CHAPTER-3

RESEARCH METHODOLOGY

"The Pioneer can only press on, sustained by the belief that somewhere in this vast territory, there lies hidden knowledge which will arm man for his greatest victory, the conquest of himself.”

-Ralph Linton

3.1. RESEARCH: THE APPROACH

The first and foremost step, in the research process is identification of the problem for study. As discussed earlier, the globalisation of the economy and paving way for establishment of new banks through amendments to the Banking Regulation Act (BR Act, 1949) created a competitive and vibrant banking sector in the country. The Organisational design, Workflow and Human Resources practices of the newly established banks varied from that of existing banks, especially those in the public sector. The emergence of new banks in the horizon led to large scale competition affecting the market shares of the existing banks and these developments made significant impact on the quality of customer service rendered by the banks. From this arose the problem under study, i.e. which are the banking institutions rendering good customer service and with varied organizational designs and HR policies and to what extent do they influence the customer service rendered by these banks.

Research can be defined as a scientific undertaking which by means of logic and systematized techniques aims to: (1) discover new facts or verify and test old facts; (2) analyse their sequences, inter-relationships and causal explanations which were derived within an appropriate theoretical frame of reference; (3) develop new scientific tools, concepts and theories which would facilitate reliable and valid study of a phenomenon, event, incident, behaviour, etc. According to P. Herring1, “the obvious function of research is to add new knowledge to the existing store, but its power for cleansing our minds of clichés and removing the rubbish of inapplicable theory is equally notable.”
A research study aims at discovery, verification, validation and finding relationship among the accumulated data. This can be achieved only by the logical and systematized application of fundamentals of science to general and overall questions of a study and also the application of scientific techniques which provide precise tools, specific procedures and technical rather than philosophical means for getting and ordering the data prior to their logical and statistical manipulation.

According to W.I. Thomas, “the scientific value of a fact depends on its connection with other facts and in this connection, the most common place facts are often precisely the most valuable ones, while a fact that strikes the imagination or stirs the moral feelings may be either isolated or exceptional or so simple as to involve hardly any problem. However, it is important to have clear and clean objectives. As stated by P.K. Hatt, “It is true that a scientific study may prove its usefulness if it is productive of practical results, provided, however, that in the pursuit of the study no other goals are kept in mind that those of science.

A scientific approach to research ensures that the study generally utilize not only a variety of techniques but also approach the subject matter from a variety of view points. The process of a study is best promoted by a research plan or design which aid in achieving optimum reliability and efficiency with a minimum of bias. Pauline V. Young in the book “Scientific Social Surveys and Research states that the study design should include at least the following components which are inter-dependent and not mutually exclusive:

1. Sources of information to be tapped
2. Nature of study
3. Objectives of study
4. Context of study
5. Geographical areas to be covered
6. Period of time to be encompassed
7. Dimensions of the study.

3.1(i). **STATEMENT OF THE PROBLEM**

The researcher has 22 years experience in Banking Industry (1983-2005). The exposure includes working in Bank of India (a medium sized commercial bank) as junior executive, State Bank of India (the largest commercial bank in India) as executive and Reserve Bank of India (RBI), the Central Bank of the Country. Further, as a part of the assignments in
the RBI, the researcher has undertaken examination (audit in common parlance) of about 15 commercial banks. The researcher was also RBI's nominee director in the Board of "Global Trust Bank" after the bank was put under moratorium and the assignment continued till its merger with Oriental Bank of Commerce. Currently, the researcher is working as General Manager and is heading the Urban Banks Department of RBI in Gujarat which controls 296 Co-operative banks functioning in the state.

During the long association with the banking sector, the subject of customer service and service excellence has intrigued the researcher. Though the subject always looked simple, it assumed great complexity when one went into detailed analysis. It was always difficult to determine and isolate critical factors which lead to service excellence in banks, as a host of factors appear to be affecting the service delivery. The perusal of literature of earlier research in the field of organisational design in banks, Human Resources Practices in banks, customer service in banks and customer surveys undertaken earlier has been helpful in locating a few of the more important factors which have tremendous influence on customer service and service excellence.

