Chapter 3

RESEARCH METHODOLOGY

Research is a process of enquiry and investigation; it is systematic, methodical and ethical. Research can help solve practical problems and increase knowledge. The purpose of research is to:

- Review or synthesize existing knowledge
- Investigate existing situations or problems
- Provide solutions to problems
- Explore and analyze more general issues
- Construct or create new procedures or systems
- Explain new phenomenon
- Generate new knowledge

Table 7 - Different Types of Research:

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<tr>
<th>Exploratory</th>
<th>Descriptive</th>
<th>Analytical</th>
<th>Predictive</th>
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<td>Exploratory research is undertaken when few or no previous Studies exist. The aim is to look for patterns, hypotheses or ideas that can be tested and will form the basis for further research.</td>
<td>Descriptive research can be used to identify and classify the elements or characteristics of The subject, e.g. number of days lost because of industrial action.</td>
<td>Analytical research often extends the Descriptive approach to suggest or explain why or how something is happening, e.g. underlying causes of industrial action.</td>
<td>The aim of Predictive research is to speculate intelligently on future possibilities, based on close analysis of available evidence of cause and effect, e.g. predicting when</td>
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Typical research techniques would include case studies, observation and reviews of previous related studies and data. An important feature of this type of research is in locating and identifying the different factors (or variables) involved.  

**Research approaches:**
Research can be approached in the following ways:

**Figure 5 – Research Approaches**

- Quantitative/Qualitative
- Applied/Basic
- Deductive/Inductive
QUANTITATIVE / QUALITATIVE RESEARCH

Quantitative research involves collecting and converting data into numerical form so that statistical calculations can be made and conclusions drawn. This type of research methods requires quantifiable data involving numerical and statistical explanations. Quantitative analysis hinges on researchers understanding the assumptions inherent within different statistical models. It generates numerical data or information that can be converted into numbers. The presentation of data is through tables containing data in the form of numbers and statistics.

Qualitative research is the approach usually associated with the social constructivist paradigm which emphasizes the socially constructed nature of reality. It is about recording, analyzing and attempting to uncover the deeper meaning and significance of human behavior and experience, including contradictory beliefs, behaviors and emotions. Researchers are interested in gaining a rich and complex understanding of people’s experience and not in obtaining information which can be generalized to other larger groups.

This type of research methods involve describing in details specific situation using research tools like interviews, surveys, and observations. It focuses on gathering of mainly verbal data rather than measurements.

Quantitative research is therefore an appropriate strategy for this study. It describes how things are and tries to identify the reasons why they are so. In addition,

Quantitative research provides the following advantages:

1. It is used as a tool for the hypotheses examination,
2. It supplies ‘workable data’ that is easy to analyze,
3. The results provided are more likely to be generalized and used later on for a similar research,
4. Considering the settings and time limitations of the research, this method is more likely to provide more responses.
Basic/applied research:

The primary aim of Basic Research is to improve knowledge generally, without any particular applied purpose in mind at the outset. Applied Research is designed from the start to apply its findings to a particular situation.

Deductive/inductive research:

Deductive research moves from general ideas/theories to specific particular & situations: the particular is deduced from the general, e.g. broad theories whereas inductive research moves from particular situations to make or infer broad general ideas/theories.

Research Methodology

This chapter provides information on research methodology used in the research. Research methodology or as we now say research methods is made up of two words-Research and Methods. Research means gathering information, reviewing and collating research done by others and methods is used for a specific research method such as questionnaire, interview or observation.

Research Methodology is a way to find out the result of a given problem on a specific matter or problem that is also referred as research problem. In Methodology, researcher uses different criteria for solving/searching the given research problem. Different sources use different type of methods for solving the problem. If we think about the word “Methodology”, it is the way of searching or solving the research problem. (Industrial Research Institute, 2010).

In Research Methodology, researcher always tries to search the given question systematically in his own way and find out all the answers till conclusion.

