CHAPTER: 3

RESEARCH METHODOLOGY
CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction - Research

Research methodology helps the researcher to decide the path for their research work in various study fields. The research methodology chapter focuses on the methodology with the research approaches adopted for the specific study. This includes objectives of study, research design that helps to decide the sampling methods, data collection methods and tools of data analysis. The research study has been undertaken to study the “Impact of information technology on banking services in selected public and private sector bank’s“on the basis of employees and customer’s awareness, customer’s satisfaction with online banking services. The other significant gain of this research is to grab an opportunity to meet and discuss with Academic Professional, Govt. Officials, regulatory Bodies of banks, Practical Bankers, Business and Industry experts, customers on various issues related to the information technology enabled e banking. The term “Research” contains of two words “Research = Re + Search”. “Re” means yet again and “Search” means to discover something. Research means “to observe the phenomena point to point and with different dimensions which aims towards to discover new thoughts. Singh Y.K.(2006) suggested that the research process includes observations with data collection and drawing out the conclusions. C.C. Crawford (2011) defines “Research as a systematic and refined technique of thinking, employing specialized tools, instruments, and procedures to obtain a more adequate solution of a problem”. Yet research begins with problem recognition, compilation of data, facts with review on the real facts and analysis. Kothari & George J. Mouly (2012) identified research as the systematic application with scientific and logical solution of any identified problems in various fields. The systematic study in research has been designed to encourage the development of social studies as a logical science.
3.2 Research Questions

The Study endeavor to address the given research questions:

**Research Problem Statement**: There is a need to evaluate the customer satisfaction with regard to E-banking services since it leads to attract more new customers, increase the retention of customers with PSUs and PSIBs banks.

**With reference to Bank’s Customers**

- **Research Question 1**: Whether the customer aware about the various E- Banking services provided by their banks in recent scenario?
- **Research Question 2**: Is there any relationship between adoption of E Banking Services and Customer Satisfaction?
- **Research Question 3**: Does the customer feel safe about Data Privacy and Security on the bank’s website in E banking transactions?
- **Research Question 4**: How many customers are satisfied with their banks with online support services and call center support in operational problem faced by the customer?

**With reference to Bank’s Employees**

- **Research Question 5**: Whether bank’s employees are aware of recent banking products and services used by the customers?
- **Research Question 6**: Does bank employees have positive attitude towards E banking services and whether they are providing appropriate and quick responses to the customer’s query about online banking product and services?

**With reference to Banks**

**Research Question 6**: Does the bank plan to provide any strategies to promote the E-banking among customers of public and private sector banks?

3.3 Review of literature

Fan. Pei. Sai(2010) defines review of literature as the process of reading, analyzing, evaluating, and summarizing scholarly information about any given subject. Review of literature is vital to gain insight which is related to adoption of technology among customers and employees of PSUs.
and PSIBs banks. Kothari (2012) suggested that the literature review is simple and fruitful method of formulating precise research problem with hypothesis.

Singh (2006) identified literature review has Two Phases of Literature Review

1. Identification of all relevant published material in the problem area and reading helps to develop the ideas and results on which the study will be built
2. Writing of the research report with foundation ideas into it.

Ranjit (2010) identified the purpose of review of literature.
- To bring clarity and focus to the Research Problem
- To improve the Research Methodology
- To broaden the Researcher Knowledge in the particular research area
- To justify the Research Question in Theoretical or Conceptual framework
- To give backdrop information required to comprehend the study
- To establish study as a link in research to develop the knowledge in a specific field

Review of Literature about Technological Improvement in E-Banking Services

After globalization the Indian banking system evolved into a technology driven banking to deliver various e banking services to the wide range of customers. WAP enabled banking provides a paradigm shift in enrichment of banking services. The demand of e banking tools among the customers and employees are continuously in increasing tremendously. This chapter focuses on various reviews to study the “Impact of information Technology on Banking Services, with reference to ‘Punjab National Bank’, ‘SBI’, ‘Axis Bank’ and ‘HDFC Bank’ – Jaipur City”. The most relevant literature from the field of Information Technology development in Indian banking industry have been cited.
3.3.1 Dimensions of Review of literature

**Dimension of review of literature** studied on the development of E-banking services and its adoption in Customers, Banks and Employees as given:

**Chart 3.1 : Dimension of Reviewed Literature**

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>Dimensions</th>
<th>No. of Review Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2.1</td>
<td>Review on Banks</td>
<td>9</td>
</tr>
<tr>
<td>3.2.2</td>
<td>Review on Customers</td>
<td>5</td>
</tr>
<tr>
<td>3.2.3</td>
<td>Review on Information Technology</td>
<td>9</td>
</tr>
</tbody>
</table>

