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REFERENCES:
3.1 Introduction

Research in common parlance refers to a search for knowledge. “As such the term ‘research’ refers to the systematic method consisting of enunciating the problems, formulating a hypothesis, collecting the facts or data, analyzing the facts and reaching certain conclusions either in the form of solutions towards the concerned problem or in certain generalizations for some theoretical formulation”1. In short, the search for knowledge through objective and systematic method of finding solution to a problem is research.

In a very common understanding research refers to a search for knowledge. One can also define research as a scientific & systematic search for information on a scientific topic. Some also regard research as a movement from unknown to known.

According to Clifford Woody “Research comprises defining & redefining problems, formulating hypothesis or suggested solution, and collecting, organizing, evaluating data, making deductions & reaching conclusions, and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis.” It can also be described as the original contribution to the existing stock of knowledge making for its advancement.

Research in other words can be said as searching for truth, which has not been yet detected due to some reasons. There are many purposes of conducting a research, but in common it can be described as:

- To get familiarity with a phenomena or to achieve new insights
- To portray accurately the characteristic of particular individual situation or a group
- To determine the frequency with which something occurs or with which it is associated with something else.
- To test a hypothesis of a casual relationship between variables
Any research work that is to be conducted should be followed in a particular way, it cannot be done is a haphazard manner. Each research has its own way but there is a common step that needs to be followed. Like are define the problem, sample size, collected the data, integrate it etc. even my research work follows the same steps or procedure which can seen after this.

3.2. Title of the Study

In the present project work title of research work is…

“A COMPARATIVE STUDY ON PERFORMANCE EVALUATION OF PRIVATE SECTOR BANK AND PUBLIC SECTOR BANK IN INDIA (WITH REFERENCE TO CAMEL MODEL)”

3.2 Review of Literature

After liberalization, globalization and privatization, Indian banking system has become quite complicated and varied. Banks have evolved into a technology for delivering a wide range of financial services. IT has become responsible to bring a paradigm shift in performance of the banks. The perceptions and expectations of the customers and employees are continuously changing.

During the period of research, various libraries / institutions were visited. The available related literature in these libraries / institutions was studied which proved to be very useful in getting an insight into the main objectives of the study and finalizing the methodology. An attempt is made in this chapter to review the Impact of Technology on banking operations, under the head – “A COMPARATIVE STUDY ON PERFORMANCE EVALUATION OF PRIVATE SECTOR BANK AND PUBLIC SECTOR BANK IN INDIA (WITH REFERENCE TO CAMEL MODEL)” However for the sake of convenience, the studies have been broadly classified into the following areas. Indian banking (changes, trends, challenges) ,Technology in banking, Information technology, E- banking, Internet banking, Online Banking, Mobile Banking, ATM, Service quality & SERVIQUAL Dimensions, Customer satisfaction and
CRM., Pre e-banking to Post e-banking (Traditional banking to E- banking), Public Sector and Private Sector banks, Employee Perceptions.

- **Amandeep (1991)** attempted to estimate profit and profitability of Indian Nationalized banks and to study the impact of priority sector lending, credit policies, geographical expansion, industrial sickness, competition, deposit composition, establishment expenses, ancillary income, and burden on bank profitability. For this purpose trend analysis, ratio analysis and regression analysis were used.

- **Amir Hussain Shar, Muneerali Shah, and Hajan Jamali, (2010),** in their study of “Performance Evaluation of Banking Sector in Pakistan: An Application of CAMELS Model” explained that the research study was based on the nationalization and de-nationalization of the banking industry in Pakistan. An effort has been made to analyze and evaluate the performance and efficiency of the banking sector using CAMEL parameters. It covered the period of pre- and post-nationalization of the state owned and commercial owned banks of Pakistan. Through the utilization of this model, it has been explored that the position of banks under study are sound and satisfactory with regards to capital adequacy, assets quality, management capabilities, earnings and liquidity. The main objective of the study was to watch performance and efficiency of the banking industry at the period of pre and post nationalization of state owned enterprises and private commercial banks of Pakistan. Reform and corrective measures were undertaken by the governments to improve the performance and soundness of banks operating in Pakistan. The study also assessed the implications of reforms and measures undertaken to streamline the entire banking sector. It covered the period of twelve years from 1990 to 2002 and analyzes the performance and efficiency of Pakistani banking sector during the reform and post reform period. This study tested the solvency of banks which are operating in Pakistan and applies a new procedure of
CAMEL for high lighting super sound banks during the period of the study. By applying the parameters of CAMEL frame work, capital adequacy, asset quality and management soundness, sensitivity to market risk, liquidity and earning were examined in detail.

- **Amudha R. and Vijaya Banu C.** (2007) in their study on “Service Quality in Banking with special reference to ICICI Bank Ltd., Tiruchirapalli District, the outcome of their study shows that organizations can assess five dimensions of service quality to determine the level of services provided and to decide which dimension need improvement. In order to develop service quality, it is necessary to contact employees’ frequency and evaluate their service experiences. By identifying strengths and weakness pertaining to the dimensions of service quality, organizations can better allocate resources to provide enhanced service.

- In the study of **A M Rawani and M P Gupta** makes an attempt to explore empirically the difference in the role of Information Systems (IS) in the banking industry. The study indicates that IS plays a supportive role in public sector banks and a strategic role in private and foreign sector banks. The study also indicates that the future impact of IS does not vary significantly with the banking groups.

- **Andreas-Nikolaos Papandreou (2006)** concluded that the potential for on-line banking is present for all banks to utilize. His thesis has shown that the Internet is a unique opportunity and a major channel for distributing banking services in Greece. The banks that stand to gain full advantage of this are the ones who have done their marketing and demographic research and who are able to attract their targeted group by devising interesting and memorable homepages to benefit from the increase in e-banking services. Bharti V. Pathak focused In this book, title “The Indian Financial System (Markets, institutions and services”
(2010) Published by Dorling Kindersley (India) Pvt. Ltd. Licensees of Pearson Education in South Asia, Noida (UP) the author explained in detail about the Indian financial system, reforms and also defines types of financial instrument, financial regulation, reforms in the financial system.

- **Balachandher Krishnan Guru, Santha Vaithilingam, Norhazlin Ismail and Rajendra Prasad** (2000) examine the evolution of electronic banking in Malaysia, Developments in information technology and telecommunications have set in motion an electronic revolution in the Malaysian banking sector. This in turn has resulted in new delivery channels for banking products and services such as the automated teller machines (ATM’s), telebanking and PC-banking. They analyze the various electronic delivery channels utilized by local banks and to assess the consumers’ reactions to these delivery channels. Advanced Internet applications adopted and the more attractive the Web site, the more the banks are able to keep profitable customers.

- **Balwinder Singh and Pooja Malhotra** (2004) try to help fill significant gaps in knowledge about the Internet banking landscape in India. The study presents data, drawn from a survey of commercial banks websites. It was also found that the profitability and offering of Internet banking does not have any significant correlation.

