Research Methodology

3.1 Introduction

The following chapter discusses briefly about the research paradigm, research design, types of data, sampling design, data analysis, collection and interpretation techniques adapted in this research in addition it also explains about the ethical considerations and limitations involved in this research.

3.2 Research paradigm

Cooper & Schindler (2010) define that research is a common parlance that refer to a search of knowledge. One can define research as scientific and systematic research pertinent information on a specific topic. Research is an art for scientific investigation. Research is a careful investigation or inquiry especially through search for new facts in any branch of knowledge. A research paradigm is a dynamical scientific work system including their perceived values by peer scientists, and ruled by associated citation decay, endurance and intrinsic intellectual values. Recognizing a developing research paradigm and evaluating alterations in an occurring paradigm have been a challenging activity due to the complexity and scale involved in the research paradigm.

According to Johnson & Christensen (2010), a research paradigm is a view about the research held by the researcher’s community that is based on a collection of shared concepts, assumptions, practices and values. More simply it is an approach to think about and do a research. Research represents a systematic method of exploring actual persons and groups, focused primarily on their experience within their social works and inclusive of social attributes and values. It is the mode of analysis of experiences that permit stating proposition in the firm. Overall, research is the search of knowledge through a framed objective and systematic method of finding solution to a problem. Research is also defined as a logical and systemized application of the fundamentals of science to the general and overall questions of a study, scientific techniques that provide precise tools, specific procedures and technical means that is out of philosophical thing and ordering the data prior to their logical and manipulation. A paradigm is the maze of beliefs and
perceptions. Foucault (1972) inherits that the research paradigm is a view of the researcher’s community that will help in the collection of concepts and conventions and shared assumptions. It is very important to think efficiently and do the research. Research is an art that is formed by skills of inquiry, experimental design, data collection, measurement and analysis, by interpretation and presentation. Research is the essence of an investigation, and it brings the investigation into process. Therefore, a research is the discovery of answers that are connected to the questions. It is a methodical exploration for truth, finding original acquaintance with the problem from side to side by grouping of thoughts and facts (Greenfield 1996).

A research paradigm is a dynamical scientific work system including their perceived values by peer scientists, and ruled by associated citation decay, endurance and intrinsic intellectual values. Recognizing a developing research paradigm and evaluating alterations in an occurring paradigm have been a challenging activity due to the complexity and scale involved in the research paradigm. Research paradigms fall into two categories by name (1) Positivism and (2) Interpretivism (Morris 2006).

3.2.1 Paradigm adapted

A mixed approach is adapted in this research. This study integrates Interpretivism and Positivism. Positivism is also referred to as quantitative method. Positivism considers the objective existence truth in the globe and emphasis is to put on the relationship measurement between variables to reveal that truth. These measurements are done in a statistical and systematic way. Therefore, the major focus is on validity, reliability and generalization of its predictions and measurement. There have been many positivism versions and though all favor scientific approach to observation, they are not similar with science and in natural sciences; positivism vanished as an essential position of methodology several decades ago. According to Gadamer (2006), positivism is concerned on truth, reason values and validity and there is a close eye on the real facts, collected through straight experience and observation and empirically measured using methods of quantitative approach such as surveys, statistical analysis and experiments. Positivism is
that where researchers will be able to take a scientific viewpoint while observing communal behavior, by means of an object analysis possible (Travers, 2001).

Positivism and science are identical concepts, while taking that there will be several differences integrating between a positivist attitude and a systematic approach. It is also noted that there are various conditions anywhere an inductive approach is noticeable surrounded by positivist research, with acquaintance entered throughout the collection of facts that provides the basis of laws. However, research based on a positivist viewpoint tends to be based on reducing theorizing, where a figure of propositions are generated for trying, with experiential confirmation then required (Babbie, 2005). Interpretivism is also referred as the study of methodological interpretation principles. The theory of Interpretivism is a social subjectivist paradigm member where the meaning is created inter-subjectively, parallel to based on assumed scientific realism (Berthon et al. 2002). Interpretivism concentrates on representing shared meaning of linguistics for symbol or representation.

As represented in the theory of Interpretivism to attain shared understanding, subjects must have right to interpretative resources and shared linguistics (Marshall et al. 2001). However the theory of Interpretivism considers that the meaning of linguistics is likely clear to infinite reinterpretation and interpretation due to ambiguity presuppositions existence, to usage conditions varied from intention of authors and to words evolution. Interpretivism is also referred to as qualitative research which emphasizes the approaches of constructivist. That means there is no clear cut reality or objectivity. The Interpretivism researcher’s tasks are to gain insight and the development of understanding. Interpretivism is a social subjective paradigm member where the meaning is created inter-subjectively in contrast to considered scientific realism empirical universe. Within this paradigm, some other approaches which exist are social ethnography and phenomenology. The Interpretivism focuses on the importance that reality aspect takes on for the participants under study as a part of the family of interpretative research. Interpretivism focuses on referring meaning for shared linguistic of a symbol or representation (Gummesson, 1991).
3.2.2 Justification for the paradigm adapted

Interpretivism is an approach in the study since the researcher has collected descriptive data for studying the problem proposed in the research. This research adapts positivism since it tests a research hypothesis by analyzing numerical data collected from primary respondents. In addition, the study uses both the paradigms since the researcher uses both survey as well as the interview techniques for the collection of primary data.

3.3 Research approach

Research approach as the name suggests defines the methodology by which a research is conducted. A research approach can differ essentially relying on what is to be researched if it is a scientific method or it would be proper to research common methods or other scientists who have done the experiment. There are two research approaches that are widely used. They are qualitative research approach and quantitative research approach. Qualitative research approach is concerned with the subjective assessment of attitudes, opinions, beliefs and behavior. Quantitative research approach involves in the generation of data in numerical form that might be subjected to rigorous analysis in a formal inflexible fashion.

3.3.1 Research approach adapted

The dissertation uses both qualitative and quantitative research approach. Qualitative research also known as inductive research is subjective in nature. Qualitative research is a multi method in focus involving naturalistic and interpretive approach to its subject matter. This means that the qualitative researchers study things in their natural settings attempting to make sense of or interpret phenomena in terms of the meaning that people bring to them (Burman, 1997). Quantitative research has its origin in its natural sciences. Quantitative research is descriptive in nature and is used by the researchers to understand different promotional input effects on the customer thus enabling the marketers to find the behavior of the consumer (Bryman, 1984).
These research approaches exchange the globe. They transform the globe into a collection of representations, including interviews, surveys, field notes, recordings, memos, photographs and conversations to the self. At this level, qualitative research includes a naturalistic and interpretive approach to the globe. This means that in their natural settings the qualitative researchers learn things by attempting to make sense of or perform phenomena in terms of the meanings that people bring to them. The way in which people learn interprets and understands their social reality which is one of the major motives of the qualitative research. The qualitative researcher’s practitioners depend considerably in the extent to which they depend on specific data collection methods. The qualitative research produces findings by means of quantification and by statistical procedure (Lewis Ritchie 2003). Qualitative research involves the gathering of empirical materials such as interview, personal experience, life story, case study, observational, historical, visual texts and interactional texts that characterizes the problematic and routine meaning and moments in the life of an individual. It is also the path of knowing in which a researcher collects, interprets and arranges information obtained from human using her or his eyes and ears as filters. Qualitative is the appropriate approach when anyone wants to describe and understand an interaction or experience in its own right rather than explaining it in terms of independent variables.

3.3.2 Justification for using both the approaches

In this research approach, the research field is approached with the help of observations, interviews, text analysis and analysis of various artifacts. Besides, a lot of existing literature is reviewed in order to make an interpretation. On the other hand to test a proposed research hypothesis with the help of statistical experiments quantitative analysis tools are used. Quantitative analysis makes use of numerical information. In addition, the researcher makes use of the personal interview technique with some retailers to know the exact idea on the awareness and knowledge about various leading FMCG products among consumers. So the study uses both qualitative and quantitative research approach.
3.4 Research design

Research design gives a clue about the research work. A research method that suggests a full meaning examination of a real-life modern occurrence in its usual background is a case study (Woodside 2010 & Yin 2012). There are three perfect circumstances for conducting a case study advocated by Yin (2009) in contrast to the additional research methods in social sciences, experiment, survey, archival analysis and the past. First, the shape of asking a study question will be in the appearance of why or how. The residual two settings are that no rejection manage is needed over behavioral actions that are being studied and the learning spotlights on current events. Thus, a case study should be based on a contemporary event as opposed to a historical one. The research design is the conceptual framework within which the research is conducted. The research design forms the blueprint for measurement, gathering and data analysis. Also the research design consists of an outline of what the researcher will do. A research design configures the logical manner in which other units or individuals are analyzed and compared and it is the basis of making interpretations from the data. Research design is also the strategy, plan and structure of investigation obtained so as to gain responses to research queries and control variance. A good research design requires clarity in the work and the problems must be well defined. The identification of the variables must be easy and simple. A good research design must serve all the validity needs. The research design is divided into two types. Exploratory research design and conclusive research design. The conclusive research design is further divided into descriptive research design and causal research design.

3.4.1 Exploratory research design

Exploratory research design is used to identify the reasons behind the occurrence of a particular problem. Exploratory research design helps in defining a problem in a precise manner, gathering data or information that is relevant to the research problem and identifying alternative actions that helps in dealing with the research problem. Exploratory research is in general a meaningful one when the researchers do not have proper understanding on how to proceed with a research work. Exploratory research
targets to enhance initial insights or hunches and to offer direction for any further required research. Exploratory research is most useful when a decision maker wishes to understand a situation better or recognize the alternatives of the decision (Frey, Lawrence, Carl Botan, & Gary Kreps 2000)

3.4.2 Conclusive research design

Conclusive research design is a well structured and formal when compared with exploratory research. Conclusive research is always quantitative and may be produced to the sampled population. Conclusive research is a structured gathering and analysis of data belonging to a particular problem or issue. It is more concentrated than exploratory research and needs big samples and several limited queries to offer quantitative data to make decisions. Conclusive research is based on samples that are large and is used to assist in identifying and selecting the best action in a particular situation. Conclusive research design is divided as the following.

Casual research design is used to investigate the cause and effect relationship between the variables. Causal research identifies the extent to which variables are interrelated to each other. On the other hand descriptive research is used to describe a specific phenomenon. It is an effective way to obtain the information by formulating the hypotheses. Descriptive research, describes the behaviours and attitudes identified during a research investigation. Its major goals are to recognize new facts about events, people, activities or situations or frequencies with which specific events exist. The major need of descriptive research is the explanation of the state of affairs as it occurs currently. Descriptive research is structured and preplanned since the information required is clearly defined (Trochim 2010).

3.4.3 Research design adapted in this study

The study uses both the descriptive and exploratory research designs. According to Best & Kahn (2007), the term descriptive research has often been used mistakenly to describe three types of investigation that are alike. Possibly their exterior similarities have hidden their distinction. Each of them admits the procedure of restricted
examination during the collection and study of observed data, and both attempts to increase the awareness. To be finished proficiently, each needs the skill of watchful and organized researcher. A concise clarification could provide everyone one in appropriate perception. The method of research, which concerns itself with the at hand phenomena in terms and conditions, practices beliefs, processes, relationships or trends invariably, are termed as descriptive survey study. According to Aggarwal (2008), descriptive research is dedicated to the gathering of information about current conditions or situations for the function of narrative and understanding. This type of research method is not just buildup and tabulating particulars other than it includes appropriate analyses, understanding, comparisons, recognition of trends and associations. It is worried not only with the individuality of individuals but also with the uniqueness of the whole sample. It gives information which is helpful to the solutions of narrow issues. Survey may be qualitative or quantitative in verbal or mathematical form of expression; the studies are truthful and hence provide sensible information.

Exploratory research design is also known as formulating research study, the main aim of this research design is to formulate a problem or develop the hypothesis. Exploratory research design provides insights into the comprehension of the issue or situation. The exploratory research design will always rely on the secondary source of data like literature, journals etc.

3.4.4 Justification for adapting both descriptive and exploratory research design

The researcher used both the designs since; the study needs to be accurately formed. Exploratory research design is used to find and test the concepts, before they are put in the actual place. Results of the exploratory research design will provide an insight about the study and it will not lead to any misinterpretations and own opinions and ideas. This type of research helps to find the true knowledge of the problem. The researcher as well as uses the observational technique to find the primary data collection. Descriptive research design is used to describe the numerical data and to know the quantitative data. The consumers of the place will be surveyed in order to find the awareness of the product in the minds of the consumers.
3.5 Sampling design

Sampling design or plan is the method that is used to select participants from the accessible population. Sampling design is the framework of the samples that are to be chosen. Samples are chosen to save money and time. In addition, samples are used to broaden the study with the limited resources. Further, samples will save in case if the research becomes destructive. Choosing samples are the only sole way if in the case of accessing the whole population is not possible. There are two types of sampling techniques such as probability sampling and non probability sampling technique. Probability sampling or random sampling is the one in which each member of the specific population has similar probability of being selected. Probability sampling calculates the sampling error. The probability sampling methods are: 1) Cluster sampling; 2) Simple random sampling; 3) Stratified sampling; 4) Systematic sampling; and 5) Multi stage sampling (Guthrie 2010).

Sekharan (2010) clarifies the non-probability sampling is one in which the samples are not chosen randomly. Here one chooses customers based on the judgment of the researcher, convenience or other nonrandom process. Since subjectivity is involved in the process of sampling every customers probability is not decided which is being included in the sample. As an outcome the sampling error cannot be measured and there is a high risk and statistical inference concerned on a non probability sample which will be biased. There are 4 kinds of non probability sampling such as: 1) Judgment sampling; 2) convenience sampling; 3) Snow ball sampling; and 4) Quota sampling.

3.5.1 Sampling design used in this study

The study uses cluster sampling as well as convenient sampling. Cluster sampling is a sampling technique where the entire population is divided into groups, or clusters, and a random sample of these clusters are selected. All observations in the selected clusters are included in the sample. Cluster sampling is typically used when the researcher cannot get a complete list of the members of a population they wish to study but can get a complete list of groups or 'clusters' of the population. In this technique, the total population is divided into these
groups (or clusters) and a sample of the groups is selected. Then the required information is collected from the elements within each selected group. This may be done for every element in these groups or a subsample of elements may be selected within each of these groups. A common motivation for cluster sampling is to reduce the average cost per interview. One version of cluster sampling is area sampling or geographical cluster sampling. Clusters consist of geographical areas. Because a geographically dispersed population can be expensive to survey, greater economy than simple random sampling can be achieved by treating several respondents within a local area as a cluster.

Frey (2000) describes quota sampling is the one where respondents are selected non-randomly on the basis of their known amount of population. Gary & Henry (1990) describe quota sampling as separating the population collection into subgroups and according to the proportions, interviewers are given a digit of unit from each subgroup so that they can select and Interview. Henry compares quota sampling to stratified probability sampling but it gives a big difference. Quota non-probability sampling and stratified probability sampling are different in which quota sampling allows the interviewer prudence in the collection of the individuals for the sample.

3.5.2 Justification for the sampling technique followed

This technique is used to identify the views of the consumers. This sampling technique is widely used on consumer surveys, so this study is taken here. This will use the principle of stratification and will lead the researcher to construct the strata. With the strata formed, the next thing is the formulation of the stratum. This consumer survey project will well suit only with the quota sampling technique. Convenient sampling is used to select the retailers for the sake of personal interviews of qualitative study.

3.5.3 Sampling unit

The sampling unit considered for this study is the people of Gujarat residing in the selected villages. The research will be conducted throughout the Gujarat. The survey will be taken from the village heads in the sample area. The villages of south Gujarat, central
Gujarat, north Gujarat and Saurashtra were chosen as sample area. The each sample area was surrounded with 2000-5000 people and the people are away from the neighborhood of the city area. Apart from the people of the villages, the retailers from the city side will also be interviewed.

3.5.4 Target population

The target population for the quantitative study is the people and village heads from Gujarat state. The qualitative study is be conducted with some retailers of the city in order to get the accurate results.

3.5.5 Sample size

The sample size for quantitative study is chosen from the four geographical areas. That is from South Gujarat, Central Gujarat, North Gujarat and Saurashtra. From each zone, a number of 385 people will be surveyed totally from the four areas; the sample size would be 1540. The calculation for fixing the sample size is:

\[ S = \frac{Z^2 \cdot P \cdot (1-P)}{d^2} = \frac{(1.96)^2 \cdot 0.5 \cdot 0.5}{(0.05)^2} = 385 \text{ customers.} \]

Following are the values for the equation

\[ Z = Z \text{ VALUE} = 1.96 \]
\[ P = \text{Proportion value (0.5)} \]
\[ d = \text{Precision Level} = 0.05 \]

In addition, retailers have been interviewed to get the entire details of the awareness of the products among consumers.

3.5.6 Sampling plan
The sampling plan decided for this study is to collect the survey from a number of 1540 people and village heads throughout the villages of Gujarat. The people will be handed out the survey questionnaires, which contains structured questions. In addition, some retailers will be interviewed and observational studies will be conducted. The questionnaire will be prepared in local languages as well as in English to avoid the language inconvenience. The people and retailers will be interviewed and surveyed directly to collect the primary data.

3.6 Data collection method

Research will be true and precise only in the collection of data. The core of data collection begins only after the designing part of the research problem. For the purpose of collecting data, a number of research instruments will be used. For adequacy and validity in research it is required that the instruments are to be designed properly. A high quality research instrument, should be not only well suited to the research requirement, but also designed to be as user friendly as possible. Instrument design requires the expertise to design custom questions to meet specific and unique requirements. The data collection is classified into primary data collection and secondary data collection (Krishnaswamy, Sivakumar & Mathirajan 2010).

3.6.1 Primary data collection followed in this research

Tashakkori, & Teddlie (1998) describes the data that is collected directly from the respondents and samples are possibly known as primary data collection. The primary data is collected from the people and village heads of the entire regions of Gujarat. Further, the retailers have been personally interviewed. Questionnaire is an important step in formulating the research design. It is specifically intended to obtain particular kinds of data. It should be designed therefore according to some set specifications and with specific goals in mind. A questionnaire cannot be judged as good or bad, efficient or inefficient unless the job is intended to accomplish as known. A questionnaire consists of a set of well-formulated questions to obtain and probe responses from the respondents. Questionnaires are easy but are an effective source for gathering the primary data. This
specific research makes use of questionnaires to gather primary data. Well structured questions will occupy the questionnaire and that will be distributed directly to the village heads and to the people of the villages to collect the primary data.

3.6.1.1 The Experts opinion in questionnaire design

After thorough literature review there were certain parameters and variables which were taken into consideration for designing the questionnaire to fulfill all the objectives in the study. The experts do not want their names to be disclosed and want their opinion to be shared without giving out their names. The experts include the Area marketing manager (Surat) and the marketing head for Gujarat from a very well known FMCG company. The other experts are the marketing executives from other well-known company. The opinion was also taken from the distributors of FMCG products across Gujarat so as to know if all the questions included were valid and would justify the study.

The experts believed that the rural people do not buy products on their own always, they can be easily influenced. They may not be always affected by the advertisements. So the factors which can influence the people have been included. The importance of price
factor and discounts was studied in the literature and all the statements included in the questionnaire were approved by the experts. The most exciting part of the questionnaire is the wide availability of counterfeit products in the rural areas. This was discovered during the pilot visit and was also discussed by the experts. All the experts considered it a threat but also gave suggestions on the inclusion of some of the items.

3.6.2 Secondary data collection method used in this research

Secondary data is the information which already exists in some form or other which was not primarily collected initially for the purpose of data at hand. Secondary data is often the start point for data collection as it is the first type of data to be collected. A major limitation is that the secondary data has already been collected for something other than the current research problem. Such data may not address the topic in question or may only provide a part of the information expected. That information may not be accurate or it may be outdated. It is very important to examine the secondary data first since these can provide invaluable background information that can be used to define the project, develop objectives and specify the most appropriate methodology. Secondary data is one that is available in advance and could be accessed through external materials. This study makes use of books, journals, research papers and internet related to agile project management in order to collect the secondary data. For this research secondary data is also gathered from the websites of target companies (Thomas, 2003).

3.7 Analysis and Interpretation of data

Burgess (1989) described that the analysis and interpretation of data involves the objective material in the possession of the researcher and his subjective reaction and desires to derive from the data the inherent meaning in their relation to the problem. To avoid making conclusions of interpretation from insufficient or invalid data the final analysis must be anticipated in detail when plans are being made for collecting the information. The problem should be analyzed in detail to see what data are necessary for its solution and to be assured that the methods used will provide definite answers. The researcher must determine whether or not the factors chosen for the study will satisfy all
the conditions of the problem and if the sources to be used will provide the requisite data. Similarly Dane (2010) described that the effort and time needed for the data analysis and interpretation rely on the study methodology and the purpose used. Analysis and interpretation may take from many days to many months. In several private studies of research involves only an individual query data analysis and the interpretation may be finished in a fraction of seconds. Each research study must be carefully planned and operated according to particular guidelines. When the analysis is finished the researcher must step back and assume what has been invented. The researchers must determine the perfect analysis whether their work is valid externally or internally.

3.7 Research Questions

i. To what extent are consumers belonging to rural part of Gurajat aware of the availability of various brands of skin care, hair care and laundry products in the market?

ii. How does demographic profile of rural consumers in Gujarat affect their purchase decision towards a particular brand?

iii. How do rural retailers’ influence the purchase decision of rural consumers in Gujarat?

iv. What distinctive competencies do rural retailers in Gujarat possess in order to retain their customers?

v. Are the rural consumers aware of various communication medium used by FMCG marketers in promoting their brands?

vi. How does the various communication medium used by FMCG marketers in promoting their brands influence the purchase decision of rural consumers of Gujarat?

3.8 Objectives of the Study

i. To study the behaviour and degree of awareness of rural consumers in Gujrat towards the selected FMCG products -
Skin Care Products:  
a) Bathing Soap  
b) Face cream  
c) Talcum Powder  

Hair Care Products:  
a) Hair Oil  
b) Shampoo  

Laundry Products:  
a) Washing soap  
b) Detergent powder  

ii. To understand the impact of awareness of consumers on their purchase decision of selected FMCG product categories.  
iii. To determine the effect of demographic profile of rural consumers on the purchase decision of selected FMCG product categories.  
iv. To comprehend the ability of rural consumers towards differentiating original and counterfeit brands in the selected FMCG product categories.  
v. To assess the role of various media instruments utilized by marketeeres of selected product categories, in order to reach out to rural consumers.  
vi. To determine the role of retailers on spreading awareness of selected FMCG products, and its impact on the consumers’ purchase decision.  

3.9 Hypothesis  

H1: customers are aware about the selected fmcg products available in the rural markets  
H2: Customers decision of buying a particular brand of product depends upon the income, age, lifestyle, gender and educational background.  
H3: Customers are not aware about the genuine brands available in the rural markets
H4: customers cannot differentiate between a genuine brand and a counterfeit product available in the rural markets.

H5: The ability of consumers’ to differentiate the genuine brand and counterfeit brands is influenced by their demographic variables (Age, Income, Education and gender).

H6: Rural retailer’s impact consumer’s decision for purchasing the brands in the rural markets.

H7: Consumers are aware about the different support media (video on wheels, folk programmes, hoardings on animal carts).

H8: consumer’s purchase a brand in the rural market which has an impact on the communication done through support media.

3.10 Statistical tools employed:

This study employs the following statistical tools to analyze the primary data collected. They are

i. Graphical method

ii. Simple percentage method

iii. ANOVA

iv. Chi-square

v. Factor analysis

vi. T-Test

vii. Correlation

i. Graphical method

Graphical method is the process of presenting the collected primary data in visual form or form of figures. There are many forms of graphical representations such as histograms, bar charts, pie charts and scatter diagrams. The biggest advantage of using a graphical method is to present the data in a readable form. This study uses bar charts for representing the data.
ii. **Simple percentage analysis:**

In making comparison between more than 2 series of data simple % analysis is used. Percentages are used to represent relationship percentages that can be used to compare similar terms in this method.

\[
\text{Percentage} = \frac{\text{No of responses}}{\text{Total number of responses}} \times 100
\]

iii. **ANOVA**

Analysis of variance is an extremely useful technique concerning the research. This is used when multi sample are involved. Anova is an extreme procedure for testing the difference among different groups of data for homogeneity. “The essence of ANOVA is that the total amount of variation in a set of data is broken down into two types such as:

- ONE-WAY ANOVA
- TWO-WAY ANOVA

If we take only one factor and investigate the differences amongst its various categories having numerous possible values one-way anova can be used. When we investigate two factors at the same time then we can use two-way anova.

iv. **Chi-square**

In this project chi-square test was used. This is an analysis of technique which analyzed the stated data in the project. It analyses the assumed data and calculated in the study. The Chi-square test is an important test amongst the several tests of significant developed by statistical. Chi-square, symbolically written as \( x^2 \) (Pronounce as Ki-Square), is a statistical measure used in the context of sampling analysis for comparing a variance to a theoretical variance. The equation is as follows:
Factor analysis is a statistical method used to describe the variability among observed, correlated variables in terms of potentially lower number of unobserved variables called factors. In other words, it is possible, for example, the variations in three or four observed variables mainly reflect the variations in fewer such unobserved variables. Factor analysis searches for such joint variations in response to unobserved latent variables.

3.11 Software tools used

3.11.1 Software tools used for quantitative analysis

The statistical tools are implemented with the help of the following software tools

i. Microsoft Excel

Microsoft Excel is used to create graphs for the evaluated percentages from the collected primary data in this study.

ii. SPSS

According to Gupta (2000, p 142) SPSS is the acronym for Statistical Package for Social Sciences. It is a famous statistical program used in different scientific disciplines. In 1968 the SPSS first version was established and SPSS was founded by Norman Nie a science student of Standford University. SPSS is one of the vast used programs for making statistical analysis in research and social science practices. The most similar area of SPSS uses are product research, marketing research, government research, marketing
organizations, medical and health research, companies survey, educational research and so on. The different vastly used and benefited SPSS features are data processing and management, statistical analysis, creating derived data, data documentation, case selection; file reshaping and data compilation and so on. SPSS is basically a comprehensive system which is used for analyzing the data. It can take data from almost any kind of file and use them to produce tabulated charts, reports and plots of trends and distribution, complex statistical analyzes and descriptive statistics. SPSS makes statistical analysis more accessible for the beginner and easier for the experienced user. It provides an efficient and easy spreadsheet like facility for entering data and searching the working data file. For windows SPSS is a package that will operate a vast number of statistical procedures. The data analysis and management can be handled well with SPSS. Using SPSS the user can make graphs, manipulate data and perform statistical techniques varying from means to regression.

Similarly Brace N, Kemp R and Snelgar (2006, p 2) described that SPSS is a vastly used computer program configured to lead the statistical data analysis specifically data gathered in the course of research. In different forms SPSS has been around for several years and has become the industry standard software for the analysis of data. SPSS is a software which is most vastly used by university researchers specifically those working in social sciences and psychology. SPSS is also vastly used in government and private research organizations and several big private companies.

3.11.2 Software tool used for qualitative analysis

According to Travers (2001) content analysis is the generic name for text analysis that involves comparing, contrasting and categorizing a corpus of data in order to test the hypothesis. It is also the process of organizing and integrating narrative qualitative information according to themes and concepts. Text analysis is a procedure for analyzing written or verbal communication in a systematic and subjective fashion.

3.12 Strategies for validating findings:
The dissertation adapts both qualitative and quantitative research design. So the following are the strategies used in validating the findings.

3.12.1 Strategies for validating quantitative technique

The strategies for quantitative analysis are as follows

3.12.1.1 Reliability

In measuring the correctness of the instrument used to collect data is used in reliability (Taylor 2006). The data is gathered by handling the questionnaires to primary respondents belonging to target construction companies in this research. In the research to assure that there is no bias in the gathered material, the researcher has assured that every respondent has responded to the entire questions.

3.12.1.2 Validity

Validity is a technique that ensures all the requirements of the research that are met by the results obtained (Coleman, 2007). Validity is maintained by gathering literature similar to safety factors affecting the construction sites in this research. Validity has been managed in this study by framing a questionnaire in such a way that it contains concepts that are relevant to the research objectives and review of literature.

3.12.2 Strategies for validating findings for qualitative analysis

The following are the strategies for validating quantitative analysis

3.12.2.1 Credibility

The quality of qualitative research can be increased by integrating credibility, dependability and transferability. Credibility relies on: 1) the researcher’s credibility; 2) rigorous methods; and 3) philosophical belief in the value of qualitative research. Rigor in qualitative research defines in employing a systematic approach to research design by careful gathering and analysis of data and effective communication. The researcher’s
Credibility is reflected in person’s experience, training and presentation of the credentials. Credibility is assumed as a qualitative research’s analog to quantitative research concept of internal validity (Patton, 2002).

3.12.2 Transferability

Malterud (2001) described that transferability is common to external validity. External validity is the capability to generalize the outcomes of a specific study to other individuals, settings and times. In general qualitative research is not generable. Qualitative research findings can be transferable to other population in common situations. A qualitative research provides the researcher rich and thick descriptive findings that can sometimes be transferred to other settings, times and persons and even other kinds of phenomena.

3.12.3 Dependability

Dependability is common to reliability. In quantitative research dependability is the extent to which the outcomes of research are stable, consistent and dependable. In qualitative research dependability focuses on whether the outcomes found are stable to the data collected. In qualitative research the reliability notion is on re-existence or replication of the behavior under observation which is problematic because human behavior is never static. Dependability may be developed by using several strategies such as dense description methods that is used to conduct the study and triangulation (Crowther and Lancaster, 2008).

3.12.4 Conformability

According to Chilisa and Preece (2005) Conformability is similar to objectivity in quantitative research. It defines to the extract to which the findings in the study can be traced to the data derived from the informants and the settings of research and not to the biases of the research. Some of the strategies of developing conformability namely triangulation and reflexivity are discussed under credibility. Another necessary strategy in conformability is auditing. This strategy consists of an external auditor who follows through the steps in the progression of the research study and tries to understand how and
why determinations were made. Audit ability also implies another researcher who could exist at comparable conclusions given to the similar data and research context.

3.13 Ethical considerations

There has to be some basic ethics that are to be adapted in any research. The researcher maintains ethics in this study by keeping the responses obtained strictly confidential and is limited to the research only. Besides, the researcher took a prior permission from the head and people of the villages before conducting the research.

3.14 Limitation of the research

The major limitation of the research is the time constraint and the extensive travel while the job is still on. The unawareness of the products and the willingness to answer the questions among villagers is the greatest limitation and problem in the study. The villagers need a higher level of confidence in the researcher as they still do not let their women meet and talk to the strangers.

3.15 Summary of research methodology used

The chapter clearly describes about the research methodologies used in the whole dissertation. A mixed approach is adapted in this research. This study integrates Interpretivism and Positivism. The dissertation uses both qualitative and quantitative research approach. The study uses both Descriptive and exploratory research designs. The study uses cluster sampling as well as convenient sampling. The sampling unit is the people of Gujarat. The target population for the quantitative study is the people and village heads of the Gujarat state. The qualitative study will be conducted with some retailers of the city. The sample size for quantitative study is chosen from the four geographical areas, that is from South Gujarat, Central Gujarat, North Gujarat and Saurashtra. From each zone, a number of 385 people will be surveyed so totally from the four areas, the sample size would be 1540. This section besides explaining the statistical tool required for testing the proposed research hypothesis has explained how the researcher has managed to maintain the validity and reliability despite of several limitations involved in conducting the research.