Source : Literated Reviewed

**Chart 3.2 Literature Reviewed Year wise**

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Literature Reviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2013</td>
<td>4</td>
</tr>
<tr>
<td>Year 2012</td>
<td>8</td>
</tr>
<tr>
<td>Year 2011</td>
<td>7</td>
</tr>
<tr>
<td>Year 2010</td>
<td>1</td>
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<td>Year 2009</td>
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</tr>
<tr>
<td>Year 2008</td>
<td>1</td>
</tr>
<tr>
<td>Year 2006</td>
<td>1</td>
</tr>
</tbody>
</table>

Source : Literated Reviewed
3.3.1.2 SNAP SHOT OF LITERATURE REVIEW
3.3.2 Review Related to Banks

3.3.2.1 Indian banking (Changes, Trends, Challenges)
3.3.2.2 Pre e-banking to Post e-banking (Traditional banking to E-Banking)
3.3.2.3 Technology in Banking
3.3.2.4 Public Sector and Private Sector Banks
3.3.2.5 Employee Perceptions

3.3.3 Review Related to Customers

3.3.3.1 Service Quality & SERVIQUAL Dimensions
3.3.3.2 Customer satisfaction and CRM.

3.3.4 Review Related to Technology

3.3.4.1 Information Technology
3.3.4.2 E-Banking
3.3.4.3 Internet Banking
3.3.4.4 Online Banking
3.3.4.5 Mobile Banking

3.3.2 Review Related to Banks

➢ Technology in Banking & Customer Perception

Komal & Vandna (2012) in their research paper examined various ways of online banking services with the evolution of e-banking in India. The e-banking growth scenario with ATM, Mobile banking in India with their impact on customer satisfaction and the problems faced in e-banking had been analyzed by the researcher. This research focused on the comparative study of PSIB banks and foreign banks in India. The study concluded that there are enormous opportunities in online banking yet there is a requirement to explore them. Komal & Vandna (2012) in their study suggested that banks must develop a strategy to enable them to offer the prospects in e-banking. They found that now online banking begins shifting from product centric to customer centric. They recommended that e-banking services must be designed as per the requirements and expectations of the customers in India. There is a need to identify the problem faced in Internet banking, SMS banking and Credit cards. This will give a positive direction to design the effective policy for online banking services in future.
Research Methodology

Employee Perceptions

Oladejo & Akanbi (2012) examined bank employees’ perceptions in post consolidation era about e-banking in Nigeria with risks factors. In this study primary data source had been used and data had been analyzed using mean score method. They stated that in Nigeria bankers identify e-banking as tool to reduce transaction costs, minimize inconvenience and quick response for customers query. The consolidation era proved an improvement in e-banking services. The researcher explored that bankers believes that e banking increases the chances of government access to public data with increased chance of fraud. The specific research could not able to analyze the reason for chances of fraud in e banking. So there is a need to study how the customers gets encrypted and firewall protected bank’s websites with other essential data security measures in banks in India to increase the trust in online banking in India.

Pre e-banking to Post e-banking (Traditional banking to E-banking)

Farhana & Priyabrata (2012) conducted a descriptive study to explore the current scenario, future aspects and challenges faced in wireless banking. The study identified the IT enabled banking services offered through banks in Bangladesh. They examined the current state, future prospects and challenges faced by customers and employees both. They found that the foreign commercial banks and a few private commercial banks were playing a significant role in providing technology driven banking services. They found that through the adaptation of IT Tools in banking, makes the banks enable to improve the customer services and closer customer retentions. This study does not disclose the cost associated with technology driven banking services. A research can be conducted on how the existing technology driven banking services can be improved and can be provided in a more cost effective way to attract the new customers along with retention of customer in PSUs banks in Rajasthan state.

Online Banking with Private Sector banks

Rajpreet & Ravinder(2013) investigated the challenges to financial security and personal privacy in online banking. This research paper studied the security problems in internet banking and emerging controls tools with policies, procedures had been suggested by the researchers. The research paper identified that the ICICI Bank as
leading bank with more secure internet banking in India. They found that ICICI bank was the first bank to initiate the internet banking revolution in India early in Oct1997. The research can be carried out on the secure and innovative online banking services being offered by other leading private sector banks in India which follows all the directions and recommendations of RBI time to time.

➤ **E-Banking (Changes, Trends, Challenges)**

*Yang & Ahmed (2009)* presented a case study of underdeveloped nation about the major issues and challenges that can rectify for the improvement in e-banking. The researchers examined the application of e-banking that can help their local banks to reduce the operating costs and provide a better and fast service to their customers in less developed nations. The study also focused on the current trends of online banking and suggested managerial insights for the banks of underdeveloped nations. This study was an empirical study based on data collected from Bangladesh an underdeveloped nation. The further research can be conducted to find out the reason of unsatisfactory growth in online banking in rural banks in India.

➤ **Employee Perceptions**

*Himani (2011)* conducted an empirical study on e banking about the bankers’ views. The researcher examined bankers’ views on IT Techniques adopted in banking operations. This study helped to identify the relationship between bankers, customers and the performance of banks due to IT enabled banking. The study also analyzed the direction provided by the bankers to promote the usage of e banking services amongst the customers. The research also investigated the greater incidence of e banking usage among the middle age men (30 to 50 years of age) and female users. There is a requirement to investigate about the greater frequency of e banking usage among the youth (age 20-30 or <40 year) or females customers in India in current scenario.