The banking institutions are service sector organisations. What they produce and deliver are services. The studies undertaken have demonstrated that organisational design has a great influence on performance. The whole organisational design should, as research points out, enable achievement of organisational objectives. The banking scenario obtaining in this country is very complex. On one side, there is State Bank of India which has a very elaborate and complex organisational structure with their controlling offices in the states being as good as independent banks, structurally. On the other hand, there are new private sector banks and foreign banks where the structures are flatter, totally different and functionally organised rather than hierarchically organised. In between falls the public sector banks (earlier refereed to as nationalised banks) which has a structure more complex that that of the new private sector /foreign banks but simpler compared to that of State Bank of India. As far as customer service is concerned, irrespective of the structure, some banks appear to be delivering quality service to the customers. In the context, the question arises as to what extent the organisational structure/design plays a role in customer service. Secondly, it would be in the research interest to know whether the banks which are credited with 'service excellence' by the customers themselves, have some pattern (common features) with regard to organisational structure/design. Hence, the problem to
be addressed through a research and analysis is “What is the impact of Organisational Design on Customer Service”?

Perusal of earlier research reveal that there is a strong relation between Human Resource Management and Organisational performance. In the banking sector, what is manufactured and delivered is service and service being intangible, the customer satisfaction depends purely on human action and behaviour of the employees. As the human resources policies have an impact on employee satisfaction and employee behaviour, the question to be answered is:

“Is Customer Service influenced by Human Resources Management”? 

Further, the human resources management practices followed by various banks differ from one another. While the public sector banks had, traditionally, a stereotyped approach to human resources management, the private banks/foreign banks have a totally different approach. In this context, the question arises as to:

“What kind of human resources management policies lead to performance excellence and service excellence”? 

Banking in India has undergone many changes in the recent past. With the arrival of new generation private sector banks and foreign banks there is wide disparities between the technology used by banks. As technology affects customer service it is worthwhile to examine “whether there is any relation between technology based services and customer satisfaction”? 

There are various other factors affecting customer service. These factors include the quality of counter service and also behaviour related aspects such as “Courteous and polite dealings with customers”, “prompt response to customer needs”, etc. Further, today’s customers expect the banks to come out with instruments of service which are upto-date in terms of technology and also that meets the requirement of the customer needs. This is possible only if the banks are innovative in identifying the needs and designing appropriate service. Hence, the question arises as to “whether there is any relation between innovations in service delivery and customer service.”
In order to ascertain the impact of organisational design and Human Resources practices on customer service, there is a need to undertake research to: (1) Identify the banks where the customer service is excellent, and (2) Examine the organisational design and HR practices existing in the banks with qualitatively good customer service and those where the service quality is not up to expectations. The study will also enable the researcher to examine the relation between counter service and customer service, technology and customer service, courteous and polite dealings with customers; Prompt response to customer needs, innovations in service delivery, etc. The existing literature on the subject could not reveal any in-depth research or analysis.

3.1(ii). NEED AND OBJECTIVES OF THE STUDY

In view of the points for analysis mentioned under section 1.10, it becomes imperative that a study is undertaken to examine the relation between organisational design, H.R. practices and service excellence in banking institutions. Based on the data collected it will also be possible to assess the link between quality counter service, courteous and polite dealings with customers, prompt response to customer needs, innovations in service delivery, etc. and customer satisfaction. The study will also enable exploratory research which will unearth customer response to other factors which are of consequences to bank's operations. Considering the issues discussed in the earlier section (section 1.10) and the need for the study considered above, the following objectives have been drawn up for the study:

1. To study the impact of organisational design on service excellence in banks in the globalised environment.
2. To study the impact of Human Resources practices on service excellence in banks in the globalised environment.
3. To examine the impact of technology on customer service.
4. To examine the impact of the following on customer service:
   i) Quality of counter service
   ii) Courteous and polite dealing with customers.
   iii) Prompt response to customer needs, and,
   iv) Innovations in service delivery.

