCH METHODOLOGY

Sample of the study: The Bank NIFTY includes most liquid hugeIndian commercial banks. NIFTY has 12 stocks from the banking sector trading on the National Stock Exchange of India Ltd. (NSE). The study selected these 12 Indian commercial banks that are listed on NSE as on 1st April2020, out of these commercial banks, three are 3 public sector banks and 9 are private sector banks. Public sector banks are State Bank of India, Bank of Baroda, Punjab National Bank, and private sector banks are HDFC Bank Ltd., ICICI Bank Ltd., Axis Bank Ltd., Kotak Mahindra Bank Ltd., IndusInd Bank Ltd., Bandhan Bank Ltd., Federal Bank Ltd., RBL Bank Ltd. and IDFC First Bank Ltd.

Period of the study: Financial year 2019-2020.

Data Collection: The study is constructed on secondary data, and these are collected from annual financial reports of selected commercial banks, published and publicly available reports from various financial websites, for the period of one financial year i.e. 2019-2020.

Data Analysis: The study is conducted on Key Performance Indicators (KPI) of selected commercial banks. These are quantifiable ways and are used to stipulate bank's financial performance. This study is conducted to analyticallyinvestigate the key financial performance indicators of the banking industry. The commercial banks were assigned ranks based on their KPIs. The two profitability ratios namely,Return on Assets (ROA)and Return on Equity (ROE) are considered as dependent variable and independent variables include: Net Profit Margin, Operating Profit Margin, Net Interest Margin, Cost to Income (%), Interest Income/Total Assets (%), Non-Interest Income/Total Assets (%), Operating Profit/Total Assets (%), Operating Expenses/Total Assets (%) and Interest Expenses/Total Assets (%). Thereafter, correlation and multiple regression tests were applied on

dependent and independent variables. To examine the relationship between time period-based parameters and return on assets, and then between time period bases parameters and return on equity, regression model has been used.

Econometric Models: Below mentioned econometric models are used to find out relationship between dependent and independent variables.

Model I. is ROA = $\beta_0 + \beta_1 NPM + \beta_2 OPM + \beta_3 NIM + \beta_4 CI + \beta_5 II/TA + \beta_6 NII/TA + \beta_7 OP/TA + \beta_8 OE/TA + \beta_9 IE/TA + \varepsilon$

Hypothesis for model I

Null Hypothesis (H01) Factors like net profit margin, operating profit margin, net interest, cost to income, interest income to total assets, non-interest income to total assets, operating profit to total assets, operating expenses to total assets, and interest expense to total assets margin do not significantly impact the ROA.

Alternative Hypothesis (H11) Factors like net profit margin, operating profit margin, net interest, cost to income, interest income to total assets, non-interest income to total assets, operating profit to total assets, operating expenses to total assets, and interest expense to total assets margin impact significantly the ROA.

Model II. is ROE = $\beta_0 + \beta_1 NPM + \beta_2 OPM + \beta_3 NIM + \beta_4 CI + \beta_5 II/TA + \beta_6 NII/TA + \beta_7 OP/TA + \beta_8 OE/TA + \beta_9 IE/TA + \varepsilon$

Hypothesis for model II

Null Hypothesis (H02) Factors like net profit margin, operating profit margin, net interest, cost to income, interest income to total assets, non-interest income to total assets, operating profit to total assets, operating expenses to total assets, and interest expense to total assets margin do not significantly impact the ROE.

Alternative Hypothesis (H12) Factors like net profit margin, operating profit margin, net interest, cost to income, interest income to total assets, non-interest income to total assets, operating profit to total assets, operating expenses to total assets, and interest expense to total assets margin impact significantly the ROE.

Where:

NPM = Net Profit Margin (%),
OPM= Operating Profit Margin (%),
NIM= Net Interest Margin (%),
CI= Cost to Income (%),
II/TA= Interest Income/Total Assets (%),
NII/TA= Non-Interest Income/Total Assets (%),
OP/TA= Operating Profit/Total Assets (%),
OE/TA=Operating Expenses/Total Assets (%) and
IE/TA= Interest Expenses/Total Assets (%).