➤ **Public and Private Sector Banks**
Research Methodology

Fozia (2013) examined the perception of customers using e-banking services. The sample size for study had been taken was 196 customers. The study examined the perception towards e-banking services among customers of PSUs and PSIBs banks. The study tried to help the banker to understand the need of customers in current state. This study highlighted that e-Banking will be successful for banks only when they have Commitment to e-Banking along with a deeper understanding of customer needs. There is a need to identify usage level of new innovative online banking services like SMS banking, Net banking and EFT. This will help the banks to improve their most demanding e-banking products and services and to design the improved strategies for providing effective services to the customers.

- **E banking in India (Amendments, Styles, Challenges)**

Tamilselvi (2011) suggested that an improved efficiency and convenience of e-banking services have been brought various challenges for the regulators and supervisors. The study recommended some direction to manage the risks and to handle and control the online queries for the banks. The study examined the banking framework of technology, security standards, and regulatory issues. Although RBI has been upgraded the Indian banking System as technologically dominated financial system. Yet there is requirement to aware the customers about Data security, easy access of updated e banking tools and privacy policy on bank website offered by the banks to increase the customer’s satisfaction and retention level in PSUs and PSIBs banks.

- **E-Banking in Public Sector Banks**

MINAKSHI & NALAWADE (2013) described that wireless banking facilitates financial institutions, customers or businesses to access online accounts, transact or access the latest information about any banking products and services through a WAP. The researchers also analyzed that in current scenario nationalized banks are more concentrate on the e-banking services and there is competition in between them. The study also compared the e banking services in terms of ATMs and complaints of customers in nationalized bank. They also explored the advantages and disadvantages of e-banking. The study leads to conclude that in view of the technology transfer, the successful introduction of the e-banking will accelerate the
economic and social progress of the country. Government should establish the legal and environmental framework for the e-banking. Today PSIs are facing enormous competition with PSIBs in India. However there is a vital requirement to compare NEFT, Mobile banking, CBS banking operations both in PSUs and PSIBs in India.

3.3.3 Review Related to Customers

➢ Service Quality & SERVQUAL Dimensions

Floh & Treiblmaier (2006) surveyed about service quality and significance of reliability, quality of the banks’ Web site, and customer satisfaction in an Austrian online bank. In this research paper they surveyed more than 2,000 customers of an Austrian online bank and a structural equation modeling approach was used to gain an insight about the customer retention with banking business. The study also revealed that the trust and reliability in online banking among customers is directly affected by the effective online banking services through the quality of bank’s website. A depth analysis is required to identify the various online operational problems, technical support to increase the awareness among customer about e-banking operations.

➢ E-Banking and Customer Satisfaction and CRM

Nupur Jannatul (2010) investigated the customer satisfaction with the various dimensions of e-banking in Bangladesh within the period of 2006 – November 2009. Researcher studied the SERVQUAL model with 5 dimensions of service quality as reliability, responsiveness, assurance, empathy and tangibility. The study analyzed the relationship between banks and corporate customers to identify the success factor in financial services. This research helps to identify the effective promotional strategy to increase the awareness among customers about online banking operations in Bangladesh. The research can be conducted to identify the usage level of online account operations, new account open, online loan track system, E lockers services for customers in PSUs and PSIBs in India.
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- **Customer Satisfaction and CRM**

Dhevika & Latasri (2011) had been conducted an empirical research to find out the factors affecting the customer satisfaction in electronic payment system. The study identified the prevailing factors to enhance the customer satisfaction as accessibility, efficiency, reliability, the frequency of usage, and e-communications to improve the service quality of Indian banking industry. They examined that information on bank’s website about banking product and operations with layout are also important factors to enhance the banking services. The study identified the customer satisfaction as the dependent variable and accessibility, efficiency, reliability, the usage and an e-communications as the independent variables. The bank’s website proved as an effective gateway to provide e banking services to the customers. However, a study is required to identify the development in EPS in India. This will enhance the awareness in customers about new guidelines of RBI to use e banking in India.

- **Service Quality and SERVIQUAL Dimensions**

Ankit (2011) investigated the factors that are responsible for the adoption of internet banking (IB) among customers in Vadodara, Gujarat, and Western India. The study revealed the Risk and Privacy Concerns, cost reduction in online banking. The researcher found more convenience of customer and adoption of banking operations through internet banking and mobile banking among customers have been increasing in current phase. However, a study is needed to increase the awareness among customers about mobile banking with the frequency of visiting the bank branches in India.