3.1(iii). SCOPE AND COVERAGE OF THE STUDY

The study will have a wide coverage in the banking system.
In order to collect the data for testing of the hypotheses, a sample selection has to be undertaken among the banks as the population include State Bank of India and Associates, Public Sector Banks, Private Sector Banks and Foreign banks. The sample will include all types of banks to ensure the representation from each. From the sample, a representative group will be chosen so that excellence in customer service can be assessed through a customer survey. Based on the survey, which will be an All-India survey, banks where service excellence is displayed and banks where service quality is comparatively on the lower side will be covered in the study to examine the impact of organisational design and HR practices and other variables on customer service. The study will also include a survey among the banks’ executives, visit to the corporate offices of the banks and interview of Heads of the HR departments of the selected banks.

3.2. HYPOTHESES FOR THE STUDY:

Karl Pearson\(^5\), the statistician and an authority on scientific exploratory research has stated that “it is not the facts themselves which make science, but the method by which they are dealt with”. The man who classifies facts of any kind, who sees their mutual relations and describes their sequences, is applying the scientific method and is a man of science.”. The idea implies that neither scientific nor practical results can be expected without development of some provisional explanations (i.e., a “hypothesis”) of a class of phenomenon or problems. G.L.Berg\(^6\) observes that gathering data with hypothesis recognises the limitations and enables concentration on some specific aspects. M.R.Cohen\(^7\) opines that the function of a hypothesis is to direct our research for the order among facts. The researcher has considered ‘Cardinal Values\(^8\) formulated by experts and the rule that the variables should be 'context bound’ and the empirical system that is constructed should be sufficiently precise and articulate to permit predictions in concrete situations\(^9\).

Based on the relevant scientific concepts and the context, the following hypotheses were formulated for the study:

1. There is a relation between Customer Satisfaction and the quality of service rendered by the bank at the counters.
2. There is a relation between customer satisfaction and the technology based services offered by the bank.
3. ‘Courteous and polite dealings with customers’ and customer satisfaction are correlated.

4. ‘Prompt response of the bank to the customer needs’ and customer satisfaction are correlated.

5. ‘Innovations in service delivery’ (technology based or otherwise) and customer satisfaction are correlated.

6. An appropriate and conducive organizational design that promotes competitive efficiency results in achievement of excellence in customer service in a competitive environment.

7. Banking organizations that practice professional and result-oriented human resources management render quality customer service.

8. Employee motivation through HR Policies / Practices (including reward/incentive schemes, etc.) influence the quality of service rendered by the organization.

3.3. TOOLS USED:

The researcher has a variety of tools to choose from. The tools used in the research, their efficacy and the rationale for selection of the tools are given under:

3.3(i). Questionnaires:

Questionnaire is a widely as well as frequently used tool in gathering a variety of data. They have been used for the collection of personal preferences, social practices and habits, etc. It enables quantitative measurement of uniformly accumulated data. This tool enables collection of data from large, diverse and widely scattered groups of people. The tool facilitates collection of data from remote corners as the questionnaire can be mailed to the subjects of survey for their response.

‘Structured Questionnaires’ – those which pose definite, concrete and preordained questions enables proper research design. ‘Closed – form’ questionnaires are useful when categorized data are required, i.e. when they need to be put in to definite classifications. It is an ideal option where studies of economic or social problems, measurement of opinion on issues/facts, events and studies of similar issues, etc. are undertaken.

As the first phase of this research involves study of the opinion of the customers on the quality of service rendered by the banks and the second phase involves the opinion of the executives on the impact of variable aspects of organizational design and HR practices on
quality of service rendered, structured, closed-form questionnaires were opted for data collection as one of the tools of the study.

The following qualitative aspects of preparing a questionnaire has been kept in mind while designing the same.

