

# RESEARCH METHODOLOGY FOR MANAGEMENT

## UNIT 4

### EDITING

Editing of data is the first task of data processing. It is the process where the data are prepared for ensuing coding. When the researcher collects the data it is in a raw form and it needs to be edited, organized and analyzed. The raw data needs to be transformed into a comprehensible form of data. Editing of data is the process of examining errors and omissions in the collected data and making necessary correction in the same. Editing of data is very important when there is some inconsistency in the responses entered in the questionnaire or any half done or partial information in the questionnaire. The editing of data can be done at two stages: field and post-field editing. The field editing is a review of reporting by the researcher for completing what has been written in an abbreviated form during interviewing the respondent. The post-field editing is carried out when field survey is completed and all the forms of schedule have been collected together.

A researcher should take care of the following points while collecting the data:

1. Accuracy of the table
2. Consistent with other facts secured,
3. Uniformity of data
4. Completeness of the data,
5. Acceptable for tabulation and arranged to facilitate coding tabulation.

### Types of Editing of Data

Let us now discuss the different types of editing of data:

1. Editing for quality: Quality is very important aspect while formulating and collecting data. To ensure the quality of the data the following should be taken care of:
  - i. the data forms should be complete,
  - ii. the data should be free from bias,
  - iii. the recordings are free from errors,
  - iv. there should be inconsistencies in responses within limits,
  - v. there should be evidences to show dishonesty of enumerators or interviewers and
  - vi. there should not be any willful manipulation of data.
2. Editing for tabulation: Editing for tabulation is done for certain accepted modification to data or even rejecting certain pieces of data in order to facilitate tabulation
3. Field Editing: The questionnaire filled up by the researcher or the respondent might have some abbreviated writings, illegible writings and the like. These are rectified by the researcher. This should be done soon after the researcher or interview before the loss of memory. The field editing should not extend to giving some guess data to fill up omissions.
4. Central Editing: It is done by the researcher after getting all schedules or questionnaires or forms from the enumerators or respondents. Obvious errors can be corrected. For missed data or information, the editor may substitute data or information by reviewing information provided by

likely placed other respondents. A definite inappropriate answer is removed and “no answer” is entered when reasonable attempts to get the appropriate answer fail to produce results.

## **CODING**

Coding is the procedure of classifying the answers to questions into meaningful categories. Coding is necessary for efficient analysis and through coding many responses may be reduced to a small number of classes which contain the critical information required for analysis.

Coding is basically done at the designing phase of the questionnaire. This makes it possible to pre-code the questionnaire choices and which in turn is helpful for computer tabulation. Coding is the process by which data are organized into classes or categories and numerals or other symbols are given to each item according to the class in which it falls. So, coding involves two steps:

1. To specify the different categories or classes into which the responses are to be classified
2. To allocate respondents responses to different categories.

While allocating the coding to the categories, it should be taken care of that the categories must be ‘all inclusive’ and ‘mutually exclusive’. The all inclusive aspects can be taken care by adding one or more categories as “other”, ‘no information’ and ‘none’. The other aspect is that categories must be ‘mutually exclusive’ i.e. they must not be overlapping and ambiguous.

To keep the response with in limited alternatives, the researcher need to assign some alphabetical or numerical symbols or both to the answers. For example in a question of educational qualifications alternative choices given are: Uneducated; Below Matriculation; Matriculation & above but below Graduate; Graduate & above; Technical Diploma; Technical Degree The alphabetical codes assigned to these alternatives could be A,B,C,D,E and F. Similarly, numerical codes to these alternatives could be 1,2,3,4.,and 5 respectively. It is necessary for the efficient analysis.

Let us now discuss the process of coding:

- Firstly, the study of the responses is very important. As discussed, coding begins at the preparation of interview schedules.
- Secondly, coding frame is developed by listing the possible answers to each question and assigning code numbers or symbols to each of them which are the indicators used for coding.
- Thirdly, after preparing the sample frame, the gradual process of fitting the answers to the questions must be begun.
- Lastly, transferring of the information from the schedules to a separate sheet called transcription sheet. Transcription sheet is a large summary sheet which contain the answer/codes of all the respondents. Transcription may not be necessary when only simple tables are required and the number of respondents are few.
- Coding is necessary to carry out the subsequent operations of tabulating and analyzing data.