In the previous equations, β_0 is constant and β is coefficient of variables while ε is the residual error of the regression.
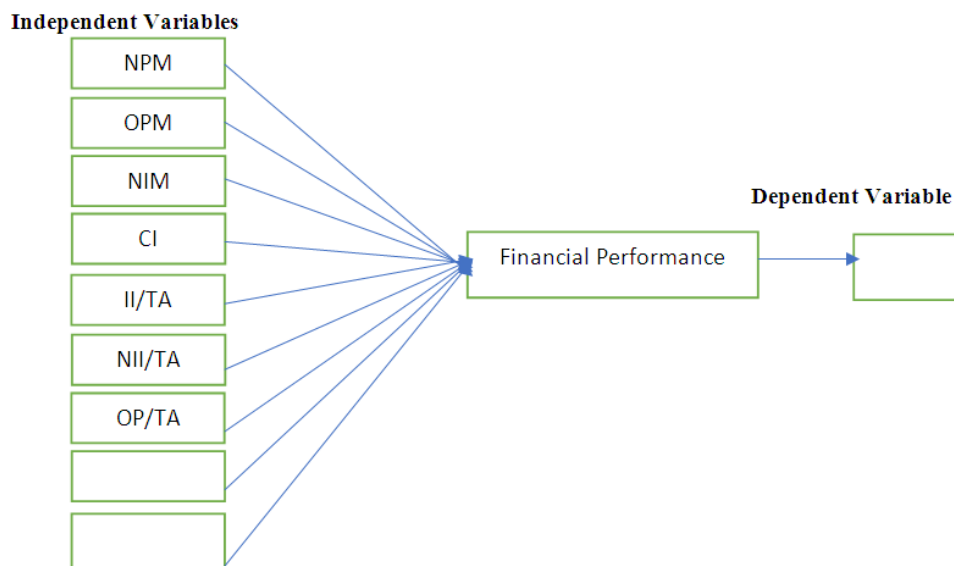

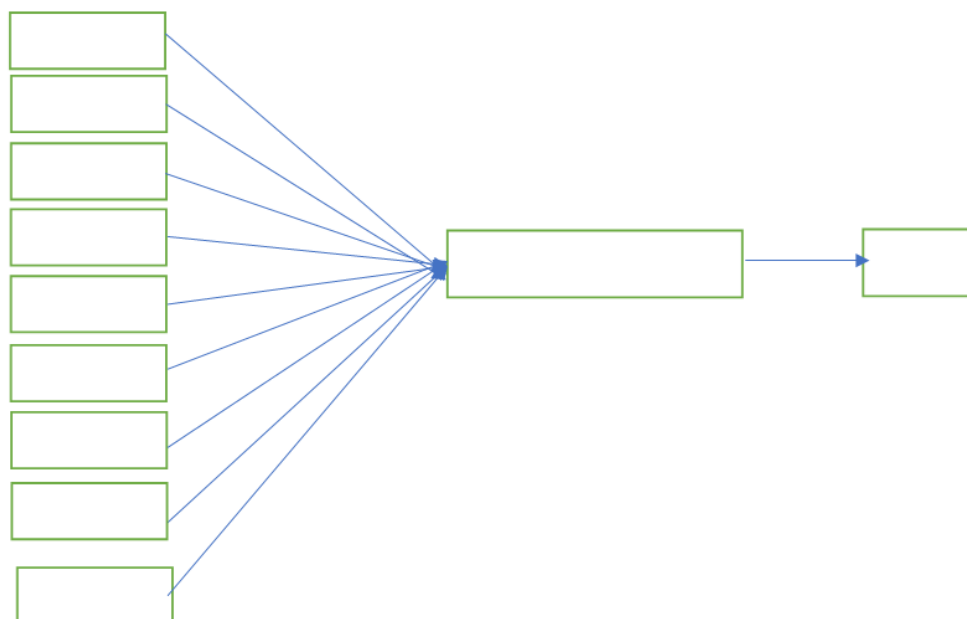**Figure 1: Conceptual Framework of the study using ROA-Model I**

Figure 2: Conceptual Framework of the study using ROE

	Return on Assets (%)	Return on Equity / Net worth (%)	Net Profit Margin (%)	Operating Profit Margin (%)	Net Interest Margin (X)	Cost to Income (%)	Interest Income/ Total Assets (%)	Non-Interest Income/Total Assets (%)	Operating Profit/Total Assets (%)	Operating Expenses/ Total Assets (%)	Interest Expenses/ Total Assets (%)
SBI	0.25	4.16	3.60	-13.74	2.39	41.87	6.77	1.17	-0.91	1.79	4.38
BOB	-0.08	-1.22	-1.15	-14.16	2.04	41.60	6.22	0.80	-0.89	1.31	4.17
PNB	-0.56	-11.33	-8.80	-24.60	2.25	49.55	6.84	1.07	-1.62	1.55	4.59
HDFC Bank Ltd.	1.69	16.04	21.11	2.92	3.83	37.88	8.04	1.46	0.23	2.25	4.21
ICICI Bank Ltd	1.09	9.00	15.38	-13.50	2.82	42.05	6.95	2.00	-0.91	1.82	4.12
AXIS Bank Ltd .	0.87	9.19	11.63	-12.47	2.93	42.56	7.27	1.75	-0.87	1.98	4.33
KOTAK MAHINDRA Bank Ltd .	1.50	11.32	18.44	-0.79	3.71	38.70	8.21	1.57	-0.07	2.67	4.50
INDUSIND Bank Ltd .	1.53	14.54	18.76	-8.24	3.26	37.89	8.20	2.21	-0.67	2.52	4.94
BANDHAN Bank Ltd	2.33	13.02	20.64	10.50	5.49	53.81	8.70	1.42	0.91	2.74	3.21
FEDERAL Bank Ltd	0.77	8.94	9.83	-1.80	2.69	32.59	7.83	0.91	-0.13	1.88	5.14
RBL Bank Ltd .	0.90	10.07	12.22	-8.86	2.53	35.46	7.39	1.56	-0.65	2.26	4.86
IDFC FIRST Bank Ltd	-1016.51	21.45	3.62	-5.04	1.25	21.61	5.34	0.58	-1017.09	1018.39	4.09

Table 1. Key Performance Indicators (KPIs) of Selected Indian Commercial Banks
Source:www.moneycontrol.com data extracted on 1st April 2020

ROA ratioindicates how well banks are utilising invested money to generate income on assets of the bank. Higher ratio implies better utilization of invested amount of money. Amongst all selected public and private sector banks, Bandhan bank has highest ROA i.e. 1.69% and IDFC First Bank has lowest and negative-1016.515%. Apart from IDFC First bank, Bank of Baroda and Punjab National bank also have negative ROA.

ROE ratiois calculated to find the return on a bank's equity. Higher the ratio better is the utilization of Bank's equity. IDFC First Bank has highest ROE ratio i.e. 21.45% and BOB has lowest and negative ROE ratio, PNB also has negative ROE Ratio.

Net Profit Margin (NPM) (%)shows how much proportion of per rupee revenue collected by a bank is translated into profit. HDFC bank has highest Net profit margin i.e. 21.11% whereas PNB has lowest and negative ratio of -8.80%. BOB also has negative ratio of -1.15%.

Operating Profit Margin (OPM) (%)shows bank's efficiency in cost-control and expenses associated with its operations. Bandhan Bank Ltd has highest ratio of 10.50% and PNB has lowest and negative ratio of -24.60%. Apart from Bandhan bank only HDFC bank is able to maintain a positive operating profit margin.

Net Interest Margin(NIM) (%)measures difference between interest earned and interest paid by a bank, relative to the assets that earn interest. Bandhan Bank has highest ratio of 5.49% and IDFC First Bank has lowest ratio of 1.25%. All selected banks have positive NIM Ratio.

Cost to Income (CI)(%)measures the profitability of the bank and shows how efficiently the bank is running its business. Lower ratio indicates higher profitability. IDFC First Bank has lowest ratio of 21.61% and Bandhan bank has highest ratio of 53.81%. it means IDFC first bank is managing its cost to income ratio in a better way. All other banks have positive ratio.

Interest Income/Total Assets (IIR) (%)reflects the change between the revenue earned from a bank's interest-bearing assets and expenses linked with paying on its interest-bearing liabilities. Higher ratio signpostsbetter performance. Bandhan bank has highest ratio of 8.70% and IDFC First Bank has lowest ratio of 5.34%. All other banks also have positive ratio.

Non-Interest Income/Total Assets (NIIR) (%)indicates non fund-based income generated from Bank's total assets. Higher ratio specifies better performance. IndusInd bank has highest ratio of 2.21% and IDFC First Bank has Lowest ratio of 0.58%. All other banks also have positive ratio.

Operating Profit/Total Assets (OPR) (%)determines a Bank's operational efficiency and shows income generated from per rupee invested in operating assets. Higher the ratio, better the performance of a Bank. Bandhan bank has highest ratio of 0.91% and IDFC First Bank has lowest and negative ratio of -1017.09%. Amongst other banks only HDFC Bank has positive ratio.

Operating Expenses/Total Assets Ratio (OER)(%)provides an assessment of expenses incurred with respect to income earned. It allows banks to compare their business in the banking industry. Lower ratio implies better management of operating expenses. BOB has the lowest ratio of 1.315 and IDFC First bank has highest ratio of 1018.39%.

Interest Expenses/Total Assets Ratio (IER) (%)measure the cost incurred on loan funds with relation to total assets by a bank. Lower the ratio better the bank's management on interest expenses. Bandhan bank Ltd has lowest ratio of 3.21% and Federal bank has highest ratio of 5.41%.

Correlation analysis

Table 2. Correlation between ROA and other KPIs

	Return on Assets (%)	Net Profit Margin (%)	Operating Profit Margin (%)	Net Interest Margin (X)	Cost to Income (%)	Interest Income/Total Assets (%)	Non-Interest Income/Total Assets (%)	Operating Profit/Total Assets (%)	Operating Expenses/Total Assets (%)	Interest Expenses/Total Assets (%)
Return on Assets (%)	1.00	0.23	-0.08	-0.47	0.70	0.65	0.51	0.99	-1.00	0.18
Net Profit Margin (%)	0.23	1.00	0.76	0.74	0.01	0.74	0.66	0.23	-0.23	-0.17
Operating Profit Margin (%)	-0.08	0.76	1.00	0.70	-0.09	0.58	0.04	-0.08	0.08	-0.39
Net Interest Margin (X)	0.50	0.74	0.70	1.00	0.60	0.88	0.48	0.50	-0.49	-0.45
Cost to Income (%)	0.70	0.01	-0.09	0.60	1.00	0.45	0.31	0.70	-0.70	-0.42
Interest Income/Total Assets (%)	0.65	0.74	0.58	0.88	0.45	1.00	0.59	0.65	-0.65	0.02
Non-Interest Income/Total Assets (%)	0.51	0.66	0.04	0.48	0.31	0.59	1.00	0.51	-0.51	0.10
Operating Profit/Total Assets (%)	0.99	0.23	-0.08	0.50	0.70	0.65	0.51	1.00	-1.00	0.18
Operating Expenses/TotalAssets (%)	-1.00	-0.23	0.08	-0.49	-0.70	-0.65	-0.51	-1.00	1.00	-0.18
Interest Expenses/Total Assets (%)	0.18	-0.17	-0.39	-0.45	-0.42	0.02	0.10	0.18	-0.18	1.00

Source: Computed using SPSS

Interpretation: ROA has a perfect positive correlation with Operating Profit/Total Asset ratio. A high degree of positive correlation with Cost to Income Ratio, Interest Income/Total Assets Ratio and Non-Interest Income/Total Assets Ratio. There is a moderate degree of negative correlation of ROA with Net Interest Margin. There exists a low degree of positive correlation of ROA with Interest Expenses/Total Assets. Net Profit Margin, Operating Profit Margin and Operating Profit Margin have low degree of negative correlation with ROA. Operating Expenses/Total Assets has a perfect negative correlation with ROA.Therefore, null hypothesis is rejected.