1. The vocabulary chosen should be simple.
2. The syntax should be clear and straightforward.
3. General, well understood phrases and expressions must be used.
4. Questions and statements of a leading character should be avoided.
5. Units of enumeration should be precisely stated or defined in order to ensure proper orientation of the respondent.
6. Avoid adjectives which may lead to subjective assessments.
7. Avoid complexity in concepts dealt with in a question.
8. The required answers should be within the informational scope of the respondent.
9. The framing of questions and responses should enable proper tabulation and analysis.

The following questionnaires were used in the research:

1. Questionnaire for survey among customers of selected banks in the preliminary selection to assess the customer satisfaction levels.
2. Questionnaire for survey among executives of the banks selected in the final selection for detailed study of organizational design and HR practices.

[Copies of the above-mentioned questionnaires have been given in the Appendix (Appendix-I & II)]

3.3(ii). Use of Historical data:

According to social scientists “the study of all integrational systems must be generic and therefore historically oriented”. A study of the existing norms, practices and policies of any system or society will require analysis of data regarding what was happening earlier, what was happening now, etc. This kind of study will involve collection of data pertaining to past or present. The sources for such data will include (1) documents/publications available, (2) Intra-organisational communications, (3) Personal sources of authentic observers, people associated with the system, etc.

In the research undertaken, it was necessary and expedient to obtain data relating to banks with regard to various aspects such as organizational design, HR practices, etc. In view of
the same, data was collected from various sources such as published documents, pamphlets, booklets, website in addition to interaction with the functionaries of the banks.

3.3(iii). Schedules:
A schedule is defined as a formal list, a catalog or inventory which is generally filled out by the research worker who will interpret and explain the questions if necessary. It is widely used in collection of quantitative cross-sectional data. This data also supplements other tools such as observation, interviews especially in evaluating personal behaviour and social situations. It also aid in standardizing and objectifying ‘observations’ and ‘interviews’ and is a useful device for isolating one element at a time and thus intensifying observation of the same. The advantage of using this tool also include the fact that it is an objective recording device which makes possible accurate accumulation of large quantities of data. The instrument to a great extent, delimit the scope of the study and concentrate on the circumscribed elements essential to the analysis.\(^\text{10}\)

In this research a schedule has been used which was filled out during the interview sessions with Human Resources Management executives of selected banks to assess the current status regarding various aspects of their functioning. A copy of the schedule used to elicit information has been given in the Appendix. (Appendix - III)

3.3(iv). Pre-testing and checking questionnaires and schedules:
The issue of utility and effectiveness of the questionnaires and schedules has to be considered before administering the same. It is imperative that a pretest and checking of the questionnaires and schedules are undertaken before administering on a larger population. The method of pre-testing provides a means of detecting mistakes before they impost damages in the form of low proportion of returns or of replies lacking in reliability and validity. “Pre-testing is essentially a trial and error procedure wherein the successful trials are repeated and the errors are avoided when the final questionnaire is administered.\(^\text{11}\)” Pre-testing provides not only a test of clarity of the questions and of the correctness of interpretation put upon them by the respondent, but it also affords the possibility of discovery of new aspects of the problem studied but not anticipated in the planning stages. The questionnaire for assessing customer satisfaction was pre-tested among 20 selected customers of various banks. The questionnaire for executives/employees of the bank and the schedule used for collection of specific
information during interviews with bank officials were pre-tested on 10 and 5 respondents respectively. Based on the observations and suggestions from the respondents and also the observations of the researcher with regard to the responses received, the questions and provisions for responses were suitably modified before administering on the general population.

3.3(v). **Interviews:**

Interview may be seen as an effective informal verbal and non-verbal conversation initiated for specific purposes and focused on certain planned content areas. The objectives of interview may be exchange of ideas and experiences, eliciting of information pertaining to a wide range of data, etc. This inter-actional process is a tool widely used in research projects. It is observed that a combination of interviewing, data analysis, observations and statistical techniques often yields the best results, but the balance of emphasis shifts with the frame of reference and the objectives of the study. This is a highly flexible tool which allows a more permissive atmosphere than is the case when using other techniques of investigation. Questions not readily grasped by the interviewees can be rephrased or repeated with proper emphasis and explanations when necessary.

