Chapter 4

Research Methodology

“The whole of Science is nothing more than a refinement of everyday thinking”.

- Albert Einstein
4.1 Introduction

The researcher has covered an overview of the Methodological approaches and research design of the topic. The study is focused on the availability of Information Technology Services and Network Connections at Rural places in Pune District. The study is trying to find out the usage of Information Technology services in rural area also the study shall investigate the impact of IT services on the life of rural area. The study shall investigate the awareness, need, frequency of use, performance satisfaction of using, Benefits about IT services. Researcher shall investigate Internet connectivity and Mobile Services Network in rural area of Pune district and trying to understand the upcoming new technologies, and interest of rural people in using them in rural area of Pune district.

4.2 Research Methodology and research design:

4.2.1 Research Methodology:

Research mean knowledge creation, addition of new knowledge, highest level of learning, fact finding kind of problem. It is systematic process, formulation of research problem.

A research methodology references the procedural rules for the evaluation of research claims and the validation of the knowledge gathered, while research design functions as the research blueprint (Creswell, 2003).

As Sekaran (2003) further clarifies, a research methodology may be defined as academia’s established regulatory framework for the collection and evaluation of existent knowledge for the purpose of arriving at, and validating, new knowledge.
Cooper and Schindler (1998) maintain that the determination of the research methodology is one of the more important challenges which confronts the researcher. In essence, the research activity is a resource consumptive one, and must maintain its purposeful or functional activity through the justification of resource expenditure. A methodology does not simply frame a study but it identifies the research tools and strategies (i.e., resources) that will be employed, and relates their use to specified research aims. As Sekaran (2003) suggests, its importance emanates from the fact that it defines the activity of a specified research, its procedural methods, strategies, for progress measurement and criteria for research success. Within the context of the research methodology, each research poses a set of unique questions and articulates a specified group of objectives.

Methodology is a body of methods rules and postulates employed by a discipline; or a particular procedure or set of procedures, and also analysis of the principles or procedures of enquiry. It is also the collection, comparative study and the critique of individual methods in that field of enquiry. Methodology refers to rational and philosophical assumptions that underlie a study. Methodology can also be used to encapsulate various processes, activities and tasks like software development methodologies along with many others.

The scientific method used for research is known as research Methodology and it includes formation of hypothesis, testing the hypothesis, to see whether the hypothesis is accepted or rejected. Methodological research is used to create an authentic certificate and replicable study, along with an aim to describe a phenomenon, to predict it, to control and to explain in the form of a theory. There are two types of research methodology - quantitative and qualitative research.

### 4.2.2 Research Design:

The research design functions to articulate the strategies and tools by and through which empirical data will be collected and analyzed. It additionally serves to connect the
research questions to the data and articulate the means by which the research hypothesis shall be tested and the research objectives satisfied (Punch, 2000). Research design is a blueprint that guides us to undertake research on a specific problem. Research Design is path way, which design you work on, complete plan.

The researcher tried to come out with the conceptual structure within which research would be conducted. This is formulating a proper research design, which provide for the collection of relevant evidence with minimal expenditure of effort, time and money. According to the purpose of the research a suitable research design is selected. Designs can be classified as - experimental designs, field research, unconstructive research, single subject designs, evaluation research, secondary research and survey research.

- **Design of Exploratory Studies**, purpose of such studies is to achieve new insights into a phenomenon, in order; to formulate a more precise problem exploratory research will be effective if survey of literature, experience survey and analysis of 'insight stimulating' cases is adapted before the initiation.

- **Description studies**, it aims at portraying accurately the characteristics of a particular group or situation. A descriptive study may be concerned with the attitudes or views towards anything, like rights to strike, prohibition, college autonomy etc. Descriptive study involves, formulating the objectives of the study, defining the population of the study, defining the population and selecting a sample, designing the methods of data collection and analysis of the data.

- **Experimental Studies**, the purpose of experimental studies is to test a hypothesis of causal relationship between variables. A central group and an experimental group are required for this study. There are three primary characteristics of experimental research:

  1. Control of independent variable.
2. Manipulation of independent variable.
3. Observation of dependent variable.

4.3 Research Questions:

Researcher has set following questions to understand the problems and prospects of Information technology in rural area.

