Chapter 3
Research Methodology
3.1 CHAPTER OVERVIEW:

This research is about understanding the problems mentioned in the Research Proposal and designing means to achieve objectives of the study. This chapter also outlines research design and methodology used for this study. It describes techniques and tools used to collect data especially Primary data. It also explains the different scaling techniques and the statistical tools used to analyse the collected data. The most challenging part of this study is testing the hypotheses as it helps to control the authenticity of the outcomes so as to propose a scope for further research.

3.2 NEED FOR RESEARCH:

The main motivation behind this study is that most of the Indian Telecom companies do not focus much on structured and planned development of competencies in employees. Their main focus remains primarily on adopting new technologies as this helps in immediate & direct revenue generation. But the sustainability of the companies depends mainly on human resource development. This area has got relatively less attention in the past and organizations are facing the problem of employee retention and competency gap. Since tacit and explicit talent of the employees is underutilized, so organizations today should take up substantial efforts in implementing the structured roadmap for competency building in the employees. This study presents a Competency Framework for Telecom employees.

3.3 SCOPE OF THE RESEARCH:

The research study was conducted for all the Private Mobile Service Operators within the City limits of Pune Municipal Corporation. The study was done to understand the level of competencies in the telecom employees especially in the Technical department. The researcher has also tried to identify those competencies that influence the performance of the telecom employees. For
Engineer and Team Lead positions. Geographical scope for this study includes select Telecom companies operating in Pune city. For Assistant Managers and Managers, sampling is done in different offices of Telecom companies in Maharashtra. The study is conducted with reference to the period from year 1995 to till date as major technological development in this sector happened during this period in India.

Period of Research- 9th September 2010 to till date

Target Group- 351 Telecom employees were surveyed from Network Operations Department (Technical Department) of different Telecom Companies in Pune.

3.4 WHAT IS RESEARCH?

Lundberg (1942) states “Scientific methods consist of systematic observation, classification, and interpretation of data. Now obviously, this process is one in which nearly all people engage in their daily life. The main difference between our day-to-day generalizations and the conclusions usually recognized as the scientific method lies in the degree of formality, rigorousness, verifiability and general validity of the latter.”

A Management research is an unbiased, structured and sequential method of enquiry, directed towards a clear implicit or explicit business objective. This enquiry might lead to validating existing postulates or arriving at new theories and models.

The Merriam-Webster Online Dictionary defines research in more detail as "a studious inquiry or examination; especially: investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or laws in the light of new facts, or practical application of such new or revised theories or laws."
3.5 RESEARCH DESIGN AND PROCEDURE:

\(^{18}\)Sellitz et al. (1962) states that ‘A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure’.

\(^{18}\)Kerlinger (1995) refers to research design as, ‘a plan, structure and strategy of investigation so conceived as to obtain answers to research questions or problems. The plan is the complete scheme or programme of the research. It includes an outline of what the investigator will do from writing the hypotheses and their operational implications to the final analysis of data’.

This is an exploratory and descriptive research design, which includes surveys and facts findings of various types. Exploratory research design involves a comprehensive study of the earlier work done on the topic and an expert or/and a respondent survey. Exploratory designs are simplest and loosely structured designs, which explores and obtains clarity about the problem through flexible & qualitative investigation. Even though exploratory designs are lowest in terms of accuracy of findings, still it is recommended that no research must be carried out without them. These further lead to more structured Conclusive Research design. After exploration about the topic is done, the descriptive research design provides a comprehensive and detailed explanation of the phenomena under study.

This research is empirical & quantitative in nature as it systematically measures and compares the variables of the study. The prominent variables of this research are performance and different competencies. This empirical research relies mainly on experience or observation, which helps to collect primary data. This data is subjected to various statistical tools to analyse the problem and to derive certain findings.

This study is designed to explore and collect information on various aspects like employee’s competencies and their effect on performance, competency gap, level
of satisfaction in employees for different types of competencies in Telecom companies. To explore these facts, the survey instrument used was structured Questionnaire. The study began by extensive literature review on the employee's competencies and related aspects with reference to Indian Telecom industry. This helped in identifying the key issues and drafting a method to design the survey instrument. This survey instrument was tested with the help of Pilot-test. Pilot test is collection of primary data by exposing the survey instrument on a small sample size.