- **Customer’s Perception Towards E-Banking**

Sumedha & Urvashi (2013) compared the competition of banking sector with non banking sector. They investigated that banks must adopt aggressive approach to compete the really rigorous competition from other non banking sector. The researchers also evaluated the awareness and level of satisfaction with e-banking services in SBI bank’s customers. The study found that e banking in SBI bank is able to handle storage and retrieval of customer database very efficiently at reduced cost. They explored that SBI bank now offers various emerging e
banking services as electronic funds transfer (EFT) and bill payments through ATMs with other EPS. The comparative research analysis can be conducted in between leading public and private sector banks on online banking services in India.

3.3.4 Review Related to Technology

➢ Information Technology

Brown, I. & Jayakody (2008) studied the success trends in B2C (Business to consumer) e-commerce model which has conceptual framework. The relationships between key dimension of B2C e-commerce model and the success had been investigated through established theories of tested TAM model. The study was based on data collected from online consumers of South Africa. The researchers concluded that the service quality and awareness of perceived usefulness of e banking directly gives impact on customer satisfaction. The study found that there is a direct relationship between the customer satisfaction and improved service quality in PSUs and PSIBs banks. The researchers stated that there is positively influenced by trust in online banking. In current state there is a necessity to measure the “Impact of information technology on banking services and risk exposure of various banking services” with the help TAM (Technology Adoption Model) and b2c E-commerce Model in public and private sector banks.

E- Banking

KAUSHIK (2012) explored the concept of Internet banking and its importance for banks as well as customers. The research paper studied the various aspects of net banking. This research paper is based SBI and RBI annual reports and publications. This study contains the 360 degree information regarding SBI e- banking. The research paper explored the latest tools and strategy to deal with the e banking problems. The case study also identified that the obsolete tools have been offered by SBI bank and lack of awareness are the major weak point of internet banking. A comparative research has been required in public sector bank to identify the kind of online banking services provided to the customers and this research will help to identify the strengths and weakness of PSUs and PSIBs banks.
Information Technology in Banking

Seranmadevi & Saravanaraj (2012) evaluated the impact of ICT in banking sector in India. They identified that banks in India have been managing their fund for improvement in automated teller machine (ATMs), technology for net banking, mobile banking, EFT, smart cards and data mining. This research paper concluded that in current scenario rise in banking sector is due to increased usage of technology in e banking. The research is based upon the PSUs, foreign banks and PSIBs in India. Researchers found that foreign banks and PSIBs invested more funds in IT enabled banking with more efficiency and have more competent force as compare to PSUs banks in India. It has been observed by researcher that to reduce the spleen and to improve the efficiency in banking services business Process Reengineering has been implemented by foreign and PSIBs banks in India.

➢ Mobile Banking

Vishal, Pandey & Batra (2012) carried out an empirical study on the mobile banking with the help of literature reviews. Researcher also evaluated customer perceptions and views of mobile banking users in urban areas. The study found that due to availability of various handset models with emerging technology the user training for “mobile handset operability” has been an important concern in mobile banking services. They identified that innovation in IT, mobile banking advantages and payment option are liable for the growth of mobile and e banking uses in commercial banks in India. The study also focused on Challenges in mobile banking, strategic, legal and ethical issues in India. The descriptive research can be conducted to identify the process of co-ordination among banks with mobile handset manufacturers as the technology (GSM, GPRS) will become compatible with mobile banking technology in India.

➢ Internet Banking

Gunasekaran & Poornima (2011) described the ways to promote the secure and IT enabled e-banking services. The study evaluated the efficiency and competitiveness of banks which can be improved through e-banking services offered for the potential customers. The study identified that online marketing systems and remote banking services have been offered through the
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financial institutions in India. However telephone banking, WAP enabled banking, and electronic clearing house systems are more popular at International level. The research can be carried out to identify the growth of NEFT, ATMs, Bill payments, reduced level of complaints in ATMs credit card and other e banking services. This will help to investigate the performance of public and private sector banks.

➢ Mobile Banking

Misra (2011) suggested that the banking and financial sector ought to grow with the great revolution and the progress in IT tools and their implementation. In today's competitive world, customer's loyalty cannot be taken for granted, and that induced banks to constantly find innovative methods to attract and retain their customers. The research described that the WAP enabled technology in banks provides the vast economic development in banking sector. Online banking contains the bill payment and online account access with track of loan for customers 24x7. The study concluded that there is a great challenge for the banks to retain the customers in the phase of high and strategic investment in IT. Limitation to this study is focus on challenges faced by customers only. The research can be conducted on the challenges of employees and customer both in foreign and upcoming private banks in India that led the way to automation of financial services industry.

Security Framework in Mobile Banking

➢ Information Technology in Public Sector Bank

Mishra & Kant (2012) evaluated the contribution of Management Information System for the performance of PSUs bank. The study is based on leading PNB bank among PSUs banks. They described that MIS is the relational data storage approach used in banking transactions. In banking sector MIS and EIS are helpful to build database and to retrieve the records on the basis of customer’s queries. The study investigated the customers’ perception towards e banking using MIS. Researchers identified that PNB banks implemented the MIS tool technology as key catalyst to provide better customer service through effective alternative channels of e banking. The research found the limitation that it only highlights the database tools for customers. The research can be conducted on data mining tools to filter the preferences of customers for
different e banking services offered by the PSUs and PSIBs. This will help to identify most demanding online banking services among customers.