The researcher has used interview as an investigative tool for obtaining information on organizational design and Human Resources Practices in the banks selected for study. The interviews were held primarily with Executives handling Human Resources Management and Development in the Corporate offices of the bank. They were also held with some selected bank officials. The interviews were partly structured to include certain specific areas to be covered while open discussions were held on matters of interest to the research. A check list has been used to ensure that all relevant areas uniformly included in discussions with all banks.

3.3(vi). **Limitations of the tools:**

The researcher, as may be observed from the above, has used tools such as Questionnaires, Schedule, collection of data on the functioning of banks and interviews for obtaining data for analysis. The researcher has considered and understood limitations of some of these tools which are enlisted below:

1. The phrasing of the questions/statements in the questionnaires/schedules may not be uniformly understood by all respondents.

2. Some respondents may react and respond in a perfunctory manner.
3. Data available on the functioning of the banks may not give an absolute picture if used as a stand-alone tool.
4. The data available may not be adequate or absolutely accurate (especially those obtained through discussions) considering the objectives of the study.
5. The interviewees’ personal bias may influence the information/opinion given during the course of interview.
6. The interviewee may withhold certain information which is relevant and important for the research.

In order to mitigate the deficiencies likely to arise due to the limitations of various tools, the researcher has consciously used a variety of tools and techniques of analysis. Further, the questionnaires and schedules were administered on groups of similar background and hierarchical levels. The surveys on customers were undertaken at various geographical zones and cities, but all of them with environments close to that of the others. Surveys on executives were done at the corporate office of banks as well as at the branches.

3.3(vii). Sampling:
One of the most significant issues to be dealt with in research is that of sampling. While from an ideal stand point a complete count of all the relevant cases would be preferable to a “sample”, it is generally impossible or impractical to include more than a small portion of the total number of cases, especially in view of time and cost associated with studying the “population”.

Principles associated with “sampling” include the following:
1. It should be representative of the population\(^{12}\).
2. Biased sample cannot be considered as representative of the population\(^{13}\).
3. The selection should be so arranged that every item in the universe has the same chance of inclusion in the sample\(^{14}\).
4. If the universe is very homogeneous with respect to a specific characteristic, a small sample may yield more reliable results than a much larger sample of another universe which is heterogeneous with respect to the characteristics studied\(^{14}\).
5. Size, quality and character of the sample should be selected in such a way that the risk of errors – the discrepancy between the sample and the true value is minimized.
The procedures used in sampling include (1) simple random sampling, (2) stratified random sampling, (3) sampling by regular intervals, and, (4) area sampling.

In a distribution analysis, the mean and standard deviation are the central concepts of position and dispersion. In distribution free statistics the median is the measure of central tendency and dispersion is measured in terms of various ranges such as the inter quartile or the semi inter quartile range. A distribution-free measure of association is the spearman ‘p’ or rank difference coefficient of correlation.

3.3(viii). **Statistical Errors:**

Proficiency in statistical analysis calls for a combination of knowledge of various techniques as well as qualities such as good judgement, a healthy skepticism, objectivity, experience and a broad understanding of the field of study. The common pitfalls of statistical work originate from the following sources which lead to statistical errors.

1. Inadequate and inaccurate data
2. Mechanical mistakes
3. Unsound interpretations.

Simple rules of statistical procedure which ‘Adolph Quetelet’ formulated are:

1. Never have preconceived ideas as to what the figures are to prove.
2. Never subject number that seems contrary to what you might expect merely because it departs a good deal from the apparent average.
3. Be careful to weigh and record all the possible causes of an event and do not attribute to one what is really the result of the combination of several.
4. Never compare data which are not fully comparable.

