CHAPTER 2
REVIEW OF LITERATURE

Introduction
In banking sector, automated services are revolutionizing the way business is conducted. Electronic banking models are replacing conventional banking system and almost all banks are rethinking business process designs and customer centric strategies. In recent past, banking sector in India has been working towards providing improved services to its customers by adopting new technologies and introducing faster and improved payment systems.

The past researches provide guidelines, direction and basis for the new researches in every field. The view of previous researches helps in finding the gaps in the vast area of knowledge and provides insight to work on the topic, which has not been covered so far by the researchers or which need more explanation. So, it is important for the researcher to go through the details of the work undertaken by the researchers in the past. Here an attempt in this chapter is made to recapitulate the existing literature related to banking sector with the use of customer centric automated service.

Financial performance of Indian private sector banks wrote Private sector banks play an important role in development of Indian economy. After liberalization the banking industry underwent major changes. The economic reforms have totally changed the banking sector. RBI permitted new banks to be started in the private sector as per the recommendation of Narashiman Committee. The Indian banking industry was dominated by public sector banks. But now the situations have changed new generation banks with use of technology and professional management has gained a reasonable position in the banking industry Kumar S. B. (2007).

Mols N. P. (2000) argued that customer acceptance of new automated channels of service delivery in banks may bring a dramatic change in the way retail banks build and maintain close relationships with their customers. The introduction of new automated channels of service delivery has made customer participation more widely possible (Dabholkar, 1994) and researchers therefore need to adopt new ways to conceptualize automated service quality, taking into consideration the attributes of all electronic delivery channels (Dabholkar, 1996; Meuter, M.L., Ostrom, A.L., Roundtree, R.I. and Bitner, M.J., 2000; Szymanski and
A number of marketing scholars identify ATM, internet and mobile/telephone banking as the principal automated delivery channels for retail banking (Joseph and Stone, 2003; Joseph, M., McClure, C. and Joseph, B., 1999; Radecki, L., Wenninger, J. and Orlow, D., 1997).

2.1 Role of Information and Technology in Banking / Automated - Banking

Both theoretical and empirical literature related to the general adoption of technology provides a framework to examine the adoption of automated-banking technologies. If the promise of increased efficiency for the banking industry and increased convenience and service for the consumer is to be realized, then understanding the factors that influence the acceptance of new products will allow businesses to create a climate in which technological advances with real advantages can be embraced by a majority instead of just a few techno-savvy consumers.

Anand M. B. and Sreenivas D. L. (2013) conducted a study on Branchless banking, its performance, cost structures and issues and challenges on selected parameters. The review base study concluded that there is a considerable growth taken place in branchless banking services in India, despite this, branches are unlikely to die, despite ATMs, laptops and smart phones becoming primary platforms for daily banking. Branches will continue even after the new modes spread to rural areas. Further study concluded that because of technical development the cost per transaction was reduced down to very cheap and affordable.

Karimzadeh M. and Alam D. (2012) conducted a study to find out the main factors and challenges posed in the development of electronic banking after a relatively long period of adoption in India. Further research provides a possible six factor model centred upon the following: infrastructure, knowledge, legal-security, socio-cultural, management and banking issues. The research was based on primary data base study. For collection of primary data 200 respondents were selected for sample survey. The results of the study indicated that legal and security, socio-cultural, and management and banking issues are accepted as challenges for the development of e-banking but that there is less awareness regarding new technologies and unsuitable software which are ranked respectively as the highest and lowest obstacles in India.

Lal R. and Saluja R. (2012) conducted a study on the bases of secondary data about technological development of banks in India and revealed the progress of the e-banking in Indian banking industry is measured through various parameters such as computerization of
branches, automated teller machines, and transactions through retail electronic payment methods etc. Banks are making sincere efforts to popularise the e-banking service and products. The research found that in years to come e-banking will not only be acceptable mode of banking but preferred mode of banking.

Seranmadevi R. and Saravanaraj M.G. (2012) presented a study aimed to analyse the role of information technology (IT) in the Indian banking industry. Indian banks invested heavily in the technologies such as automated teller machine (ATMs), net banking, mobile banking, tele-banking, credit cards, debit cards, smart cards call centers, CRM, data warehousing etc. Both exploratory research and descriptive research were used to achieve the objective of the study. The researcher used non proportionate stratified sampling technique to construct a sample of 350 respondents. The study found that foreign banks and private sector banks which took more IT initiative, were found more efficient and more competent than public sector banks.

Agrawal S. and Jain A. (2012) conducted a study on ‘Technological Advancement in Banking Sector in India: Challenges Ahead’. It highlighted the benefits and challenges of innovative banking trends. The main purpose of the study was to analyze the effects of innovation in banking on growth and development of India. The research was purely based on secondary database. The researcher revealed that banking sector in India has undergone significant transformation in the 2006-2011. A conductive macro-economic environment, the landmark foreclosure law, falling interest rate, fast spreading technological revolution system and huge potential in the retail segment augur well for India banks. The new banking system puts a premium on creativity and innovation more than ever before.

Sawant B.S. (2011) conducted a study on technological development in Indian banking sector. The theoretical research study was adopted to identify the technological development in banks. Study revealed that use of technology in expanding banking is one of the key focus areas of banks. The banks in India are using Information Technology (IT) not only to improve their own internal processes but also to increase facilities and services to their customers. Efficient use of technology has facilitated accurate and timely management of the increased transaction volume of banks, which comes with large customer base. By designing and offering simple, safe and secure technology, banks reach at doorstep of customer with delight customer satisfaction.
Sharma S. and Vyas V. (2011) conducted a study to measure the employee’s awareness, perception, and the level of satisfaction with regard to information technology (IT) services offered by the Indian public and private sector banks in Jaipur city. The study has divided into four measure statements i.e. information technologies, strategic advantages technological knowhow and organisational capacity, decision making process and motivation towards information technology. To make comparison between banks six banks were taken as samples State Bank of India (SBI), Punjab National Bank (PNB), and State Bank of Bikaner and Jaipur (SBBJ) have been selected from public sector banks whereas ICICI, HDFC and AXIS banks have been selected from private sector banks for the study. In total 750 respondents (125 from each) were selected for sample in the study. The study revealed that near 70 percent of ICICI bank transactions take place electronically, resulting lower cost of transaction, high productivity and better profitability. Private sector banks are the early adopter of the technology and took more IT imitative than public sector banks. The motivation towards information technology is high for ICICI banks and employees are akin to work in an environment which is computerized.

Suman N. and Jain A. (2011) conducted a study to analyze the role of information technology (IT) in the banking industry. The main objective of the study was review the implementation of IT on banking Industry. The study was a review base study. The study found that Indian banks have compared favorably on growth, asset quality and profitability with our regional banks over the last few years. Further study concluded that for better performance Indian banks need new technology, especially IT is the main area where Indian banks can focus for their investment.

Chawla S. and Sehgal R. (2010-11) address the inter-country comparison of technological developments of banking sector. The research was purely secondary database research. The research was considered the data of ATM development, debit and credit card circulation, large value payment system (ECS/NEFT) and Real Time Gross Settlement System. The paper revealed the data related to ATM, debit and credit card circulation, large value payment system and real time gross settlement system. The study concludes that banks and IT are walking parallel tracks. IT allows banks to offer diverse services by utilizing wide ranging infrastructure and delivers many important benefits. In case of ATM the percentages of foreign sector banks are higher followed by new private sector banks, SBI group, old private sector bank and nationalized banks in India.
Kaur J. and Jhamb H. V. (2010) conducted a study to provide an overview on electronic banking in India and how it has impacted the traditional services provided by banks. The study also bring-forth the pros and cons of the new technology. The research was purely secondary data base study. The study found that the development of electronic banking is good and targeted to meet the expectation of customers.

Chandrasekhar M. and Sonar R. M. (2009-10) made and attempt to measure of the effect of IT resources on productivity of Indian banks. Data of 29 banks from government and private sector was analyzed. The results of the study indicated that IT has a beneficial impact on bank productivity.

Uppal R. K. (2008) study described that in the post-LPG (Liberalization, Privatization and Globalization) era and information technology (IT) era, transformation in Indian banks is taking place with different parameters and the curves of banking services are dynamically altering the face of banking, as banks are stepping towards e-banking from traditional banking. Study empirically analyzed the quality of e-banking services in the changing environment, with different statistical tools such as weighted average method and ranking method, the study concludes that most of the customers of e-banks are satisfied with the different e-channels and their services, but the lack of awareness is a major obstacle in the spread of e-banking services.

Gupta S. and Verma R. (2008) studied the changing paradigm in Indian banking and revealed that banking sector has been serving the crucial needs of the society even after undergoing various changes. With the passage of time, the wonderful resilience and adaptability of the banking sector to the changing needs of the society seem to have reached the threshold of the revolutionary era. ‘Anywhere and anytime banking’ ‘tele-banking’, ‘internet banking’, ‘web banking,’ e-banking’, ’e-commerce’, ‘e-business’ are all innovative offerings to their customers. Finally, they concluded that Indian banking industry has been recognized as one of the important pillars of the economy.

Uppal R. K. (2006) made an attempt by considering 500 bank customers to examine the impact of computerization on the satisfaction of customers of all bank groups and concluded that customer services are quite better in fully computerized banks and further in e-banks as compared to that in partial or non-computerized banks.
Agboola A. A. (2003) conducted study aimed to identify the application of information and technology and bank automation in banking industry. To achieve the objective of the study in total 60 respondents were included in the survey. The study examined that investment in technology has become an important component in the overall strategy of bank operations to ensure competitive strength.

Eastin M. S. (2002) presented the model which demonstrated the adoption of four e-commerce activities currently available for internet users: (1) online shopping, (2) online banking (3) online investing and (4) electronic payments for an internet service (i.e. access to exclusive sites). Further researcher also found six attributes like perceived convenience, financial benefits, risk, previous use of the telephone for a similar purpose, self efficiency and internet use which are common to the model and play a significant role in the adoption process.

2.2 Dimensions of Customer Satisfaction

Satisfaction is a person’s feelings of pleasure or disappointment resulting from comparing a product’s perceived performance (or outcome) in relation to his or her expectations (Kotler P. and Keller K., 2006). Customer satisfaction is a collective outcome of perception, evaluation and psychological reactions to the consumption experience with a product/service (Yi, 1990).

Applications of information technology in the service industry are now on the constant increase and Internet Banking is the one of the prominent examples. For the internet users, online banking is both; convenient and time-saving, as compared with traditional retail banking. Now a day’s superior service quality has entered the picture as a differentiating strategy (Parasuraman A., Zeithaml, V.A., and Berry, L.L., 1990). The complex nature of service sector has further increased the need for better service quality. Therefore, the topic of service quality is increasingly recognised as one of the key strategic value of organisations in both the manufacturing and service sector (Lewis and Mitchell, 1990). Service quality enables the company to differentiate itself from its competitors by increasing sales and market share, its result in the satisfaction and retention of customers, its leads to enhance post-purchase satisfaction and brand loyalty, and it enables it to attract new customers through the positive word of mouth (Newman, 2001 and Wang, Y.S., Wang, Y.M., Lin, H.H., and Tang, T.I., 2003).
Lin, J. C., Hu, J. L., and Sung, K. L., (2004-05) demonstrated that the level of service quality had positive impact on customer satisfaction and, the level of customer satisfaction influenced the level of customer retention accordingly. The study of Bolton and Drew (1991) showed that service quality is an antecedent factor of customer and retention. It was an interesting finding that service quality does not directly influence the level of customer retention.