➢ **Technology in Banking**

_Singh, Pandey & Gupta (2011)_ analyzed that the technological evolution in banking sector transform the banks into one-stop retail chain. In current phase banking sector focus has been shifted to customer centric with value added services from mass banking. _Researcher investigated that the_ technology enabled banking gives emphasis on virtual banking rather than physical bank branches. The study is based on survey of bank branches which offers Tele banking, ATMs, _Internet Banking_ and functioning on 24 X 7 mode. The study also described that WAP enabled communication channels in banking are helpful to attract more customers at reduce cost. The researchers suggested some strategies to offer efficient value added products and services and to retain more customers with efficient value added banking services. The study can be conducted on website IT support with the antivirus protection, encryption, digital signature, different languages website’s operations. Technology in banking ensures the banks to offer more reliable and more responsive website to improve the customer’s satisfaction.

➢ **Internet Banking**

_Panida & SECAU (2012)_ studied and evaluated the security measures for Internet banking in 16 selected banks of Australia. The researchers also further examined and compared the results of security in _internet banking_ in between 9 foreign subsidiary banks and 16 selected banks of Australia. The objectives of specific study were to build inclusive directions and to determine the weight of security option offered by Australian’s banks websites. The relevant research found that Australian and foreign owned bank’s websites were not able to implement more secure internet banking. The secure net banking ensure the increase the trust and belief of customer in e banking. The Comparative analysis had been done to evaluate and compare in between 9 foreign subsidiary banks and the 16 selected Australian owned banks. The research recommended utilization of standard set of internet banking to implement secure and user friendly internet banking services. This can improve the belief and level of satisfaction among potential user of internet banking services. With this measure, further research can be conducted.
in Indian banks and Transactions Security in internet banking, mobile banking can be measure. The study can be carried out on user’s privacy policy, cyber act for net banking governed by RBI in India.

### 3.4 Research Gap

It is evident from the literature reviewed, that banking sector in India has emerging through ICT enabled E-banking. The level of customer satisfaction and retention as well as employees responsiveness has been improved through effective online banking tools. To the best of knowledge and belief none of research in Indian banking sector has been carried out by anyone till now according to the given dimensions. However a few analytical research works had been compared and evaluated the customer satisfaction regarding mobile banking and net banking. This enforced the researcher to evaluate the current development in banking services. Hence an attempt is made to fill this gap.

Thus, the present research work endeavors to analyze the ICT impact on banking services with comparison of PSUs and PSIBs. The study includes mobile banking, Online Fund Transfer, bank’s website quality, customer support system also. However, it has been found that there is a major gap in between international and Indian scenario in banking sector.

So, there is a focus on the “Impact of Information Technology on Banking Services in public and private sector Banks” and how it can be made more popular.

- It has been observed by the researcher that banks are facing cut throat competition with limited resources with a pressure to reduce cost, improve quality of banking products and service. The bank needs to update its website’s timely and more user-friendly also. Effective promotional measures for the various offers and schemes should be offered for customer satisfaction and retentions. So, the specific research on “Impact of Information Technology on Banking Services” is essential to provide the right direction to this wave of growth.

- Banks needs to reduce their transactional cost and do more promotional activities with the help of bank’s websites, so, it is more accepted by the customers. Banking industry requires input from the “Research & Development” cell to search and incorporate latest and cost
effective technologies to successfully implement online banking services. So, the study aims to explore the maximum utilization of e-banking instruments, their implementation problems and various solution provided by research and Development cell of banks.

- **Another challenge for banks is to maintain the service quality to keep high quality banking services into its new e-banking system. The quality of bank services is highly dependent on the training and actions of each employee.** So the focus of this research is to find out perception of bank employee towards e-banking. Bank employees’ should undergo training and skill development programmes for their skills enhancement. It has been observed by the researcher that the major success factors of e-banking are the well-informed employee with precise technical and transactional expertise.

- **3.5 Need and Significance of Study**

  Information Technology refined banking products and e-banking services. The ‘security' issues have been raised due to the increased use of technology in banks has also brought up ‘security' concerns. It has been observed that it is not smooth sailing for banks to jump onto the Innovative technological band smoothly. There are some issues in the path of inflexibility in operations of e-banking in banks in Jaipur city. The Impact of emerging Information technology on bank’s operations & services has been evaluated to investigate the customer’s satisfaction and trust in online banking operations. The researcher finds that increasing use of online banking in various age and income groups have also raise the data security and accuracy issue. So, the research aims to measure the latest E-banking trends, improvement in online banking services, customer’s satisfaction and employee responsiveness in PSUs and PSIBs banks of Jaipur city. Customer acquisition & retention is only possible when the customer has trust over the online banking services effectively provided by the PSUs and PSIBs.

- **3.6 Objectives of the Study**

  - To evaluate the trends and impact of Information Technology on Banking Services in PSUs and PSIBs banks.
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- To compare the e-banking operations of EFT, Internet banking, Mobile banking and Credit card transactions in current phase of IT development between in PSUs and PSIBs banks.

- To investigate the awareness, satisfaction level among customers and belief about e-banking while using EFT, RTGS, Internet banking, Mobile banking and Credit cards, ATM and to identify problems faced by the customers in e-banking operations offered by PSUs and PSIBs.

- To find out the employee’s awareness and perception about the e-banking operations and risk associated with e-transactions in PSUs and PSIBs banks.

- To explore the role of employees in the successful implementation of e-banking in PSUs and PSIBs banks.

- To discover the challenges faced in implementation of information technology in banking operations in PSUs and PSIBs banks.

- To offer suitable suggestions to improve e-banking services and to increase the credibility of PSUs and PSIBs banks.

3.7 Hypotheses

Bob Ryan, Robert W. Scapens and Michael Theobald (1992) defines hypothesis as “Hypothesis = Hypothesis” which is a tentative statement regarding the elucidation of any given problem that require to be verified on some logical base.

Hypotheses for Questionnaire Administered to Customers

- **H0**: There is no significant association among emerging Information Technology tools adopted by banks and customers satisfaction with the e-banking services.

- **Ha**: There is a significant association among emerging Information Technology tools adopted by banks and customers satisfaction with the e-banking services.

- **H01**: There is no significant difference between the opinion of customers regarding the impact of information technology on banking services with respect to various selected parameters between PSUs and PSIBs banks.
• **H\textsubscript{a1}:** There is a significant difference between the opinion of customers regarding the impact of information technology on banking services with respect to various selected parameters between PSUs and PSIBs banks.

**Hypotheses for Questionnaire Administered to Employees of PSUs and PSIBs Banks**

• **H\textsubscript{a2}:** There is no significant association between emerging Information Technology tools adopted by banks and responsiveness of bank’s employees.

• **H\textsubscript{a2}:** There is a significant association between emerging Information Technology tools adopted by banks and responsiveness of bank’s employees.

• **H\textsubscript{a3}:** There is no significant difference between the opinion of bank’s employees regarding the impact of information technology on banking services with respect to various selected parameters between PSUs and PSIBs banks.

• **H\textsubscript{a4}:** There is a significant difference between the opinion of bank’s employees regarding the impact of information technology on banking services with respect to various selected parameters between PSUs and PSIBs banks.

**3.8 Research Design**

Claire Selltiz (2000) suggested that the conceptual structure of research design is based on the blueprint approach to collect, measure and for data analysis. A good design is categorized on the basis of flexible, appropriate, efficient and economical approach. The minimizing of the biasness and maximizing the reliability of collected data for the analysis is the key feature of good research design. The exploratory and descriptive research design has been used for the research. Exploratory research provides the direction of study in online banking and its adoption in PSBs and PSIBs in India. Exploratory research design has been useful for the researcher to decide paramount research design, data collection method and selection of respondents. In statistical research, the descriptive research helps to describe data and demographic profile of the population for the study. Descriptive research assists to get the answer of (“who, what, where, when and how”) for the relevant research. The exploratory and descriptive research design has been used to find out the level of awareness and trust among customers with e-banking and challenges faced by customer and employees both in adoption of electronic payment system (EPS) in PSBs and PSIBs. The research design also integrated B2C E-commerce Model to
measure the impact of information technology on banking services and risk exposure in online banking.

3.8.1 Sampling Technique

In behavioral research sampling is indispensable technique. It is not feasible to study the complete population in behavioral approach and in banking sector it is not viable. Sampling techniques have been used in all relevant research to make research findings cost-effective and more precise.

Stratified Random Sampling

The population has been divided in two strata on the basis of PSUs and PSIBs by the researcher. Afterwards the sample has been selected through Simple Random Sampling method from each homogeneous groups or strata of PSUs and PSIBs.

<table>
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<th>Table 3.3 Sampling Technique and Strata Size</th>
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<td>Banks</td>
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<td>Strata1</td>
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<tr>
<td>Strata2</td>
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<tr>
<td>Total</td>
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Source: Primary Data

3.8.2 Sample Size

Exploratory and Descriptive research design has been used to carry out the research on selected public sector as well as private sector banks of jaipur city in Rajasthan state.

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<thead>
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<th>Table 3.4 Study Sample Size</th>
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<tbody>
<tr>
<td>Banking Sector</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Public Sector Banks</td>
</tr>
<tr>
<td>Public Sector Banks</td>
</tr>
<tr>
<td>Private Sector Banks</td>
</tr>
</tbody>
</table>
3.8.3 Data Collection Method

The research is based on both surveyed primary and secondary data of PSUs and PSIBs banks.