Table3: Correlation between ROE and other KPIs

	Return on Equity / Networth (%)	Net Profit Margin (%)	Operating Profit Margin (%)	Net Interest Margin (X)	Cost to Income (%)	Interest Income/Total Assets (%)	Non-Interest Income/Total Assets (%)	Operating Profit/Total Assets (%)	Operating Expenses/ Total Assets (%)	Interest Expenses/ Total Assets (%)
Return on Equity / Networth (%)	1.00	0.72	0.72	0.24	-0.56	0.19	0.20	-0.47	0.47	-0.17
Net Profit Margin (%)	0.72	1.00	0.76	0.74	0.01	0.74	0.66	0.72	-0.23	-0.17
Operating Profit Margin (%)	0.72	0.76	1.00	0.70	-0.09	0.58	0.04	-0.08	0.08	-0.39
Net Interest Margin (X)	0.24	0.74	0.70	1.00	0.60	0.88	0.48	0.50	-0.49	-0.45
Cost to Income (%)	-0.56	0.01	-0.09	-0.09	1.00	0.45	0.31	0.70	-0.70	-0.42
Interest Income/Total Assets (%)	0.19	0.74	0.58	0.88	0.45	1.00	0.59	0.65	-0.65	0.02
Non-Interest Income/Total Assets (%)	0.20	0.66	0.04	0.48	0.31	0.59	1.00	0.51	-0.51	0.10
Operating Profit/Total Assets (%)	-0.47	0.23	-0.08	0.50	0.70	0.65	0.51	1.00	-1.00	0.18
Operating Expenses/Total Assets (%)	0.47	-0.23	0.08	-0.49	-0.70	-0.65	-0.51	-1.00	1.00	-0.18
Interest Expenses/Total Assets (%)	-0.17	-0.17	-0.39	-0.45	-0.42	0.02	0.10	0.18	-0.18	1.00

Source: Computed using SPSS

Interpretation: There is high degree of positive correlation of ROE with Net Profit Margin and Operating Profit Margin. A low degree of positive correlation of ROE exists with Net Interest Margin, Interest Income/Total Assets and Non-Interest Income/Total Assets. A high degree of negative correlation exists between ROE and Cost to Income. Moderate degree of negative correlation exists between ROE and Operating Profit/Total Assets. Low degree of negative correlation exists between ROE and Interest Expenses/Total Assets. Therefore, null hypothesis is rejected.

Multiple Regression Analysis

Table 4. Parameters Estimation for ModelI- ROA

Model 1	Unstandardized Coefficients		Standardized Coefficients	*t Stat*	*P-value*
	Coefficients	*Standard Error*	*Beta*		
Intercept	0.2483	0.1157	0.0000	2.1451	0.1651
Net Profit Margin (%)	-0.0032	0.0021	-0.0001	-1.4941	0.2737
Operating Profit Margin (%)	-0.0019	0.0010	-0.0001	-1.8335	0.2082
Net Interest Margin (X)	0.2926	0.5404	0.0011	0.5415	0.6424
Cost to Income (%)	-0.0060	0.0025	-0.0002	-2.4234	0.1363
Interest Income/Total Assets (%)	-0.2465	0.5292	-0.0008	-0.4657	0.6872
Non-Interest Income/Total Assets (%)	1.0089	0.0202	0.0017	49.9304	0.0004
Operating Profit/Total Assets (%)	0.9987	0.0056	0.9976	177.9360	0.0000
Operating Expenses/Total Assets (%)	-0.0014	0.0056	-0.0016	-0.2474	0.8277
Interest Expenses/Total Assets (%)	0.2157	0.5206	0.0004	0.4144	0.7188