For a customer perspective, price is the most important motivation for engaging in online purchases and is the most critical comparison element (Surjadaja H, Ghosh S and Antony J., 2003). Price is considered as one of the most important determinant of automated service. Consequently price has been incorporated as an additional factor that could influence overall customer perceptions of automated service quality (Iqbal, Z., Verma, R., and Baran, R., 2003).

On the other hand service quality has been linked with customer satisfaction within the banking industry (Avkiran N. A., 1994) and has been recognised as a key strategic issue for organisations operating in any service sector (Lewis and Mitchell, 1990). Zeithaml V.A., Bitner M.J. and Gremler D., (2008), defined customer satisfaction as the “Customers evaluation of a product or service in terms of whether that product and service has met their needs and expectations”. On the other hand, (Oliver, 1997) defined satisfaction as “the consumer’s fulfilment response and the degree to which the level of fulfilment is pleasant or unpleasant”. Thus, organisations achieving higher levels of service quality have high levels of customer satisfaction and an antecedent of sustainable competitive advantage (Lewis and Mitchell, 1990).

In India, commercial banks have been quick to realise to importance of satisfaction factor to competitive advantage. The banking industry has witnessed several regulatory changes, during recent years, which have resulted in increase competition among the banks. The entry of private sector banks and foreign sector banks, subsequent to the recommendations of the Narashimhan Committee, has increased the expectations of the customers in all areas relating to customer service (Thampy A. and Madanmohan T.R., 1999). Since the 1990s, they have instantly innovated, through technology-superior products and services, such as multi-function automated teller machine (ATMs), electronic share application, tele-banking, electronic money transfers, electronic cash cards and e-banking.
Understanding the dimension of customer satisfaction help a company service attract new customers through positive word of mouth and increase the number of repeat customer. Customer satisfaction is an important aspect of company service success because the customer will be voluntary promotes company to another people. The fulfilment of customer expectations of service is valid indicators of customer satisfaction. The identification and measurement of service quality are critical factors, which is responsible for customer satisfaction (Parasuraman, Zeithaml and Berry, 1985). It is why the research of dimension of customer satisfaction is very important.

Al-Hawari, M., and Ward, T., (2005) defined that the success of automated banking business depends on an understanding of the key factors determining customer satisfaction and automated service quality. This has become more critical view of the increasingly global competition in the banking and financial services, and the increasing presence of powerful foreign players in the domestic banking. On the other hand, in the competition within the corporate banking, banks have realised the importance of automated service quality in the development of good bank-corporate relationship. Improving such relationship should increase bank profitability and accrue other benefits, such as commitment (Perrien J. and Ricard L. 1995) and co-operation (Zineldin, 1995).

Automated service quality is defined as the customer’s overall evaluation of the excellence of the provision of the services through electronic networks such as the internet, Automated Teller Machine (ATM), and telephone banking. Service quality is the main factor that determines the success or failure of electronic commerce (Santos J., 2003). Analysing markets based on customer perceptions, designing a service delivery system that meets customer needs, and enhancing the level of service performance are pertinent objectives for banks to gain and retain a competitive advantage (Brown and Swartz, 1989). Service quality has received much attention because of its obvious relationship with costs, financial performance, customer satisfaction, and customer retention.

**Studies Related to Automated Services and Automated Service Quality**

Mishra V., Yadav M., Mandhar M. and Bajaj P., (2015) conducted a comprehensive empirical investigation to discover customers’ perception and satisfaction of quality delivery of e-service in four leading Indian banks namely HDFC Ltd., ICICI Ltd., Punjab National Bank and State Bank of India. SERVQUAL analysis was used to measures the gap between
customer expectations and actual experience. The study was based on primary data and in total 100 questionnaire have been administrated, i.e 25 questionnaire from each bank. The study found that the degree of customer satisfaction is higher in case of private sector banks. It has been found that public sector banks have a well-built existence in the banking market, but in current time they are facing competition from private sector banks in the range and quality of the service offered.

Sudesh and Chugh (2015) have made an attempt to explore the online banking services of ICICI bank, a leading private sector bank. To achieve the objective of the study descriptive type of research was conducted, with Sample size of 80 respondents have been taken for analysis. The study found that efficiency, responsiveness, reliability and privacy of customers’ information are main important factors of online banking. Further it has been found that ICICI bank is a pioneer bank in India into online banking as it excels into the quality dimensions.

Iyer S. B. (2013) conducted a study on ‘Impact of Service Quality on Customer Satisfaction in Retail Banks- A Comparative Study between Public, Private and Cooperative Sector Banks’. To collect primary data in total 150 customers were selected from different banks; 50 customers from public sector banks, 50 customers from private sector banks and 50 customers from cooperative sector banks were surveyed. The study found that among all customers, who were more satisfied belongs to private sector banks. Further it was found that on the factor like timely service, easy and quick access to loans and better limits in overdraft facility definitely add to customer satisfaction level in private banks ensuring 85% of customer satisfaction. Most of the customers felt that public and cooperative banks do not offer attractive overdraft limits hence only 45% customers of public sector banks and 30% of cooperative banks showed the sense of satisfaction. In compression to public and cooperative banks the private sector banks employees were found well trained in handling customer queries.

Goyal K. and Joshi V. (2012) conducted a review base study to identify the general sentiments, challenges and opportunities for the Indian banking industry. The study identified that pre and post liberalization era has witnessed various environmental changes which affect the entire phenomena. Further study revealed that post liberalization era has spread new colours of growth in India. The study found that rural market, transparency, customer
expectation, management of risk, growth in banking sector, human factor, global banking, environmental concern, social and ethical issue was very important factors in retail banking.

Sharma H. (2011) conducted a study to cover the banker’s perspective on e-banking activities of respondents, impact of e-banking and promotional measure used by banks to promote e-banking. The research was both primary as well as secondary data study. To collect the primary data 192 bankers from northern region of India were selected for sampling. The study revealed that customers generally use e-banking services on persuasion of bankers. User-ship is mostly concentrated on professionals, business class and males belonging to middle age. The bankers were convinced that e-banking helps in improving the relationship between ‘bankers and customers’ and it will bring patent improvement in the overall performance of banks. So far as promotional avenues was concerned, print media was at the top.

Nager N., Masih E. and Badugu D., (2011) made an attempt to cover the theoretical aspects of the retail banking which includes the issues and challenges in retail banking, the recent trends in retail banking, future growth of Indian retail banking and challenges to retail banking in India. The study concluded that for the growth of Indian retail banking industry development in product, differentiation, innovation, business process reengineering, micro planning, marketing prudent pricing, customization, technological up graduation, mobile banking and cost reduction must required.

Babu C. and Kasilingam R. (2011) conducted a study to analyze the perception of customers towards different service delivery dimensions such as technology, physical atmosphere, convenience, behaviour of employees and problem handling. The study was conducted among customers of SBI, Canara Bank, United Bank of India, Standard Chartered Bank, HSBC Bank, HDFC Bank and ICICI Bank. The study was based on 370 respondents and analyzed with the help of confirmatory factor analysis methodology. The study results indicate that customers have positive perception about service delivery dimensions. Customers feel that public sector bank branches are located at convenient place, employees of private sector banks are knowledgeable and the banks were not that good in handling grievance. They prefer public sector banks for unsecured loan and private sector banks for secured loan. They remain customers of public sector banks for longer duration than private sector banks.
According to Invalli, Raghurama A. and Chandramma M. (2011) banking sector has witnessed a rapid shift in terms of distribution of service and employing automated self-service modes. Their study was conducted to develop an understanding of adoption of e-banking services among the customers in urban and semi urban areas. The results of the study revealed that the influence of demographic variables experience with computer technologies and medium of information as predictors of channel adoption. Logistic regression was used to find out the significance of different level of socio-techno-demographic variables and behavioural factors on the propensity to adopt ATM and Internet Banking at an individual level.

Uppal R.K. (2011) highlighted the customer perception regarding e-banking services. The survey of 1200 respondents was covered in Ludhiana, Punjab. The respondents were equally divided among three bank groups namely, public sector, private sector and foreign sector banks. The main objective of the research was to investigate the perceptions of the banks customers regarding necessity of e-banking services, quality of e-banking services, bank frauds, future of e-banking, preference of bank customers regarding banks, comparative study of banking services in various bank groups, preferences regarding use of e-channels an problems faced by e-bank customers. Researcher investigated that customers of all bank groups are interested in e-banking services but at the same time they are facing many problems regarding e-banking services like inadequate knowledge, poor network, lack of infrastructure, unsuitable location, misuse of ATM cards and difficulty to open an account.

Selvan V. and Nanjappa C. (2010-11), examined the customers’ awareness and satisfaction about e-banking at ICICI bank, Gobichettipalayam town. The main objective of the study was customer awareness and satisfaction about e-banking. To achieve the objective of the study the survey of 280 respondents were conducted. The data collected from the primary source were analyzed with the help of Statistical tools such as percentages, chi-square, F-test and Z-test. The results revealed that ICICI provided well awareness to the customers about e banking, and awareness level is significantly different with age, gender, education and occupation.

Malarvizhi V. and Devi A. P. (2010) conducted a study to investigate the level of awareness among the customers on the use of e-banking and their expectation from e-banking. A survey was conducted in Coimbatore city among 50 customers of nationalized banks. For analysis of
the data confirmatory factor analysis method were used and concluded that customers are satisfied with the quality of e-banking services. The study showed that among the varied e-banking services, only ATM is more cost effective. While using e-banking services the customers faced problems such as technical hurdle, more formalities, less social relation with banks, skill up-gradation, lack of knowledge and insufficient number of ATM centers. Further empirical analysis of the study revealed that in the global competition world, to promote e-banking services it is of paramount importance that the bank must ensure service quality. ‘Quality in Work’ and ‘Satisfaction of the Customers’ are the two key words which must be given sternest attention to promote a product.

**Bedi M. (2010)** made an attempt to investigate the relationship between service quality, overall customer satisfaction and behaviour intentions across public and private banks in India. The survey was designed to obtain the information about the determinants of customer’s bank selection decision. A total of 603 customers from 17 banks have been obtained. The study indicated that service quality was a significant determinant of customer satisfaction in Indian banking industry irrespective of public and private sector banks. While different dimension of service quality were found to be statistically significant across public and private banks. Customer satisfaction was found strongly associated with propensity of customers.

**Kaur M. (2010)** examined the attributes that contribute to the satisfaction level of customers by evaluating questionnaire filled from 200 customers. The parameters were rated by the customers on the basis of influence and their minds, which affect their choice of a particular bank. The choice was affected by various demographic variables such as age, gender, qualifications and income level. The findings of the study show that the most important factors that can add to a customer’s delight are technological savvy, good investment advisory services, efficient and cooperative staff and better approach to customer relationship management.

**Malhotra and Singh (2010)** Study was an attempt to show the present status of internet banking in India and the extent of internet banking services offered by internet banks. In addition, it seeks to examine the factors affecting the extent of internet banking services. The data for the study was based on a survey of bank websites explored during July 2008. The sample consists of 82 banks operating in India at 31 March 2007. Multiple regression
technique was employed to explore the determinants of the extent of internet banking services. The results showed that the private and foreign internet banks have performed well in offering a wider range and more advanced services of internet banking in comparison with public sector banks. Among the determinants affecting the extent of internet banking services, size of the bank, experience of the bank in offering internet banking, financing pattern and ownership of the bank was found significant.