- **Primary Data**

The primary data have been collected using structured questionnaire and interview method from the customers and employees of selected PSUs and PSIBs (SBI, PNB (PSUs) and Axis bank Ltd., HDFC bank (PSIBs)) in Jaipur city of Rajasthan State. Structured questionnaires are **Quantitative and Qualitative in nature**. Both questionnaires contain various dimensions to evaluate the impact of information technology on banking services on customer’s satisfaction and employee’s responsiveness.

- **Tools of Data Collection**

There were **three Sections of Structured Questionnaire** administered to customer and employees of Public and Private Sector Banks as given:

**Section A** Dealt with Demographic Profile of Respondents.
- This has been measured using nominal scale with intervals ranging from 1 to 5.
- Demographic Profile of Respondents as given

**Section B** Contains Bank’s Name of Respondents.

**Section C** Contains Statements on various Dimensions

1. Online Banking Benefits
2. Reliability
3. Innovative E banking Tools and Customer Satisfaction
4. Customer Support Services
5. Data Security
Research Methodology

This has been measured using “5 point Likert scale” with intervals ranging from 1 = Never, 2 = Rarely, 3 = Sometime, 4 = Often and 5 = Very often. The respondents were also asked to reply to various statements on “5 point likert scale” ranging from 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly agree. Content and construct validity and reliability were carried out to test the scales.

- **Content and Construct Validity With Measure of Sample Adequacy Using KMO and Bartlett’s Test**

The validity and reliability of the scales have been checked in pre-testing of questionnaire. To ensure the high degree of reliability of the collected data, the researcher thoroughly examined each statement designed for the study on customer satisfaction and employees responsiveness with e banking services. Kaiser-Meyer-Olkin (KMO) and Bartlett's test has been applied to measure the sample adequacy and strength of the relationship among factors. The researcher found that each item in both structured questionnaires had a meaning and associated to the objectives of the study.

<table>
<thead>
<tr>
<th>Table 3.5.1 Kaiser-Meyer-Olkin (KMO) and Bartlett’s Test on Questionnaire Administered to Customers of Public and private sector banks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</strong></td>
</tr>
<tr>
<td>0.799</td>
</tr>
<tr>
<td>738.318</td>
</tr>
<tr>
<td>Source: SPSS 22 Result of Primary Data</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 3.5.2 Kaiser-Meyer-Olkin (KMO) and Bartlett's Test on Questionnaire Administered to employees of Public and private sector banks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</strong></td>
</tr>
<tr>
<td>.680</td>
</tr>
<tr>
<td>62.872</td>
</tr>
<tr>
<td>Source: SPSS 22 Result of Primary Data</td>
</tr>
</tbody>
</table>

The KMO ranges from 0 to 1 with an accepted index for further study must be over 0.6. Above table 3.5.1 and 3.5.2 table shows the KMO measure is greater than 0.60 in the present study which is
satisfactory for the sample adequacy and further hypothesis test. The Bartlett’s test of Sphericity relates to the significance of the study and must be less than 0.05. It can be seen in given table that Bartlett's test of Sphericity value is less than 0.05, it is actually 0.000 shows significant for the study.

- **Secondary Data**

Secondary data on the performance of the various online banking services and e banking products has been collected from the annual reports, publications, Trends and progress report from the FY 2010-2011 to FY 2014 –FY2015 of the given bank for the research on’ Impact of information technology on banking services’. The secondary data have been collected through Annual Reports of banks, publications of RBI, various versions of trends and progress report of RBI, Website of individual banks and RBI website.

### 3.8.4 Independent and Dependent Variables

There is a strong association between a satisfied and retained customer with highly efficient innovative online banking service. The growth and customer satisfaction have been influenced through effective implementation of information technology in banking services. Employee’s responsiveness also enhanced through the innovative e banking services and promotional strategies of banks.

- **Dependent Variables and Independent Variables of Questionnaire Administered to Customers** of Public and Private sector Banks are as given:

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Independent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Satisfaction</td>
<td>Online Banking Benefits</td>
</tr>
<tr>
<td></td>
<td>Reliability</td>
</tr>
<tr>
<td></td>
<td>Customer Support Services</td>
</tr>
<tr>
<td></td>
<td>Data Security in E-Banking Risk</td>
</tr>
</tbody>
</table>

- **Dependent Variables and Independent Variables of Questionnaire Administered to Employees** of Public and Private sector Banks are as given:
3.9 PILOT STUDY - RELIABILITY and VALIDITY

‘Reliability’ means the consistency of the items of the whole scale. Researcher investigated the “Cronbach’s alpha or “the reliability coefficient” in Pilot study on the responses through scale based questionnaires using IBM SPSS 22. According to Nunnaly (1978) “Cronbach’s alpha must be 0.700 or above”. Pilot study has been performed on coded data using SPSS 22. Though total sample size for the research is 600 respondents, which comprises 400 customers and 200 employees of public and private sector banks. Pilot study had been conducted on responses of 100 customers and 50 employees. The researcher had obtained Cronbach’s reliability coefficient for all dimensions as given below:

Table 3.7 Pilot Study – Reliability Statistics - Results Of Cronbach’s Alpha on Questionnaire Administered To Customers

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Study Dimensions</th>
<th>Reliability Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Online Banking Benefits</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>Customer Satisfaction with Innovative E-Banking</td>
<td>23</td>
</tr>
<tr>
<td>3</td>
<td>Reliability</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Customer Support Services</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Data Security and Privacy</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: SPSS 22 Result of Primary Data

Table 3.7.1 Pilot Study - Reliability Statistics - Results Of Cronbach’s Alpha on Questionnaire Administered To employees of Public and Private Sector Banks

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Study Dimensions</th>
<th>Reliability Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. of Items</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Pilot study results in above table depicts that Cronbach’s alpha values were more than 0.70 in all dimensions and results were found acceptable & indicates a high level of internal reliability.

### 3.10 STATISTICAL TOOLS OF DATA ANALYSIS

Data analysis signifies the method of hypotheses testing and holds an outcome of findings on the basis of selected techniques.

Steps of Statistical Data Analysis in follows in Current Study are as given:

#### 3.10.1 Processing of Data

- Editing:
  - The editing had been done carefully for scrutiny of all collected questionnaires to check the completeness, error-free and readability of collected responses.

- Coding:
  - The numeric codes have been assigned for each item in questionnaire. Code 1 has been given for strongly disagree --- code 5 has been assigned to strongly Agree with using the statistical software for social sciences (SPSS) 22 IBM application and Spread Sheet 2007.

#### 3.10.2 Statistical Analysis Techniques

- Cronbach’s Alpha Reliability Test
- Kaiser-Meyer-Olkin (KMO) and Bartlett's Test Sampling Adequacy
- Descriptive Statistical Analysis
- Rank Analysis
- Inferential Analysis /Testing of Hypotheses
• **Classification:** The received questionnaires have been classified on the basis of banking sector as PSU and PSIB banks using codes.

• **Tabulation:** Tabulation process helps in summarizing the data and displaying them in the appropriate tables in Spread Sheet 2007 which can be used for further analysis.

### 3.10.2 Statistical Analysis Techniques

Statistical analysis made the observation more precise, useful and convenient. To analyze the data and testing of hypotheses collected data were aggregated on the basis of given dimensions under study. **The statistical analysis has been done in given two ways.**

#### 3.10.2.1 Descriptive Statistical Analysis

Descriptive Statistical analysis techniques as dimension wise average, percentage, frequency, mean and standard deviation were performed on coded data using IBM SPSS (statistical package for social sciences) 22. Tables and Charts were created using Spread Sheet 2007 and IBM SPSS 22 to analyze demographic structure of respondents. Rank analysis has been carried out to compare the impact of e banking and customer’s satisfaction and employee’s responsiveness in between PSUs and PSIBs banks on the basis of both customers and employees responses. **Descriptive Statistical Analysis tools** are as given:

- KMO and Bartley Test for Construct validity
- Pilot Study - Reliability and Validity Cronbach’s Alpha Test
- Frequency Distribution
- Mean and Standard Deviation
- **Rank Analysis on Responses from Customers** of PSUs and PSIBs Banks
- **Rank Analysis on Responses from Employees** of PSUs and PSIBs Banks

#### 3.10.2.2 Inferential / Empirical Statistical Analysis

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The collected data through structured questionnaire were aggregated on the given dimensions of study and reliability measures with Pearson Multiple –Correlation and Multiple Regression tests were performed to identify the key factors which gives major impact on e banking services on customers’ satisfaction and employee’s responsiveness. An Independent t-test has been conducted to compare impact of information technology on banking services on the basis of various selected dimensions between PSUs and PSIBs banks on the basis of both customers and employees responses. Inherent / Empirical Statistical Analysis tools for Hypotheses Testing are as given:

- KMO and Bartley Test for Construct validity
- Cronbach’s Alpha Test
- Pearson Multiple –Correlation
- Multiple Regression Technique
- Independent t Test

The accessible literature review about “information technology impact on banking services” indicates that there is a paradigm shift is taking place in Indian banking sector in current scenario. However it has been identified that responsiveness of bank’s employees, improvement in online banking services and enhanced level of customer satisfaction have been achieved through WAP or IT enabled banking system. Therefore the present research aims to compare and analyze the “impact of emerging trends of information technology on banking services” through primary and secondary data of leading PSUs and PSIBs. However, only few studies are carried out in foreign countries. It has been observed that none of research compares the customer satisfaction and employee’s perception on various dimension of IT enabled banking in PSUs and PSIBs banks. Therefore, this significant research is an attempt to provide awareness among customers and put forward valuable suggestions to offer secure and efficient wireless banking services. The present study makes use of collected data from leading and more IT oriented PSUs and PSIBs in jaipur city of Rajasthan state. This chapter describes the research design of study along with various statistical analysis tools to do specific and significant research.