- **Caalin Guraau** (2002) investigates and analyses the present situation of online banking in Romania, and the appropriate strategies for the successful implementation and development of online banking services in the Romanian context. Internet banking is one of the newest Internet technology applications, which promises multiple benefits both for the financial institutions and for clients. In the last five years a large number of banks have launched Web sites, offering online banking services. While the implementation and the functioning of these digital
systems seem to be relatively smooth in the developed economies, the situation may be different in countries with economies in transition.

- **Chandrashekhar and Ray (2005)** show that PSBs have increasingly opted for investment in risk-free returns of government securities, their share in total earning assets rising from 26 to 33 percent during the 21st century. But there is no doubt that enforcement of stringent prudential norms, capital adequacy stipulations, setting up of the Board for financial Supervision (BFS) and pressure to reduce NPAs have made banks so risk-verse that they have reduced their exposure to private loans with even a modest risk of non-recovery.

- **D. Maheshwara Reddy and K. V. N. Prasad, (2011),** in their article about “Evaluating performance of Regional Rural Banks : An application of CAMEL Model” for Andhra pragathi Grameena bank (APGB) and Sapthagiri Grameena bank (SGGB) found that CAMEL provides a measurement of banks current overall financial, managerial, operational and compliance performance. Thus the current study has been conducted to examine the overall performance of Andhra pragathi Grameena bank and Sapthagiri Grameena bank. The study revealed that, Andhra pragathi Grameena bank excelled over Sapthagiri Grameena bank in protecting the interest of the creditors. Sapthagiri Grameena bank proved to be good in Asset Quality perspective. Andhra pragathi Grameena bank performed better than Sapthagiri Grameena bank in case of TA/TD, whereas Sapthagiri Grameena bank proved to be good in Profit per employee perspective. Andhra pragathi Grameena bank outperformed Sapthagiri Grameena bank in front of quality of earnings. The two sample banks do not differed significantly in Liquidity position during the study period. The study also revealed that APGB rated top on the basis of overall performance.
Daddihal V.S. and Kulakarni P.K. (2008) analyses the changes in Virtual Banking which includes Automated teller machines (ATMs), Shared ATM Network, Electronic fund Transfer at Point of Scale (EFTPOS), Smart Card, Phone Banking and Internet Banking and related services.

Dickinson studies the bank failure in U.S.A. and the impact of cost of operations on banks. Further, regulatory measures have varying impact on the bank performance ranging between the extremes of safety and efficiency. The social cost of bank failure has been worked out keeping in mind the financial and real economic sector. This is done through the examination of the impact of a contracted credit intermediation process upon levels of production.

Diwanji Abizer (2010) reveals that Indian banks had to clean up their systems and practices to ensure stability in a recovering economy. Four challenges must be addressed before success can be achieved.

Dr. Mohi-ud-Din Sangmi and Dr. Tabassum Nazir, (2013), in their study of “Analyzing Financial Performance of Commercial Banks in India: Application of CAMEL Model” explained that Sound financial health of a bank is the guarantee not only to its depositors but is equally significant for the shareholders, employees and whole economy as well. As a sequel to this maxim, efforts have been made from time to time, to measure the financial position of each bank and manage it efficiently and effectively. In this paper, an effort has been made to evaluate the financial performance of the two major banks operating in northern India. This evaluation has been done by using CAMEL Parameters, the latest model of financial analysis. Through this model, it is highlighted that the position of the banks under study is sound and satisfactory so far as their capital adequacy, asset quality, Management capability and liquidity is concerned.
Dr. Muhammad Zafarullah, Dr. Hayat, and M. Awan (2010) conceptualize and measures key determinants of internal organizational orientation of service quality from the employees’ perspective in this paper. The data collected from a sample of 150 employees of pure Islamic banks and conventional banks with IBBs (Islamic Banking Branches or windows. Findings of this study guide the management of islamic banks to indirectly influence customer perceptions through effective employees’ recruitment and selection criteria, complemented by training to improve service oriented skills and knowledge development about Sharia principles related with the products/ services offered by Islamic banks in Pakistan.

Ferrier, Gary, et. All have adopted the institutional goal to analyze the structure of cost efficiency in banking. This is to find out whether efficient cost varies with provision of services and how actual cost departs from efficient cost. The analytical goal is to compare the ability of linear programming technique to reveal the structure of cost efficiency in banking.

Firdoso and Bhroff T. (2004) discusses that the need of hour is banks upliftment and its survival in the days of stiff competition. All Bankers should come together and work as a team. They should set a task force to look into this aspect of making ONLINE VOLUNTEERS, and take full advantage of the power of the NET and VRS Force, which is available at present.

George Rigopoulos and Dimitrios Askounis (2007) explained that Technology Acceptance Model (TAM) have been used for measuring users’ attitude towards adoption of several IT based services. We present the model developed, as well as initial results from a relevant survey at a Greek bank’s target users group.
Isaac k. Otchere (2005) conducted a study on the performance of privatized banks in middle and low income countries shows mixed results by “Competitive and value effects of bank privatization in Developed courtiers.” The paper observed that private banks in developed countries have experienced significant improvements in operating performance. The improvement in performance remains significant after controlling for persistence in bank performance. A comparison of the performance of privatized banks in developed and developing countries suggests that privatization has encouraged excessive risk taking among privatized banks in developing countries with the consequence that those banks carry large NPAs than their counterparts in the developed countries. They also observed that consistent with the competitive effect hypothesis, investors view privatization announcements as foreshadowing bad news for rival banks.


In the study of Sonja Grabner-Kra´uter and Rita Faullant (2008) presents the conceptualization of internet trust as a specific form of technology trust, and its pivotal role in the adoption process of internet banking, together with the extension of the propensity to trust concept to technological systems. Their results confirm the influence of internet trust on risk perception and consumer attitudes towards internet banking.

Ipshita Bansal and Rinku Sharma (2008) sheds light on the Achievement of Indian banking services - Formulation of customer service committee, Improvement in the collection and processing of check, settlement of claims of the Deceased Depositors, Improvement in Grievance Redressal Mechanism, Door step banking, Credit card facilities, etc.

Jayshri D. Parmar focused in his research project title, “A study of Ratio Analysis in Jivan Commercial Co-Operative Bank in Rajkot” Type of areas m.com, (2010) Saurashtra University. The researcher has studied the financial statement of ratio analysis of in Jivan Commercial Co-Operative Bank in Rajkot and she evaluates the statement using ratio techniques and ANOVA of F-test (two way classification).

Johannes Liebach Lüneborg and Jørn Flohr Nielsen (2003) views on survey data from 278 retail banks in Denmark, Finland, Norway and Sweden the study analyzes differences due to size in the use of Internet-banking and customer-relationship management. The findings mainly indicate that the positive effects of using customerfocused technology are strongest in small banks.