Review of literature helped in understanding the theories, concepts, past researches and scope relevant to the topic. Researcher found that most of the research is done outside India. Based on this, researcher has applied the concepts keeping in mind the Indian context. After extensive interviews, discussions and observations with the HR and employees of the Telecom companies, the competencies were listed. These competencies were classified into 4 categories viz. a viz. Technical/ core competency, Managerial competency, Organizational competency and General competency.

3.6. FRAMING OF OBJECTIVES:

3.6.1 To study the existing level of performance competencies & skills in employees of select Telecom companies and design a complete set of competencies for each key position.

3.6.2 To measure the performance level among employees with the existing competencies.

3.6.3 To examine all the existing methods for enhancing the performance competencies of employees in the organization.

3.6.4 To analyse and correlate all the Core competencies required to deliver optimum performance of job.

3.6.5 To design a complete set of performance competencies for each key position in the companies.
3.6.6 To suggest the types of training required to increase competency level in employees of the organization so that the employees are developed in accordance with the organizational needs.

3.7. FRAMING OF HYPOTHESES: According to the objectives of the research, the present study probes to find the answers to the following questions:

- **Hypothesis 1** Few performing competencies like Intellectual competencies (innovation, comprehension, decision making etc.) may not produce any relevant or visible change in performance of the employees.
- **Hypothesis 2** Employees with better competencies will deliver better result in their job performance.
- **Hypothesis 3** Core competencies if missing in the employee do produce significant decrease in performance.
- **Question 1**: Which specific competencies from each category of Technical, Managerial, Organizational and General Competencies provide happiness and motivation to the employees?
- **Question 2**: Which specific competencies from each category of the Technical, Managerial, Organizational and General Competencies lead to better performance of the employees?
- **Question 3**: Which among the 4 Competencies, namely Technical, Managerial, Organizational and General Competencies provide considerable level of satisfaction to the employees while working?
- **Question 4**: Which groups of competencies have better correlation with each other and can be clubbed for training purpose?
- **Question 5**: What’s the weightage allocated to each Competency category for each profile?
3.8. METHODS OF DATA COLLECTION:

The information in the language of research is called data. Researcher has access to two types of data, namely primary and secondary. Sources of data collection are:

- Primary data is collected through closed/Structured questionnaire.
- Secondary  data collected through Internet, Books, National and International referred journals, Conference proceedings, Magazines, Newspapers, Annual Reports of Telecom companies, Government publications etc. serves as basis of literature review.

Majorly this study is based on analysis of Primary data collected through Questionnaire.

3.9. POPULATION AND SAMPLING PROCEDURE OF THE STUDY:

This study is basically limited to Mobile industry in Pune and population for the study comprises of all the Private Cellular Operator companies in Pune, namely Vodafone, Reliance, Airtel, Uninor, Aircel, Tata, Idea. To select a representative part of the population, the total sample arrived at is 351.

The statistical acceptable sample size could be determined by employing formula:

\[
n = \frac{X^2 \times N \times P \times (1-P)}{d^2(N-1) + X^2 \times P(1-P)}
\]

where  
\(n\) = sample size  
\(N\) = Population size  
\(X^2\) = Table value of chi square @d.f. =1 for desired confidence level 0.1  
\(\approx (1.96)^2 = 3.84\)  
\(p\) = population proportion (assumed to be 0.5)  
\(d\) = degree of accuracy
3.10. DESIGNING A QUESTIONNAIRE:

A survey is a measurement process used to collect information during a highly structured interview—sometimes with a human interviewer and other times without. Questions are carefully chosen, crafted, sequenced, and precisely asked of each participant.

Structured Questionnaire is a quantitative method of research [advocated by Emile Durkheim (1858-1917)]. A questionnaire comprises of series of questions relating to the problem. A Questionnaire can serve as a good survey instrument only if it has appropriate questions, correct order, correct scaling, should be short and simple.

This Questionnaire was scientifically developed with the help of extensive literature review on topics like Types of Competencies, different Competencies Frameworks, Competencies needed by employees in general for other industries and Competencies with reference to Telecom engineers. The detailed interaction with the employees and HR department helped the researcher to broadly categorize them into 33 competencies. Competency Mapping is done using tools like company records, interviews, observations, questionnaire, feedback form, job analysis record, performance appraisal formats, Key Result Areas (KRA) & attributes for each key position.

Finally a draft of Questionnaire was made based on work done by previous researcher. This draft was finalized after discussion with HR professionals from Telecom Company (in context with the Job Description) and the research Guide. This final Questionnaire was subjected to pilot test on a small sample of population to test its reliability and validity.