The chapter will describe the procedure used in getting an answer to our purpose, and the various ways through which we collected data. Problems and limitations of types of data used during our work will also be discussed in this chapter. Hence the chapter will focus on how the information was collected and finally analyzed to give meaningful inferences.
This research process is a multiple-step process where the steps are interlinked with the other steps in the process. If changes are made in one step of the process, the researcher must review all the other steps to ensure that the changes are reflected throughout the process.

Figure 6 – Research Process

Step 1: Identify the Problem

The first step in the process is to identify a problem or develop a research question. It helps in understanding as to what the researcher wants in the research without which the research would be baseless and meaningless. Hence identifying the problems is helpful for checking the adequacy for meeting our research goals. The research goals or questions should be unambiguous cleared and should clarify the meaning with reference to practical and theoretical outcomes.

The researcher in the present research through its literature review could make out that the buying process is not that simple. The buying process goes through different stages starting from introduction, influencing, decision making with regards to choosing referred channels
for purchase and making brand choice at pre store to in store. The problem for marketer is to understand the factors that influence the consumers during the buying process stages itself. the researcher identified this problem through his research intend to understand those factors and provide a workable solution to the marketers in influencing consumers towards their products.

**Step 2: Developing the Objectives and Hypothesis**

Objectives are the goals you set out to attain in your study. They inform a reader what you want to attain through the study. It is extremely important to word them clearly and specifically.

Objectives should be listed under two headings:

a) Main objectives (aims): the main objective is an overall statement of the thrust of your study.

b) Sub-objectives: The sub-objectives are the specific aspects of the topic that you want to investigate within the main framework of your study.

After setting the objectives hypothesis are made. Hypothesis is tentative assumption made in order to draw out and test its logical or empirical consequences. As such the manner in which research hypotheses are developed is particularly important since they provide the focal point for research. They also affect the manner in which tests must be conducted in the analysis of data and indirectly the quality of data which is required for the analysis. It sharpens his thinking and focuses attention on the more important facets of the problem. It also indicates the type of data required and the type of methods of data analysis to be used.

The researcher steps ahead to develop the list of information needed to frame the particular objectives. This enabled the researcher to streamline the research process. The first step in this direction was to understand consumer durable category. It was identified that this category can be divided into home appliances and electronic goods. The literature review reveals that purchase behavior towards both the categories is different and hence the objectives and hypothesis were framed. The next step in framing the objectives and hypothesis was to understand the buying decision making process and the stages involved in it. The problem identified by the researcher suggested that there are different stages of buying
decision making process and the roles of different factors influencing the stages are significantly different.

**Step 3: Define the Population and determining the Sample Design**

In research terms, the group to involve in the study is always called the population. Defining the population assists the researcher in several ways. First, it narrows the scope of the study from a very large population to one that is manageable. Second, the population identifies the group that the researcher’s efforts will be focused on within the study. Finally, by defining the population, the researcher identifies the group that the results will apply to at the conclusion of the study. Census inquiry is not possible in practice under many circumstances. Hence, quite often we select only a few items from the universe for our study purposes.

Sample is mainly a small representative group of people that reflects all potential consumers. Sample selection is derived from consideration of the relevant systematic and variable errors that might occur during the research process.

According to Smith, Albaum, 2005 there are several compelling reasons for sampling, including:

1. lower cost,
2. greater accuracy of results,
3. greater speed of data collection,
4. availability of population elements.

There are two types of sampling to choose: nonprobability and probability sampling. Probability sampling is based on the concept of random selection – a controlled procedure that assures that each population element is given a known nonzero chance of selection. In contrast, nonprobability sampling is the items so selected constitute what is technically called a sample. The researcher must decide the way of selecting a sample or what is popularly known as the sample design. In other words, a sample design is a definite plan determined before any data are actually collected for obtaining a sample from a given population. Adult members above 18 years were selected. The market for consumer durables is growing. Delhi NCR was chosen as the sample area for the study. Delhi is the hub of ideas and has people from different states. It has people from extreme North to Extreme south to East and West. The population can be a good representation of the entire country. With in
Delhi NCR efforts were made to choose sample from 5 different areas i.e Delhi, Ghaziabad, Faridabad, NOIDA and Gurgaon. Equal number was chosen as sample from these areas. The reason for dividing them into equal number from all areas was to ensure that the representation of population was from all income groups and all lifestyle situations. Convenience sampling technique was used. Selection of sample is left primarily to the researcher. It is least expensive and least time consuming of all the techniques. But is a not representative of any definable population. It is used for generating insights.