Jorn Flohr Nielsen (2002) traces important antecedents of internet banking adoption and analyses its impact on relationship – marketing performance. Based on structural equation modeling, the findings offer some support for the view that the more advanced Internet applications adopted and the more attractive the Web site, the more the banks are able to keep profitable customers.
Joris Claessens; Valentin Dem, Danny De Cock, Bart Preneel and Joos Vandewalle (2002) discusses the security of today's electronic banking systems. They focus on Internet and mobile banking and present an overview and evaluation of the techniques that are used in the current systems.

Jacobs Tom (2008) highlights the Mobile Banking limitations such as security, lack of standard technology platform, communication protocol etc., Mobile banking will pave the way to a cashless society. Very soon, we will expect the fruit stand on the corner to accept payment through mobile phone. In order to position themselves for the mobile banking revolution, banks should seek out solutions that have been designed to support multiple channels across the entire customer life cycle. Banks need platforms that have a vision and architecture for the future.

Kapil Sheeba (2004) concluded that Indian banking industry has embraced many new features like Internet banking, ATMs, Phone banking etc. banks are now able to offer products and services which were difficult or impossible with traditional banking. But the banks in India still have to go a long way.

Kamesam Vepa (2001) analysed the future of Indian banking. He describes some challenges that call for a dynamic, aggressive work culture to meet the demands of customer relationships co-operate governance, and regulatory prescriptions. Technology would play a pivotal role by providing solutions in the form of data ware housing and analysis for decision support consideration of financial sector.

Kulkarni G.R. (1980) examines the nature and. significance of the international operations of Indian banks in the furtherance of their Business strategies.
The aim of the Sylvie Laforet and Xiaoyan Li (2005) study is to investigate the market status for online/mobile banking in China. With the recent and forecasted high growth of Chinese electronic banking, it has the potential to develop into a world-scale internet economy and requires examination. Their studies offer an insight into online/mobile banking in China, which has not previously been investigated. Distinct differences and common trends between Chinese and other countries were observed with clear indication of marketing strategy to be deployed by the service providers.

Khushboo Khanbelwal M.S and Shwetha Choudhary M.S. (2010) have tried to identify the impact of information technology. The research work is based on secondary data comprising of case analysis. And their findings are Information technology has greatly impacted the entire banking system of our country and its application in banking has a very prospective future in India.

Kangis and Voukaltos (1997) compare the customers’ expectations and perceptions of SQ in public and private sector banks in their study. The study reveals that customers of private sector banks were found to have lower level of difference between perceptions and banks. Convenient location, opening hours, friendliness and courtesy of employees were not considered as important factors by the customers of both sector Banks.

Malhotra R.N. (1990) reveals that, after 20 years of banks nationalization and tremendous growth witnessed, the commercial banking system has entered a phase of consolidation. The phase has coincided with considerable diversification of banking services, a substantial measure of liberalization of the regulatory regime for imparting flexibility to the financial system.

Mihir Dash and Annyesha Das, (2009), in their research paper about “A CAMEL Analysis of the Indian Banking Industry” stated that the banking sector has undergone a complex, but comprehensive phase of restructuring since 1991, with a view to make it sound, efficient, and at the same time forging its links firmly with the real sector for promotion of savings, investment and growth. Some improvement in the Indian banking sector has been seen after the reforms. A natural framework to analyze this improvement is the CAMELS framework, under which banks are required to enhance capital adequacy, strengthen asset quality, improve management, increase earnings and reduce sensitivity to various financial risks. The study compared the performance of public sector banks with private/foreign banks under the CAMELS framework. The data used for the study were the audited financial statements of a sample of Indian banks over the last five financial years. The results of the study shown that private/foreign banks fared better than public sector banks on most of the CAMELS factors in the study period. The two contributing factors for the better performance of private/foreign banks were Management Soundness and Earnings and Profitability. The results of the study suggested that public sector banks have to adapt quickly to changing market conditions, in order to compete with private/foreign banks. This is particularly due to the wide difference in their credit policy, customer service, ease of access and adoption of IT services in their banking system. Public sector banks must improve their credit lending policies so as to improve asset quality.
and profitability. They need to continuously monitor the health and profitability of bank borrowers, so that the risk of non-performing assets decreases. They also must improve their marketing and distribution strategies in order to attract customers and provide better customer service. They also must take steps to improve employee motivation and productivity. There were some limitations inherent in the study. The sample size used for the study was limited. Further, the study period was limited due to the limited availability of data. Another limitation was in the nature of the overall CAMELS rating used: the rating gives undue importance to the factors of management soundness and earnings. Further, the CAMELS framework is not a comprehensive framework; for example, it does not take into consideration other forms of risk (such as credit risk). Further studies can incorporate other risk factors into the framework to provide a more comprehensive measure of banking performance.

- Mathew Joseph, Cindy McClure and Beatriz Joseph (1994) analyses the use of technology in the delivery of banking services. Importance-performance grid, results indicated that consumers have perceptual problems with some aspects of electronic banking. Some strategic implications are discussed.

- Malhotra R.N. (1990) reveals that, after 20 years of banks nationalization and tremendous growth witnessed, the commercial banking system has entered a phase of consolidation. The phase has coincided with considerable diversification of banking services, a substantial measure of liberalization of the regulatory regime for imparting flexibility to the financial system.

- Moushumi Datta (2010) identified the emerging trends in Internet banking, ATM’s, Credit cards and debit cards, Mobile phone usage, 24 hour banking service, Unhindered competition amongst banks,
privatization of the banking sector, Participation of Foreign investment, Increased presence and influence of foreign banks.

- **Ms. Kiran K. Mungara** focused in the research project title “Financial Statement Analysis of Rajkot District Co-Operative Bank”, (2009) Type of Areas M. Com Saurashtra University. Ms. Kiran Mungara explained the introduction of banks and specially gives the profile of Rajkot District Co-Operative Bank. She has analyses the financial statement of the Rajkot District Co-Operative Bank and evaluates the financial performance of the bank using Trend Percentage Method. The researcher has used the secondary data for this research study.

- **Miss. Popat Nayna** A focused in this project report, title “A project report on customers views toward banking services of Union Bank of India”, (2010) type of Areas M.Com, Saurashtra University. Miss. Nayna Popat has given the introduction about Indian banking in detail. She also gave the information about Union Bank profile and its services. The researcher has conducted research through primary data. She has used the questionnaire containing various types’ questions like multiple choice, rating questions, scaling type questions and dichotomous questions regarding the overall effectiveness of the service provided by the bank. The researcher tried to understand the attitude and behaviour of customers also using secondary data.

- **Mediwala Yasmin Moiz** focused in this dissertation; title “Evaluation of branch expansion scenario of Indian banks”, (2008) Type of Areas, M. Phil (Accountancy & Finance), and Saurashtra University. Yasmin Moiz has studied the branch expansion scenario of Indian banks. The researcher has collected the data using secondary data. He has analyses the data using trend percentage or ratio and finally it using two-way ANOVA for testing hypotheses.
Mr. Nilesh M. Marvadiya focused in this research, title “Comparative study of Non-fund based income of selected public sector banks and selected private sector banks in India”, (2011) Type of Areas Ph.D., Saurashtra University. The research scholar has compared the selected public and private sector banks which has non-fund based income using financial statements of the banks. The researcher has used the primary data collection method. He has evaluated the data using tabular format and charts using percentage and ratio. To test the hypothesis he has used two-way ANOVA Classification.

Mishra, Krishna Murari focused in this research, title “Financial Performance of Indian Banks in Post Liberalization Era: a study of Public and Private Banks” 29-May-2013 Type of Areas U P Rajarshi Tondon Open University. To test the hypothesis he has used two-way ANOVA Classification.

Marius Dannenberg and Dorothée Kellner (1998) shows that the appropriate application of today's cutting-edge technology can lead to a momentous competitive advantage for banks. This is illustrated by a scenario focusing on the potentials of "Advising via Internet".

The purpose of the Mathew Joseph, Yasmin Sekhon, George Stone and Julie Tinson (2005) study is to discover the underlying areas of dissatisfaction associated with the banking experience in the UK, particularly as it relates to the implementation of new service delivery technology in the banking industry. The researchers of the study utilized three samples of banking customers residing in the southern part of the UK. It involved distributing 300 surveys to a convenience sample of electronic banking customers from the sampling area of interest in the UK. In order to qualify, respondents had to have used one of the available electronic banking services offered by the bank at least once during the previous month. This analysis explored the ranking of
importance of selected technology on consumer perception of service delivery performance.

- **Margaret Tan and Thompson S. H. Teo’s (2000)** research framework based on the theory of planned behaviour (Ajzen 1985) and the diffusion of innovations theory (Rogers 1983) was used to identify the attitudinal, social and perceived behavioural control factors that would influence the adoption of Internet banking. The results revealed that attitudinal and perceived behavioural control factors, rather than social influence, play a significant role in influencing the intention to adopt Internet banking.

- **Meenakshi Rishi and Sweta C. Saxena (2004)** highlight the role of labour unions in public sector banks and their initial opposition to technological adoption. This study charts out the path of technological innovation in the Indian banking industry post economic liberalization (1991-2) and identifies initial conditions in terms of competitive environment and regulatory pressures that have contributed to the diffusion of these innovations.

- **Masud Ibn Rahman, Hemanta Bahadur Gurung and Sampa Saha (2005)** investigates the level of job satisfaction of bank employees in Dhaka City identifying the important job satisfaction factors that are associated with the overall satisfaction of bank employees. Factors including payment, healthy relationship with colleagues, sense of personal accomplishment, adequate information available to do job, ability to implement new ideas and overall job satisfaction are found important for improving job satisfaction of bank employees in Dhaka City. These factors are significantly related to the overall satisfaction of the employees. The higher level of these factors is involved, the higher overall satisfaction is likely to be. The factors that are influential have
been identified following overall job satisfaction through some statistical techniques.

- **Nikhil Agarwal, Ruchi Agarwal, Prasoon Sharma and Sherry A.M. (2003)** prepare a background for discussion for e-banking and e-democracy. Their study will look for such avenues where banking can play a significant role in e-democracy. Farmer Service Centre (FSCs) is a concept originated from usage of smart card technology for village farmers. E-sever is a community billing service helping citizens of Andhra Pradesh to access governmental services online.

- **O.P. Agarwal** focused in this book entitled “modern Banking of India” (2008) published by Himalaya Publishing House, New Delhi on the history of Banks, Electronic – Business and E-Banking, E-Payment, Settlement and Data Collection, Anytime Banking and Cyber Law. The author has written the history from very begin and tried to compare the old banking & Modern Banking.

- **Prof. R. Ganeshan** focused in this Project Report, title “A project Report on ‘Analysis of financial Statement by using the technique of Ratio Analysis for ULTRATECH Cement Ltd. At Kovaya, Amreli, Gujarat”, (2009-10). Type of Areas MBA, Maharashtra University the researcher has evaluated the financial performance of ULTRATECH Cement Ltd. The researcher has used Ratio Technique for his research study. He has conducted research through secondary data collection method. He has found the various financial ratios for the selected company and evaluates it.

- **Padhy P K and Swar B.N (2009)** investigated the role of technology in banking and its impact on perceived SQ (Service Quality) in public, private and foreign banks in Orissa. Foreign bank was found to be very close to the expectations of customers followed by ICICI and AXIS.
Bank private sector whereas the SQ of public sector banks was found to be very low as SBI was ranked lowest on tangibility and responsiveness and PNB was ranked lowest on assurance and empathy.

- **Rao N.V.M, Prakash Singh and Maheshwari Neeru (2005)** analyses a comparison of various models using metric method. The different elements of the metric include revenue generation, value proposition, infrastructure etc. A mathematical model has been developed to analyse whether investments in e-initiative increased productivity and profitability in the Indian banking system. The model suggests that the performance of the banking sector has improved considerably. Profitability, customer satisfaction, and many other parameters show a market improvement.

- **Radha V. and Gulati P. (2004)** discusses that new technology always brought some more fraudulent criminal activities developed around these technologies. Prevention is basically a cycle of monitor, analyze, detect, act and protect. In this study we discuss about the technology based opportunities that thieves take advantage and its prevention and how to build future technology based banking services that can limit the frauds.

- E-banking has the potential to transform the banking business as it significantly lowers transaction and delivery costs as stated by **Rupa Rege Nitsure (2004)**. Major concerns such as the 'digital divide' between the rich and poor, the different operational environments for public and private sector banks, problems of security and authentication, management and regulation, and inadequate financing of small and medium scale enterprises (SMEs) are highlighted.

- **Robert Rugimbana and Philip Iversen (1994)** explored ATM usage entirely from the viewpoint of consumers' demographics. Examines ATM usage patterns on the basis of consumers’ perceptions. The results
based on a survey of 630 retail banking consumers from two separate Australian banking institutions - a bank and a credit union - suggest that ATM users from both institutions differed quite significantly from non-users in their perceptions of at least three ATM attributes; convenience, reliability, and suitability. Furthermore, the results indicate that most users perceive ATMs as mere cash dispensers.

- **R.K.Uppal (2009)** analyses the responses of 768 customers of public sector bank, Indian private sector bank & Foreign Bank (each one from these groups) operating in Amritsar district of Punjab. It may be inferred that there is significant difference among three bank groups with regard to the time customers have to spend to transact a business. The e-banks are more efficient in regard to time factor.

- In their paper, **Ram Mohan. T and Subhash C. Ray (2001)** attempt a comparison between PSBs and their private sector counterparts based on measures of efficiency and productivity that use quantities of outputs and inputs. Both measures are relevant in attempting a comparison between the private and public sectors.

- **RK Uppal (2009)** attempts to study the perceptions of bankers for internet based e-banking services related with important issues like collaborative culture, training & development, knowledge management. The perceptions of employees experienced in e-banking system are surveyed where the study covers 60 employees of e-banks located in selected districts of Punjab during the first half of July 2007. The study concludes that there exists collaborative culture and employees are satisfied with the working of e-channels. The employees experienced some frustration and a major problem of lack of knowledge of e-channels and their operating ways while dealing with these channels, are the most prevalent ones.
S.C. Gupta focused in this book, title “Fundamentals of statistics”, Published by, Himalaya Publishing House, Mumbai. The author covers many statistical topics like origin of statistics, meaning and scope of statistics, collection of data, classification and tabulation, basics of statistics, dispersion. The author also include the various techniques of forecasting methods, theory of probability, index number, sampling, various types of Tests and statistical decision theory.

Sanjeev Kumar, (2010), in his Thesis about “Performance measurement systems in Indian Banking Sector” and findings regarding performance measurement system in Indian Banking Sector in CAMELS framework explained that CAMEL framework is an important performance measurement system based on different ratios used to find out ranking of the banks. CAMEL Model involves computation of various ratios under Capital Adequacy Assets Quality, Management Efficiency, Earning Quality and Liquidity of the banks. Different banks may use different ratios (relationship) for each variable of CAMEL Model so as to find out ranking of various banks. CAMEL Model is basically a ratio based Performance Measurement system which is based on financial measures for measuring the performance of the Banks.

Sharaddha V. Karia focused in this study, title “A study of customer’s preference towards banking with special reference to ING VYSYA Bank Ltd”, (2009) Type of Areas MBA, Saurashtra University. The researcher has focused on the customer’s preference towards banking. He has used the ratio techniques and used the ANOVA F-test (Two-way Classification). The researcher evaluates the financial data using secondary source of data.

Siva and P. Natarajan, (2011), in their study about CAMEL Rating Scanning of SBI Groups found that Indian financial system has passed
through second generation reforms by giving emphasis on individual upgradation, strengthening internal system, attention to different prudential norms like capital adequacy, containment of NPA, functional antennary and systemic improvements towards effecting credit delivery system. It can be done only through proper supervisory and regulatory mechanism. The CAMEL Methodology has been developed and practiced by the North American bank regulators to assess the financial and managerial soundness of US commercial banks. Subsequently Basel committee on banking supervision (BCBS) has been created in 1974 and they also accept the CAMEL as uniform financial institution rating system to evaluate and monitor the banks. In India is adapting the Basel I & II norms in total so has to ensure the better financial standing of own banks & financial Institutions. The paper empirically tested the applicability of CAMEL norms and its consequential impact on the performance of SBI Groups. They concluded that the study observed that there is significant difference in ratio’s in CAMEL among the State Bank Groups in India. In this part all parameters (C, A, M, E, L) are ranked together and final ranking (CAMEL Rating) was computed. The study revealed that CAMEL scanning helps the commercial bank to diagnose its financial health and alert the bank to take preventive steps for its sustainability. S.C. Gupta focused in this book, title “Fundamentals of statistics”, Published by, Himalaya Publishing House, Mumbai. The author covers many statistical topics like origin of statistics, meaning and scope of statistics, collection of data, classification and tabulation, basics of statistics, dispersion. The author also include the various techniques of forecasting methods , theory of probability, index number, sampling, various types of Tests and statistical decision theory.

Shastri R.V. (2004) discusses that Many Indian banks are adopting the information technology not merely as a frill, but as a dire need. These are augmenting profit pool, operational efficiency, customer
management, product innovation, distribution and reach, and efficient payment and settlement system. For the success of any IT program, integration of IT and business strategy is crucial factor.

- **Sarangapani A. and Mamatha T. (2008)** described that Information Technology (IT) has become an integral part of the banking system. The study discusses the recent developments in the Indian banking industry, various IT initiatives, e-security aspects, cyber laws and the RBI guidelines to regulate the e-security issues.

- **Saroj Kumar Datta and Sukanya Kundu (2008)** focus on the impact of information technology on Indian PSBs and how this is affecting the level of their customer satisfaction.

- **Sathya (2005)** examined the effect of privatizing of banks on performance and efficiency. The time taken was for 5 years (1998-2002) and it was analyzed by using difference of means test. The banking sector in India includes domestic banks as well as foreign banks and objective of this study is to study the impact of privatization on the banking firms. It was concluded that partially privatized banks have performed better as compared to fully PSBs in respect of financial performance and efficiency. Partially privatized banks have continued to show improved performance and efficiency in the year after privatization.

- **Sonja Grabner-Krauter and Rita Faullant (2008)** confirm the influence of internet trust on risk perception and consumer attitudes towards internet banking. Propensity to trust is a determinant not only for interpersonal relationships but also for trust in technological systems.

- **Sultan Singh and Komal (2009)** present the impact of ATM on customer satisfaction. This is a comparative study of three major banks
i.e. State Bank of India, ICICI bank and HDFC bank. This paper has been divided into two sections. A sample of 360 respondents equally representing each bank has been taken through questionnaire. Data has also been collected through interview also.

- **Swamy (2001)** studied the comparative performance of different bank groups since 1995-96 to 1999-2000. An attempt was made by researcher to identify factor which could have led to changes in the position of individual banks in terms of their share in the overall banking industry. He analysed the share of rural branches, average branch size, trend in bank’s profitability, share of public sector assets, share of wage in expenditure, provision and contingencies, net NPA in net advances, spread, has been calculated. He conducted that in many respects nationalized public sector banks much better than private Banks, even they are better than foreign banks.

- **Srinivas Vissapragada (2009)** discusses the innovations in information technology being used in the Indian banking system.

- **Sohani A.K. (2009)** explains that The State Bank of India is facing challenges from different players in the banking industry. With the help of numerous technological initiatives, it is working to bring about organizational improvements in order to withstand the competition.

- **Siriluck, Rotchanakitumnuai and Mark Speece (2003)** analyzed that Many Thai banks are currently implementing Internet banking. Banks that offer service via this channel claim that it reduces costs and makes them more competitive; however, many corporate customers are not highly enthusiastic about internet banking. An understanding of why corporate customers do not accept internet banking can assist banks to implement this self-service technology more efficiently.
Sanjay J Bhavani (2006) concludes that the competition among banks is tough and the consumer benefits from it. As a result, Indian customers enjoy better service quality, innovative products, and better bargains. Growth has been tremendous, particularly in the retail segment including housing loans, vehicle loans and credit cards. The coming fiscal will prove to be a transition phase for Indian banks, as they will have to align their strategic focus to increasing interest rates.

Sunil Kumar (2008) examines the objective of his analysis is to explore the relationship between technical efficiency and profitability in India PSBs using the ‘efficiency – profitability matrix’. The study is confined to cross-sectional data for the year 2005. A non-parametric technique named DEA was applied for computing TE scores for 27 PSBs. The overall level of technical inefficiency in the Indian public sector banking industry has been found to be around 11.5 percent. Also, banks affiliated with the SBI group outperformed the banks in the NB group in terms of operating efficiency.

Sunil Kumar and Rachita Gulati (2008) examine the issue of convergence of efficiency levels among Indian public sector banks (PSBs) during the post-reforms period spanning from 1992/1993 to 2005/2006. That is, the banks with low level of efficiency at the beginning of the period are growing more rapidly than the highly efficient banks. In sum, the study confirms a presence of convergence phenomenon in the Indian public sector banking industry.

Sunayna Khurana (2009) aims to identify customer preferences towards online banking and to find out various service quality dimensions that affect customer satisfaction. The five factors that influence the satisfaction level of customers are responsiveness, reliability, efficiency, privacy of information and easiness to use. The researcher is of the opinion that the present study can make its
contribution in two ways. First, it describes the customer preferences towards internet banking. Secondly, it explains the various service quality dimensions that effect customer’s satisfaction and importance of each factor. Responsiveness and reliability on the banks website are most important factors that affect customer’s satisfaction. Various banks have to take important steps to make their website more reliable and more responsive to give more value and satisfaction to customers.

➢ **Thomas p. Ferguson (2007)** conducted a research on “Observations on the securitization of Non –performing loans in Russia.” Asset securitization is a burgeoning trend in Russia as companies burdened by poor credit ratings seek access to capital at lower costs than they would be allowed in traditional equity or debt markets. Study indicates that securitization of these bad loans has not occurred in Russia at the levels one might expect. This has been due to both a relatively small amount of loans that under perform as well as legal and regulatory impediments that have discouraged investors and lenders alike. This article anticipates a significant rise in the level of non-performing loans which will be logically paired with an increased interest of Russian lenders in securitizing these assets.

➢ **The Committee on the Functioning of the Public Sector Banks under the Chairmanship of James Raj, (1978),** found RRBs to be useful and preferred its expansion in the rural areas to the expansion of the rural branches of commercial banks. Some relevant segment of the report revealed that “Regional Rural Banks can play a significant role in the financing of the rural sector. RRBs should not only open more branches in the rural areas but also gradually take over the existing rural branches of commercial banks. Consequently all public sector banks and large private sector banks and large private sector banks should be allowed to open branches only up to the district headquarters/ manual Unblock level”.

Thorsten Hennig-Thurau (2005) states that with the performance of service personnel often constituting a major element of a service per se, the customer orientation of service personnel is often regarded as a main determinant of service firms’ success. The model is then empirically tested against a sample of 989 consumers for two service contexts (i.e. book/CD/DVD retailers and travel agencies), with the results providing support for most hypotheses. Implications of the findings for services and retail management are discussed.

Uppal R.K. and Rimpi Kaur (2008) concluded that at present, government should introduce third banking sector reforms. The major factors, which are critical for the success in the complex scenario, are: Commitment to develop strong long lasting relationship with customers and to provide quality services.

Uppal R.K. and Rimpi Kaur (2008) analyzes the impact of IT on the transformation of banks during the second phase of banking sector reforms. The specific objective of the study is process and contents of bank transformation in the regime of post-second banking sector reforms, and to study the challenges and opportunities for the banking industry particularly to the public sector banks. The study is concerned with the Indian banking industry. Total nine top banks have been selected on the basis of their market share in business in 2003-04.
Vasant Desai in his book titled “The Indian Financial System and Development” (2009) Published by Himalaya Publishing House, Mumbai, has explained financial system, financial Markets, Financial intermediaries, and Institutions, Banking and Non Banking Intermediaries and various financial services. The author tried to give Maximum updated data and the given table is very informative and important for reader as well as students.

Ved pal and Malik (2007) in their empirical paper examined the difference in financial characteristics of public, private and foreign sector banks based on factors such as profitability, liquidity, risk and efficiency. Sample of 74 Indian commercial banks consisting of 24 public sectors, 24 private sector and 23 foreign banks were taken for the period of 2000-2005. Multinomial regression analysis was used and results revealed that foreign banks proved to be high performer in generating with a given level of resources and they are better equipped with managerial practices and in terms of skills and technology. Foreign banks were more consistent with market system as reflected in terms of net interest margin. The public banks emerged as the 80 next best performances after foreign banks. There were giving a higher return on equity in comparison to foreign and private banks. It was high performance from expense rate and efficiently ratio. The private banks emerged with a better use of resources as compared to PSBs.

Venugopal Dharmalingam (2004) describes that Post nationalization of banks, the banking activities have increased by leaps and bounds. To remain competitive, banks are adopting core banking system, which provides interlinkage between branches. While formulating a technology policy, banks are taking into account the vision of five to ten years and technology which is compatible to Basel II norms.

V.P. Gulati, M.V. Sivakumaran and C.Manogna (2002) reveal their views on IT framework in Indian Banking sector. An attempt is made in
this regard to identify the principal components of a structured IT plan
tailored to the needs of the banking sector in India.

Walfried M Lassar; Chris Manolis; Sharon S Lassar (2005) distinguishes between innate consumer innovativeness, a generalized personality trait, and internet domain-specific or actualized innovativeness in order to explore consumer characteristics' impact on adoption. Data are analyzed using logistic regression. Findings - While results confirm the positive relationship between internet-related innovativeness and online banking, they also surprisingly show that general innovativeness is negatively related to online banking.

3.4 Objective of the Study

No work is started without any objective. The present research work has also some objectives. The present research work has been undertaken keeping in view the following objectives:

1. To compare the capital adequacy Ratios of the selected private and public Banks during period of the study.

2. To compare the Assets quality Ratios of the selected private and public Banks during period of the study.

3. To compare the Management earnings Ratios of the selected private and public Banks during period of the study.

4. To compare the Earning Ability Ratios of the selected private and public Banks during period of the study.

5. To compare the Liquidity Ratios of the selected private and public Banks during period of the study.

6. To make suggestions for better improving performance.
3.5 Hypothesis Formulation

- **Null hypothesis:**

  If we have to compare method A with method B about its superiority and if we proceed on the assumption that both methods are equally good, then this assumption is termed as null hypothesis. It means that there is no significant difference between methods. Null hypothesis is symbolized by $H_0$.

- **Alternative hypothesis:**

  As against null hypothesis, we may think that the method A is superior or the method B is inferior, we are then stating what is termed as alternative hypothesis. It means that there is a significant difference between two methods. Alternative hypothesis is symbolized by $H_a$.

- **Level of significance:**

  This is very important concept in the context of hypothesis testing. It is always some percentage (usually 5%) which should be chosen with great care, thought and reason. In case we take the significance level at 5%, then this implies that $H_0$ will be rejected when the sampling result (observed evidence) has a less than 0.05 probability of occurring if $H_0$ is true. Thus the significance level is the maximum value of probability of rejecting $H_0$ when it is true and it usually determined in advance before the testing the hypothesis.

  Hypothesis formulated under this study are listed below. They are based on F-test (two-way ANOVA).
3.5.1 Null Hypotheses for this Research Study

Null Hypothesis ($H_0$):

1. There is no significance difference between in Capital Adequacy Ratios of selected Private and Public Sector Banks in India.
2. There is no significance difference between in Asset Quality Ratios of selected Private and Public Sector Banks in India.
3. There is no significance difference between in Management Earnings Ratios of selected Private and Public Sector Banks in India.
4. There is no significance difference between in Earning Ability Ratios of selected Private and Public Sector Banks in India.
5. There is no significance difference between in Liquidity Ratio of selected Private and Public Sector Banks in India.

3.5.2 Alternative Hypotheses for this Research Study

Alternative Hypothesis ($H_1$):

1. There is significance difference between in Capital Adequacy Ratios of selected Private and Public Sector Banks in India.
2. There is significance difference between in Asset Quality Ratios of selected Private and Public Sector Banks in India.
3. There is significance difference between in Management Earnings Ratios of selected Private and Public Sector Banks in India.
4. There is significance difference between in Earning Ability Ratios of selected Private and Public Sector Banks in India.
5. There is significance difference between in Liquidity Ratio of selected Private and Public Sector Banks in India.
3.6 Nature of the Study

As one of the objectives is to acquire deeper insight into the various pertinent aspect of the problem, thus the study can be turned as exploratory in nature. The researcher has also utilized the facts and information available in various secondary sources to make critical evaluation and thus from this point of view, the nature of the study become analytical.

3.7 SCOPE OF THE STUDY

The scope of this research study is as under.

Functional Scope:

Functional scope of this study is to analyze CAMEL model Ratios of Private and Public Sector Banks in India,

Geographical Scope:

In this study researcher selected 5 Private and 5 Public Sector Banks which are working in India. So, whole India is geographical criteria for this research study.

3.8 UNIVERSE OF THE STUDY

Hear all the private Banks and public Banks which are works in India are as a universe of the study.

3.9 SAMPLE DESIGN

There are many Private and Public Sector Banks which are working in India. In this research study, researcher has randomly selected 5 Private and 5 Public Sector Banks as the sample for this study. The sample has been selected considering following factors:

- Data for the entire period of the study from 2004-05 to 2013-14 are available.
- The Banks should be listed in Indian.
List of selected 5 sample units of Private and Public Sector Banks in India which are given below:

<table>
<thead>
<tr>
<th>Private Banks</th>
<th>Public Banks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. HDFC Bank</td>
<td>1. BOI Bank</td>
</tr>
<tr>
<td>2. AXIS Bank</td>
<td>2. DENA Bank</td>
</tr>
<tr>
<td>3. ING Bank</td>
<td>3. PNB Bank</td>
</tr>
<tr>
<td>4. KOTAK Bank</td>
<td>4. SBI Bank</td>
</tr>
<tr>
<td>5. ICICI Bank</td>
<td>5. BOB Bank</td>
</tr>
</tbody>
</table>

### 3.10 Data Collection:

The data collection is very important task for the researcher for the research study. This research study is mainly based on secondary data. The secondary data shall be collected from the records, documents, related subject matter and related web side. Personal visits and unstructured interviews with the officials of the Private and Public Banks are also the main source of the data. Besides, the researcher shall collect and analyze published data as per the requirement. As such the universe of this research study is restricted with the reference to selected Private and Public Banks, which are working in India. So, researcher has selected 5 Private and 5 Public Banks. The data regarding selected 5 Private and 5 Public Banks have been obtained and collected from the annual report of the Private and Public Banks and related websites.

### 3.11 Period of the Study

This research study covered the data of last ten years of the functioning of the selected Private and Public Banks. A longer period could have been still better but due to time and resource constraints the last ten years not very short period has been taken for analyze the data of research program. Here the researcher
undertaken on banking sector in which including CAMEL models for the period of 10 years 2004-05 to 2013-14.

3.12 Significance of the Study

This study is important for the major aspects:

1: It can give understanding overview and all information about banking sector.

2: It gives comparative study of financial data of selected private and public sector Banks.

3: It also gives the information about CAMEL model in banking sector. It is the method of to find out different types of Ratio.

It is analytical study in nature so the Significance of the Study is very high, some observations may be useful to the banker, shareholders, brokers and policy maker and people who are interested in investment in banks.

3.13 Tools and Techniques for the Analysis

Use of statistical tools has become a normal phenomenon in any type of analysis. The researcher has picked up the tools and techniques to suit their requirements and based on data available to them. Under this research study statistical tools Viz., percentage or ratio, diagrammatic and graphic presentation, addition and tabulation of data have used wherever needs.

For the present study following tools and techniques have been used for analyzing the ratio analysis of selected private and public sector banks.

3.13.1 Accounting Technique:

Accounting techniques or tool which may use for financial analysis is such as ratio analysis. The users pick up the techniques to suit their requirements and also on the basis of data available to them.
3.13.1. (1) Ratio Analysis:

Ratio is useful analysis for financial statement. It is conveniently and clearly capsules the data in a form that is easily understood interpreted as “Ratios are simply a means of highlighting in arithmetical terms, the relationship between figures drawn from financial statements” The technique of ratio analysis is the process of determining and interpreting numerical relationship based on the financial statements.

According to Batty “Accounting ratio describes the significant relationship which exists between figures shown in a Balance sheet, in a Profit & Loss account, in a budgetary control system, another part of accounting or organizing”. It concludes whether the financial condition of banks enterprise is good or bad it is universally used for appraising the performance of banks.

3.13.2 Statistical Techniques:

Use of statistical techniques has become a normal phenomenon in any type of analysis.

3.13.2. (1) Mean:

“The most commonly used average is the arithmetic mean, briefly referred to as the mean.” The mean can be found by adding all the variables and dividing it by total number of the years taken. It gives a brief picture of a large group which is represents and gives a basic of comparison with other groups. The formula of mean is as under.

\[ X = \frac{\Sigma X}{n} \]
3.13.2. (2) The Standard Deviation:

The Standard deviation concept was introduced by Karl Pearson in 1823. It is by far the most important and widely used measure of studying dispersion. Standard deviation is also known as root mean square deviation for the reason that it is the square root of the mean of the square deviation from arithmetic mean. The formula of standard deviation is as under.

\[ \sigma = \sqrt{\frac{\sum (x-\bar{x})^2}{n-1}} \]

3.13.2. (3) Diagrammatic and Graphic presentation of data:

Diagrams and Graphs are visual aids, which give a bird’s eye of a given set of numerical data. They present the data in comprehensible and intelligible form. Graphic presentation of statistical data gives a pictorial effect to what would otherwise be just a mass of figures. Diagrams and graphs depict more information than the data presented in the tabular form. These clarify the existing trend in the data and how the trend changes. For presenting the data of sampled banks, diagrammatic and graphic presentation of data have been applied.
3.13.2. (4) F-Test ANOVA (Analysis of Variances):

What is ANOVA?