Source: Computed using SPSS

Model 1. is ROA = $\beta_0 + \beta_1 NPM + \beta_2 OPM + \beta_3 NIM + \beta_4 CI + \beta_5 II/TA + \beta_6 NII/TA + \beta_7 OP/TA + \beta_8 OE/TA + \beta_9 IE/TA + \varepsilon$

Therefore,

ROA=0.2483-0.0032NIM-0.0019OMP+0.2926NIM-0.0060CI-0.2465II/TA+1.0089NI/TA+0.9987OP/TA-0.0014OE/TA+0.2157IE/TA

Table 5. Model Summary

Regression Statistics	Multiple R	R Square(r^2)	Adjusted R Square	Standard Error
	1	1	1	0.002188369

Source: Computed using SPSS

Multiple R is used to measure strength of linear relationship between predictor and response variables. In the above study Multiple R is 1 which represent perfect linear relationship between other KPIs and ROA. R square or coefficient of determination is the ratio of variance in the response variable that can be described by the predictor variable. r^2 =1 indicates that response variables i.e. ROA can be perfectly explained without error by the predictor variables i.e. other KPIs. Adjusted r^2 is a modified version of r^2 that has been adjusted for the number of interpreters in the model. The adjusted R-squared can be useful for comparing the fit of different regression models to one another. In the above study, adjusted r^2 is also 1. The standard error of the regression is the average distance that the observed values fall from the regression line. In the above study, the observed values fall an average of 0.002188369 units from the regression line. This indicates a good explanatory power of the regression model.

Table 6. Parameters Estimation for ModelII- ROE

Model 1	Unstandardized Coefficients		Standardized Coefficients	t Stat	P-value
	Coefficients	*Standard Error*	*Beta*		
Intercept	-86.3996	87.2263	-0.0260	-0.9905	0.4263
Net Profit Margin (%)	1.9084	1.6008	1.2886	1.1922	0.3555
Operating Profit Margin (%)	1.1650	0.7770	1.4888	1.4993	0.2726
Net Interest Margin (X)	-726.5727	407.2561	-78.7003	-1.7841	0.2163
Cost to Income (%)	2.3578	1.8624	1.4374	1.2660	0.3330
Interest Income/Total Assets (%)	704.7775	398.8515	68.4172	1.7670	0.2193
Non-Interest Income/Total Assets (%)	-3.1370	15.2289	0.2217	-0.2060	0.8559
Operating Profit/Total Assets (%)	1.3345	4.2299	-43.1450	0.3155	0.7823
Operating Expenses/Total Assets (%)	1.3667	4.2341	-42.2376	0.3228	0.7775
Interest Expenses/Total Assets (%)	-693.1327	392.3714	-35.4339	-1.7665	0.2193

Source: Computed using SPSS
Model 2. is ROE = β0 + β1NPM + β2 OPM+ β3NIM + β4CI + β5 II/TA+ β6 NII/TA + β7 OP/TA + β8 OE/TA + β9 IE/TA + ε
Therefore,
ROE =-86.3996+1.9084NPM+1.1650OPM -726.5727NIM+2.3578CI+704.7775II/TA-3.1370NII/TA+1.3345+1.3667OE/TA-693.1327IE/TA

Table 7. Model Summary

	Multiple R	R Square	Adjusted R Square	Standard Error
Regression Statistics	0.9966	0.9932	0.9625	1.6493

Source: Computed using SPSS

In the above study Multiple R is 0.9966 which represent almost perfect linear relationship between ROE and other KPIs. In the above study, adjusted r^2 is 0.9625. The observed values fall an average of 1.6493 units from the regression line.

IV. CONCLUSION:
The above study is conducted on selected Indian commercial banks to analyse their performance with the help of KPIs and other statistical tools. It can be concluded from the above study that KPIs play a crucial role in analysingfinancial performance of banks. ROA and ROE are critical factors that provide a pathway to

measure the financial performance of banks and both the ratios are correlated with profitability ratios. By using multiple regression model it can be concluded that there exist a linear corelation between the selected independent variables (ROA and ROE) and other KPIs. The above study strongly supports the phrase that Key Performance Indicators (KPIs) stand "critical success factors" that are decisive for the sustained growth of banks.

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