According to **Geetika, Nandan and Upadhyay (2008)** in their study observed the concept of internet banking, perception of internet bank customers, non-customers and issue of major concern in internet banking. In order to have a clear and focussed insight about the perception of user and non-users about internet banking survey was conducted. In total 100 adult internet users in Allahabad were selected. The finding of the survey provides valuable insight into concern for security, reasons for lower presentation, and likeliness of adoption. It is very important for the banks to study not only the perception of the people who visit the bank as customer but also the ones who are internet users but currently not using internet banking.

**Vanniarajan T. (2008)** conducted a research on the customer service quality in branch banking. In total 225 customers have been studied. The results of the study reveal that the important service qualities in commercial banks was creditability, customization, service consistency, access, service components, tangibility and innovation. Further the results indicate that private sector banks customers were rated higher level compared to the other customers.

**Das K. M. (2007)** conducted a study to access customer satisfaction by measuring customer’s service quality expectations as opposed to perceptions of actual performance of the bank, using five SERVQUAL dimensions namely tangibility, reliability, responsiveness, assurance and empathy. The study population consist of users of bank service of state bank of India (SBI) and Industrial Credit and Investment Corporation of India (ICICI). Further study classified the sample of 132 users (working and non working) of banking services were selected. The study found a significant difference between the respondent’s expectations and their perceptions. All SERVQUAL dimensions showed that customer’s expectations exceeded their perceptions, with tangibles having the smallest gap and empathy having the largest gap.
Kumar Vijaya T. and Velu R. (2007) conducted a study to identifying the determinants of customer’s satisfaction in terms of service quality dimensions; service feature, service problems, service recovery and product used and the intension of switch over to other banks. Data for the study was collected from 325 customers of various retail banks by administering a well structured questionnaire. Factor analysis method was used for analysis. The results of the study showed that a service problem which is not resolved had substantial impact on the customer’s attitude towards the service provider. Further study concluded that the above determinants of customer satisfaction were very important for banks to maximise the satisfaction level of their employees.

2.3 Factors Enabling the Use of Customer Centric Automated Services in Indian Retail Banking

Over the past few years, the banking industry has become increasingly complicated. Regulatory changes, innovative technologies, and the sluggish economy have all played a part in reshaping its dynamics. These factors have heightened competition, changed customer expectations, and focused insurers’ attention on cost savings. Attracting new accounts and retaining high-value customers is becoming increasingly difficult as banks and brokerages develop innovative ways of integrating banking products into their distribution channels. Supporting customers with a breadth of products and delivering superior service while still controlling costs offer additional challenges. To address these issues, creating a customer-centric banks and leading account are transforming their banks from product-centric to customer centric organizations, (Cristian M., 2005).

Customer centricity is a way of banking based on trust and fairness that use knowledge of customers to meet their needs and achieve sustainable, valuable and long-term relationship. Establishing an empathic relationship with customer is central to customer centricity, but hard to achieve in a self service, impersonal channel like internet. Banks have to look for innovative ways to create personal rapports with customers online, similar to that achieved within a branch. Customer centricity is about ensuring that every interaction on every channel is designed from a customer perspective, and is convenient, uncomplicated and user-friendly, (Giri S., 2012).
Studies Especially related to Factors that Enabled the Use of Customer Centric Automated Services

Benjamin M., Attah Mc A., Israel and Ranga P., (2014) conducted a study focused on the important factors as determinants of customer satisfaction for better performance of the banks. In order to gathering the data for study, a random sampling technique was used. The data was collected through questionnaire from 150 customers and banking staff. The researcher had identified various factors which have positive impact on customer satisfaction i.e. quick services delivery, productivity, clear defined customer policy, communication, responsiveness, being friendly and approachable, creativity, access, honour promise competence.

Dawar P. (2013) has made an attempt to identify the main factors that influence the customer satisfaction in banking at the present contemporary global and highly competitive economy. In the study researcher used a comparative research design to explicate the determinants of customer satisfaction with the help of Factor Analysis method. In total a sample of 100 retail banking customers were interviewed. Study concluded that reliability, technology, commitment, empathy and privacy are the main factors which influence the satisfaction level of the customers.

Garg R. (2013) examined the customer’s perceptions towards internet banking facility and also analyzed the customer’s satisfaction on various parameters of internet banking services. In total 180 respondents were surveyed to achieve the objective of the study. The study found that perception of customers towards internet banking service quality was largely influenced by the ‘reliability’, ‘user-friendliness’, ‘responsiveness’, ‘accuracy’, ‘speed of service’, whereas ‘compatibility’, ‘efficiency’, ‘customer support’, ‘security’, ‘approachability’ and ‘availability’ were the major factors which influence the customer perception in private banks. Further it was observed that the least score was given to the ‘accuracy’ in public sector banks, whereas ‘security’ gets the minimum score in case of private sector banks which leading to the dissatisfaction of customers as compared to the other dimension.

Mistry S. K. H. (2013) conducted a study to identify the factors affecting customer satisfaction in banks and analyze their effects on the level of customer satisfaction. Study included a sample of 120 customers who have their bank account with different banks having operations in Surat city were selected. By using Confirmatory Factor Analysis method
researcher concluded that reliability, responsiveness, assurance, empathy and tangibility are the important factors which affect customer satisfaction.

Geetha K.T. and Malarvizhi V. (2011) investigated the factors which affect the acceptance of e-banking services among the customers and also indicate level of concern regarding security and privacy issue in Indian context. Primary data was collected from 200 bank customers belonging to 19 commercial banks in the city of Coimbatore, India through a structured questionnaire. Factor analysis and Regression method were used to know the factors affecting e-banking services among customers in India. The study depicted many factors like security and privacy and awareness level increased the acceptance of e-banking services among Indian customers. Further study showed that if banks provide them necessary guidance and ensure safety of their accounts, customers are willing to adopt e-banking.

Kumbhar V. M. (2011) conducted a research to identify the major factors affecting on customer satisfaction in e-banking. A sample of 200 customers of public and private sector in Statara city of Maharashtra was used for to achieve the objectives. Principal component analysis and multiple regression tests were performed to identify the major factors which influencing customers’ satisfaction. The results of the study revealed that major factors (i.e. service quality, brand perception and perceived value) affecting on customers satisfaction in e-banking services. Study revealed that all satisfaction variables were found significant and were good predictors of overall satisfaction in e-banking. Further study concluded that perceived value, brand perception, cost effectiveness, easy to use, convenience, problem handling, security/assurance and responsiveness was important factors in customers satisfaction in e-banking it explains 48.30 percent of variance. Contact facility, system availability, fulfilment, efficiency and compensation was comparatively less important because these dimensions 21.70 percent of variance in customer satisfaction.

Saraswathi S. (2011) conducted a study to examine the effectiveness of the SERVQUAL’s five dimensions in the banking sector and measure service quality perceived by the customer’s. A survey was conducted among the customers of private banks; convenience sample of 111 respondents was selected for data collection. The findings revealed that dimensions ‘Tangibles’ and ‘Assurance’ were the dimensions perceived high by the customers while the dimension ‘reliability’ is perceived low compared to other dimensions. Correlation matrix revealed that the high correlation exists between ‘understanding the specific needs of customers’ and ‘staff giving customers’ best internet at heart which means
these two factors are important for the customers in perceiving the service quality provided by private banks.

Rahmath S., Hema D. and Abdullah K., (2011) conducted a research on the topic “Internet Banking Adoption in an Emerging Economy: Indian Consumers Perspective”. The study determined the factors influencing the consumer’s adoption of internet banking in India. The sample of the study was 116 respondents using internet banking were used for analysis and showed that perceive usefulness, perceived ease of use and perceived risk are the important determinants of online banking adoption.

Ragoobur T. V., Ayrga A. and Doomun R., (2010) studied the extent to which internet banking was adopted among bank customers and investigated the factors that affect the adoption of this new delivery channel. A sample of a 400 bank customers of different age groups and of different educational levels in both urban and rural areas across the country were chosen. The results showed that perceived ease of use and perceived security and privacy were important factor that influence the use of internet banking among customers. It has also been observed that having internet access at home promotes the use of internet banking. Further, reluctance to change had a significant negative impact on the adoption of internet banking. It also found that more robust marketing by banks, the inclusion of chat forum on the websites and awareness campaign concerning security aspects also encourage customers to use internet banking.

Khurana S. (2009) conducted a study on ‘Managing Service Quality: An Empirical Study on Internet Banking’ was aimed to identify customer preference towards Online Banking and to find out various service quality dimensions that affect customer satisfaction in Internet Banking. A sample of 100 respondents of Hisar city of Haryana, India, who actually use Internet Banking, was selected by non probabilistic convenience sampling techniques. The five independent factors were extracted from the factor analysis from a list of 21 statements and study revealed that the five factors that influence the satisfaction level of customers are ‘responsiveness’, ‘reliability’, ‘efficiency’, ‘privacy of information’ and ‘easiness to use’.

Trivedi M. and Aggarwal N. (2009) conducted a study to identify the quality of service is an indicator to customer satisfaction. Measuring service quality involves objective feedback about existing customers of ICICI bank with respect to their expectations and service offered. A descriptive research design was used to gain and insight into customers’ perception about
the service offered by ICICI bank with respect to five dimensions of SERVQUAL scale. The sample size used was 100. The study was based on five overall dimensions used to measure service quality i.e. tangibility, reliability, responsiveness, assurance and empathy. The study found that all the above five dimension of service quality are important for banks in order to satisfied their customers.

Jha B.K., Gupta S.L. and Yadav P. (2008) conducted a study to examine the awareness, expectation and acceptance levels of the customers with respect to the use and effectiveness of the new technologies in banking sector. Further study tried to investigate the different technologies used in the Indian banking sector and various advantages and disadvantages of adoption of new the technologies. The sample size was considered 75 respondents generally carry out banking transactions. The study revealed that services like ATM, internet banking, mobile/phone banking have impact on banks and people have started accepting and using new techniques offered by banks. The private sector banks have performed better in case of technology adoption.

Venkata S. S. and Vunyale N., (2007) analyzed the factors that affect the choice of customers in choosing the retail banks by the customers. The researcher tried to study the consumer behaviour with respect to the people’s choice of retail banks. The study identified 15 different factors, as follow (1) safety of deposits, (2) size and strength, (3) accuracy, (4) general service quality, (5) speed of delivery, (6) proximity, (7) security of environment, (8) cordiality of staff, (9) price and service charges, (10) product packaging, (11) general public impression, (12) peer group impression, (13) face lift (structural), (14) friendship with staff and (15) advertisement and publicity. According to the findings, based on the empirical study, the first six factors exert the greatest influence, next four have moderate importance, and the rest five have relatively lower influence.