The study has used ‘stratified random sampling method’ for conduct of ‘customer satisfaction survey’. For selection of banks for study of the organizational design and HR Practices, those banking institutions where the customer satisfaction levels are high and those where the customer satisfaction levels are low have been chosen to enable comparison. Efforts have been made to avoid errors, some of them described above, to ensure accuracy and reliability of data as also the observations and conclusions.

3.4. **Statistical techniques used:**

The analysis of the data for testing the hypotheses will require investigation into quantitative relationship between the variables. These relationships may be of the nature
of dependence of one variable on the other or that of mutual inter dependence. In the research, with the purpose of analyzing the relationship between the variables and also to examine the existence of cause-effect relationship, if any, correlation and regression analyses have been used as major tools. The techniques used are restricted to simple linear correlation and simple linear regression.

3.4(i). Correlation:
If two or more quantities vary in sympathy so that movements in one tend to be accompanied by the corresponding movements in the other(s), then they are said to be correlated. Correlation denotes inter-dependence amongst variables. It is a statistical technique which measures and analyses the degree to which two or more variables fluctuate with reference to one another. The degrees are expressed by a coefficient which ranges between -1 and +1. While +1 shows a sympathetic movement in the same direction, -1 shows in the opposite direction. The advantage of this technique is that the average of relationships in a series can be summed up in a single value of change called the coefficient of correlation.
The Methodology used for calculation is Karl Pearson’s Method or Co-variance Method. Of the Direct and Indirect methods, the researcher has chosen the direct method. Karl Pearson’s coefficient of correlation is based on the following assumption:

1. There is linear relationship between variables.
2. There is often a cause and effect relationship between the forces affecting the distribution of the observations in the two series of data compares (causal relationship).
3. Each of the variables (series) is being affected by a large number of independent contributory causes of such a nature as to produce normal distribution.
4. The coefficient of correlation is more reliable, i.e. the error of measurement is reduced to the minimum.

While the merits of the method include the availability of a precise and a summary quantitative value which can be interpreted meaningfully and also the utility of the coefficient to estimate the value of the dependent variable from independent variable, the major demerits include the facts that it presumes a linear relationship and the value is unduly affected by extreme items.
The formula used for calculation considering two series of variables $X$ and $Y$ for $N$ number of items is:

Correlation coefficient ($r$) = $\frac{\Sigma xy}{\sqrt{\Sigma x^2 \times \sqrt{\Sigma y^2}}}$

where, $x = X - \bar{X}$  
    $\frac{\text{-----}}{\text{N}}$

$y = Y - \bar{Y}$  
    $\frac{\text{-----}}{\text{N}}$

Karl Pearson has given a formula for measuring correlation. If the value is +1, it indicates perfect positive correlation while the value of -1 indicates perfect negative correlation. If the result is zero, it shows absence of correlation. The range suggested by him are:

<table>
<thead>
<tr>
<th>Degree of correlation</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perfect correlation</td>
<td>+1</td>
<td>-1</td>
</tr>
<tr>
<td>Very high degree of correlation</td>
<td>+0.9 or more</td>
<td>-0.9 or more</td>
</tr>
<tr>
<td>Fairly high degree of correlation</td>
<td>+0.75 to 0.9</td>
<td>-0.75 to -0.9</td>
</tr>
<tr>
<td>Moderate degree of correlation</td>
<td>+0.50 to +0.75</td>
<td>-0.50 to -0.75</td>
</tr>
<tr>
<td>Low degree of correlation</td>
<td>+0.25 to +0.50</td>
<td>-0.25 to -0.50</td>
</tr>
<tr>
<td>Very low degree of correlation</td>
<td>Less than +0.25</td>
<td>Less than -0.25</td>
</tr>
<tr>
<td>Absence of Correlation</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

3.4(ii). Probable and Standard Error:

Probable error $P.E. (r)$ defines the limits above and below the size of the coefficient determined within which there is an equal chance that coefficient of correlation similarly calculated from other samples fall.