## **CLASSIFICATION OF DATA**

In most research studies, voluminous raw data collected through a survey need to be reduced into homogeneous groups for any meaningful analysis. This necessitates classification of data, which in simple terms is the process of arranging data in groups or classes on the basis of some characteristics. Classification condenses the data, facilitates comparisons, helps to study the relationships and facilitates in statistical treatment of data. The classification should be unambiguous and mutually exclusive and collectively exhaustive. Further, it should not only be flexible but also suitable for the purpose for which it is sought.' Classification can either be according to attributes or numerical characteristics.

1. Classification According to Attributes: To classify the data according to attributes we use descriptive characteristics like sex, caste, education, user of a product etc. The descriptive characters are the one which can not be measured quantitatively. One can only talk in terms of its presence or absence. The classification according to attributes may be of two types.

i) Simple Classification: In the case of simple classification each class is divided into two sub classes and only one attribute is studied viz, user of a product or non-user of a product, married or unmarried, employed or unemployed, Brahmin or non-Brahmin etc.

ii) Manifold Classification: In the case of manifold classification more than one attributes are considered. For example, the respondents in a survey may be classified as user of a particular brand of a product and non-user of particular brand of product. Both user and non-user can be further classified into male and female. Further one can classify male and female into two categories such as below 25 years of age and 25 and more years of age. We can further classify them as professionals at nonprofessionals. This way one can keep on adding more attributes. This is shown in Figure - 1. However, the addition of a particular attribute (process of sub-classification) depends upon the basic purpose for which the classification is required. The objectives of such a classification has to be clearly spelt out.

2. Classification According to Numerical Characteristic: When the observations possesses numerical characteristics such as sales, profits, height, weight, income, marks, they are classified according to class intervals. For example, persons whose monthly income is between Rs. 2001 and Rs. 3500 may form one group, those whose income is within Rs. 3501 and Rs. 7000 may form another group, and so on. In this manner, the entire data may be divided into a number of groups or classes, which are usually called class intervals. The number of items in each class is called the frequency of the class. Every class has two limits: an upper limit and a lower limit, which are known as class limits. The difference between these two limits is called the magnitude of the class or the width of the class interval. The class intervals may be formed by using inclusive and exclusive method.

### **DEFINITION OF TABULATION**

Tables are efficient, enabling the researcher to present a large amount of data in a small amount of space. Tables usually show exact numerical values, and the data are arranged in an orderly display of columns and rows, which aids comparison. The reader can more easily comprehend and compare data when they are presented in tabular form. Tabulation is the process of condensation of information collected through enquiry. A table represents summary of the data by using columns and rows entering figures in the body of table.

### **PURPOSE OF THE TABULATION**

The purposes of tables and figures in documents is to enhance readers' understanding of the information in the document. Most word processing software available today will allow you to create your own tables and figures, and even the most basic of word processors permit the embedding of images, thus enabling you to include tables and figures in almost any document.

The main purposes of the tabulation are. To...

- Summarize a mass of numerical information, and
- Present it in the simplest possible form consistent with purpose of the study.

### **STEPS IN TABULATION**

The steps are followed in tabulation -

- Transformation of information according to classification from questionnaire to work-sheets for facilitating handling.
- After summarization of information in the work-sheet draft table is to be prepared.
- Preparation of final table containing the results of draft table.

### **Forms of Table**

Forms of tables may be single, double, triple or manifold, according to the number of characteristic covered by the table. Practical illustration will make the idea more clear. A simple table shows only one characteristic. The data are presented only in terms of one of their characteristic. In two-fold table two characteristics are included. Similarly, manifold tables show many characteristics. Examples are given below-

Table 12.1

Percentage Distribution of the Respondents According to Nature of Migration

<u>Nature of Migration</u>	<u>No. of Respondents</u>	<u>Percentage</u>
Alone	290	25
<u>With the Group</u>	<u>868</u>	<u>75</u>

Source: Ahmed, A. Migration of Rural Poor to Urban Slums and Their Poverty Situation: Case Studies of Selected Metropolitan Cities in Bangladesh, BARD, 2004, 52.