1000 adults were given questionnaires outside malls and shopping places. Out of 1000 only 509 answered and out of that 405 were fully filled. We in order to perform analysis tools correctly took 400 sample were 200 were for Home appliances and 200 for Electronic goods. The sample size is respectable enough to give results.

There are various formulas for calculating the required sample size based upon whether the data collected is to be of a categorical or quantitative nature. These formulas require knowledge of the variance or proportion in the population and a determination as to the maximum desirable error, as well as the acceptable Type I error risk (e.g., confidence level). Many researchers suggest that it is good to have Confidence Level = 95% and Margin of Error = 5%. However, a 10% interval may be considered unreasonably large. For more precision greater confidence is desired (0.01). Professional researchers typically set a sample size level of about 500 to optimally estimate a single population parameter (e.g., the proportion of likely voters who will vote for a particular candidate). This will construct a 95% confidence interval with a Margin of Error of about ±4.4% (for large populations). The formula used for these calculations is the one used by Krejcie & Morgan in their 1970 article “Determining Sample Size for Research Activities” is:
The researcher in this research used the standard table developed by Krejcie & Morgan. The Population of Delhi according to the 2011 census stands at about 16 million, making it the 18th most populated state in India. He found that the population for the survey above 18 year and above poverty line according to the census report is approximately 10 million. Hence the sample size according to the table in attached in annexure at 5% margin of error and after applying reduction formula will be 384. Thus the researcher finally performed the research on 400 consumers.

**Step 4: Data collection Methods**

A research cannot be done properly till an appropriate method of data collection is used. There are two types of research. One is exploratory and the other is conclusive. Exploratory research is done by secondary data search and through analysis of cases. This is the quickest and most economical way for research to find out possible hypotheses. In this study also secondary data was used for setting hypotheses. Secondary information has two types – internal and external. Internal information can be found within the company past researches and report whereas external is outside of the company. Using internal secondary information will help us find product range in area, kind of formats and industry, sales by area, sales volume from different formats, percentage share of sales by product model, product size etc. External secondary information allows verifying overall size of market, characteristics of market, features of competitor products, prices, and promotion. Census reports, research papers, official records, published material, publically circulated reports of projects, newspapers and e-material has been used in the research. This type of data is obtained quickly and provides information that could not be obtained by typical organization. The

\[
\text{n} = \frac{X^2 \cdot N \cdot P \cdot (1-P)}{\left(\text{ME}^2 \cdot (N-1)\right) + (X^2 \cdot P \cdot (1-P))}
\]

Where:

- \(n\) = sample size
- \(X^2\) = Chi – square for the specified confidence level at 1 degree of freedom
- \(N\) = Population Size
- \(P\) = population proportion (.50 in this table)
- \(\text{ME}\) = desired Margin of Error (expressed as a proportion)
biggest drawback of such method is that it is difficult to find accurate data and hence no conclusions can be drawn from it for decision making purposes.

Hence conclusive research is done through primary data. The main advantage of primary data collection is it’s up to date information which respond researcher's main criteria—the extent of the obsolescence of collected data. That is why primary data gives more realistic view to the researcher. Another advantage is that primary information can be collected in varied ways from interview to email questionnaire. This gives researcher flexibility in choosing process. Cost and time spend to acquire this type of information varies. It can be attributed to the quantity of respondents should be asked, their accessibility in terms of location and etc. So, it is the researcher who decides whether to collect primary data or not based on availability of secondary data, time and budget of research. The collection of Primary data is a critical step in providing the information needed to answer the research question. Every study includes the collection of some type of data—whether it is from the literature or from subjects—to answer the research question. In conclusive research descriptive studies are used. Descriptive studies attempt to obtain complete an accurate description of situation. It includes survey and fact finding enquiries of different kinds. In this research one does not have any control over the variables and only one can report to what has been found.

Formal designs are made to collect data. The questionnaire is a structured technique for collecting primary data in a marketing survey. It is a series of written or verbal questions for which the respondent provides answers. A well-designed questionnaire motivates the respondent to provide complete and accurate information.

**Steps used by this researcher in designing the questionnaire**

1. **Specify needs:**
   Before framing the questions for the questionnaire the researcher has to specify needs. The questions will provide us information related to their buying behavior and the factors affecting the consumers. The questions should also help us in differentiating between the decision making process towards kitchen appliances and electronic goods. The information related to the differences in role of factors with in each stage should also be obtained from the questions.
2. **Determine the type of schedule to be used**
   Keeping the population to be studied and the result expected from the study it was decided to make a structured non-disguised schedule. Structured interview schedule includes a set of questions in a given sequence. This reduces the chances for the interviewer to influence results through different phrasing of questions. It provides more reliable results. The data obtained through this technique can be easily tabulated and interpreted.

3. **Determine the content of individual questions.**
   It includes questions like
   
   a. Is the question necessary?
   b. Does the respondent have the information required?
   c. Will the respondent have to do a lot of work to get the information?
   d. Will the respondent give information?
   e. Are several questions needed instead of one?

   It is important to determine content of the questions. The researcher made sure the importance of the questions and also the relevance of the questions. Also he ensured if several questions were needed instead of one or that the questionnaire should avoid leading questions, avoid implicit assumptions, the questions should be in proper order and should be in a proper form and layout.

4. **Determine the type of question to use:**
   The questions used were both closed ended and open ended. The open-ended questions introduce the subject and obtain general reactions that are relatively uninfluenced by the question itself. If the question is left wide open, almost every respondent will be able to give some answer and will thus begin to warm up to the questioning process. The use of open-ended questions is to permit a free response from the subject rather than one limited to stated alternatives. Whereas the purpose of close ended questions are to provide alternative replies that helps clarifying the question. Close-ended questions may be Dichotomous or multiple choices. Dichotomous questions provide two alternatives and multiple choices provide many possible alternatives. The importance of combination of both types of questions is to ensure no diversions from the study. Wording of the questions needs to be decided with utmost care. The method of execution of collecting data
through questionnaire is decided i.e whether the data will be collected through mail, phone or in person. In this research the data was collected in person.

5. **Decide on layout and reproduction**: There are three things that needed to be taken care of while doing this:
   - Securing Acceptance
   - Making it easy to control
   - Making it easy to handle

6. **Pretest**: Before the interview schedule is ready for the field, it is pretested under field conditions. Thus the survey was conducted on a small sample and attitudes and reaction are noted which cannot otherwise be obtained. The sample here is similar to the sample of final study. Thus the required changes were made. The Reliability and validity of the questionnaire is important.

**Reliability** can be measured in terms of stability, equivalence and internal consistency.

- Stability is achieved through test retest method where the test is repeated on the same sample after a specified time interval.

- Equivalence is concerned with comparison at the same point in time. Interrated reliability method is used which consists of determining correlations between the scale rating given by difference judges. The method of parallel or different forms is used when the respondent is given two forms of different scales to be tested simultaneously. The responses are then correlated.

- Internal consistency: Split half technique is used in it where the scale is split in two halves and the responses of the two halves are correlated. Cronbach’s coefficient alpha is also used where if the value calculated is less than .6 then it means poor internal consistency.

**Validity of scale**: It is measured using

- Content validity: check if the scales adequately measure the characteristics to be studied.
• Criterion validity: It measures accuracy and suitability of the items used for measuring the characteristics being evaluated.

• Construct validity: It develops a theoretical basis in explaining why the construct works.

Pilot testing was carried on 15 consumers. Cronbach’s alpha test was used to check reliability of the questionnaire using the formula:

$$
\alpha = \frac{K}{K-1} \left(1 - \sum_{i=1}^{K} \frac{\sigma_{Y_i}^2}{\sigma_X^2}\right)
$$

where $\sigma_X^2$ the variance of the observed total test scores, and $\sigma_{Y_i}^2$ the variance of component i for the current sample of persons. The test scores obtained were >0.7, the questionnaire was considered reliable.

**Final draft**

The questionnaire was finally decided for large scale data collection process.

Another primary data collection tool Observation was used in the study to note the consumers viewpoint and hence to give logic to the findings. It is the process of recognizing and noting people, objects, and occurrence rather asking for information. Observation is done naturally, directly and in unobstructed matter. Thus the respondent does not know that his/her expressions, lifestyle, attitude etc. are also being watched. By doing so an attempt is made to understand the feeling of the respondent as well as to ensure what ever he/she is saying does match with the circumstances in which he/she is living.

**Step 5 : Data Analysis**

The questions and responses were coded and entered in the computer using Microsoft Excel software. Certain statistical methods were applied on the data to get the results which were analyzed. Then, the data was analyzed to determine if the differences are statistically significant. If the differences are statistically significant, the study validates the theory that
was the focus of the study. The study used two tests for testing Hypothesis ANOVA and Chi square.

ANOVA – the Analysis Of Variance is Inferential hypothesis-testing procedure. It has tremendous advantage over t-tests. It is used to compare multiple (two or more) treatments and provides researchers with much greater flexibility in design and analysis of experiments. The advantage of using ANOVA is to test for differences among treatment means rather than testing all possible pairs of treatment means. The advantages of using ANOVA is that if two means are compared the ANOVA will provide the same result as the t-test. ANOVA is a statistical method for making simultaneous comparisons between two or more means. It therefore generalizes t-test to more than two groups. Doing multiple two sample t-tests would result in an increased chance of committing type 1 error. Type 1 error occurs when the null hypothesis, (Ho), when it is true but it is rejected. Also t-test for comparing two or more means are time consuming than ANOVA. It can be used for the three treatment condition but in order to compare the three conditions with the t-test you cannot do so. In research using a two-variable design offers many advantages over using a one-variable design. The first advantage is increased efficiency. The other advantage is that we can analyze the interaction of the two variables in the design. It is used in the analysis of comparative experiments, those in which only the difference in outcomes is of interest.

The chi-square test is used to determine whether there is a significant difference between the expected frequencies and the observed frequencies in one or more categories. If the number of individuals or objects that fall in each category differ significantly from the number you would expect? Is this difference between the expected and observed due to sampling error, or is it a real difference?

Chi-Square Test requires

1. Quantitative data.
2. One or more categories.
3. Independent observations.
4. Adequate sample size (at least 10).
6. Data in frequency form.

7. All observations must be used

One of the largest strengths of chi-square is that it is easier to compute than some statistics. Also it can be used with data that has been measured on a nominal (categorical) scale. It can also be used to see if there is a “difference” between two or more groups of participants.

SPSS was used to perform the hypothesis testing where the results obtained had p value. A P-value (or probability value) is the probability of getting a value of the sample test statistic that is at least as extreme as the one found from the sample data, assuming that the null hypothesis is true. By extreme we mean: far from what we would expect to observe if the null hypothesis is true. In other words, a small P-value indicates that observation of the test statistic would be unlikely if the null hypothesis is true. The lower the P-value, the more evidence there is in favor of rejecting the null hypothesis.

**Decision Rule Based on P-value**

To use a P-value to make a conclusion in a hypothesis test, compare the P-value with $\alpha$

1. If $P \leq \alpha$, then reject $H_0$.

2. If $P > \alpha$, then fail to reject $H_0$.

**Concluding remarks**

In this chapter research design has been presented. Use of questionnaire, observation and case study methodology has been extensively used for this exploratory research. The details of research methodology, questionnaire design, its validation and administration are discussed.