Standard Error $[S.E.(r)]$ denotes 67.45% of chance of the coefficients calculated from other samples falling within limits as against 50% in the case of probable error. The formula for $S.E.(r)$ and $P.E.(r)$ are:

$$S.E.(r) = \frac{1 - r^2}{\sqrt{N}}$$

and $N$ is the number of pairs of data taken for the calculation.
\[
P.E. (r) = 0.6745 \times S.E. (r) \\
= 0.6745 \times 1 - r^2 \\
\frac{\sqrt{N}}{
}
\]

The limits within which the population correlation coefficient may be expected to lie, will be,

\[ R \neq P.E. (r) \]

The significance of correlation coefficient can be assessed using P.E. (r). If \( r < P.E. (r) \), then the correlation is not significant at all. On the other hand, if \( r > P.E. (r) \), then correlation coefficient is significant.

3.4(iii). **Significance of Correlation Coefficient - T-test**

The objective of T-test is to investigate whether the difference between the sample correlation coefficient and zero is statistically significant. For undertaking the test a ‘null hypothesis’ is presumed wherein the population value of coefficient of correlation (r) is zero. The test statistic ‘t’ is calculated using the formula,

\[
t = \frac{r \sqrt{n-2}}{\sqrt{1-r^2}}
\]

where \( r \) is the correlation coefficient and ‘n’ is the number of items used in calculation. This follows the t-distribution of the data with (n-2) degrees of freedom. The test will normally will be two tailed but in certain cases could be one-tailed. The value of ‘t’ obtained in the calculation is compared with the critical value of ‘t’ for (n-2) degrees of freedom at a level of confidence of 5%, which is readily available in the tables. If the \( t(n-2) (0.05) \) value obtained in the calculation is more than that of the critical value of \( t(n-2) (0.05) \), the ‘null hypothesis’ is to be rejected as correlation coefficient is significant. If the value of ‘t’ calculated is less than of the critical value of \( t(n-2) (0.05) \), the ‘null hypothesis’ is not rejected as correlation coefficient is not significant.

3.4(iv). **Regression:**

M.M.Blair described regression as the measure of the average relationship between two or more variables in terms of the original units of the data. In regression there are two types
of variables. The variable whose value is to be predicted is called ‘Dependent variable’ and the variable(s) which influence(s) the value or is used for prediction is called ‘Independent variable’.

Regression analysis is a widely used tool in statistical analysis in view of its utility in predicting cause-effect relationships. Further, it is simple, has a better predictive value as a linear trend can be easily projected in to the future. The algebraic methods used in simple linear regression can be broadly classified as (1) Regression Equations (2) Regression coefficients.

3.4(v). **Equation on the line of regression:**

Accordingly to J.R.Stockton, ‘the device used for estimating the value of one variable from the value of the other consists of a line through the points drawn in such a manner as to represent the average relationship between the two variables. Such a line is called the line of regression. The regression equation with either of the two dependent variables are of the form:

\[ Y = a + bX \]

Where, ‘\( Y \)’ is the dependent variable and ‘\( X \)’ is the independent variable. Here ‘\( a \)’ and ‘\( b \)’ are unknown constants of the equation where ‘\( a \)’ refers to the intercept of the line and ‘\( b \)’ to the slop of the line. The values of these constants are calculated from a given pair of values. The equation used for calculating the coefficient of correlation of \( Y \) on \( X \) is :

\[ \text{byx} = \frac{N \sum XY - \sum X \cdot \sum Y}{N \sum Y^2 - (\sum Y)^2} \]

The equation on the line of regression is calculated by,

\[ Y - \bar{Y} = \text{byx} (X - \bar{X}) \]

Where, \( \bar{Y} = \frac{Y}{N} \), \( \bar{X} = \frac{X}{N} \) and \( \text{byx} \) is the regression coefficient

3.4(vi). **Test of Significance - T-test**

The objective of conducting t-test is to investigate the significance of the regression coefficient of \( Y \) on \( X \). The limitations of the test arise from the fact that it presumes that
‘Y’ follows a normal distribution for each value of ‘X’ and that the variance among the ‘Y’ values remains constant for any given value of X.