Table 12. 2

Distribution of Consumers According to their Education and Occupation

<u>Education</u>	<u>Fixed Salary Job</u>	<u>Business</u>	<u>Profession</u>	<u>Wage Earner</u>	<u>Other</u>
<u>Total</u>					
Illiterate	4	11	1	25	2
43					
Up to Class IV	6	22	2	13	2
45					
Above class IV but not matriculate	4	30	2	2	2
40					
Matriculate but not graduate	24	12	3	-	1
40					
Graduate & above	8	3	7	-	1
19					
<u>Total</u>	<u>56</u>	<u>78</u>	<u>15</u>	<u>40</u>	<u>8</u>

197

Source: Retailing of Consumer Goods in former East Pakistan published by Bureau of Economic Research, Dacca University, 1965.

**Graphic Presentation of Data**

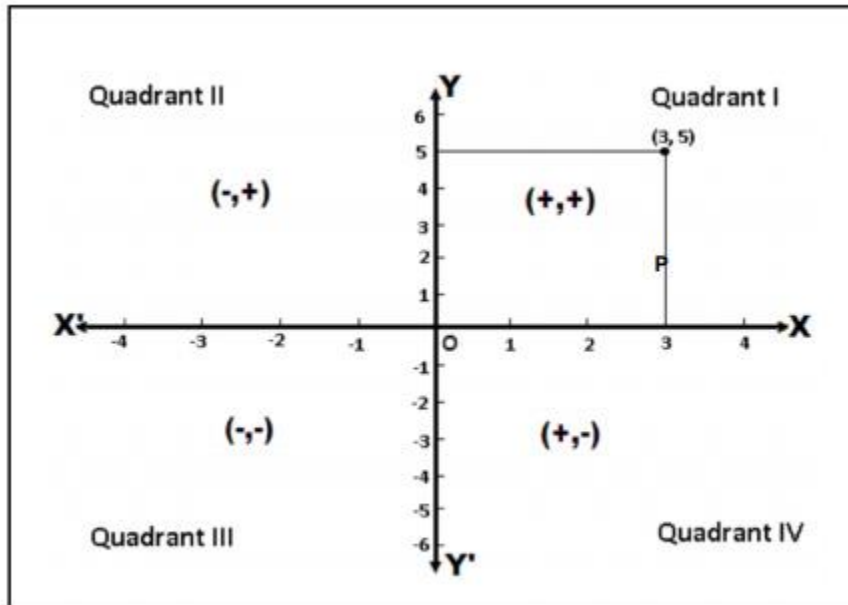
Apart from diagrams, Graphic presentation is another way of the presentation of data and information. Usually, graphs are used to present time series and frequency distributions. In this article, we will look at the graphic presentation of data and information along with its merits, limitations, and types.

**Construction of a Graph**

The graphic presentation of data and information offers a quick and simple way of understanding the features and drawing comparisons. Further, it is an effective analytical tool and a graph can help us in finding the mode, median, etc.

We can locate a point in a plane using two mutually perpendicular lines – the X-axis (the horizontal line) and the Y-axis (the vertical line). Their point of intersection is the Origin.

We can locate the position of a point in terms of its distance from both these axes. For example, if a point P is 3 units away from the Y-axis and 5 units away from the X-axis, then its location is as follows:



Graphical Plane

**Some points to remember:**

- We measure the distance of the point from the Y-axis along the X-axis. Similarly, we measure the distance of the point from the X-axis along the Y-axis. Therefore, to measure 3 units from the Y-axis, we move 3 units along the X-axis and likewise for the other coordinate.
- We then draw perpendicular lines from these two points.
- The point where the perpendiculars intersect is the position of the point P.
- We denote it as follows (3,5) or (abscissa, ordinate). Together, they are the coordinates of the point P.
- The four parts of the plane are Quadrants.
- Also, we can plot different points for a different pair of values.

**General Rules for Graphic Presentation of Data and Information**

There are certain guidelines for an attractive and effective graphic presentation of data and information. These are as follows:

1. **Suitable Title** – Ensure that you give a suitable title to the graph which clearly indicates the subject for which you are presenting it.
2. **Unit of Measurement** – Clearly state the unit of measurement below the title.
3. **Suitable Scale** – Choose a suitable scale so that you can represent the entire data in an accurate manner.
4. **Index** – Include a brief index which explains the different colors and shades, lines and designs that you have used in the graph. Also, include a scale of interpretation for better understanding.

5. **Data Sources** – Wherever possible, include the sources of information at the bottom of the graph.
6. **Keep it Simple** – You should construct a graph which even a layman (without any exposure in the areas of statistics or mathematics) can understand.
7. **Neat** – A graph is a visual aid for the presentation of data and information. Therefore, you must keep it neat and attractive. Choose the right size, right lettering, and appropriate lines, colors, dashes, etc.

#### Merits of a Graph

- The graph presents data in a manner which is easier to understand.
- It allows us to present statistical data in an attractive manner as compared to tables. Users can understand the main features, trends, and fluctuations of the data at a glance.
- A graph saves time.
- It allows the viewer to compare data relating to two different time-periods or regions.
- The viewer does not require prior knowledge of mathematics or statistics to understand a graph.
- We can use a graph to locate the mode, median, and mean values of the data.
- It is useful in forecasting, interpolation, and extrapolation of data.

#### Limitations of a Graph

- A graph lacks complete accuracy of facts.
- It depicts only a few selected characteristics of the data.
- We cannot use a graph in support of a statement.
- A graph is not a substitute for tables.
- Usually, laymen find it difficult to understand and interpret a graph.
- Typically, a graph shows the unreasonable tendency of the data and the actual values are not clear.

#### Types of Graphs

Graphs are of two types:

1. Time Series graphs
2. Frequency Distribution graphs

#### Time Series Graphs

A time series graph or a “*histogram*” is a graph which depicts the value of a variable over a different point of time. In a time series graph, time is the most important factor and the variable is related to time. It helps in the understanding and analysis of the changes in the variable at a different point of time. Many statisticians and businessmen use these graphs because they are easy to understand and also because they offer complex information in a simple manner.

Further, constructing a time series graph does not require a user with technical skills. Here are some major steps in the construction of a time series graph:

- Represent time on the X-axis and the value of the variable on the Y-axis.
- Start the Y-value with zero and devise a suitable scale which helps you present the whole data in the given space.
- Plot the values of the variable and join different point with a straight line.
- You can plot multiple variables through different lines.

### **Line Graph**

You can use a line graph to summarize how two pieces of information are *Advantages*

- You can compare multiple continuous data-sets easily
- You can infer the interim data from the graph line

*Disadvantages*

- It is only used with continuous data.

*Use of a false Base Line*

Usually, in a graph, the vertical line starts from the Origin. However, in some cases, a false Base Line is used for a better representation of the data. There are two scenarios where you should use a false Base Line:

1. To magnify the minor fluctuation in the time series data
2. To economize the space related and how they vary with each other.

### **Net Balance Graph**

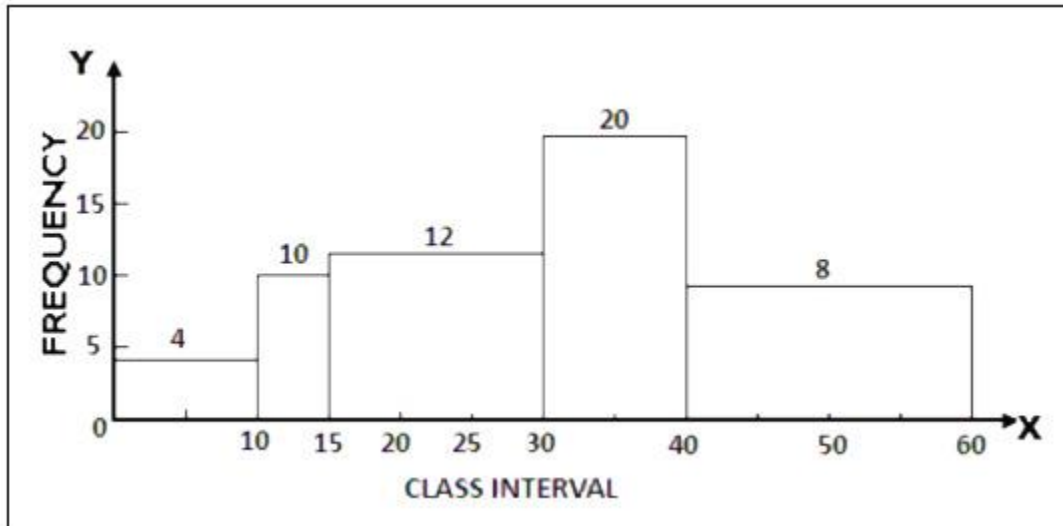
If you have to show the net balance of income and expenditure or revenue and costs or imports and exports, etc., then you must use a net balance graph. You can use different colors or shades for positive and negative differences.