Structured Questionnaire is used in this study, as there are high numbers of respondents. It was properly constructed and administered to the sample of population. Most of the respondents were forwarded the Questionnaire via Google Drive. Their responses were collected via Internet. In this research, the researcher has used a standard Questionnaire for self-assessment about the effect of
competencies on the performance of the employees. This structured survey Questionnaire used in this study helps in quantitative research to ensure that each interviewee is presented with the same set of questions in same order so that the answers are reliably aggregated and tested. The Questionnaire was developed with the guidance of the Research Guide, secondary data and discussion with some experts & professionals from Telecom industry. Questionnaire was tested and validated with a small sample for its clarity, reliability, ease of use and value of the information that could be collected. After that it was subjected to the employees for data collection. The structure of the Questionnaire is divided into-

- Basic Information about the employees
- Technical Competencies
- Managerial Competencies
- Organizational competencies
- General Competencies
- Questions for General evaluation

Most of the questions are closed ended and have Multiple-choice answers with 5 point Likerts scale for grading each variable.

*Type of Questions*- The survey instrument used in this research has-

a. Open-ended questions inorder to gather specific information from the respondents.

b. Closed-ended question, namely Dichotomous questions (Yes/No) and Multiple choice answers.

*Measurement and Rating scale*- The scale used is Ordinal with Five-point likert-type rating scales. The nominal scale is also used to collect variables, which have no quantitative value.

- Five-point likert-type scale was used ranging from 1 to 5 e.g. 1 as Not at all important and 5 as Extremely Important in many of the questions.

The final version of survey instrument is attached as *Annexure I, Annexure II, Annexure III*. 
The data is collected with the help of this detailed structured questionnaire from employees helps the researcher to understand the degree of importance of a particular competency in a defined competency framework at specific profile.

3.11 PILOT TESTING:

Pilot testing refers to testing and administering the designed instrument on a small group of people from the population under study. Before we proceed for Data collection, it is essential that we pre-test the survey instrument for its reliability and validity. Instrument reliability is a way to ensure that there is consistency in experimental variables. Reliability of the instrument depends on accuracy and precision, which tells how accurate and precise the instrument, is for measuring the desired variables.

The pilot study was conducted in following steps:

• First, the profiles were studied for different telecom companies through detailed interviews with the few senior personnel. It should be mentioned here that all Telecom companies primarily have 85-90% employees with technical engineering background.

• Second, the researcher designed a structured Questionnaire with competency related multiple choice questions.

• Five-point likert-type scale was used ranging from 1 to 5 e.g. 1 as Not at all important and 5 as Extremely Important in many of the questions.

• Respondents were subjected to this detailed structured questionnaire as apart of the survey for Pilot study which will be used further for Research on the same topic.

• The respondents selected for this study were the employees of Technical department of Vodafone (India) working in Pune city of Maharastra.

• The respondents were asked to fill up the questionnaire which helped the researcher to rate each competency based on its importance to effective job performance.
Since this study aims to design a competency framework that would help the organizations to understand which competency would fit in best to deliver effective job performance in organizational environment.

The population of this research comprises of all technical employees working in different telecom companies operative in Pune city in Maharashtra. The target population or respondents are categorised into 4 levels starting from level 1 which includes all Engineers and Senior Engineers, level 2 includes Team leads and Cluster Leads, level 3 includes Assistant manager and level 4 includes Managers, Deputy Manager, Directors, etc.

For sample size calculations following Companies were considered: Airtel, Reliance, Vodafone, Tata. Since the population data is scattered and not defined and also not readily available because large number of employees are on off-role profiles and it is quite difficult to segregate off-role and on-role employees at the engineer level, hence researcher has chosen Non probability, convenient sampling.

Population (N) = 4000,
At Confidence level = 95%
Margin of error / confidence interval = +/- 5
Sample size (n) = 351
For pilot test, Sample size is 200 which is equal to 57%

The pilot test was conducted using a sample size of 200 respondents. Designations included in sample size from 6 functional areas of Technical department (viz. a viz. BSS (Base Station Subsystems), Transmission, NPO (Network Planning and Optimization), OMCR (Operation and Maintenance Centre Remote), Project Management, INVAS (Value Added Services) are: Managers, Assistant manager, Team leads, Engineers.