Considering a dependent variable of Y and an independent variable of X, the following data are calculated for a given ‘n’ number of pairs of ‘Y’ and ‘X’.

\[
\overline{X} = \frac{\sum X}{N} \quad \overline{Y} = \frac{\sum Y}{N} \quad b = \text{correlation coefficient}
\]

The variance of the X’s and the variance of Y’s about the regression line are calculated as follows:

\[
S_x^2 = \frac{\sum (X - \overline{X})^2}{n-1} \quad \text{and} \quad S_Y^2 = \frac{\sum (Y - \overline{Y})^2 - b \sum (X - \overline{X}) (Y - \overline{Y})}{n-2}
\]

The test statistic ‘t’ is calculated using the formula,

\[
T = \frac{b \cdot S_x}{S_Y \sqrt{\frac{1}{n-2}}}
\]

The value of ‘t’ follows the data’s t-distribution with (n-2) degrees of freedom. The test must be two-tailed since ‘b’ may be positive or negative. The value of ‘t’ obtained in this calculation is compared with the critical value of t(n-2) at a confidence level of 5% (which is readily available from tables). If the value of ‘t’ calculated is more than the critical value t(n-2) (0.05), the ‘null hypothesis’ can be rejected as the coefficient of regression is significant. On the other hand if value of ‘t’ calculated is less than the critical value of t(n-2) (0.05), the ‘null hypothesis’ cannot be rejected as correlation coefficient is not proved to be significant.

3.5. **Sample Selection and Methodology for Research – In Brief**

Sample selection and methodology for data collection are given in brief below:

3.5 (i). **Steps and Methodology undertaken:**

1. All the commercial banks (total 101 banks) were analysed with respect to their financial position for the accounting year ended March 2000. Twelve (12) banks with high levels and low levels of ‘Profit per employee’ from various categories were selected for further study.
2. A survey was conducted among the customers of the 12 selected banks to assess the customer satisfaction levels (customer rating) in a scale of seven (7) ranging from ‘Excellent’ to ‘Poor’. The survey was conducted in eight cities including metros and covered a sample of 1080 (excluding rejected questionnaire) customers. The customers along with their rating also indicated the reasons for assigning a particular rating enabling analysis of cause-effect relationship using statistical techniques.

3. Based on the customer ratings, a sample of six banks – three with higher levels of customer satisfaction rating and three with rating on the lower side – were chosen for studying the impact of organizational design and HR practices.

4. The impact of organizational design and Human Resources Practices were studied using the following methodologies.
   I. Visit to the Corporate Office (Head Office) of the banks selected for study and discussion with the concerned department dealing with organizational matters.
   II. Visit to Human Resources Management Department of the bank at Corporate Office and discussion with the Head of HR department (or a senior executive) on HR policies of the bank.
   III. Collection of information from the officials of the HR department using schedules.
   IV. Discussion with some officials at some selected branches.
   V. A survey among the employees / executives of the selected banks to elicit their views on the impact of organizational design and HR practices on customer service rendered by the bank.
   VI. Study of the web-site of the bank, their publications including Annual Reports, leaflets, pamphlets, etc.

3.5 (ii). **Data Analysis in Brief:**

Data from the following sources were subjected to analysis:

1. Survey among the customers.
2. Survey among the executives
3. Information collected through schedules, personal interviews, study of web-sites, published documents, etc. to investigate in to the impact, if any, of the organizational design and HR practices on customer service.
The information collected from the above was analysed to:

a. Examine the cause-effect relationship, if any, between the ratings and various reasons for assigning the rating given in the questionnaire.

b. Examine the cause-effect relationship, if any, between organizational design and HR practices and customer service.

c. Inter-bank comparison to examine the impact, if any, of the organizational design and HR practices on customer service.

Details of the sample selection and methodology are given in the following section. (Chapter-4).

References: