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## CHAPTER 2

# REVIEW OF LITERATURE

The banking sector, being the lubricant to the economic vehicle is constantly monitored for its performance by the decision makers, including government, owing to the crucial role it plays in the globalized market economy. The researches in an assortment of aspects of the banking sector are being carried out by various committees, academicians, researchers and decision makers for meeting the challenges in the ever changing scenario.

Various strands of related literature were reviewed with the motive to identify the perspectives that are needed to be focused upon and to understand the techniques conceded in measuring the financial firmness of the banks. Some worthwhile researches are categorized and viewed as under.

- 2.1) Reviews related to efficacy and performance of various financial components of banks,
- 2.2) Reviews related to the determinants of efficiency and profitability of the banks,
- 2.3) Reviews related to the multiple criteria decision making approaches, and
- 2.4) The Research Crevice.

### 2.1 REVIEWS RELATED TO EFFICACY AND PERFORMANCE OF VARIOUS FINANCIAL COMPONENTS OF BANKS

**Munish Yadav (2016)** evaluated and compared the financial performance of scheduled commercial banks in India through the parameters like Return on Assets Ratio, Credit-Deposit Ratio, Capital Adequacy Ratio, Return on Equity Ratio and Net NPA Ratio for five years from 2008-09 to 2012-13. The study result showed that the private sector banks and foreign banks have shown better performance in all areas of banking operations, and these banking sectors have made the best use of their resources and technology to their maximum

advantage. Further, the author suggested that the public sector banks can be made better and more profitable by adopting some improvements in the system.

**Abdul Kaium Masud, Mahbubul Haq (2016)** conducted a study to analyze the financial soundness and trend analysis of commercial banks in Bangladesh. The study was to analyze the financial performance of seven select Scheduled Commercial Banks of Bangladesh from 2006 to 2014, and the necessary data was gathered from books, annual reports and journals. Trend analysis and descriptive statistics were employed to analyze the financial performance of the select banks. It was concluded that private sector commercial banks hold a major role in the development of the economy. The social profitability of the banking industry was measured by branch expansion and employment generation. It was observed from the study that all the select banks had positive results on those two factors.

**Jasmina Popovska (2014)** constructed index of financial stability of the banking sector in Macedonia. The author made an attempt towards creating a more appropriate framework for evaluation of the financial stability. The necessary data was collected through annual reports of the respective banks and websites. CAMEL analysis, Z score analysis and S score analysis were used to analyze the effect of the crisis in 2008-2009. The results showed that the index of financial stability of the Macedonian banking sector was stable during the stress period due to its previous conservative policies.

**MD Aminul Islam (2014)** attempted primarily to measure the financial performance of National Bank Limited which is the largest and prominent private commercial bank in Bangladesh from 2008 to 2013 and to identify whether any difference existed between a bank's years of operation and its performance during two periods (2008-10 & 2011-13). The author used Financial Ratio Analysis (FRA) method to draw an overview of financial performance of the National Bank Limited in terms of profitability, liquidity and credit performance. To test the hypothesis, the author applied student t-test by using SPSS and analyzed the current and past performance of banks, as the banking sector in

Bangladesh suffered a default culture which is the consequence or result of bad performance of most banks. The results of the study proved that the performances of banks are dependent more on the management's ability in formulating strategic plans and the efficient implementation of its strategies. It further identified specific areas for bank to work on to ensure sustainable growth for these banks.

**Padmasai Arora (2014)** measured the technical efficiency of balanced panel of 54 commercial banks operating in India during 1991-92 to 2006-07 using Data Envelopment Analysis (DEA) with an aim to study the effects of reforms and ownership on bank efficiency. The study employed a blend of tests including profitability analysis, and established that financial reform, ownership and listing of bank shares have influenced the bank efficiency in India while there were conclusive evidence regarding the relationship between size and efficiency. The study further found that the most efficient banks were characterized by higher Net Profit to Total Assets and higher Profit per Employee while the least efficient banks reported higher level of Non-performing Assets.

**Parul Chotalia (2014)** made an empirical study to measure the financial health and soundness of the six major private sector banks from 1st April 2007 to 31st March 2012. Tools used for the study were Altman Z Score and average and the required data were collected from secondary sources. The study concluded that all the banks in the sample fell in Grey Zone. Yet, out of six selected banks, four banks, i.e., ICICI, Kotak Mahindra, Axis and HDFC have better financial position compared to DCB and YES Banks. The author further opined that the select banks must improve their financial performance to avoid bankruptcy.

**Zawadi Ally (2013)** explored the financial performance of commercial banking sector in Tanzania from 2006 to 2012. Financial ratios were employed to measure the profitability and liquidity of banks. In addition, Analysis of Variance was used to test if there was a difference in profitability mean among peer banks group. The study found that overall bank financial performance increased

considerably during the first two years of analysis. A significant change in trend was noticed at the onset of the global financial crisis from 2008 to 2009. However, the results further identified that Tanzania banking sector remained stable, adequately capitalized and in a sound position. Besides, the study also found that there was no significant mean difference in profitability among the peer banks group in term of ROA, and a significant difference existed in ROE and NIM.

**Asikhia Olalekan and Sokefun Adeyinka (2013)** examined the effect of capital adequacy on profitability of deposit - taking banks in Nigeria. The authors assessed the effect of capital adequacy of both foreign and domestic banks in Nigeria and their profitability. The primary data, by involving a sample of 518 staff of the banks, was collected, and the secondary data from published financial statement of banks were used from 2006 – 2010. The findings for the primary data analysis revealed a non - significant relationship, but the secondary data analysis showed a positive and significant relationship between capital adequacy and profitability of bank, which implies that for deposit taking banks in Nigeria, capital adequacy plays a key role in the determination of profitability. It was also discovered that capitalization and profitability are indicators of bank risk management efficiency and cushion against losses not covered by current earnings.

**Narasimhan, V.K. and Mridula Goel (2013)** analyzed the top Indian banks having a composition of both private and public sectors for the period 2008 – 2012 after global recession, and attempted to demonstrate that the banks in India exhibit stability in such times of crisis due to their capital structure and regulatory environment. The author concluded that there is sufficient capital at safety level and the debt- equity ratio was higher which lead to higher earnings per share.

**Khaled Abdalla Moh'd Al-Tamimi, et al. (2013)** identified the important factors that determine the Capital Adequacy of Commercial Banks of Jordan in Amman Stock Exchange from 2000 - 2008 by means of Multiple Linear

Regression Analysis and the Correlation Coefficient. The results showed that there is a significant positive correlation between capital adequacy in commercial banks and the independent factors like liquidity risk and the rate of return on assets. It was also found that there is an inverse relationship between the degree of capital adequacy of commercial banks and rate of return on equity and interest rate risk. Besides, the results showed that the independent variables combined with an effect on the dependent variable and the changes that occur within, as the percentage of the interpretation of the independent variables of the dependent variable was around 61%.

**Mishra Aswini Kumar, et al. (2012)** used CAMELS approach to explore the performance of 12 public and private sector banks listed in the CNX bank index for over a period of eleven years from 2000 to 2011. The study established that the public sector banks like Union Bank and SBI have displayed poor economic soundness, while the private sector banks proved to be the best in terms of the soundness, and stood at the top of the list.

**Mohammed Arif Pasha, et al. (2012)** studied the need, genesis and development of the concept of Capital Adequacy Ratio (CAR) in banking and linked up to Basel norms for banking. The analysis revealed that the Indian banks have adhered to a *de facto* CAR of above 9% to ensure a better safety cushion; the regulatory framework has been designed in such a way to encourage individual banks to maintain higher CAR than the stipulated minimum that reflects their differential risk profiles. Thus, the capital remains a useful regulatory tool in the hands of policy makers for influencing bank's behaviour. Yet there is no definite evidence to support a shift from high-risk towards low-risk asset category by banks.

**Mansoury Ali and Mahdi Salehi (2011)** explored the efficiency of 38 branches of Industrial and Mine Bank in Iran using Data Envelopment Analysis (DEA). The inputs of the study were number of personnel, operational and non-operational costs, whereas, output units referred to the given facilities and payments, operational and non-operational income in branches of the bank.

Input orienting technique was used to compute management efficiency, scale efficiency and technical efficiency. On the basis of average efficiency, type of returning to scale and frequency of each branch as a pattern, all the branches have been ranked and classified to six levels, as superior, excellent and degree from 1 to 4. The results proved that only five branches were efficient. The authors suggested that Industrial and Mine Bank could increase its efficiency up to 30% by including the research strategies and by attempting to optimize the system.

**Prasad and Ravinder (2011)** analyzed the profitability of four major banks in India, namely, State Bank of India, Punjab National Bank, ICICI Bank and HDFC Bank from 2005-06 to 2009-10. Statistical tools like arithmetic mean, one-way ANOVA and Tukey HSD Test were employed for the purpose of study. The profitability of these banks were evaluated using various parameters like Operating Profit Margin, Gross Profit Margin, Net Profit Margin, Earning per Share, Return on Equity, Return on Assets, Price Earnings Ratio and Dividend Payout Ratio. The empirical results proved that State Bank of India performed better in terms of earning per share and dividend payout ratio, while Punjab National Bank performed better in maintaining good operating profit margin and return on equity. Further, the results showed that HDFC Bank outperformed in terms of gross profit margin, net profit margin, return on assets and price earnings ratio. The study also showed that ICICI Bank paid highest portion of earning as dividends to shareholders. Analysis ranked HDFC Bank on the top position followed by Punjab National Bank, State Bank of India and ICICI Bank.

**Syed Ibrahim, M. (2011)** made a diagnostic and exploratory study on operational performance of Indian Scheduled Commercial Banks. The study was confined only to specific areas such as Aggregate Deposits mobilized by the banks, Loans and Advances, Credit-Deposits Ratios and Investment-Deposits Ratios for the ten years period starting from the year 2000 to the year 2009. In order to analyze the data and draw conclusions, various statistical tools like descriptive statistics, 't' test and correlation were applied. The study concluded by finding that there was an increase in the aggregate deposits during the study

period, a positive correlation was found between demand and term deposits, credits deployed and investments made by the banks have shown significant performance and the Indian scheduled commercial banks have proved to be efficient by maintaining the C-D ratios in an increasing trend over the period of the study.

**Hassan Mobeen Alam, et al. (2011)** compared the financial performance of public banks and private banks which were working in Pakistan during the period 2006-2009. Bank size, efficiency / profitability ratios, capital / leverage ratios, liquidity ratios and asset quality ratios were taken as variables to rank the banks. Finally, the study concluded that the ranking of the banks differ as the financial ratio changes.

**Kumar Sunil and Gulati Rachita (2010)** measured the efficiency, effectiveness and performance of 27 public sector banks operating in India by employing a two-stage performance evaluation model. Using the cross-sectional data for the financial year 2006/2007, the technique of data envelopment analysis was used for computing the efficiency and effectiveness scores for individual PSBs. The empirical results revealed that high efficiency did not stand for high effectiveness in the Indian public sector banks. A positive and strong correlation was found between effectiveness and performance measures. Further, on the efficiency front, State Bank of Travancore appeared as an ideal benchmark, while State Bank of Bikaner and Jaipur and State Bank of Mysore emerged as ideal benchmark on the effectiveness front.

**Uwafio Jeremaiah, et al. (2010)** employed the stochastic cost frontier approach to generate X- efficiencies for each bank over the period 2000-2004. For the purpose of the study, the banks were classified into two groups, namely, the 10 dominant banks and the rest banks. The study specifically examined the cost efficiency of banks. A variation of the intermediation approach was found with total costs as dependent variable and total customer loans, other earning assets, staff expenses/average number of personnel, interest expenses/total customer deposits, other non-interest expenses/total fixed assets and other fixed

assets, total shareholders' funds and non-performing loans/total loans as independent variables. The study revealed that there was inefficiency in the Nigerian banking system and that the level of inefficiency ranged between 0 and 19 percent of total cost.

**Mabwe Kumbirai and Robert Webb (2010)** investigated the performance of South Africa's commercial banking sector for the period between 2005 and 2009. The authors employed financial ratios to measure the profitability, liquidity and credit quality performance of five large South African based commercial banks. The study found that overall bank performance increased considerably in the first two years of the analysis. A significant change in trend was noticed at the onset of the global financial crisis in 2007, reaching the highest during 2008-2009 which resulted in falling profitability, low liquidity and deteriorating credit quality in the South African Banking sector.

**Mohi-ud-Din Sangmi and Tabassum Nazir (2010)** evaluated the financial performance of the two top banks based in northern India, representing the biggest nationalized bank (Punjab National Bank, PNB) and the biggest private sector bank (Jammu and Kashmir Bank, JKB) from 2001 to 2005 using CAMEL parameters. For analysis of the data, two important statistical tools, namely, mean and standard deviations have been used. The study highlighted that the position of the banks under study is sound and satisfactory as far as their Capital adequacy, Asset quality, Management capability and Liquidity are concerned.

**Kanika Goyal (2010)** examined the state of affairs of the NPAs of public sector banks in India. The study was analytical in nature and the scope of the study is limited to the analysis of NPAs of the public sector banks for the period 2002-03 to 2008-09. It examined the trend of NPAs, quality of assets, health of several loan assets and sector-wise NPAs, etc. The data has been analyzed by statistical tools such as descriptive statistics, correlation, regression analysis, one-way ANOVA and post-hoc Tukey HSD procedure. The study observed increase in gross as well as net NPAs in absolute terms and improved asset

quality of banks. Therefore, the public sector banks have managed its assets proficiently by reducing the NPA levels.

**Kalluru Siva Reddy & Sham Bhat K (2009)** investigated the effects of foreign banks' entry on the operations of public sector banks in India between 1996 and 2007. Variables employed to mark the intensity of foreign banks presence are the ratio of number of foreign banks to the total number of banks in the country, net interest margin to total assets, non-interest income to total assets, profits before tax to total assets, overhead expenses to total assets, non-performing loans to total loans which measure the income, profitability and costs of public sector banks. The results revealed that foreign banks have increased their profitability and tend to be highly competitive to the public sector banks. The study further concluded that foreign banks' entry in the Indian banking system adversely affected the operations of public sector banks.

**Kumar Sunil & Gulati Rachita (2009)** made an attempt to examine the inter-bank differentials in income generating efficiency. The study covered 28 public sector banks operating in India during the financial year 2006-2007. The technique of Data Envelopment Analysis (DEA) was employed to compute the efficiency scores for individual public sector banks. The empirical results revealed that public sector banks secured mean efficiency score of 0.918 indicating the high level of efficiency in generating net-interest and non-interest incomes. The authors suggested that the inefficient public sector banks should concentrate more on generating non-interest income from the off-balance sheet activities rather than interest income from the traditional activities like advancing loans and investments in other earning assets for improving their performance.

**Harish Kumar Singla (2008)** undertook a study to examine and understand how financial management plays a crucial role in the growth of banking. The study was concerned with examining the profitability position of the sixteen BANKEX-based banks for a period of five years from 2000-01 to 2006-2007. The study revealed that the profitability position was reasonable during the period of study when compared with the previous years. Return on

Investment proved that the overall profitability and the position of selected banks sustained at a moderate rate. With respect to debt equity position, it was evident that the companies were maintaining 1:1 ratio, though at one point of time it was very high. Interest coverage ratio was continuously increasing, which indicated the bank's ability to meet the interest obligations. Capital adequacy ratio was constant over a period of time. During the study period, it was observed that the return on net worth had a negative correlation with the debt equity ratio. Interest income to working funds also had a negative association with interest coverage ratio, and the Non-Performing Assets (NPA) to net advances was negatively correlated with interest coverage ratio.

**Al-Zubi, K, et al. (2008)** analyzed the capital and risk behavior of Jordanian banks from 1990-2003 using the econometric models like Generalized Least Square, Fixed Effect Model and Random Effect Model, and established that there was a strong positive correlation between the regulatory pressure, capital of the banks and their credit levels. The study reported that the banks in Jordan are close to the minimum regulatory capital requirements and the tendency to increase both their allotment of capital to risk weighted assets and levels of risk.

**Eliana Angelini (2008)** described the case of a successful application of neural networks to credit risk assessment. The Basel Committee on Banking Supervision proposed a capital adequacy framework that allows banks to calculate capital requirement for their banking books using internal assessments of key risk drivers. Hence, the need for the system is to assess credit risk. The author developed two neural network systems, one with a standard feed forward network, and the other with special purpose architecture. The application is tested on real-world data, related to Italian small businesses. The study revealed that neural networks can be very successful in learning and estimating the default tendency of a borrower, provided that careful data analysis, data pre-processing and training are performed.

**Mandira Sarma and Yuko Nikaido (2007)** presented an analytical review of the capital adequacy regime and the state of capital to risk-weighted asset

ratio (CRAR) in 2007 of the banking sector in India. It was found that, in the regime of Basel I, Indian banking system performed reasonably well, with an average CRAR of about 12 percent, which is higher than the internationally accepted level of 8 percent as well as India's own minimum regulatory requirement of 9 percent. They further examined the Basel II norms from the Indian perspective.

**Rahman, et al. (2004)** studied the reasons for the failure of the banks in South Asia when financial crisis took place in late 1990s during which many banks had to be bailed out by their governments. The countries like Indonesia, South Korea and Thailand were included in the study. Models were developed for each country that identified banks experiencing financial distress as a function of financial ratios. The study revealed that the banks that enjoyed profitability during the pre- crisis period were the ones mostly affected by the financial crisis in 1997. The study used Logistic regression to evaluate the sample data from 1995 to 1997, and explored that capital adequacy, loan management and operating efficiency are the three common performance dimensions found to be able to identify problem banks in all the three countries. The study suggested that the financial ratios and models would be useful to bankers and regulators in identifying problem banks in Asia in future.

**Cheema and Agarwal (2002)** analyzed the productivity of commercial banks in India and compared the performance of public sector banks, private sector banks and foreign banks in India. Public sector banks were classified into two categories, i.e., State Bank group and nationalized banks. For analysis, owned funds, deposits, borrowings and wage bills were used as the input variables, and spread and non-interest income were used as the output variables. The mean productivity scores of all public sector banks were observed to be the same. State Bank of Patiala and Allahabad Bank amongst public sector banks, and Jammu & Kashmir Bank among private sector banks, were found to be the most efficient banks in their bank groups. ING Bank was on the top among foreign banks group. The results revealed that the inefficiency among public sector banks was due to excessive amount of owned funds, and

inefficiency among foreign banks was due to excessive borrowings. The researchers suggested that concentration should be on the proper utilization of deposits and borrowings, and on the diversification of their activities in order to improve the efficiency of banks.

**Ahmad, Taha Khaled (2000)** attempted to examine the efficiency of banking system in Jordan from 1990 to 1996. A comparative analysis of the frontier cost efficiency was made by applying econometric and mathematical programming techniques. The analysis on the profit efficiency of Jordanian banks estimated a non – standard profit function. The result of the second stage regression indicated that the banks with fewer employees per total assets, lower ratio of branch per total deposits, higher assets and higher salaries to total assets were the most cost efficient banks. The profit efficiency was found to be positively correlated with growth in bank total assets, age and size of the bank while the ratios like branch to total deposits, number of employees and salaries to total assets and risks were found to be negatively correlated.

**Garg, Mohini (1994)** in his thesis compared the profitability of Indian Scheduled Commercial Banks with foreign banks from 1970 to 1990. The study revealed that the Indian Scheduled Commercial Banks have achieved remarkable progress during the study period in terms of their growth in branch expansion in rural areas, higher deposit mobilization and credit deployment to priority sector and small borrowers, but their profits were low where the foreign banks with the smaller geographical spread and low resource, earn almost as much as by way of profits as 20 nationalized banks put together. The study concluded that there was a lot of difference between the banks in the pattern of advances and investments and even in lending rates.

## **2.2 REVIEWS RELATED TO THE DETERMINANTS OF EFFICIENCY AND PROFITABILITY OF THE BANKS**

**Nicolae Petria, et al. (2015)** assessed the main determinants of banks' profitability in EU27 over the period 2004-2011. The authors divided the factors that influence bank profitability into two large groups: bank-specific (internal)

factors and industry specific and macroeconomic (external) factors. As proxy for banks profitability, the return on average assets (ROAA) and the return on average equity (ROAE) were considered. The empirical findings stated that credit and liquidity risk, management efficiency, the diversification of business, the market concentration/competition and the economic growth have influence on bank profitability, both on ROAA and ROAE. Further, an interesting and valuable result proved was the positive influence of competition on bank profitability in EU27.

**Sara Kanwal and Muhammad Nadeem (2013)** investigated the impact of macroeconomic variables on profitability of public limited commercial banks in Pakistan from 2001- 2011, based on vital contribution of the commercial banks to economic progress of Pakistan. Pooled Ordinary Least Square (POLS) method was used to examine the effect of 3 major external factors; inflation rate, real gross domestic product (GDP) and real interest rate on profitability indicators like return on assets (ROA), return on equity (ROE) and equity multiplier (EM) ratios in 3 separate models. The empirical findings indicated a strong positive relationship of real interest rate with ROA, ROE and EM. Secondly, real GDP was found to have an insignificant positive effect on ROA, but an insignificant negative impact on ROE and EM. Inflation rate, on the other hand, had a negative link with all 3 profitability measures. Overall, the selected macroeconomic factors were found to have a negligible impact on earnings of commercial banks.

**Vincent Okoth Ongore and Gemechu Berhanu Kusa (2013)** studied the moderating effect of ownership structure on bank performance. The authors analyzed the parameters using linear multiple regression model and Generalized Least Square on panel data. The result showed that bank specific factors significantly affect the performance of commercial banks in Kenya, except for liquidity variable. However the overall effect of macro-economic variables was unconvincing at 5% significance level. The moderating role of ownership identity on the financial performance of commercial banks was insignificant. Therefore, the study concluded that the financial performance of commercial banks in

Kenya is driven mainly by board and management decisions, while macroeconomic factors have insignificant contribution.

**Yong Tan and Christos Floros (2012)** scrutinized the effect of GDP growth on bank profitability in China over the period 2003 to 2009. The one-step system GMM estimator was used to test the persistence of profitability in the Chinese banking industry. The empirical findings showed that cost efficiency was positively related to bank profitability, while lower profitability was due higher taxes paid by banks. In addition, there was a negative relationship between GDP growth and bank profitability. The results also showed that the profitability in the Chinese banking industry was significantly affected by the level of non-performing loans, and Chinese banks with higher levels of capital were found to have lower profitability. Finally, the authors found that the departure of banks from a perfectly competitive market structure in the Chinese banking industry was relatively small.

**Sehrish Gul, et al. (2011)** examined the relationship between bank-specific and macro-economic characteristics over bank profitability by using data of top fifteen Pakistani commercial banks over the period 2005-2009. The pooled Ordinary Least Square (POLS) method was employed to investigate the impact of assets, loans, equity, deposits, economic growth, inflation and market capitalization on major profitability indicators, i.e., return on asset (ROA), return on equity (ROE), return on capital employed (ROCE) and net interest margin (NIM) separately. The empirical results have found strong evidence to show that both internal and external factors have a strong influence on the profitability.

**Christos K. Staikouras and Geoffrey E. Wood (2011)** classified the bank profitability determinants based on the reviews on bank performance studies. The second part of the paper quantified how internal determinants (“within effects” changes) and external factors (“dynamic reallocation” effects) contribute to the performance of the EU banking industry as a whole in 1994-1998. The authors constructed OLS and fixed effects models. The results provided a new perspective for understanding the impact of changes in competition on the performance of the EU banking industry. The estimation

results suggested that the profitability of European banks is influenced not only by factors related to their management decisions but also to changes in the external macroeconomic environment. The results were in contrast to studies that have examined the structure-performance relationship for European banking and found a positive effect of the concentration and/or market share variables on bank profitability.

**Andreas Dietrich and Gabrielle Wanzenried (2010)** examined the bank-specific characteristics, macroeconomic variables and industry-specific factors that affect the profitability of 453 commercial banks in Switzerland over the period from 1999 to 2008. In order to take into account the impact of the financial crisis, the authors separately considered the years before and during the crisis, namely, the period up to 2006 and the crisis years 2007 and 2008. The results of the study showed that there existed large differences in profitability among the banks, and certain industry-specific and macroeconomic characteristics included in the analysis had a significant effect on the dependent variables.

**Sufian, F and Habibullah, M.S (2009)** made a study on the determinants of bank profitability in Bangladesh. The study consisted of data of 32 banks from 1997-2004 and used internal factors like total loans to total assets, bank size, credit risk, non-interest income to total assets, non-interest expense to total assets and equity to asset ratio, and external factors like natural logarithm of GDP and the annual inflation rate for assessing their influence on the three profitability measures namely ROAA, ROAE and NIM. The study revealed that the internal factors like loans intensity, credit risk and cost have positive and significant impact while the external factors have no significant impact on the earnings of the commercial banks in Bangladesh.

**Valentina Flamini, et al. (2009)** studied the determinants of bank profitability in Sub-Saharan Africa (SSA) with the samples of 389 banks in 41 SSA countries. It was found that, apart from credit risk, higher returns on assets were associated with larger bank size, activity diversification and private ownership. The authors also found that bank returns are affected by macroeconomic variables, suggesting that macroeconomic policies that promote

low inflation and stable output growth do boost credit expansion. The results indicated moderate persistence in profitability. Causation in the Granger sense from return on assets to capital occurred with a considerable lag and implied that high returns were not immediately retained in the form of equity increase. The paper suggested a policy of imposing higher capital requirements in the region in order to strengthen financial stability.

**Kosmidou, K, et al. (2008)** investigated the impact of bank-specific characteristics, macroeconomic conditions and financial market structure on 32 UK owned commercial banks' profits for the period of eight years from 1995-2002. The regression results showed that the capital strength of these banks has a positive and dominant influence on their profitability, the other significant factors being efficiency in expenses management and bank size. These bank-specific determinants are robust to the inclusion of additional macroeconomic and financial market measures of bank performance, which add little to the explanatory power but nevertheless appear to have positively influenced profitability.

**Panayiotis P. Athanasoglou. et al. (2008)** examined the effect of bank-specific, industry-specific and macroeconomic determinants of bank profitability, using an empirical framework that incorporates the traditional structure conduct-performance (SCP) hypothesis. In order to account for profit persistence, the authors applied a GMM technique to a panel of Greek banks that covers a period of 17 years from 1985 to 2001. The estimation results showed that profitability persists to a moderate extent, indicating that departures from perfectly competitive market structures may not be that large. All bank-specific determinants, with the exception of size, affect bank profitability significantly in the anticipated way. However, no evidence is found in support of the SCP hypothesis. Finally, the business cycle has a positive, albeit asymmetric effect on bank profitability, being significant only in the upper phase of the cycle.

**Das, A and Ghosh, S (2007)** explored the factors affecting problem loans of Indian state owned banks using advanced panel data techniques for the period 1994-2005. The findings of the study revealed that the GDP growth at

macro level and loan growth, operating expenses and bank size at micro level influences the credit risk. The authors suggested that there is high incidence of non-performing loans due to poor credit analysis skills and decision making, external shocks and shortcomings in the legal and judicial system which prevents the bankers from exercising their rights.

**B.S. Badola and Richa Verma (2006)** made an attempt to identify the key determinants of profitability of public sector banks in India. The analysis was based on step-wise multivariate regression model used on temporal data from 1991-92 to 2003-04. The study found that the explanatory power of variables like NII, OE, P&C and Spread is significantly high, and some variables, namely, CD ratio, NPAs and BPE are found with low explanatory power. Hence, it is identified that the variables, namely, non-interest income, operating expenses, provision and contingencies and spread have a significant relationship with net profit. Among them, two variables, P&C and OE are found having negative relationship. The study concluded that control over non-performing assets, operating expenses, provision and contingencies are major areas of concern for the management of public sector banks. To strengthen the position further, the public sector banks must strive to greatly enhance efficiency through a control over shrinking spread, increasing non-interest income, and maximizing business per employee and per branch, etc. Technology upgradation, provision of better service quality, inculcating customer driven work culture, mental revolution among the staff of public sector banks, use of modern risk management practices are also the most sought after steps that are needed to ensure the sustainable level of profit and its growth.

**Maji and Day (2006)** scrutinized the productivity and profitability of the banks in India selecting five banks each from the public and private sector banks on the basis of quantum of deposit mobilization. The data covered the time period between 1996-97 and 2003-04. The empirical results revealed the productivity index of greater than 1 was found for most of the banks under study. In achieving the target level of profitability, State Bank of India and Punjab National Bank were more successful and the performance of Jammu & Kashmir

Bank, Canara Bank and Bank of India were found to be poor. The authors also opined that the Interest Spread has been an important influencing factor in determining the profitability of Banks. The authors suggested that Bank of India and Jammu & Kashmir Bank should take necessary steps to utilize their available resources for enhancing their profitability.

**Roland Craigwell (2005)** examined the trends in non-interest income at commercial banks in Barbados between 1985 and 2001. Furthermore, an investigation on the determinants of non-interest income and its impact on financial performance of the commercial banks were made. The study revealed that the incidence of non-interest income in Barbados declined over the period, contrary to the findings in Jamaica, Trinidad and Tobago as well as the wider developed world. The empirical results revealed that the bank characteristics and the ATM technology are the most influential factors shaping the trend of non-interest income in the Barbados banking industry, and suggested that non-interest income is positively related to both bank profitability and earnings volatility.

### **2.3 REVIEWS RELATED TO THE MULTIPLE CRITERIA DECISION MAKING APPROACHES**

**Chao Li and Caiqin Ye (2014)** used an improved TOPSIS method to evaluate the performance of 16 listed commercial banks of China. In order to apply the principles of comprehensiveness and representativeness, first, the study built a set of index system using cluster analysis and multiple correlation coefficient method. Secondly, the Analytical Hierarchy Process (AHP) was used to identify the weight coefficient. Finally, the operating performance of the commercial banks was assessed and ranked, using the improved TOPSIS method, and the comprehensive scores were assigned to each bank.

**Tamal Datta Chaudhri and Indranil Ghosh (2014)** applied multi-criteria decision making algorithms to arrive at the financial health of the commercial banks in India, both in the public and private sectors. The study considered various performance parameters of Basel guidelines. They analyzed the

performance of the banks over time and also investigated whether the stock market has taken cognizance of these regulatory variables and have valued the banks accordingly. The study results indicated that the relative performance of private sector has not undergone much change while some public sector banks have improved over time. Further, the study also revealed that the stock market does not attach much importance to these regulatory variables in the valuation of banks.

**Sanjeev C Panandikar (2014)** used the multi criteria method, TOPSIS, to obtain the entropy function of information theory, to measure the metric efficiency ratings for Indian Commercial Banks on a (0,1) scale. In order to rate and rank the banks, the bank-wise data, comprising seven financial ratios, were used from the financial year 2001-02 to 2012-13. The non-performing assets and business per employee were assigned highest weights. The hypotheses of equal and stable performance were tested. The findings revealed that the public, private and foreign banks do not differ in terms of average efficiency ratings but they differ from year to year.

**Emrah Onder and Ali Hepsen (2013)** forecasted the financial performance of 3 state banks (Ziraat Bank, Halk Bank and Vakıflar Bank) 9 private banks (Akbank, Anadolubank, Sekerbank, Tekstil Bank, Turkish Bank, Turk Ekonomi Bank, Garanti Bank, Is Bank and Yapı Kredi Bank) and 5 foreign banks (Denizbank, Eurobank Tekfen, Finans Bank, HSBC Bank and ING Bank) in Turkey during 2012-2015 for ten groups of financial performance indicators including Capital Ratios, Balance Sheet Ratios, Assets Quality, Liquidity, Profitability, Income-Expenditure Structure, Share in Sector, Share in Group, Branch Ratios and Activity Ratios as described by the Banks Association of Turkey. The forecasting analysis tools like classical time series methods such as moving averages, exponential smoothing, Brown's single parameter linear exponential smoothing, Brown's second-order exponential smoothing, Holt's two parameter linear exponential smoothing and decomposition methods were applied to financial ratios data (based on 2002-2011 data) for forecasting, after which the outranking was made using multi criteria decision techniques like

Analytical Hierarchy Process (AHP) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) methodologies. Results indicated that Garanti Bank continue to be the leader followed by Ziraat Bank and Denizbank during years 2012-2015.

**Emrah Onder, et al. (2013)** evaluated the performance of 3 state banks, 9 private banks and 5 foreign banks in Turkey using AHP and TOPSIS method for the period 2002 to 2011. The total performance of banks was divided into ten groups including Capital Ratios, Balance Sheet Ratios, Assets Quality, Liquidity, Profitability, Income-Expenditure Structure, Share in Sector, Share in Group, Branch Ratios and Activity Ratios. The five important ratios were identified using AHP method, and the ranking of the banks was made using TOPSIS method. Their model showed that Akbank is the best performing bank during the years 2007-2011 and 2009-2011.

**Soner Akkoc and Kemal Vatansever (2013)** opined that the banking sector is crucial for any economy. The performance measurement of the bank concerns different segments of the society. The study was conducted to provide decision support for decision makers about the performance of banks by using multi criteria decision making techniques. For the purpose, the authors analysed financial performance of twelve commercial banks in terms of seventeen financial performance indicators by employing Fuzzy Analytic Hierarchy Process and Fuzzy Technique for Order Preference by Similarity to Ideal Solution methods. The findings of the study proved that these two methods rank banks in a similar manner. Here, the authors could have made suggestions on the most relevant method of ranking.

**Abbas Toloie-Eshlaghy, et al. (2011)** proposed a conceptual approach to assess and rank the perceived service quality dimensions such as SERVQUAL gap between two types of banks, namely Public and Private Islamic Banks in Iran. The aim of the study was to introduce Fuzzy TOPSIS approach for this purpose to evaluate the service quality of state and private banks. The paper further developed an evaluation model based on the Fuzzy Analytic Hierarchy Process (FAHP) and Fuzzy Technique for Order of Preference by Similarity to

Ideal Solution (FTOPSIS) and Fuzzy Simple Additive Weighting (FSAW) methods. Furthermore, the relative weights of the chosen evaluation indexes were calculated by Fuzzy Analytic Hierarchy Process (FAHP), and FTOPSIS and FSAW were respectively adopted to rank the four banks, and as a result both the approaches gave the same result. It was concluded that service quality in private banks ranked far higher than state banks.

**Hsu-Shih Shiha, et al. (2007)** integrated TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution), a Multi-Attribute Decision Making (MADM) technique, to a group decision environment which was found to be a practical and useful technique for ranking and selection of a number of externally determined alternatives through distance measures with the other decision makers. The proposed model developed by the authors was mentioned as a unified process and readily applicable to many real-world decision making situations without increasing the computational burden. The authors suggested that the newly developed model proved to be both robust and efficient with less computational complications.

## **2.4 THE RESEARCH CREVICE**

Performance and efficiency analysis researches in the banking industry are countless due to its imperative role in the economy. The most number is occupied by the ratio analysis, CAMELS approach and frontier approaches. In a country like India, where the banks are the focal point for the macroeconomic operations, it is necessary to scrutinize the diverse aspects of business for the improvement and to withstand the universal grave competition. Thus, evaluation of each criterion determining the efficiency is of prime importance. Researches on the application of multiple criteria decision making approaches in the banking industry are scanty in India. Hence, an attempt has been made to measure the financial performance of Scheduled Commercial Banks in India using the scientific, reasonable and feasible method. The components of CAMEL analysis were considered as the criteria for evaluation, and the rating was made using the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) method.