2.4 Delivery Channels of Automated Services in Retail Banking

Information Technology has marked a turning point in the history of global banking and services with ever increasing availability of international bandwidth and powerful workflow management, it is now possible to disaggregate any banking process, execute the sub-processes in multiple locations around the world, and reassemble it, at another location. Technology has opened up new markets, new products, new services and efficient delivery channels for the banking industry (Seranmadevi R. and Saravanaraj M.G. (2012). Any
activity carried out based on the application of Information Technology could be termed as Automated Banking. In other words IT Enabled Services cover the entire range of services which exploit information technology for empowering an organization with improved efficiency or a type of service which may not be possible to be rendered cost effectively without IT. ATMs, debit and credit cards, internet banking, mobile banking, electronic payments are just the few examples of automated banking. “Automated service quality” is defined as the customer’s overall evaluation of the services provided through automated channels (Santos J., 2003). Some of the studied related to automated banking service delivery channels are as follows:

2.4.1 ATM (Automatic Teller Machine), Debit Card

The banking sector has become completely dependent on technology as the service/product delivery channel. Technology is identified as the single strongest factor that provides a bank with a competitive edge over others. The banking has undergone a major change due to the adoption of E-banking. One of the latest channels of distribution to be used in the financial services organizations is electronic banking; this method was established in the mid-1990s in some countries, thereafter speedily covers all over the world (Allen, F., McAndrews, J., Strahan, P., 2001). E-banking can offer speedier, quicker and independable services to the customers for which they may be fairly satisfied than that of manual system of banking. E-banking system not only generates latest viable return, it also offers its better dealings with customers (Jannatul M. N., 2010).

E-banking provides various e-channels for using banking services like ATMs, credit cards, debit cards, internet banking, mobile banking, electronic fund transfer (EFT), electronic clearing system etc. However as per the Indian e-banking scenario ATM is the most acknowledged than any other e-channels. The Indian ATM industry has seen explosive growth in recent times (Kumbhar M. V., 2011-12). Banks have been positioning ATMs to increase their reach. While ATMs facilitate a variety of banking transactions for customers, their main utility has been for cash withdrawal and balance enquiry. Now we can deposit cash in ATMs up to certain cash limit. While the ATM is a great service for customers, for the banks it means immense savings on the cost of operations. While a typical cash transaction carried out in a bank’s branch premise would cost Rs 40 that in an ATM will only cost Rs18 translating into a cost saving of Rs 22 per transaction (Singh, and Komal, 2009).
ATM is a device that allows customers who have an ATM card to perform routine banking transactions without interacting with a human teller. ATMs are currently becoming popular in India that enables the customers to withdraw their money 24 hours*7 days. ATM Sharing system through proper connectivity and switching technology provides the first real opportunity to serve the customers on a nation-wide basis. Debit Card is a deposit access product where the card holder uses his own money in his bank account on the principal of “Pay First and Use Later”. It is the only passport for the success of banks in the highly competitive and globalized world (Uppal R.K., 2011).

**Studies Specially Related to ATM are as follows**

**Jha K. B., Sureka S. and Shitika (2014)** conducted a study to find out the satisfaction level of customers in ATM services in Bihar. For this purpose primary data was collected from 100 respondents of different bank ATM users of Bihar. Data was tested for normality and reliability and then analysed to meet the objectives. Out of total respondents more than 50% agree that it is convenient and time saving to use ATM as it acts like a “mini bank” providing cash to the needy customers at anytime, anywhere whenever and wherever there is an ATM counter. Though it is restricted to withdraw cash up to a certain limit, still then it fulfils the customers’ need in order to meet their growing demand at any time satisfying one of the best dimensions of service quality level. Majority of customers was aware about the Cash withdrawal services of ATMs. Balance enquiry service was ranked on first position on awareness scale. In the same manner majority of customer preferred ATMs for withdrawal purpose while second preference was given to mini statement facility. The awareness level about ATM services was affected by demographics of customers.

**Kani R. M. and Joy M. T. A. (2013)** made an attempt to examine the issues and challenges faced by customers. The study highlighted ATM services (most preferred by customers) as well as the awareness level and problems faced by customers regarding ATM services in south Tamilnadu. The south Tamilnadu comprises in Kanyakumari were Trinelveli and Thothukudy distright. From each district 40 customers were selected with the help of simple random sampling method from State Bank of India. It was found that ATM services of SBI south Tamilnadu were well received and utilized by the customers. It was revealed that withdrawal of cash through ATM is very convenient and majority of the respondents had used ATM services regularly. The positive association between the age of respondents and purpose of using ATM cards was well accepted by the study. The study was demonstrated
that a considerable number of customers have access to this machine and was consequently utilizing them for multi-purpose transactions, despite its challenges and shortcomings.

**Sundaram and Premalatha J. (2012)** studied the overall satisfaction level of the customers of the various banks in Vellore district, and they concluded that customers felt that bankers must improve the safety, provide accurate, timely information and make easy for customers while using the ATM services in order to retain the customers. According to the study the majority of the customers are highly satisfied in using the ATM services of their banks.

**Chattopadhyay P. and Saralelimath S. (2012)** conducted a study to study the awareness and preference to use ATM services offered by selected Cooperative banks in Pune city and problems faced by customers while using ATM services. The state of Maharashtra has a strong cooperative movement and Pune city has number of cooperative banks. Three banks viz. VishweshwarSahakari Bank Ltd., The Thane JanataSahakari Bank Ltd., Thane and Abhyudaya Cooperative Bank Ltd., was selected for the purpose of the study. In total 300 customers from the sample banks was interviewed for purpose of data collection. The study revealed that majority of the customers was highly satisfied with ATM services and view them as essential services. The customer’s preferred ATM with time and cost utility which provides efficient services.

**Leelavathi R. and Munishamappa P. (2012)** conducted a study to identify the evaluation of ATM card services, some cautions involved in ATM card services. The present study was based on the secondary data. Study found that writing and depositing checks are perhaps the most fundamental ways to move money in and out of a checking account, but advancements in technology have added ATM, debit card, credit card transactions and ACH (Automated Clearing House) transfers to the mix. Study further identified various rules and regulations about how long it takes to access your deposits, how many debit card transactions you're allowed in a day, and how much cash you can withdraw from an ATM. It is very important to customers to make complex passwords and only doing online banking through secure internet connections.

**Ramola P. J. and Sharma K. A. (2012)** made an attempt to investigate some factors which affect the uses and the resulting satisfaction of ATM service in Vellore District. To achieve the objective of the study primary data was collected from 200 users of ATM service of various banks. The study found that majority of the customers were accepted the ATM, as a useful and modern tool for dispensing cash due to advance technology. In total 61 % of the
customers accepted that they ‘never lost any money due to use of ATM’. Also they felt highly satisfied because of security and availability of ATM in all the places required by customers.

Govindarajan K., Renganathan R. and Balachandran S. (2012) conducted a study to know customers awareness and utilization of debit card in India and made critical evaluation with the help of statistical methods such as ANOVA and Factor analysis about the awareness and utilization of debit cards in India. The sample size of the study was 180 respondents using debit card. The study concluded that people are aware of various purposes for which debit card can be used, but still they prefer it for withdrawal of money and for remitting certain expenses such as purchasing railway ticket. With the help of factor analysis study identified that banking customers are fully aware that loss of debit card can be resolved without any difficulty, debit card reduce the need of holding cash, charges collected for using debit card in other ATMs is reasonable. Among the all six factors one factor i.e. “Debit Card will force people to spend more” was very much significant.

Singh S. (2011) with an aim to understand the impact of ATM services on the customer satisfaction in Indian banking sector. The study used primary data of 400 customers’ about customer satisfaction through ATM service. The data was collected using a structured questionnaire designed to ascertain the satisfaction levels. ANOVA and factor analysis was used to identify significant factors and frequency analysis was used to analyse customer satisfaction. The ATM services had a positive impact on the customer satisfaction; if proper functioning is ensured by the banks, there will be significantly higher customer satisfaction. The research identified the significant factors which the banks may take care to enhance the customer satisfaction. Some characteristics were very high customer satisfaction whereas some characteristics have the lower customer satisfaction level. The response to query and availability of cheque drop box which was the most significant factors have considered overall lower satisfaction level.

Kaushal R. and Singh M. (2011) conducted a study to analyze the e-banking adoption by banks in India and revealed that all the banks are at different stage of e-banking adoption. However private banks are very fast and quick in providing the services in comparison to public sector banks. The study also revealed that all the banks irrespective of their category are providing 100% services of ATM’s. So effective use of e-banking services has enabled the bank to hold various positions in the banking sector and top two positions out of ten are
held by private sector banks which showed that they are more efficient and providing better customer services as compared to public sector banks.

**Singh and Saxena (2011)** made an attempt to analyze the satisfaction levels of customers of ICICI bank holding ATM cards in Udaipur city with respect to some aspects such as service quality of ATM personnel, location, sufficient number of ATMs in city, regularly working of ATMs etc., for it 120 customers holding debit card were selected for sampling. The study revealed that customers are satisfied with availability of cash in ATMs, security-safety-privacy and promptness of delivering the ATM debit card. On the other hand customers feel dissatisfied with availability of complaint book, location aspect and number of ATMs in the Udaipur city.

**Kumar L., Malathy D. and Ganesh L. S. (2010)** conducted a study to understand the diffusion of ATM technology and its replacement of the teller (Labour). In the study researcher use the ATM as a proxy for capital and the teller as a proxy for labour, for it a model for ATM adoption was developed, as the degree of substitution can be measure. The degree of substitutability of one form of input for another namely, ATM (Capital) for teller (Labour) has been selected for analysis. The diffusion of the ATM was clearly large from 1998, nine years after it was first adopted. That was also a time when the number of teller was failing and the wage bill for tellers increasing. The study showed that degree of substitutability of the teller by the ATM was high. Further study explored that both a fall in the price of ATMs and increase in the wage bills for teller contributed for diffusion of ATM.

**Singh S. and Komal (2009)** conducted a study to investigate the impact of ATM on customer satisfaction. Researcher made comparative study between three major banks i.e. State Bank of India, ICICI bank and HDFC bank. A sample of 360 respondents equally representing each bank has been taken through questionnaire. Study concluded that customer’s satisfaction level was highest in SBI, then second is ICICI Bank and third is HDFC Bank.

**Al-Hawari and Tony W., (2006)** compiled a list of five major items about ATM service quality that include convenient and secured locations, functions of ATM, adequate number of machines and user-friendliness of the systems and procedures. **Mcandrew (2003)** talked about the various utilities of ATMs, which has given worldwide popularity. The utilities include withdrawal of cash as per convenience of the customers than during the banking hours at branches. Besides providing off time and off shore services, there is reduction of cost of servicing.
2.4.2 Credit Cards

Credit card is a laminated plastic card issued by a bank or non-banking financial company giving the credit card holder a preference to borrow funds on a short term basis. The bank or NBFC issuing credit card impose an interest for lending short term funds to credit card holder. Credit card holders can buy goods and services from merchants, traders and other parties based on the earning capacity and credit sanctioned to them, credit card shall be used with a prescribed credit limit. This limit is based on the earning capacity and credit worthiness of a credit card holder as communicated by entity issuing to its customer. By using credit card, customer promise for the repayment of credit card transactions executed by them. Generally credit card holders are given a credit period of 30-45 days for all purchases made by them. If repayments are not made within the stipulated period interest is collected at the agreed date. Some of the studies especially related to credit cards are considered as follows:

Vimala V. (2014) made an attempt to provide a platform to understand the evaluation and the impact of credit card on the selected HDFC Bank customers of Shimoga District; it also studied the awareness level, usage of new innovative services and its beneficial impact on the financial System. It highlighted the current weakness of the existing cardholders in the area selected for the study. The sample was consist of 100 respondents was selected among public in the Coimbatore District. It concentrates on the new emerging challenges in infrastructural development and its opportunities, issues and policies in credit card services and upgrade technical know-how in the banking sector with special reference to HDFC Banks to provide maximum benefits to the bank customers. The plastic money efficient services and credit card development in Shimoga district contributed significantly to the banking development of the country.

Deviranjitham S. and Thamilarasan S. (2014) had made an attempt to study the awareness, perception and satisfaction with credit cards of the customers in Krishnagiri district. They also analyze the extent and factors influencing utilization of credit cards, it was found that the popular brands of credit cards provided by banks in Krishnagiri District were ICICI Card, SBI Card, HDFC Card, and AXIS Card. It was further concluded that there was a number of bank customers who do not have any knowledge about credit cards. Many people have knowledge about credit cards, but do not possess credit cards because of the fear of falling into debt trap. High income earners and highly educated class use credit cards more, availing
high credit limits. Customers’ satisfaction was found less because of high rate of interest charged by banks.

Kumar S. (2013) made an attempt at empirical investigation of how credit card consumers respond to, and revealed their attitudes towards credit cards. The objectives of this study were threefold: (1) To understand the usage patterns of credit cards by the consumers; (2) To identify the grievances that the credit card holders face while using the credit cards; and (3) To study if the card issuers make any efforts to remove grievances. The stratified random sampling technique was used to determine the size of sample. The sample size was 165 respondents holding credit card. Consumers satisfied with the use of their credit cards. The information regarding the credit card terms such as repayment, finance charges, fees and charges was found more important to the consumers. On the whole, credit card users appeared that credit cards are useful, and that consumers are better off with credit cards than without them.

Govindarajan K., Anand V. V. and Balachandran S. (2012) conducted study on the awareness and utilization of credit cards in India and bring out the perception of credit card holders regarding credit cards. The study was carried out by primary and secondary data. For collecting primary data 200 customers using credit cards were selected for study. The study brings out the relationship between age, occupation and education with reference to use of credit card and also establishes awareness and utilization of credit card holders regarding credit card. Respondents were highly happy about the security check and support extended by the credit card department in compelling them to avail loan, further owing a credit card is considered as status symbol by the respondents and they don’t give much value for the bonus points assigned by the credit card division. Debit card holders also expressed their desire to go for credit card if bankers approach them, though they have a fear that it may increase their spending habit.

Selvi D. V. (2012) studied IT enabled banking services by Indian banking industry by taking computerization of banks, reach of ATMs area wise, bank wise, location wise and the usage of debit cards and credit cards. The study was fully secondary database study. The study has been analyzed with the help of statistical tools i.e. trend analysis, percentage analysis, correlation analysis, coefficient of determination and exponential growth rate and found that there is a tremendous growth of technological applications in the banking sector except in the usage of credit cards.
Sudhagar S. (2012) conducted a study to know the awareness of bank customers about credit cards, extent of usage of credit cards, assess the eligible credit limits and the actual credit limits availed by the card holders. The total number of commercial bank branches located in Krishnagiri District stood at 105 as on 31st March 2010, comprising of 81 public sector, 24 private sector banks branches as per the banking statistics published by Lead Bank Office, Indian Bank, Krishnagiri, 2009-10. These 105 bank branches constituted the sample frame for the selection of banks. The research also constitutes 600 customers’ holding credit cards. It was observed from the analysis of bank customers’ awareness about credit cards that ICICI credit cards are more popular which followed is by SBI Card and HDFC Card. The respondents’ revealed that the agents of ICICI bank were the source of information about ICICI card. In the case for SBI Card, advertisements provided the necessary knowledge and for HDFC cards, the bank was the source of necessary information for the customers. Regarding the conditions and charges on credit cards, majority (64%) was aware of the basic conditions and 76 percent of the respondents know about the charges imposed on the services. Cash withdrawal facility on credit cards is not known to majority (68%) of the respondents. None of the sampled respondents have awareness about the interest free credit period. The card holders were significantly and positively correlated with monthly income of the card holders, their family size, and total family expenditure. Income was the most significant factor determining the actual credit limit availed by the card holder. Availability of emergency funds through credit cards and shopping without paying cash immediately contributed more towards the positive attitude of card holders. However, 28.80 percent of the card holders have negative attitude and higher rate of interest charged was the cause of this negative attitude.

2.4.3 Internet Banking

The growth of IT and its remarkable application to banking and financial sector has greatly facilitated the growth of retail banking to a very large extent. In addition to websites they have introduced ATMs, Internet banking, mobile/phone banking etc. in a big way by computerizing and networking their branches. Internet banking actually uses the internet as the delivery channel to conduct various banking activities like transferring funds, paying bills, viewing account balances, paying mortgages and purchasing financial instruments and certificates of deposit. ICICI Bank was the pioneer to introduce internet banking. Later on
HDFC Bank, CITI Bank, IDBI and others followed the suit. Some of the studies related to internet banking are as follows:

**Singh T. and Kaur M. (2012)** conducted a study with aimed to compare the pre-login and after login features of selected banks online portals. For study purpose two leading banks, one each from public and private sector were selected. State bank of India and ICICI banks were used for the study to analyze the online banking services. A content analysis technique was used to study the listed features of selected websites. Further study found that selected banks’ online portals differ on various features such as accounts information, fund transfer, online requests and general information. Study concluded that ICICI bank’s online portal had upper hand as compare to SBI bank’s portal. Further both of the banks attempt to make their online portal more secure, informative and user-friendly but still they differ on one account or another.

**Shah A. (2012)** conducted a study on ‘Market Research on Factors Affecting Customer Adoption of Internet Banking’ in Vadodara, Gujarat, and Western, India. It provides a detail understanding of how and why specific factors affect the consumer decision. Sample survey of 300 local respondents were analysed for study. The researcher have found that banking needs, followed by risk and privacy concerns, and cost saved were the major factors that promote the adoption of internet banking. Further convenience and feature availability were found to moderately affect Internet banking adoption.

**Singh S. (2010)** explained the use of internet banking in customer relationship management. The author surveyed the opinion of 400 customers of two public sector and two private sector banks. ANOVA was applied to find out the significant differences and found that private sector banks were better in results. The website of private sector banks were also found more attractive. The study found that internet banking also considered an important tool by the banks and used as a business strategy to create, retain and maintain long-term profitable customer relationship by satisfying customers’ needs.

**Tommi L. (2007)** carried out a study to explore and compare customer value perceptions in internet and mobile banking. Further aim of the study is to compare customer perceived value and value creation between internet and mobile bill paying service. A qualitative in-depth interviews design was applied in order to ascertain the factors that create value perception in fund transfer service via personal computer and mobile phone. The findings reflected that customer value perceptions in banking actions differ between internet and mobile channels.
The study concluded that the efficiency, convenience and safety were important in determining the differences in customer value perceptions between internet and mobile banking.

**Poolad D. and Ramesh H. N. (2010)** examined the concept of service quality and demonstrate the model of service quality gap and seek to measure the gap between customer satisfaction of services and their preference of the interpretive service in internet banking in commercial banks in India. The primary data was collected from 102 respondents and analyzed by employing correlation and regression analysis. The study revealed that there was significant difference between overall expectations and satisfaction of customers. Customers were more concerned with the ‘sufficient menu for transaction’, ‘variety of services readily accessible’, ‘availability for business’, and ‘user-friendly system’ as important factors for the internet banking.

**Singhal D. and Padhmanabhan V. (2008)** surveyed with purpose to explore the major factors responsible for internet banking based on respondents’ perception on various internet applications. It also provided a framework of the factors which are taken to assess the internet banking perception. The study employs primary and secondary in nature. In order to collect the primary data in total 61 respondents were considered for analysis. The study found that major factors responsible for adoption of internet banking were ‘utility request’, ‘ticket booking’, ‘security’, ‘utility transaction’, and ‘fund transfer’. More than 50 percent of total respondents agreed that internet banking is convenient and flexible way of banking and it also have various transaction related benefits.

**Srivastava K. R. (2007)** conducted a research focused on what are the consumer’s perceptions about internet banking and what are the drivers that drive consumers and how the consumers have accepted internet banking and how to improve the usages rate were the focus of research. Qualitative exploratory research study with 500 respondents was selected for the analysis. The study revealed that education, gender, income played an important role in usage of internet banking. It was investigated that the perception of the consumers can be changed by awareness program, friendly usage, less charges, proper security, and the best response to the service offered.

**Shajahan S. (2005)** conducted a study on the level of customers’ satisfaction on various modes of banking services such as internet, phone, branch and ATM in India. A total of 100
respondents across ten branches of ICICI bank in Chennai participated in the survey. The study observed that Internet literacy in a country is the major issue in online banking penetration in India.

Rao G. R. and Prathima (2003) provided a theoretical analysis of Internet banking in India and found that as compared to banks abroad, Indian banks offering online service still have a long way to go. For online banking to reach a critical mass, there has to be sufficient number of users and the sufficient infrastructure in place. IT has introduced new business paradigms and is increasingly playing a significant role in improving the services in the banking industry. Internet banking is becoming more and more popular today, as is banking via digital television. Beyond doubt, a substantial part of the future of banking business lies in a banking environment that is less branch based and where customers are able to access banking services remotely.

2.4.4 Mobile Banking

Mobile Banking is gaining increasing acceptance amongst various sections of the society. This growth can be partly traced back to technological and demographical developments that have been influencing important aspects of the socio-cultural behaviour in today’s world. The need/wish for mobility seems to be the driving force behind Mobile Commerce in general. Mobile Banking, availability of bank-related financial services via mobile devices, builds a cornerstone of Mobile Commerce. Some of the studies specially related to mobile banking are as follows:

Malarvizhi V. and Rajeswari A. (2012) studied the awareness and uses of mobile banking services and to estimate the user’s criteria for selecting mobile banking services in Coimbatore district. The total sample consist of 100 mobile banking services users in urban areas, in Coimbatore city. The study found that mobile banking users were all educated, belongs to business group and middle income group. Further the study concluded that customers were likely to find mobile banking more useful resulted increase in their expectations.

Shukla N. S. and Bhatt V. K. (2012) were conduct a study to find out the adaptation of mobile banking in north Gujarat region, knowledge of M-banking, which service of mobile banking they use, their view about the fee of mobile banking charged by banks and their overall satisfaction through mobile banking. The responses were collected through a
structured questionnaire and in total 100 respondents were surveyed. Results of the study indicate that age, income and education is strongly associated variables with using of mobile banking service. The main reason for not using the mobile banking facility was less knowledge about the operation of the mobile banking facility. Customers also feel the services of mobile banking too complex to use and it is so risky.

**Bamoriya, Sharma P. and Singh P. (2012)** study was focused on the Barriers in adoption of mobile banking. It further focused on preferred services by the mobile banking customers and influence of demographic variable on mobile banking service adoption. In total sample size were 100 consumers using mobile banking at Indore city, Madhya Pradesh. A cross section descriptive design was adopted and collected data was analysed with Product moment correlation, Oneway Kolmogorov-Smirnov test and frequency analysis. Study reveals that customers’ security concern was the major barrier in adopting mobile banking services followed by network problem and insufficient operations guidance. Further study concluded that customers prefer information based services rather than financial services provided by the bank i.e. balance check.