3.12. DATA COLLECTION:

The data is collected with the help of detailed structured questionnaire from employees who categorically helps the researcher to understand the degree of importance of a particular competency in a defined competency framework at
specific profile. The detailed interaction with the employees and HR department helped the researcher to broadly categorize them into 33 competencies. Out of these, there are few competencies in employees that help them to perform better. Competency Mapping can also be done using tools like company records, interviews, observations, questionnaire, feedback form job analysis record, performance appraisal formats, Key Result Areas (KRA) & attributes for each key position. Since researcher could not find any secondary data source from previous research conducted on the same content and context, therefore collection of primary data becomes necessary. Identification of correct population and sample becomes an essential part of methodology.

Emailing the Questionnaire to Technical employees of the 7 different companies helped in data collection. Around 500 questionnaire were forwarded out of which researcher could seek 353 responses. After the responses were collected it was presented in a structured manner to be analyzed through SPSS software. Data was collected during February 2013 to July 2014. Confidentiality and anonymity of all the participants has been maintained constantly in this study. Questionnaire enclosed a ‘covering letter’, which contained all the relevant information about the research and researcher. Questionnaire was designed in such a manner that respondents were:

- Informed about the nature and purpose of the study.
- About the researcher’s professional background and identity.
- Informed about the confidentiality of their responses.
- Promised to maintain anonymity of respondent’s identity.
- Asked to respond only if they wanted to voluntarily participate in the research.

### 3.13. DATA PREPARATION AND ANALYSIS:

After data collection, establishing categories, arranging, coding and tabulation of raw data so that further statistical inferences could be drawn does processing. The collected data is subjected to percentage analysis, cross tabulation, Chi square
test and Pearson Correlation coefficient test.

For data analysis, the scale of reliability is first used to find out the internal consistency of the variables. These variables are used further in Factor analysis. Reliability is synonymous with repeatability. An instrument is said to be reliable if it yields consistent results over time. When a measurement is prone to random error, it lacks reliability. The reliability of an instrument places an upper limit on its validity. A measurement that lacks reliability will also lack validity. If the scale of reliability is close to 1, then it can be concluded that the variables are suitable for conducting factor analysis. Reliability analysis is a popular and frequently used SPSS method of measuring the internal consistency of the variables. The value of Cronbach’s Alpha (α) for this study is 0.923, hence we can conclude that the variables are having high internal consistency and these variables are considered to be suitable for conducting factor analysis.

Further more, factor analysis is done to understand the significance of Advanced Network Factors and Error Control factors on Job Performance. It is visible from Eigen values that these variables have high internal consistency and can be used further for hypothesis testing.

For hypothesis testing, simple percentage method, one-way Chi-square test, 2-way Chi-square test and Pearson correlation tests are used. In order to find out the effect of different competencies on the job performance of the employees, Pearson coefficient “r” value is noted. Pearson product correlation coefficient (PCC or Pearson’s r) is a measure of the linear correlation (dependence) between two variables, giving values between +1 and -1 inclusive, where 1 is total positive correlation, 0 is no correlation and -1 is total negative correlation. Correlation is denoted by ‘r’ called as Pearson Correlation Coefficient. If r = 0 then there is no correlation, r = -1, then it is negative correlation. If r = +1, then it is perfect positive correlation.

If r lies from 0.75 to 1, then there is high correlation
If r lies from 0.5 to 0.74, then there is moderate correlation
If r < 0.5, then there is low correlation.
In order to prove the Hypothesis 1, all those Technical competencies are selected who have ‘r’ value more than 0.75, which shows that all these competencies have strong correlation with Job performance.

Similarly for proving Hypothesis 3, all those behavioral competencies are selected which have ‘r’ value less than 0.6 because all these competencies have either low or moderate correlation with the Job Performance.

Use of Computer software is used for analysis of data:

- SPSS 13.0 update version (statistical package for the Social Sciences) was used for statistical test and analysis.
- Microsoft Office Excel 2007 was used to generate graphs, tables and percentage analysis.

3.14. LIMITATIONS OF THE RESEARCH:

The research is carried out in Pune, so researcher is not considering any other parameter, which may or may not exist at different places other than Pune City. The change in environmental factors may deviate the responses considerably.

3.15 PROBLEMS FACED BY THE RESEARCHER:

- Due to work pressure at offices, it was a difficult task approaching the respondents.
- Few respondents had inhibitions regarding filling the questionnaire and had to be convinced.
- Regular followup about getting the responses from the respondents consumed lots of energy and time.
- As the Questionnaire was a bit long, the respondents took longer to respond.
- Converting and coding of raw data into usable data took considerable efforts.
- To make cross tabulation and association of different variable.