Frequency Distribution Graphs

Let's look at the different types of frequency distribution graphs.

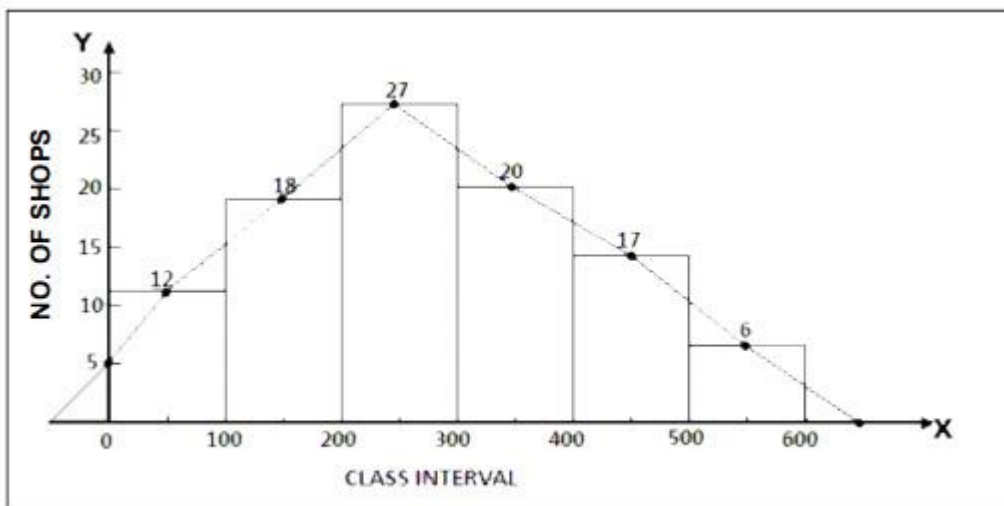
### **Histogram**

A histogram is a graph of a grouped frequency distribution. In a histogram, we plot the class intervals on the X-axis and their respective frequencies on the Y-axis. Further, we create a rectangle on each class interval with its height proportional to the frequency density of the class.



**Frequency Polygon or Histogram**

A frequency polygon or a Histogram is another way of representing a frequency distribution on a graph. You draw a frequency polygon by joining the midpoints of the upper widths of the adjacent rectangles of the histogram with straight lines.



**FREQUENCY POLYGON**

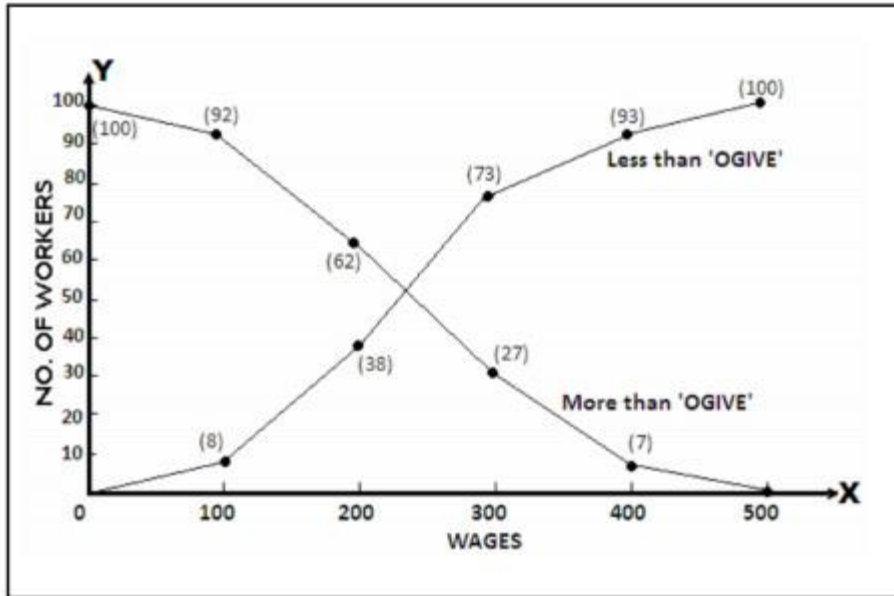
**Frequency Curve**

When you join the verticals of a polygon using a smooth curve, then the resulting figure is a Frequency Curve. As the number of observations increase, we need to accommodate more classes. Therefore, the width of each class reduces. In such a scenario, the variable tends to become continuous and the frequency polygon starts taking the shape of a frequency curve.