**Reji K. G. and Sundharani R. D., (2012)** examined the factors influencing the continuance decisions of the early adopters of M-banking services in Kerala. The study was design in the backdrop of the issues faced by the banks to attract more customers irrespective of the huge mobile penetration in the country and for it Technology Acceptance Model (TAM) model along with constructs of perceived service quality, perceived credibility and perceived risk to empirically establish the influence on satisfaction and continuance usage intensions were analyzed. The study found the strong relationship between perceived service quality, satisfaction and continuance intensions. Further study found that after adoption of the technology, the customer finds satisfaction in the quality parameters of the service. Perception involved in M-banking had adverse impact on service quality and satisfaction. Continuance intensions were found solely dependent on satisfaction in the M-banking context in Kerala.

**Bamoriya, Sharma P. and Singh P. (2011)** conducted a research to explore the issues in mobile banking perceived critical for adoption by both mobile banking users as well as non-users. The study explore selected mobile banking issues from customer’s perspective and to make recommendation to various parties involve in mobile banking service viz. banks, mobile operators, content providers, regulators, on relevant issues which could become challenges for them in providing effective mobile handset operability, security/privacy and...
standardization of services was the critical issues. For this a descriptive design was adopted with a sample size comprised of 50 mobile banking users and 50 non mobile banking users. Majority of the customers were indifferent towards utility of mobile banking in comparison to retail banking and online banking.

Dass R. and Pal S. (2010) conducted a study with aim at identifying drivers and inhibitors for adoption of mobile financial services (MFS) among the rural under banked population of three states in India. The study was based on secondary data. The study found that the demand for banking and financial services and the amount of hardships faced in availing three services through the existing channels of delivery can act as strong drivers for mobile financial services adoption among the rural under banked. Further factors like lack of trust on technology and lack of technology readiness were found to act as barriers to the adoption of mobile financial services (MFS).

Vyas C. (2009) stated that Indian banks will target non-online banking users who may lack regular access to desktop internet but very likely to have own mobile device, thus reporting great potential of mobile banking in India. This report of Vital Analytics suggested huge potential of Mobile banking in India, as it found that urban Indian customers’ checking account balance is the most frequently cited reason for using Mobile banking. 40 million urban Indians used their mobile phones to check their bank account balances and mini statement.

2.4.5 NEFT/RTGS/ECS

In the mid eighties RBI started promoting computerization and Management Information System (MIS) in banking to improve customer services, book keeping and to enhance productivity. Since then banks, along with the guidance of RBI, achieved various objectives, such as the introduction of MICR based cheque processing, implementation of the electronic payment system such as RTGS (Real Time Gross Settlement), Electronic Clearing Service (ECS), National Electronic Funds Transfer (NEFT), Cheque Truncation System (CTS), Mobile Banking System etc. Technology has led banks to grow and expand its reach to the underserved areas as well. It is now the spearhead for Banking, making it more convenient for the common man. Indian banks are putting in place a robust infrastructure to leverage the benefits of IT. Also, it helps them function in an organized and secure way. Accounts at any of the Clearing Banks with access to the EFT clearing system can be credited or debited. Currently, banks have focused on a number of IT products especially EFT (Electronic Fund
Transfer) which is comprehensive, flexible and cost effective alternative to cash and paper payments. The large value electronic payment systems, viz., Real Time Gross Settlement System (RTGS) and the Retail Electronic Payment Systems, viz., National Electronic Clearing Services (NECS and ECS), National Electronic Fund Transfer (NEFT) and Card Payment Systems are the electronic payment systems available in India (Tandon D., Tandon N., Kumari N., and Ranjan R. (2014).

Studies Especially related to RTGS/NEFT/ECS are as follows

Malik S. (2014) focused on how the technology has transformed the face of banking in India. India’s banking system has seen some major financial innovations in the past decades which lead to tremendous improvements in banking services and operations. The various innovations in banking and financial sector are ECS, RTGS, EFT, NEFT, ATM, Retail banking, Debit and Credit cards, free advisory services, online banking, mobile banking and many more value added products and services. The study also highlighted the benefits and challenges of changing banking trends. Mobility and customer convenience were viewed as the primary factors of growth and banks are continuously exploring new technology, with terms such as mobile solutions and cloud computing being used with greater regularity. The study concluded that ECS, NEFT, RTGS, are very important payment services facilitates by Indian commercial banks and execution of these payments system by Indian commercial system was tremendous.

Tandon D., Tandon N., Kumari N., and Ranjan R. (2014) made an attempt to expound the scope of innovation and the paradigm shifts taking place in RTGS, M- banking, NEFT, EFT, ECS have made significant move in payment systems through electronic mode. The authors have studied Volume of RTGS and Mobile transactions for the years 2011 to 2013 for 14 chosen banks - seven each in private and public banks by applying Shapiro-Wilk Test of normality and NEFT/ RTGS, paired t-tests and have concluded that by increasing cost of building brick-and-mortar branches, decreasing cost of computers, high delivery costs and slow revenue growth force a relook at the conventional delivery systems in the Indian Banking system. The new strategy changes the focus of the branch from being a high cost transaction centre to a provider of a wide range of services i.e. NEFT, RTGS, NECS, Internet banking, Mobile banking and Debit and Credit cards etc.

Subramanian S. (2014) to analyzed and evaluated whether electronic payment systems have been proving to be effective in India during the period of study. Furthermore, this study also
reveals that all electronic modes of payments have attained a vast growth compared to the physical paper-based payments like cheques or drafts etc. The study is based on secondary sources of information collected from various sources and the data was used from the periods of financial year (FY) 2003-04 to 2012-13. Despite RBI’s efforts to promote electronic banking, almost 90 per cent of total payments were estimated to collect through cash/cheque (RBI Annual report). The vision document by RBI, proactively encourage efficient electronic payments systems through developing accessibility, availability, affordability and assurance among other things are needed for cash-free society. Banks and other financial institutions should concentrate further on efforts to encourage corporate, individual /retail customers and also noted that the gaps in the bill payments eco-system for lack of inter-operability, high cost of cash, cheque/draft collection and poor accessibility in semi-urban and rural areas to ensue efficient innovative paper free electronic payments and settlement systems form the backbone of economic well being of the nation. In addition, simplifying documentation requirements, increasing role of non-banks in the payment systems, innovation and competition, uniformity, addressing risks could facilitate more usage of the innovative efficient paper free mode.

Gupta A. and Gupta M. (2013) examined the developments of payment system in Indian banking system and analysed. ICT based payments and settlement service. In recent years Indian banking system have been undergoing from modernisation phase and implementing many innovation ideas in the system. This article focused on only payment and settlement system and it is based on secondary data sources. Data consist in it has been analysed by the simple statistical tools. The study focused on ICT based payment system and services provided by RBI and banking institutions in India as well level of transaction volume, value as well as include threats of electronic payment system as suggest applicable measures to enhance payment system. Now Indian banking system has undergone a significant transformation over time in terms of diversity and innovation. The developments in information and communication technology resulted in numerous innovations in the payment system of India. In the sense of rural India various facilities was not provided sufficient level by the banking institutions due to lack of ICT connectivity and other infrastructural facilities.

Bapat D. (2012), made an attempt to find out the key attributes of electronic payment and its use by consumers. It consider various issues and concern relating to electronic payment i.e. awareness level, usage of generic products and usage of specific products offered by bank for various electronic payment products. To achieve this objective the author used primary banks as a measure for customer relationship and assesses the relationship between primary bank
and various variables. The results revealed that age, asset class, debit card and internet banking, EFT, NEFT, RTGS are the key drivers of electronic payment.

Ponmuthumari S. (2012) conducted a study to analyze the impact of electronic banking on payment and clearing system and identifies the important factors for the customers to choose electronic banking as a mode of payment. The payment systems like card-based payment systems, ECS, EFT, RTGS, NEFT and CTS have offered a variety of services to the customers. The sampling population of the study included 500 bank customers of nationalized and private banks in Thoothukudi district. Out of which 250 customers are from nationalized and remaining 250 from private banks. The customers of five public sector banks, viz., State Bank of India, Bank of Baroda, Punjab National Bank, Canara Bank and Indian Bank, and five private sector banks, viz., ICICI Bank, HDFC Bank, AXIS Bank, TMB Bank, and City Union Bank, were selected and the rationale for selection of these banks was their asset base structure. Stratified random sampling method was adopted for choosing the samples. The data collected through the questionnaire was analyzed by using factor analysis. The study found that anywhere and anytime banking become easier for the customers through various models of e-banking payments. Though the customers enjoy different benefits of e-banking, for the banks the electronic movement of funds makes fewer funds available for floating. E-payment system in India has made a considerable growth into usage of e-payment. Further study concluded that dimensions adopting new techniques, customer convenience, motivating rules and legal framework was the four factors leading to popularizing the e-payment system.

Murugavel V. and Muthamizh D. (2011) conducted a study to analyzes the attitude of the customers using RTGS service in Gobichettipalayam. The study was based on primary data. Primary data were collected from 50 respondents using RTGS service. The study analysed that RTGS is fully secured electronic fund transfer system where banks and customers can receive payments on real time basis. The outreach of RTGS transactions has also grown geographically. It was found that lack of awareness was considered as the major problem faced by RTGS users. Further the minimum limit of one RTGS was more than one lakh was also a problem for those customers who are not making big transactions.

Goswami M. M. (2010) compared the characteristic analysis of efficient e-payment system namely, credit card system, e-coins, e-cheque, and net bill. Study concluded that the e-
payment system in India was more efficient. It also provided the benefits for the user to appropriately select e-payment methods.

**RBI Committee on Payment and Settlement Systems (2010)** examined to what extent change in market structure or ownership might affect the expansion of central clearing services. Committee concluded that the clearing industry’s structure has a bearing how far central clearing will be used in different markets and hence on the resilience of the financial system as a whole. The different kinds of market structure have developed over the last decade.

**Das A. and Aggarwal R. (2010)** studied the transaction payments costs involved in India by holding independent interaction with all payers in the banks, the card companies and the merchants and by comparing the practice in different countries. They concluded that the banks and card companies would continue to gain. Their revenues would increase due to increase usage and user base. The government has benefits which they will be sizable reduction in the growth of currency management costs and generate the volumes of data on spending behaviour of individual.

**Raja J., Velmurgan S. M. and Seetharaman A., (2008)** evaluated the impact of e-payment system on the business opportunities. They identified that due to the growth of internet users, various electronic payment mechanisms had been developed to cater the diversity of applicants. The researcher identified three main issues related to e-payment that were security issues, low interest among businessmen, and heavy reliance on traditional payment methods. The study also analyzed that there were technical and cultural problems which hinder the path of e-payments. However, to make e-payments more effective, security threats was reduced; and people was realized that traditional payment methods were more time consuming than electronic payment methods. Study concluded that plastic card payments are more convenient, easier and more secure than cash or cheques.

**Ashiya M. (2006)** evaluated developments made by electronic payments. The author evaluated different modes of e-payment used across the globe. The main objective of the study was to find the current offerings and development provided by electronic payments. The author evaluated different modes of e-payment such as plastic cards, debit cards, credit cards, smart cards, electronic cheques etc. These electronic ways provided an excellent instrument for payment system. The author analyzed that security was the main concern among electronic payments. However, e-payment this sophisticated technology could be used
as a tool for the enhancement of customer loyalty and business of banks as it had reduced the risk and cost and could increase the customer loyalty.

2.5 Studies Related to Profitability and Performance of Indian Commercial Banks

Liberalization and financial sector reforms during the last one decade have brought the issue of productivity and profitability of banks into the limelight. Profitability of banks has been under strain on account of declining net interest margin and increasing competition. The comfortable business of accepting deposits and lending at administered rates has been dented following deregulation of interest rates and increase in competition after the entry of private and foreign banks. In the changing context, banks with a high degree of cost effectiveness, increased efficiency and customer centric approach would survive. Use of modern risk management practices, exploring ways to increase non-fund based income, analysis and control over expenses and greater use of information technology have become imperative to protect their bottom-lines in the deregulated environment (Mittal R.K. and Dhingra S., 2007). Performance of banks can be expressed “in terms of competition, concentration, efficiency, productivity and profitability” (Bikker J. A., 2010).

Some of the studies especially related to profitability and productivity performance are as follows:

Suneja A. and Shweta (2015) conducted a study to examine the performance of public and private sector banks during the period 2008-13. The study was based on twenty ratios of the variables relating to capital adequacy, asset quality, management efficiency, earning quality and liquidity. A sample of top five public and five private sector banks selected for the purpose of the study. Twenty one variables related to CAMEL model are used to achieve the objectives of the study. The study concluded that public sector banks has been giving the considerable protection for the creditors with respect to the regular payment of interest and return of capital while private sector banks has just sufficient capital in meeting the contractual obligations between the banks and its creditors in the event of liquidation. About assets, management efficiency and liquidity position public and private sector banks do not have any significant differences.

Subramanyam T. (2014) conducted a study to investigate a new methodology to evaluate the efficiency of banks. The performance indicator variable NPA has been used to identify the environment of a bank. The overall technical efficiency was decomposed to scale, environmental risk and pure technical efficiency. To achieve the objectives of the study
secondary data related to Public sector banks, Private sector banks and foreign sector banks were collected from 2012-13. CCR and BCC model of DEA method were adopted to check the technical efficiency of the banks. The empirical results revealed that public sector banks were affected more from environmental risk inefficiency. The independent sample t-statistic showed that in CCR environment there was high significant difference between all pairs of the banks. In BCC and E-BCC environments, there was no significant difference between public and foreign sector banks. It indicates that, public sector banks were equally performed comparing to foreign sector banks. In scale and environmental risk free environment public and foreign sector banks were worked effectively with the mean efficiency scores 80% and 82% respectively. The private sector banks were worked poorly with 49% mean efficiency. Overall, foreign sector banks were worked effectively in all environments. Public sector banks were also equally functioning after removing the scale and environmental risk from overall technical efficiency.

Gudala C. and Rao N. E.S.V. (2014) conducted a study on ‘Performance evaluation and ranking of private sector bank’. The study involved the application of DEA model to assess the efficiency of 13 private sector banks in India during the years 2006-07 to 2011-12. The objective of research was to evaluate the performance of private sector banks and know how private sector banks were influencing the common man and Indian economy. On the basis of constant return to scale, study found that AXIS bank, City Union Bank ltd., Development Credit Bank ltd., South Indian Bank ltd. and Yes Bank ltd. nearly 38 percent of private sector banks exhibited constant performance throughout the study period. South Indian Bank ltd. and Dhanalakshmi Bank ltd. have stood first rank from the year 2008 to 2012.

Ghosh A., Dey M., Bandyopadhyay G., and Guha B. (2014) investigated the efficiency of Indian banks enlisted with the application of Data Envelopment Analysis (DEA), to estimate the efficiency of the Indian banks using publicly available financial data of various different parameters related to the financial health of Indian banks. The researcher applied super efficiency model to measure the most efficient bank over a certain time horizon among all the banks. The study found that City Union Bank Ltd., ICICI Bank Ltd., IDBI Bank Ltd., State Bank of India and State Bank of Travancore have proved to be efficient over all the years as compared to the other banks included in the study. These banks have been able to make the optimal utilization of the input consistently throughout the period. They have been able to convert most of their deposits into loans and investment and have been successful in minimizing their operating cost and investment in fixed assets. Development Credit Bank
Ltd., Dhanlaxmi Bank Ltd., Karnataka Bank Ltd., Kotak Mahindra Bank Ltd., Lakshmi Vilas Bank Ltd. and Oriental Bank of Commerce have also fared well over the decade included in the study. Eight banks, namely Allahabad Bank, Central Bank Of India, Dena Bank, ING Vysya Bank Ltd., Punjab National Bank, Union Bank of India, Vijaya Bank and Indian Overseas Bank has not been able to match their competitors in any of the 10 years included in the study. They have not been able to utilize the inputs to their fullest.

**Nandkumar and Singh A. (2014)** used DEA approach to estimate the technical efficiency of commercial banks in India over the years 2006-2010. The present study considers ten commercial banks as decision making units. Out of these, five are public sector banks and other five are private sector banks i.e. State Bank of India, Punjab National Bank, Canara Bank, Vijaya Bank, Allahabad Bank, HDFC Bank, Axis Bank, ICICI Bank, Yes Bank and Kotak Mahindra Bank. Study considered three inputs which are deposits, number of employees, operating expenses and the three outputs are investments, other income and advances. In this study the data related to various input and outputs over the period 2006 - 2010 have been taken. The results indicate that deregulation of banking sector has led to an increase in the efficiency of commercial banks in India. Banks like Allahabad bank, Canara bank, Kotak Mahindra bank, ICICI bank and Yes bank are very efficient and show consistency in their performance. On the other hand, the performance of banks like SBI, PNB and HDFC bank have poor performance as efficiency scores was below to satisfactory level. The major factor resulting in the poor performance of these three banks was their huge amount of deposits and operating expenses. Also, the excess number of employees was increased their problems. So, here either these banks possess blocked/non-performing assets or was not able to make a set off between the deposits and advances.

**Jayaraman A. R. and Srinivasan M.R. (2014)** analyzed the performance of the Indian banks using cost, revenue and profit models of DEA and comes-out with a comprehensive efficiency index for banks, by combing the efficiency scores of various DEA models, using the Shannon entropy. The banks included in present study were sound in terms of total assets, manpower, branch network etc., and they have been ranked based on their performance, which depends on optimal utilization of select variables. In order to measure the degree of agreement between rankings of banks based on three different models, namely cost, revenue and profit model, Kendall’s coefficient of concordance have been used. The banks which were operating on the efficient frontier are ranked as 1 under the Shannon method, which includes two public sector banks viz., State Bank of India and IDBI Bank, and three private
sector banks viz., ICICI Bank, Indusind Bank and Karnataka Bank. These banks operate on the efficient frontier and optimally use their inputs and outputs i.e. without any slack. The second group of banks which was very close to the efficiency frontier with Shannon index more than 0.98 and ranked between 2 and 5 are: Axis Bank, HDFC Bank, ING Vysya Bank and State Bank of Travancore.

Arora and Kaur G. (2014) conducted a study to measure the extent of technical, pure technical and scale efficiencies of the Indian banks across different ownership categories. The study was carried out across 19 nationalized banks, 15 private sector banks and 10 foreign banks for the period 2011-2012. The selection of private and foreign banks has been based upon their average asset size for the period 2011-12. DEA technique was used to evaluate the efficiency scores and it was observed that only 10 out of 44 selected banks were efficient. Out of these efficient banks, three banks are from the nationalized category (Andhra Bank, Indian bank and Punjab National Bank), the other four from private sector (Axis Bank Ltd., ICICI Bank Ltd., Kotak Mahindra Bank Ltd. and Tamilnad Mercantile Bank Ltd.) and remaining three from foreign sector (Bank of America NA, Barclays Bank PLC and The Royal Bank of Scotland). The overall technical efficiency score (OTE) was found least for foreign banks whereas the private sector banks have marginally outperformed the public sector banks. Further, it was observed that efficiency scores did not vary much across public sector, private sector and foreign sector banks. Performance of public sector and private sector banks is almost at par with respect to technical efficiency whereas in the case of foreign banks, there lays scope for improving scale efficiency.

Rajput N., Chopra K. and Oberoi S. (2014) made an attempt to measure and compare the efficiency scores of public sector banks, private sector banks and foreign sector banks operating in India during 2008-2013 using frontier based non-parametric technique, i.e., DEA. The study has measured the efficiency level of all foreign sector banks operating in India during the last eight years from 2008-2009 to 2012-2013. The result demonstrates that the efficiency of foreign sector banks has shown continuous improvement in comparison with public sector banks and private sector banks following the route of deregulation with modest drifts. Foreign banks have made substantial contribution to the Indian banking sector over the years by bringing capital and global best practices as well as grooming talent. Foreign banks have shown an increasing trend of efficiency through their efficient working style and better customer service except in 2009-10 which was mainly due to the global financial crisis. Over the last five years, there was persistent increase in the net profits of public sector banks and
private sector banks in comparison with foreign banks but as far as efficiency scores are concerned foreign banks has shown substantial improvement.

**Bodla B.S. and Neeraj (2013)** conducted a study to analyze managerial efficiency and profitability of selected banks in India. The efficiency and profitability are measured by using panel data of commercial banks for the period from 2001 to 2012. t-test is used to find significance of difference in the performance between two periods (i.e. 2001-2006 and 2007-2012) and between the performance of public and private sector banks. The study found that both public sector banks and private sector banks have performed satisfactorily during 2001-2012 in terms of profitability and managerial efficiency. However the private sector banks were seen having an edge over their counterpart public sector banks. The Interest Spread in case of private sector banks was found higher than that of public sector banks. Further study brings out that return on long term funds as well as on net worth was found significantly higher in public sector banks than private sector banks.

**Gupta M. and Sharma M. (2013)** examined the effectiveness of economic value added (EVA) vis-à-vis other performance measure as a better indicator of shareholders wealth maximisation of private sector banks in India. The results obtained from analysis was carried out on the secondary financial data from year ended 2003 to 2008 for top 20 private sector banks selected on the basis of highest market capitalisation. The result indicated that EVA does not prove to be better predictor of wealth maximisation as compared to traditional measures in explaining market value added (MVA).

**Parsad B. G. V. and Veena D. (2013)** study was intended to find out the comparative performance of Indian banks and analyzed that all SCBs have shown significant differences in their performance with reference to return on assets, return on investment, net interest margin, interest spread, operating expenses, non interest income and non performing assets, capital adequacy ratio. Foreign sector banks, new private sector banks are performing better than public sector banks and old private sector banks. While new private sector banks and foreign sector banks started with clean slate and latest technologies. The public sector banks and old private sector banks had to overcome the old system and employee’s resistance and introduce the new systems and process and norms.

**Kumbhar V. M. (2012)** tried to analyze the work performance of the various banks in India with the base of data provided by the reserve bank of India in his various annual reports on Indian banking. According to the available data the foreign banks were performed well, who
was on first rank in the manner of operational efficiency, private banks were on second rank and public sector banks were in third rank in India.

Verma A. (2009) conducted a review based study on ‘The Impact of Technology on Productivity and Profitability of Indian Banks in Post Liberalization Period’ and analyzed that Indian public sector banks have a unique advantage over their competition in terms of their branch network and the large customer base, but in the use of technology that will enable public sector banks to build on their strength. Foreign banks and the new private sector banks have embraced technology right from their inception and they have better adapted themselves to the change in technology. Whereas the public sector banks and old private sector banks have been slow in keeping pace with the changing technology.

Uppal R.K. (2011) analysed the performance of major banks in terms of productivity and profitability in the post e-banking period. To achieve the objectives of the study total nine banks have been selected on the basis of their market share in business in 2003-04, three banks from each group i.e. public sector banks, new private sector banks and foreign sector banks. To analyze the performance of the banks labour productivity ratios, branch productivity ratios and profitability ratios have been calculated. The study investigated that transformation is taking place almost in all categories of banks. IT is playing a crucial role to create the drastic changes in the banking industry particularly in the new private sector and foreign sector banks.

Saraandevot S. S., Rathore Y. S. and Shaktwat (2011) made an attempt to evaluate the impact of E-commerce on productivity and profitability of Indian banks. The study was divided in two parts; pre e-phase and post e-phase. Profitability and productivity has been analyzed with the help of different ratios i.e. Deposit Per Employee, Credit Per Employee, Business Per Employee, Total Expenditure Per Employee, Total Earning Per Employee. Further to assess the impact the information technology on profitability of Indian banking industry, a prominent ratio that was per percentage of net profit to working funds was calculated in two respective periods. An appraisal of these ratios clearly suggested an improvement of profitability after induction of information technology. Further study found that the profitability of Indian banking industry have significantly improved after induction of information technology.

Babu C. and Kasilingam R. (2011) with the prime objective of the study analysed the technical efficiency, cost efficiency and total factor productivity change of commercial banks by taking advances and investment as output variables deposits and number of employees as
input variables by using DEA model. The sample in the study was consisted of sixty commercial banks in India including 27 public sector banks, 22 private sector banks and 11 foreign sector banks. The results of the study indicate that the average efficiency of public sector banks is higher than that of private sector banks for the year 2009-10. Furthermore, foreign sector banks are much efficient than public and private sector banks when all commercial banks were analysed. Finally it was concluded that business per employee and cost of funds are the factor which cause variations in the banks efficiency.

Dash M. (2009) studied the technical efficiency of Indian banks segmented in terms of ownership using DEA model with five input variables (viz. borrowings, deposits, fixed assets, net worth and operating expenses), and the efficiency scores were calculated for a sample of 49 major banks operating in India and found that foreign banks were slightly more efficient than public and private banks, and that there was not much of a difference in the efficiency of public and private banks.

Mitra R. D., Shankar R. (2008) made an attempt to evaluate the efficiency of 50 Indian banks. The Inefficiency can be analyzed and quantified for every evaluated unit. The aim of the study was to estimate and compare efficiency of the banking sector in India. The analysis was supposed to verify or reject the hypothesis whether the banking sector fulfilled its intermediation function sufficiently to compete with the global players. The results were insightful to the financial policy planner as it identifies priority areas for different banks, which can improve the performance. The study concluded that the performance of banking sectors in India was excellent.

Uppal R.K. and Kaur R. (2007) analyzed the efficiency of all the banks groups in the post banking sector reforms era. Time period of the study was related to second post banking sector reforms (1999-2000 to 2004-05). The study concluded that the efficiency of all the bank groups has increased in the second post banking sector reforms period but these banking sector reforms are more beneficial for new private sector banks and foreign sector banks.

Sahoo B. K., Sengupta J. K. and Mandal A., (2007) paper attempt to examine, the performance trends of the Indian commercial banks for the period: 1997-98 to 2004-05. To analyse the secondary data DEA efficiency analysis model has been applied. The main findings of the study were; First, the increasing average annual trends in technical efficiency for all ownership groups indicate an affirmative gesture about the effect of the reform process on the performance of the Indian banking sector, Second, the higher cost efficiency accrual of private banks over nationalized banks indicate that nationalized banks, though old, do not
reflect their learning experience in their cost minimizing behaviour due to X-inefficiency factors arising from government ownership. This finding also highlighted the possible stronger disciplining role played by the capital market indicating a strong link between market for corporate control and efficiency of private enterprise assumed by property right hypothesis. Further concerning the scale elasticity behaviour, the technology and market-based results differ significantly supporting the empirical distinction between returns to scale and economies of scale.

**Varadi, Vijay, Mauluri and Nagarjuna (2006)** in their study on Measurement of efficiency of bank in India concluded that in modern world performance of banking is more important to stable the economy. In order to analyze the efficiency of Indian banks research considered four indicators i.e. profitability, productivity, assets, quality and financial management for all banks includes public sector, private sector banks in India for the period 1999-2000 to 2002-2003. For measuring efficiency of banks were envelopment analysis was adopted and found that public sectors banks are more efficient then other banks in India.

**Bodla B.S and Verma R. (2006),** conducted a study on ‘Determinants of Profitability of Banks in India: A Multivariate Analysis’ and revealed that control over non-performing assets, operating expenses, provision and contingencies are the major areas of concern for the management of public sector banks. The public sector banks must strive to greatly enhance efficiency through a control over a shrinking spread, increasing non interest income and maximising business per employee and per branch etc. Technology up gradation, 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 were also the most important aspect to ensure the sustainable level of profit and its growth.

**Sathye M. (2005),** study examined the impact of privatization on bank’s performance and efficiency using data of banks in India for the period 1998-2002. The study was based on three groups of banks- partially privatized, fully state owned and those already in the private sector. To obtain the financial performance researcher calculate various ratios i.e. return on asset (ROA), spread to working fund ratios, establishment expenses to total expenses ratio, loan out ratio and non performing assets to net advance ratios. Efficiency of the bank was measured using accounting ratios deposit per employee, advance per employee etc. Researcher have found that partially private sector banks performed better as compared to the fully public sector banks in respect of certain financial performance and efficiency parameters.
Satish, D., Jutur, S., and Surender, V., (2005) adopted CAMEL model to assess the performance of Indian banks. The authors analyzed the performance of 55 banks for the year 2004-05. Study concluded that the Indian banking system looks sound and information technology (IT) will help the banking system grow in strength while going into future. Banks’ initial public offers (IPOs) will be hitting the market to increase their capital and gearing up for the Basel-II norms.

Ram M. and Ray C. (2004), in their article titled, “Comparing Performance of Public, Private and Foreign Sector Banks: A Revenue Maximisation Efficiency Approach” made a comparison of performance among three categories of banks - public, private and foreign banks using physical quantities of input and outputs and comparing the revenue maximization efficiency of banks during 1992-00. The findings of the study showed that public sector banks performed significantly better than the private sector banks but in no way different from foreign banks.

Prasuna D. G. (2004) analysed the performance of Indian banks by adopting the CAMEL Model. The performance of 65 banks was studied for the period 2003-04. The study concluded that the competition was tough and consumers benefited from it. Better services quality, innovative products, better bargains are all greeting the Indian customers. The coming fiscal will prove to be a transition phase of Indian banks, as they will have to align their strategic focus to increasing interest rates.

Reddy A. A. (2004) conducted a study on technical efficiency and its decomposition in Indian banks (post liberalisation). The study examined the competitiveness of Indian scheduled commercial banks in the deregulated period 1996-2002. Efficiency change, scale efficiency and pure technical efficiency change between two periods has been estimated by using data envelopment analysis and window analysis. The results indicated that there was an increase in technical efficiency and scale efficiency of most of the banks. Most of the banks facing decreasing return to scale especially public sector banks due to the wide spread bank branches with little interconnectivity. The foreign sector banks and new private sector banks exhibited most productive scale size, as they were new entrances in to bank industry with well interconnected bank branches than old private banks and public sector banks.

Pathak B. (2003), made an attempt to compare the financial performance of private sector banks since 1994-95. Researcher studied the performance of private sector banks in terms of financial parameters like deposits, advances, profits, return on assets and productivity. In this research, the author made an attempt to have an insight into the financial operation of these
institutions. A sample of 5 private sector banks has been taken for financial analysis i.e. HDFC, ICICI, IndusInd bank, Development Credit Bank and Federal Bank. Financial track record of all sampled banks was evaluated, and their financial performance was compared. The working of all the sampled banks was satisfactory but the HDFC Bank emerged as a top performer among them followed closely by the ICICI Bank. Study further concluded that private sector banks have delivered a new banking experience.

Koeva P. (2003) in his study on “The Performance of Indian Banks” during Financial Liberalization stated that new empirical evidence on the impact of financial liberalization on the performance of Indian commercial banks. The analysis focused on examining the behaviour and determinants of bank intermediation costs and profitability during the liberalization period. The empirical results suggest that ownership type has a significant effect on some performance indicators and that the observed increase in competition during financial liberalization has been associated with lower intermediation costs and profitability of the Indian banks.

Padamasai T. (2000) evaluated the profitability, productivity and efficiency of India’s five big public sector banks i.e. SBI, PNB, BOB, BOI and CANARA bank. Six parameters namely deposits, advances, investment, profits, net NPAs and CAR of five selected banks have been analyzed separately and the various parameters of productivity, profitability and efficiency were compared by naming it as B-Efficiency Model. The study concluded that productivity and profitability of five big banks has increased throughout the post reforms period in terms of selected ratios of each parameter, but on account of efficiency, the performance of these five banks was very dismissal as inefficiency has increased during the study period.

Bhattacharyya A., Lovell C.A.K., and Sahay P., (1997-98) used DEA and SFA methods to measure and endeavoured to explain the performance of Indian commercial banks during the early phase of the government’s liberalisation programme with the examination of 70 Indian commercial banks during the early stages (1986-1991) of the opinion period of the liberalization. Researcher has found that publicly owned banks have been the most efficient, and privately-Owned banks the least efficient, in utilizing the resources at their disposal to deliver financial services to their customers. Foreign banks were the least efficient at the beginning of the same period, but by the end of the period they were nearly as efficient as the publicly-owned banks, which exhibited a temporal decline in performance. The rise of the foreign owned banks occurred despite the fact that their performance was hindered, not only
by the existing regulations constraining their operations, but also to a significant degree by capital adequacy requirements and relatively modest priority sector lending requirements.

**Kaushik S. (1995)** analyzed comparative productivity and profitability of public sector banks, nationalized banks and private sector banks with the help of various ratios through averages, correlation, regression and factor analysis. The study concluded that the productivity of public sector banks show greater decline as compared to that of private sector banks, which further reduce their profits.

**Amandeep (1991)**, in her thesis titled, “Profits and Profitability of Indian Nationalised Banks” explored that the banks have become an instrument to meet effectively the needs of the development of the economy to effect the total socioeconomic transformation. It has adversely affected the profitability of the bank operations. Study concluded that profitability of a bank is determined and affected mainly by two factors: spread and burden. The other factors determining bank’s profitability are credit policy, priority sector lending, massive geographical expansion, increasing establishment expenses, low non-fund income, deposit composition etc. in study researcher chosen 11 factors affecting a bank’s profitability to identify the most significant variable affecting its profitability. The study found that for maximise their profitability banks must need to control management of spread, burden, establishment expenses, non-fund income and deposit composition.

**Conclusion**

Review of literature showed that different researchers and experts in the fields of banking have discussed role of information technology in banking, service quality of automated services and customer satisfaction, factors enabled the use of customer centric automated services, various delivery channels of customer centric automated services and impact of information and technology on profitability and performance of Indian banks. It has been observed that none of the reviewed study addresses the issues such as awareness and knowledge about automated services, extent of computerization of commercial banks, effectiveness of customer centric automated services in banking practices, different aspects affecting the development of commercial banks, problems and prospects of bank computerization, responses of the customers on bank automation. Therefore, this study is an attempt to address these issues.