Professor **R. A. Fisher** was the first man to use the term ‘Variance’ and in fact, it was he who developed a very elaborate theory concerning ANOVA, explaining its usefulness in practical field. Later on Professor Snedecor and many others contributed to the development of this technique. ANOVA is essentially a procedure for testing the different group of data for homogeneity. “The essence of ANNOVA is that the total amount of variation in a set of data is broken down into two types, that amount which can be attributed to chance and that amount which can be attributed to specified causes”. There may be variation between sample and also within sample items. ANNOVA consists in splitting the variance for analytical purposes. Hence, it is a method of analysis the variance to which a response is subject into its various components corresponding to various sources of variation.

**Two –way ANOVA**

Two-way ANOVA technique is used when the data are classified on the basis of two factors. A Banks may have its sales data classified on the basis of different salesmen and also on the basis of sales in different regions. In a factory, the various units of a product produced during a certain period may be classified on the basis of different varieties of machines used and also on the basis of different grades of labor. Such a two-way design may have repeated measurements of each factor or may not have repeated values.

F-test is also known as ANOVA, means analysis of variances.
Table No. 3.1

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of squares (SS)</th>
<th>Degrees of freedom (d.f.)</th>
<th>Mean square (MS)</th>
<th>F-Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between rows</td>
<td>$\sum \frac{(Tj)^2}{nj} - \frac{(T)^2}{n}$</td>
<td>$(c - 1)$</td>
<td>SS between columns $(c - 1)$</td>
<td>MS between rows</td>
</tr>
<tr>
<td>Between Columns</td>
<td>$\sum \frac{(Tj)^2}{nj} - \frac{(T)^2}{n}$</td>
<td>$(r - 1)$</td>
<td>SS between rows $(r - 1)$</td>
<td>MS between columns</td>
</tr>
<tr>
<td>Error</td>
<td>Total SS– (SS Between columns + SS between rows)</td>
<td>$(c - 1) (r-1)$</td>
<td>SS residual $(c-1) (r-1)$</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$\sum x^2_{ij} - \frac{(T)^2}{n}$</td>
<td>$(c*r-1)$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: “Research Methodology” by Kothari C. R., second edition, p. 311

c = number of columns (c - 1)
r = number of rows (r - 1)

3.13.2.5. t - Test:

Theoretical work on t-distribution was done by **W. S. Goesset** in the early 1900s. Gusset was employed by the Guinness & Son, Dublin bravery, Ireland, which did not permit employees to publish research findings under their own names. So Goesset adopted the pen name “Student” and published his findings under this name. Thereafter, the t-distribution is commonly called Student’s t-distribution or simply Student’s distribution. T-Test is based on t-distribution and is considering an appropriate test for judging the significance of a sample mean. It can also be used for judging the significance of the Co-efficient of simple and partial Co-relations. The relevant test statistical is calculated from the sample data and then compared with its problem value based on distribution at a specified level of significance for concerning degree of freedom for accepting or rejecting the Null Hypothesis.
Testing difference between means of Two Samples (Independent Samples):

Given two independent random samples of size, n1 and n2 with X1 and X2 and standard deviations S1 and S2 we may be interested in testing the hypothesis that the samples come from the same normal population. To carry out test, we calculate the statistic as follows:

\[ t = \frac{|\bar{x}_1 - \bar{x}_2|}{\sigma \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \]

\[ \sigma = \sqrt{\frac{\sum(x_1 - \bar{x}_1)^2 + \sum(x_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}} \]

\[ \bar{x}_1 = \frac{\sum x_1}{n_1} \]
\[ \bar{x}_1 = \frac{\sum x_1}{n_1} \]

\[ \text{d.f.} = n_1 + n_2 - 2 \]

\( \bar{X}_1 \) = Mean of the first sample

\( \bar{X}_2 \) = Mean of the second sample

\( n_1 \) = Number of observations in the first sample

\( n_2 \) = Number of observations in the second sample

\( \sigma \) = Combined standard deviation

3.14 Chapter Plan

The present study is divided into seven chapters, which are as under:

Chapter 1: Overview of Indian Banking

This chapter shows an overview of banking. It covers all the information to the banking like Introduction-Birth of the word ‘Bank’-Meaning of Bank-

Chapter 2:- Conceptual Framework of Performance Evaluation with CAMEL Model.


Chapter 3:- Research Methodology


Chapter 4:- Analysis of Private Sector Banks in India.

As the title state, in this chapter also covers concept of Private Sector banks studied in five ways, namely, (1) Capital Adequacy Ratios, (2) Asset Quality (3) Management Earnings(4) Earning Ability (5) liquidity. A study of technical CAMEL Model of Selected Private Sector Banks to use various statistical tools and techniques ratio analysis and also include F-test (Two-way ANOVA) Analysis and deep study has been done and at last result should be received.

Chapter 5:- Analysis of Public Sector Banks in India.

In this chapter deal with concept of Public Sector banks studied in five ways, namely, (1) Capital Adequacy Ratios, (2) Asset Quality (3) Management Earnings(4) Earning Ability (5) liquidity. Performance of Selected Public
Sector Banks to use various statistical tools and techniques and also include F-test (Two-way ANOVA) Analysis and deep study has been done and at last result should be received.

Chapter 6:- Comparative Analysis of Private and Public Sector Banks in India.

This chapter covers Return on Capital Employed Ratio, Borrow to Net worth Ratio, Rate of return on total assets Ratio, Interest Earned to Total Assets Ratio, Operating Expense on Total Fund Ratio, Net Profit on Total Fund Ratio, Interest Income to Business Ratio, Net profit to business Ratio, and Quick Ratio of comparative study of Private and Public Sector Banks. In this chapter covers the analysis of t-Test of Selected Private and Public Sectors Banks. This chapter also covers the broader hypothesis testing and the conclusion drawn on the basis of the analysis.

Chapter: 7 Summary, Findings and Suggestions

This chapter gives the summary, finding and Suggestion which find out by researcher after completion of research work.

3.15 Limitations of the Study

The study is limited to only ten financial years analysis i.e. from the year 2004-05 to 2013-14.

(a) This study was limited only to the selected private and public sector Banks. As a result it has a narrow outlook.

(b) The study is based on the secondary data collected from the published annual report of the Bank and website like moneycontrol.com. So limitation of the secondary data will remain with the study.

(c) It is new & developing concept so it is not possible for other study.

(d) As it is a concept, it becomes hard task and tough for the researcher and the other person.
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