**Cumulative Frequency Curve or Ogive**

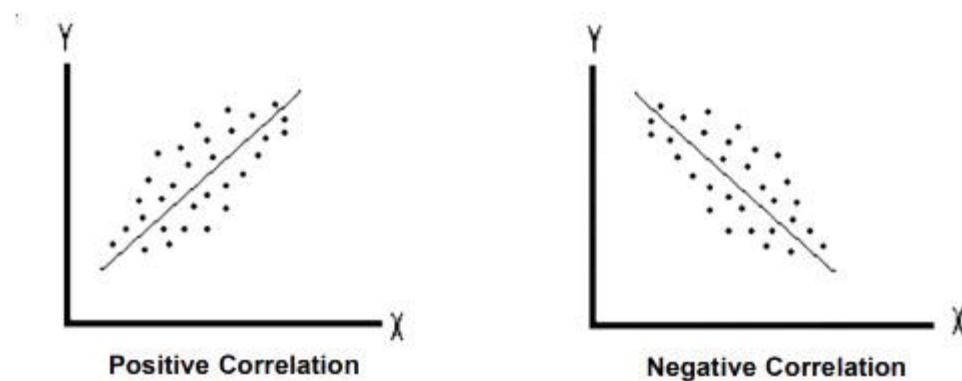
A cumulative frequency curve or Ogive is the graphical representation of a cumulative frequency distribution. Since a cumulative frequency is either of a 'less than' or a 'more than' type, Ogives are of two types too – 'less than ogive' and 'more than ogive'.





### Scatter Diagram

A scatter diagram or a dot chart enables us to find the nature of the relationship between the variables. If the plotted points are scattered a lot, then



the relationship between the two variables is lesser.

### Research Reports: Definition

Research reports are recorded data prepared by researchers or statisticians after analyzing information gathered by conducting organized research, typically in the form of surveys or qualitative methods.

Reports usually are spread across a vast horizon of topics but are focused on communicating information about a particular topic and a very niche target market. The primary motive of research reports is to convey integral details about a study for marketers to consider while designing new strategies. Certain events, facts and other information based on incidents need to be relayed on to the people in charge and creating research reports is the most effective communication tool. Ideal research reports are extremely accurate in the offered information with a clear objective and conclusion. There should be a clean and structured format for these reports to be effective in relaying information.

A research report is a reliable source to recount details about a conducted research and is most often considered to be a true testimony of all the work done to garner specificities of research.

The various sections of a research report are:

1. Summary
2. Background/Introduction
3. Implemented Methods
4. Results based on Analysis
5. Deliberation
6. Conclusion

#### Components of Research Reports

Research is imperative for launching a new product/service or a new feature. The markets today are extremely volatile and competitive due to new entrants every day who may or may not provide effective products. An organization needs to make the right decisions at the right time to be relevant in such a market with updated products that suffice customer demands.

The details of a research report may change with the purpose of research but the main components of a report will remain constant. The research approach of the market researcher also influences the style of writing reports. Here are seven main components of a productive research report:

- **Research Report Summary:** The entire objective along with the overview of research are to be included in a summary which is a couple of paragraphs in length. All the multiple components of the research are explained in brief under the report summary. It should be interesting enough to capture all the key elements of the report.
- **Research Introduction:** There always is a primary goal that the researcher is trying to achieve through a report. In the introduction section, he/she can cover answers related to this goal and establish a thesis which will be included to strive and answer it in detail. This section should answer an integral question: “What is the current situation of the goal?”. After the research was conducted, did the organization conclude the goal successfully or they are still a work in progress – provide such details in the introduction part of the research report.
- **Research Methodology:** This is the most important section of the report where all the important information lies. The readers can gain data for the topic along with analyzing the quality of provided content and the research can also be approved by other market researchers. Thus, this section needs to be highly informative with each aspect of research discussed in detail. Information needs to be expressed in chronological order according to its priority and importance. Researchers should include references in case they gained information from existing techniques.
- **Research Results:** A short description of the results along with calculations conducted to achieve the goal will form this section of results. Usually, the exposition after data analysis is carried out in the discussion part of the report.
- **Research Discussion:** The results are discussed in extreme detail in this section along with a comparative analysis of reports that could probably exist in the same domain. Any abnormality uncovered during research will be deliberated in the discussion section. While writing research reports, the researcher will have to connect the dots on how the results will be applicable in the real world.
- **Research References and Conclusion:** Conclude all the research findings along with mentioning each and every author, article or any content piece from where references were taken.

#### 15 Tips for Writing Research Reports

Writing research reports in the manner can lead to all the efforts going down the drain. Here are 15 tips for writing impactful research reports:

- **Prepare the context before starting to write and start from the basics:** This was always taught to us in school – be well-prepared before taking a plunge into new topics. The order of survey questions might not be the ideal or most effective order for writing research reports. The idea is to start with a broader topic and work towards a more specific one and focus on a conclusion or support, which a research should support with the facts. The most difficult thing to do in reporting, without a doubt is to start. Start with the title, the introduction, then document the first discoveries and continue from that. Once the marketers have the information well documented, they can write a general conclusion.
- **Keep the target audience in mind while selecting a format that is clear, logical and obvious to them:** Will the research reports be presented to decision makers or other researchers? What are the general perceptions around that topic? This requires more care and diligence. A researcher will need a significant amount of information to start writing the research report. Be consistent with the wording, the numbering of the annexes and so on. Follow the approved format of the company for the delivery of research reports and demonstrate the integrity of the project with the objectives of the company.
- **Have a clear research objective:** A researcher should read the entire proposal again, and make sure that the data they provide contributes to the objectives that were raised from the beginning. Remember that speculations are for conversations, not for research reports, if a researcher speculates, they directly question their own research.
- **Establish a working model:** Each study must have an internal logic, which will have to be established in the report and in the evidence. The researchers' worst nightmare is to be required to write research reports and realize that key questions were not included.
- **Gather all the information about the research topic.** Who are the competitors of our customers? Talk to other researchers who have studied the subject of research, know the language of the industry. Misuse of the terms can discourage the readers of research reports from reading further.
- **Read aloud while writing.** While reading the report, if the researcher hears something inappropriate, for example, if they stumble over the words when reading them, surely the reader will too. If the researcher can't put an idea in a single sentence, then it is very long and they must change it so that the idea is clear to everyone.
- **Check grammar and spelling.** Without a doubt, good practices help to understand the report. Use verbs in the present tense. Consider using the present tense, which makes the results sound more immediate. Find new words and other ways of saying things. Have fun with the language whenever possible.
- **Discuss only the discoveries that are significant.** If some data are not really significant, do not mention them. Remember that not everything is truly important or essential within research reports.
- **Try and stick to the survey questions.** For example, do not say that the people surveyed "were worried" about an issue, when there are different degrees of concern.
- **The graphs must be clear enough so that they understand themselves.** Do not let graphs lead the reader to make mistakes: give them a title, include the indications, the size of the sample, and the correct wording of the question.
- **Be clear with messages.** A researcher should always write every section of the report with an accuracy of details and language.
- **Be creative with titles**– Particularly in segmentation studies choose names "that give life to research". Such names can survive for a long time after the initial investigation.
- **Create an effective conclusion:** The conclusion in the research reports is the most difficult to write, but it is an incredible opportunity to excel. Make a precise summary. Sometimes it helps to start the conclusion with something specific, then it describes the most important part of the study, and finally, it provides the implications of the conclusions.
- **Get a couple more pair of eyes to read the report.** Writers have trouble detecting their own mistakes. But they are responsible for what is presented. Ensure it has been approved by colleagues or friends before sending the final draft out.

#### **Presentation of Research Report**

- Oral presentation
- Poster session

- Computer based presentation
- Slide presentation format
- Word processing software
- Written presentation
- Multimedia presentation