- What is the role of ICT for rural India?
- What are the government policies of ICT development in rural area?
- To find out the awareness of IT services in Pune District villages.
- What are the basic amenities available in rural area of Pune district?
- What are the needs of IT services and impact are seen in the rural area?
- To find out the frequency and performance of use of IT service in rural area?
- What are the benefits that occurred from the IT services?
- Which bandwidth is getting for Internet service?
- What is the reach of mobile service network and service providers available in rural area?
- To find out the awareness of new technologies are reaching in rural area?
- To find out the interest of using new technologies and response of rural to understand what type of services are more preferred.
- To find out the Kiosk center available in Pune District area, status about, which type of services are getting from the center?
- What is actual use of IT services and development?
- To find out the suitable model of Pune District.
4.4 Research Objective:

- To study the various information technology services available at rural places in Pune district, and to understand problems of connectivity at rural places in Pune District.
- To Find out the Information Technology Services requirement in Pune District
- To Study the impact of present IT facilities available at rural places of Pune District and to find out the level of usage of I.T. services at rural places.
- To study the value added services provided at rural places of Pune District.
- To find out the feasibility of upcoming network technologies for rural benefit.
- To study the willingness of the rural areas to adopt the technology in day to day life.

4.5 Research Hypotheses:

- **H1** The villagers are of the opinion that Internet services rather than entertainment services are essential and are satisfied with Internet services.
- **H2** The villagers feel that the ATM Centers are essential for Finacial Information required by them.
- **H3** Penetration of Internet is marginal but e-commerce and kiosk centers are the useful services in the opinion of villagers.
- **H4** The villagers Income group rather than the education qualification play an important role in adapting new technology such as video format MP4.

4.6 Research Purpose:

Researcher has identified three main purposes to the research activity. These are the Exploratory, Evaluate, experimental and elaborate. Exploratory, Miles and Huberman
define the function of explanatory research as the clarification of relationship between variables and the componential elements of the research problem; explore certain existing or certain situation.

Elaborate, Punch (2000) explains the purpose of the descriptive research as the collection, organization and summarization of information about the research problem and issues identified therein. Similar to the descriptive research, it renders complicated phenomenon and issues more understandable. Dane’s (1990) definition of the descriptive research and its purposes coincides with the stated. Descriptive research entails the thorough examination of the research problem, for the specified purpose of describing the phenomenon, as in defining, measuring and clarifying it (Dane, 1990). Jackson (1994) contends that all research is partly descriptive in nature. The descriptive aspect of a research is, simply stated, the (1) who, (2) what, (3) when, (4) where, (5) why, and (6) how of the study.

To answer the research question, and test the proposed hypotheses, it is necessary to ask

- “What is the government Policy for rural Development of India?”
- “What are the purpose of IT services and impact on rural places?”
- “What are the models are commonly used of Network connectivity to reach the poor people?”
- “What are the available model are sustaining in India for rural people?”
- “Which model yours suggesting for Rural Part of Pune District?”
- “Which selected group for research?”
- “What strategy of your apply for gathering information?”

These questions, immediately correlate to the research objectives, are integral to the testing of the hypotheses and are essential for the answering of the research questions. More importantly, these questions are descriptive in nature, shall be answered through
the literature review and, as such, impose a descriptive purpose upon the research undertake.

There are various techniques like survey, Interview, observation, content, analysis and research, synthesis, Meta analysis and Tools like Questionnaire, Scales, Interview, Scheduled, Observation, sheets, tests and checklist.

4.7 Research Approach:

The research approach does not simply inform the research design but it gives the researcher the opportunity to critically consider how each of the various approaches may contribute to study.

4.7.1 The Deductive versus the Inductive Approach:

The study of Deductive reasoning works from the more general to the more specific, top-down approach, the study of inductive reasoning works on moving from specific observation to boarder generalizations, bottom up approach.

4.7.2 The Qualitative vs. Quantitative Approach:

Qualitative Approach, “All research ultimately has a qualitative grounding”, says Donald Campbell “8. Objective of qualitative approach start with Formulate theory, verified theory. Researcher has found suitable for survey methodology and random sampling technique (Non Probability convenience sampling method used) and questionnaire tool used.
Quantitative approach, Data collection, compilation, formulation of groups and then data analysis processes are done by simultaneously testing cross tabulation theory. Cross tabulation theory tested are formulated and validated. It is not useful when the emergency needed situation, it takes time. Analysis proceeds by using statistics, tables, or charts and discussing how they relate to hypotheses.

4.8 Research Design:

4.8.1 Type of Research Design:

Researcher had to understand the problems and prospects of rural Information Technology Services and network problems and prospects. Since the requirements of Information Technology of various villages were to be understood and documented, an exploratory design was chosen to conduct the study.

4.8.2 Sample size and Sampling method:

As there are different types of IT requirements of in different people, looking at the universe stratified random sampling was done with the sample size of 150 (around 10% of total villages that is 1500) was selected as representation of population. The method of sampling used was non probability random sampling. Researcher has selected group of respondents like Student, Employee, Self Employee, Farmer and Other (daily wages, Landless etc.). Family structure whether joint / nuclear as well as Monthly Income (Below 3,000/ 3,000-5,000/5,000-10,000/10,000-20,000/Above 20,000)

4.9 Data Collection:

4.9.1 Collection of Primary Data:
Arthur Marwick &amp;#10; says “primary sources are absolutely fundamental to history” In addition, primary sources avoid the problem inherent in secondary sources. Researcher has collected data through questionnaire.

The purposes of gathering information were distributed among different respondents. They are designed for statistical analysis of the responses. Type were considered for the purpose i.e. some question are in the form of Yes/No type, some descriptive, for some scale was provided.

For this study researcher has selected 150 villages out of villages in Pune District and collected one questionnaire from each village. Researcher has collected basic information right from demographics as well as IT services available, usage, awareness, Need of service, benefit, Interest of using and opinion of village people.

4.9.2 Secondary Data Collection:

Secondary data for the study was taken from various Indian and Foreign surveys, manuals, websites, magazines, etc.

4.10 Analysis and Interpretation of Results:

Once the data is collected, analysis and interpretation of results is one of the important steps in research. This process is linked with various operations. Like - establishment of categories, the application of these categories to raw data through coding, tabulation and then drawing statistical inferences. There exist different categories through which new data can be classified like coding, editing and tabulation. After this classification, analysis of work is based on the computation of various percentages, coefficients etc., by using statistical methods and formulae. In the process of analysis, relationships or differences supporting or conflicting with original or new hypothesis should be subjected to tests of significance to determine with what validity of data can be said to indicate a conclusion.
4.11 Communicate Results:

After completion of communicating results is of prime importance of a research and it can be presented in different forms like graphs, statistical figures, also plain text with conclusion and recommendation. 

4.12 Questionnaire:

Researcher has designed a questionnaire to collect the required data from the select respondents from 150 villages in Pune district. Questionnaire was arranged according to selected groups of respondents.

• Question 1. General information’s to be collected form each and every respondent regarding the amenities available in the village.

• Question 2. Information regarding the awareness about Information Technology and telecommunication Services are there or not.

• Question 3. Find out the need of IT services.

• Question 4. Find out the frequency of use of IT services.

• Question 5. Find out the satisfied with the performance of IT Services

• Question 6. Find out the benefit of IT Services.

• Question 7. Find out the availability of bandwidth for Internet connection.

• Question 8. Find out the availability of Mobile Service Network in the Village with respect to connectivity.

• Question 9. Find out the awareness of new technology with respect to interest of using.

• Question 10. Find out interest of using IT services.
• Question 11. Find out the Opinion of respondent about the IT services.

4.12.1 Research Tools used:

Researcher assumed the Normal Distribution for interval estimation for the % of data with given attributes at the confidence level of 95%.

In probability theory and statistics, the normal distribution or Gaussian distribution is a continuous probability distribution that describes data that cluster around the mean. The graph of the associated probability density function is bell-shaped, with a peak at the mean, and is known as the Gaussian function or bell curve.

The normal distribution can be used to describe, at least approximately, any variable that tends to cluster around the mean. For example, the heights of adult males in the India are roughly normally distributed, with a mean of about 70 in (1.8 m). Most men have a height close to the mean, though a small number of outliers have a height significantly above or below the mean. A histogram of male heights will appear similar to a bell curve, with the correspondence becoming closer if more data are used.

Chi-square test is used by researcher to find out the dependency of the variables. This has also helped researcher to find out whether there is difference sector wise in the security requirements of the organizations.

A chi-square test (also chi-squared or \( \chi^2 \) test) is any statistical hypothesis test in which the sampling distribution of the test statistic is a chi-square distribution when the null hypothesis is true, or any in which this is asymptotically true, meaning that the sampling distribution (if the null hypothesis is true) can be made to approximate a chi-square distribution as closely as desired by making the sample size large enough.
4.13 References:


