

# **Methods and tools use** **in research**

- A. Qualities studies, quantitative studies**
- B. Simple data organization descriptive data analysis,**
- C. Limitation & sources of Error**
- D. Inquiries in form of Questionnaire, etc.**

To carry out the types of the different investigation described in the earlier chapters, the researcher must gather data with which to test the hypothesis or answer the questions. Many different methods and procedures have been developed to aid in the acquisition of data.

Methods are used for the collection of the data and Tools are used for the analysis of the data. This chapter covers all the details of the methods and tools which are used in the research.

There is too much dependence upon single method of inquiry. Because each data-gathering procedure or device having weakness so there will be merit in using the multiple methods. Students of research should familiarize with each of the research tools and attempt to develop skill in their use and sensitivity to their effectiveness in specific situation.

## **A. Qualities studies, quantitative studies**

### QUANTITATIVE STUDY

Quantification has been defined as a numerical method of describing observations of materials or characteristics when a defined portion of the material or characteristic is used as standard for measuring any sample, a valid and precise method of data description is provided. Scientists distinguish among four levels of measurement:

- A nominal scale
  - Least precise
  - It describes differences between the things by assigning them in to two categories.
- An ordinal scale
  - When difference can be possible to indicate by their amount or degree. Ranks are given from highest to lowest
- An internal scale
  - An arbitrary scale based on equal units of the measurements indicates how much of the given characteristic is present.
  - It is based on some range
  - Advantage is that it indicates the relative amount of trait or characteristics.
  - Limitation is the lack of a true zero.
- A ratio scale
  - Same as internal scale but having some additional advantages.
  - It has a true zero.
  - The numerals of the ratio scale can be mathematically processed.

Quantitative study having generally little value because excessive use may lead to fragmentary quality of the research not relevant to real behavior. But by improving the type of observation and other technique, it can be very useful.

- Types of quantitative research include:

- Descriptive
- Quasi-experimental
- Experimental
- correlation study

1. **Descriptive and correlation studies** examine variables in their natural environments and do not include researcher imposed treatments.

There is no universal standard for categorizing research designs and different authors may change names of designs in their discussions of them.

Thus what is shown here is intended more to be informative than exhaustive.

Selecting an appropriate design for a study involves following a logical thought process.

A calculating mind is required to explore all possible consequences of using a particular design in a study.

2. **Experimental design**

The paradigm for scientific method in research is the true experiment or randomized control trial (RCT).

Typical examples of RCT's include drug trials.

Experimental designs are set up to allow the greatest amount of control possible so that causality may be examined closely.

The three essential elements of experimental design are:

- Manipulation : The researcher does something to at least some of the participants in the research
- Control : The experimenter introduces one or more controls over the experimental situation.

### 3. **Quasi-experimental design**

Quasi-experimental designs were developed to provide alternate means for examining causality in situations which were not conducive to experimental control.

The designs have been developed to control as many threats to validity as possible in situations where at least one of the three elements of true experimental research is lacking (i.e. manipulation, randomization, and control group).

There are too many types of Quasi-experimental design to go into in great depth.

Most are adaptations of experimental designs where one of the three elements is missing.

Randomization : The experimenter assigns participants to different groups on a random basis.

### 4. **Descriptive design**

Descriptive designs are used to gain more information about a particular characteristic within a particular field of study.

A descriptive study may be used to, develop theory, identify problems with current practice, justify current practice, make judgments or identify what others in similar situations may be doing.

There is no manipulation of variables and no attempt to establish causality.

### 5. **Correlation studies**

As already mentioned they are not universally accepted as a form of quantitative research.

The basic purpose of this form of study is to determine the relationship between variables.

However the significant difference from experimental and quasi-experimental design is that causality cannot be established due to lack of manipulation of independent variables.

Correlation does not prove Causation.

## QUALITATIVE STUDY

- Qualitative research explores the richness, depth, and complexity of phenomena.
- Qualitative research, broadly defined, means "any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification"
- Unlike quantitative research, there is no overarching framework for how qualitative research should be conducted; rather each type of qualitative research is guided by particular philosophical stances that are taken in relation by the research to each phenomenon.

### Main Types of Qualitative Research

- Case study

Attempts to shed light on phenomena by studying in-depth a single case example of the phenomena. The case can be an individual person, an event, a group, or an institution.

- Grounded theory

Theory is developed inductively from a corpus of data acquired by a participant-observer.

- Phenomenology

Describes the structures of experience as they present themselves to consciousness, without recourse to theory, deduction, or assumptions from other disciplines

- Ethnography

Focuses on the sociology of meaning through close field observation of socio-cultural phenomena. Typically, the ethnographer focuses on a community.

- Historical

Systematic collection and objective evaluation of data related to past occurrences in order to test hypotheses concerning causes, effects, or trends of these events that may help to explain present events and anticipate future events.

### **Main Types of Qualitative Data Collection & Analysis**

- Those who are not familiar with qualitative methodology may be surprised by the sheer volume of data and the detailed level of analysis that results even when research is confined to a small number of subjects.
- There are three main methods of data collection:
- **Interactive interviewing:** People asked to verbally describe their experiences of phenomenon.
- **Written descriptions by participants:** People asked to write descriptions of their experiences of phenomenon.
- **Observation:** Descriptive observations of verbal and non-verbal behavior.

Analysis begins when the data is first collected and is used to guide decisions related to further data collection.

In communicating--or generating--the data, the researcher must make the process of the study accessible and write descriptively so unspoken knowledge may best be communicated through the use of rich, thick descriptions.

### **Criticism of qualitative research**

- Qualitative studies are tools used in understanding and describing the world of human experience.

- Since we maintain our humanity throughout the research process, it is largely impossible to escape the subjective experience, even for the most seasoned of researchers.
- As we proceed through the research process, our humanness informs us and often directs us through such subtleties as intuition or 'aha' moments.
- Speaking about the world of human experience requires an extensive commitment in terms of time and dedication to process; however, this world is often dismissed as 'subjective' and regarded with doubt.
- This means that small qualitative studies are not generalizable in the traditional sense, yet have redeeming qualities that set them above that requirement.
- A major strength of the qualitative approach is the depth to which explorations are conducted and descriptions are written, usually resulting in sufficient details for the reader to grasp the different aspects of the situation.
- The ultimate aim of qualitative research is to offer a perspective of a situation and provide well-written research reports that reflect the researcher's ability to illustrate or describe the corresponding phenomenon.
- One of the greatest strengths of the qualitative approach is the richness and depth of explorations and descriptions.

## **METHODS OF DATA COLLECTION**

The task of data collection begins after a research problem has been defined and research design/plan chalked out.

Two types of data:

- Primary data are those which are collected afresh and for the first time, and thus happen to be original in character.
- *Secondary data*, on the other hand, are those which have already been collected by someone else and which have already been passed through the statistical process.

Various methods are used for the collection of the primary data:

- observation method
- Interview method
- Through questionnaires
- Through schedules
- Warranty cards
- Distributor audits
- Pantry audits
- Consumer panels
- Using mechanical devices
- Through projective techniques
- Depth interviews
- Content analysis.

### **Observation method**

Advantages

- The method of choice
- Observation becomes a scientific tool and the method of data collection for the researcher, when it serves a formulated research purpose, is systematically planned and recorded and is subjected to checks and controls on validity and reliability.
- The main advantage of this method is that subjective bias is eliminated, if observation is done accurately.

- The information obtained under this method relates to what is currently happening; it is not complicated by either the past behavior or future intentions or attitudes.
- This method is particularly suitable in studies which deal with subjects (i.e., respondents) who are not capable of giving verbal reports of their feelings for one reason or the other.

#### Limitations

- It is an expensive method.
- The information provided by this method is very limited.
- Sometimes unforeseen factors may interfere with the observational task. At times, the fact that some people are rarely accessible to direct observation creates obstacle for this method to collect data effectively.

### **Interview method**

The interview method of collecting data involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses.

Here if skillful interviewer then we can say that it is very useful or superior method of the data collection. Because here no chance of the misinterpretation or any problem because here interviewer will explain face to face all the problem of the subject. So data collection will be very accurate.

Two types of the interview methods:

- personal interview
- telephonic interview

### **Personal interview**

The chief merits of the interview method are as follows:

- More information and that too in greater depth can be obtained.
- Interviewer by his own skill can overcome the resistance, if any, of the respondents; the interview method can be made to yield an almost perfect sample of the general population.

- There is greater flexibility under this method as the opportunity to restructure questions is always there, especially in case of unstructured interviews.
- Observation method can as well be applied to recording verbal answers to various questions.
- Personal information can as well be obtained easily under this method.
- Samples can be controlled more effectively as there arises no difficulty of the missing returns; non-response generally remains very low.
- The interviewer can usually control which person(s) will answer the questions. This is not possible in mailed questionnaire approach. If so desired, group discussions may also be held.
- The interviewer may catch the informant off-guard and thus may secure the most spontaneous reactions than would be the case if mailed questionnaire is used.
- The language of the interview can be adapted to the ability or educational level of the person interviewed and as such misinterpretations concerning questions can be avoided.
- The interviewer can collect supplementary information about the respondent's personal characteristics and environment which is often of great value in interpreting results.

But there are also certain weaknesses of the interview method.

- It is a very expensive method, especially when large and widely spread geographical sample is taken.
- There remains the possibility of the bias of interviewer as well as that of the respondent; there also remains the headache of supervision and control of interviewers.
- Certain types of respondents such as important officials or executives or people in high income groups may not be easily approachable under this method and to that extent the data may prove inadequate.
- This method is relatively more-time-consuming, especially when the sample is large and recalls upon the respondents are necessary.
- The presence of the interviewer on the spot may over-stimulate the respondent, sometimes even to the extent that he may give imaginary information just to make the interview interesting.

- Under the interview method the organization required for selecting, training and supervising the field-staff is more complex with formidable problems.
- Interviewing at times may also introduce systematic errors.
- Effective interview presupposes proper rapport with respondents that would facilitate free and frank responses. This is often a very difficult requirement.

### **Through questionnaires**

This method of data collection is quite popular, particularly in case of big enquiries. It is being adopted by private individuals, research workers, private and public organizations and even by governments.

The merits claimed on behalf of this method are as follows:

- There is low cost even when the universe is large and is widely spread geographically.
- It is free from the bias of the interviewer; answers are in respondents' own words.
- Respondents have adequate time to give well thought out answers.
- Respondents, who are not easily approachable, can also be reached conveniently.
- Large samples can be made use of and thus the results can be made more dependable and reliable.

The main demerits of this system can also be listed here:

- Low rate of return of the duly filled in questionnaires; bias due to no-response is often indeterminate.
- It can be used only when respondents are educated and cooperating.
- The control over questionnaire may be lost once it is sent.
- There is inbuilt inflexibility because of the difficulty of amending the approach once questionnaires have been dispatched.
- There is also the possibility of ambiguous replies or omission of replies altogether to certain questions; interpretation of omissions is difficult.
- It is difficult to know whether willing respondents are truly representative.
- This method is likely to be the slowest of all.

**General form**

- Structured or unstructured questionnaire.
- Structured questionnaires are those questionnaires in which there are definite, concrete and pre-determined questions. The form of the question may be either closed (i.e., of the type 'yes' or 'no') or open (i.e., inviting free response) but should be stated in advance and not constructed during questioning.
- Structured questionnaires may also have fixed alternative questions in which responses of the informants are limited to the stated alternatives. Thus a highly structured questionnaire is one in which all questions and answers are specified and comments in the respondent's own words are held to the minimum.
- When these characteristics are not present in a questionnaire, it can be termed as unstructured or non-structured questionnaire.

**Question sequence**

- A proper sequence of questions reduces considerably the chances of individual questions being misunderstood. The question-sequence must be clear and smoothly-moving, meaning thereby that the relation of one question to another should be readily apparent to the respondent, with questions that are easiest to answer being put in the beginning.
- The first few questions are particularly important because they are likely to influence the attitude of the respondent and in seeking his desired cooperation. The opening questions should be such as to arouse human interest.
- Following the opening questions, we should have questions that are really vital to the research problem and a connecting thread should run through successive questions.

**Essentials of a good questionnaire**

- To be successful, questionnaire should be comparatively short and simple i.e., the size of the questionnaire should be kept to the minimum. Questions should proceed in logical sequence moving from easy to more difficult questions.
- Personal and intimate questions should be left to the end.

- Technical terms and vague expressions capable of different interpretations should be avoided in a questionnaire.
- Questions may be dichotomous (yes or no answers), multiple choice (alternative answers listed) or open-ended. The latter type of questions is often difficult to analyze and hence should be avoided in a questionnaire to the extent possible.
- There should be some control questions in the questionnaire which indicate the reliability of the respondent. For instance, a question designed to determine the consumption of particular material may be asked first in terms of financial expenditure and later in terms of weight. The control questions, thus, introduce a cross-check to see whether the information collected is correct or not.
- Questions affecting the sentiments of respondents should be avoided. Adequate space for answers should be provided in the questionnaire to help editing and tabulation.
- There should always be provision for indications of uncertainty, e.g., “do not know,” “no preference” and so on.
- Brief directions with regard to filling up the questionnaire should invariably be given in the questionnaire itself.
- The quality of the paper, along with its color, must be good so that it may attract the attention of recipients.

### SELECTION OF APPROPRIATE METHOD FOR DATA COLLECTION

Thus, there are various methods of data collection. As such the researcher must judiciously select the method/methods for his own study, keeping in view the following factors:

**1. Nature, scope and object of enquiry:** This constitutes the most important factor affecting the choice of a particular method. The method selected should be such that it suits the type of enquiry that is to be conducted by the researcher. This factor is also important in deciding whether the data already available (secondary data) are to be used or the data not yet available (primary data) are to be collected.

**2. Availability of funds:** Availability of funds for the research project determines to a large extent the method to be used for the collection of data. When funds at the disposal of the researcher are very limited, he will have to select a

comparatively cheaper method which may not be as efficient and effective as some other costly method. Finance, in fact, is a big constraint in practice and the Researcher has to act within this limitation.

**3. Time factor:** Availability of time has also to be taken into account in deciding a particular method of data collection. Some methods take relatively more time, whereas with others the data can be collected in a comparatively shorter duration. The time at the disposal of the researcher, thus, affects the selection of the method by which the data are to be collected.

**4. Precision required:** Precision required is yet another important factor to be considered at the time of selecting the method of collection of data.

#### **ORGANIZATION OF THE DATA COLLECTION**

- Theses, dissertation and advanced research projects usually involve sophisticated experimental designs and statistical analysis.
- The use of the computer is the standard procedure because it can effectively process complex variable relationship, it is necessary tool.
- When the results of an observation, interview, questionnaire or test to be analyzed, problems of organization confront the researcher.
- Even with the computers, the first problem is to designate appropriate, logical and mutually exclusive categories for tabulation of the data.
- The researcher should keep in the mind about the data categories before the data collection procedure he follows.
- Proper attention given to this matter of organization early in the research process can serve a great deal of time at the data analysis phase.
- Once the data have been collected, it is difficult if not impossible to go back and get the additional information, such as gender, income, if not asked initially.
- Some time the data if not organized in categories it is having no value. So from data collection we should think about the group of the data.
- Comparison of the quantitative data is if there then comparison of middle data is avoided. Instead, comparison between starting data and only last data is carried out. By this way sharper contrast will be achieved, but the risk of the regression to the mean effect is increased.

**LIMITATION AND SOURCE OF ERROR**

A number of limitation and sources of error in the analysis and interpretation of data can destroy the success of an investigation. Some of the problems are described here:

- **Confusing statement with facts**  
A common fault is the acceptance of statements as facts. What individual report or statement that is not necessarily true always. It is having the chance of error. So it is researcher's responsibility to verify all the statements as completely as possible.
- **Failure to recognize limitation**
- **Careless or incomplete data entry**  
If data entered are incomplete, then it will come with the wrong result. So no meaning of the collection of the data.
- **False selection of the method of analysis**
- **Misinterpretation and misunderstanding about the data**

## **PROCESSING AND ANALYSIS OF THE DATA**

Some processing operation:

### **1. Editing**

Editing of data is a process of examining the collected raw data (especially in surveys) to detect errors and omissions and to correct these when possible.

Editing is done to assure that the data are accurate, consistent with other facts gathered, uniformly entered, as completed as possible and have been well arranged to facilitate coding and tabulation.

There are two types:

- Field editing consists in the review of the reporting forms by the investigator for completing (translating or rewriting) what the latter has written in abbreviated and/or in illegible form at the time of recording the respondents' responses. This type of editing is necessary in view of the fact that individual writing styles often can be difficult for others to decipher.
- Central editing should take place when all forms or schedules have been completed and returned to the office. This type of editing implies that all forms should get a thorough editing by a single editor in a small study and by a team of editors in case of a large inquiry.

### **2. Coding**

Coding refers to the process of assigning numerals or other symbols to answers so that responses can be put into a limited number of categories or classes.

Coding is necessary for efficient analysis and through it the several replies may be reduced to a small number of classes which contain the critical information required for analysis.

Coding decisions should usually be taken at the designing stage of the questionnaire.

### **3. Classification**

Most research studies result in a large volume of raw data which must be reduced into homogeneous groups if we are to get meaningful

relationships. This fact necessitates classification of data which happens to be the process of arranging data in groups or classes on the basis of Common characteristics.

Classification is of two types:

- According to the class-intervals.
- According to the attributes.

#### 4. Tabulation

‘When a mass of data has been assembled, it becomes necessary for the researcher to arrange the same in some kind of concise and logical order. This procedure is referred to as tabulation.’

Tabulation is essential because of the following reasons.

- It conserves space and reduces explanatory and descriptive statement to a minimum.
- It facilitates the process of comparison.
- It facilitates the summation of items and the detection of errors and omissions.
- It provides a basis for various statistical computations.

#### SOME PROBLEMS IN PROCESSING

We can take up the following two problems of processing the data for analytical purposes:

(a) *The problem concerning “**Don’t know**” (or DK) responses:*

While processing the data, the researcher often comes across some responses that are difficult to handle. One category of such responses may be ‘Don’t Know Response’ or simply DK response. When the DK response group is small, it is of little significance. But when it is relatively big, it becomes a matter of major concern.

(b) *Use or percentages:*

Percentages are often used in data presentation for they simplify numbers, reducing all of them to a 0 to 100 range. Through the use of percentages, the data are reduced in the standard form with base equal to 100 which

fact facilitates relative comparisons. While using percentages, the following rules should be kept in view by researchers:

- Two or more percentages must not be averaged unless each is weighted by the group size from which it has been derived.
- Use of too large percentages should be avoided, since a large percentage is difficult to understand and tends to confuse, defeating the very purpose for which percentages are used.
- Percentages hide the base from which they have been computed. If this is not kept in view, the real differences may not be correctly read.
- Percentage decreases can never exceed 100 per cent and as such for calculating the percentage of decrease, the higher figure should invariably be taken as the base.
- Percentages should generally be worked out in the direction of the causal-factor in case of two-dimension tables and for this purpose we must select the more significant factor out of the two given factors as the causal factor.

#### ELEMENTS/TYPES OF ANALYSIS

As stated earlier, by analysis we mean the computation of certain indices or measures along with searching for patterns of relationship that exist among the data groups.

Analysis, particularly in case of survey or experimental data, involves estimating the values of unknown parameters of the population and testing of hypotheses for drawing inferences.

Analysis may, therefore, be categorised as **descriptive analysis** and **inferential analysis** (Inferential analysis is often known as statistical analysis).

*“Descriptive analysis is largely the study of distributions of one variable. This study provides us with profiles of companies, work groups, persons and other subjects on any of a multiple of characteristics such as size, composition, efficiency, preferences, etc.”*

This sort of analysis may be in respect of one variable (described as unidimensional analysis), or in respect of two variables (described as bivariate

analysis) or in respect of more than two variables (described as multivariate analysis).

*Correlation analysis* studies the joint variation of two or more variables for determining the amount of correlation between two or more variables.

*Causal analysis* is concerned with the study of how one or more variables affect changes in another variable. It is thus a study of functional relationships existing between two or more variables. This analysis can be termed as regression analysis. Causal analysis is considered relatively more important in experimental researches, whereas in most social and business researches our interest lies in understanding and controlling relationships between variables then with determining causes *per se* and as such we consider correlation analysis as relatively more important.

In modern times, with the availability of computer facilities, there has been a rapid development of *multivariate analysis* which may be defined as “all statistical methods which simultaneously analyse more than two variables on a sample of observations”

Usually the following analyses\* are involved when we make a reference of multivariate analysis:

**(a) Multiple regression analysis:**

This analysis is adopted when the researcher has one dependent variable which is presumed to be a function of two or more independent variables. The objective of this analysis is to make a prediction about the dependent variable based on its covariance with all the concerned independent variables.

**(b) Multiple discriminant analysis:**

This analysis is appropriate when the researcher has a single dependent variable that cannot be measured, but can be classified into two or more groups on the basis of some attribute. The object of this analysis happens to be to predict an entity's possibility of belonging to a particular group based on several predictor variables.

(c) ***Multivariate analysis of variance (or multi-ANOVA):***

This analysis is an extension of twoway ANOVA, wherein the ratio of among group variance to within group variance is worked out on a set of variables.

(d) ***Canonical analysis:*** This analysis can be used in case of both measurable and non-measurable variables for the purpose of simultaneously predicting a set of dependent variables from their joint covariance with a set of independent variables.

**Inferential analysis** is concerned with the various tests of significance for testing hypotheses in order to determine with what validity data can be said to indicate some conclusion or conclusions. It is also concerned with the estimation of population values. It is mainly on the basis of inferential analysis that the task of interpretation (i.e., the task of drawing inferences and conclusions) is performed.

# Hypothesis

## WHAT IS HYPOTHESIS?

Hypothesis has the definite utility and important place in the social research. The formulation of hypothesis is a prerequisite of any successful research. We have already seen in the preparation of the proposal that hypothesis is an assertion of the investigator for the solution of the selected problem that the investigator seeks to investigate.

It can be defined as

- a) Webster's New International Dictionary of English language

"A proposition, condition or principle which is assumed, perhaps without belief in order to draw out its logical consequences and by this method to test its accord with facts which are known or may be determined."

- b) Kerlinger

"A hypothesis is a conjectural statement of the relation between two or more variables. Hypothesis are always in declarative sentence form and they relate either generally or specifically variables to variables."

- c) In the words of Goode and Hatt

"Hypothesis is a proposition which can be put to a test to determine its validity. It may seem contrary to, or in accord with, common sense."

- d) George A. Lundberg

"The hypothesis is a tentative justification, the validity of which remains to be tested."

**IMPORTANCE**

- Main focus of the study
- Gives point to inquiry
- Help to explain
- Help to collect data or to prevent a blind search
- Provides direction
- Tools of research
- Helps to draw conclusion
- Save time, money and energy
- Helps in building a body of the scientific knowledge
- Helps to suggest theory
- Helps to solve the problem

**TYPES OF HYPOTHESIS**

On the basis of the level of abstraction it can be classified in to three types:

- Hypothesis explaining the existing empirical uniformities  
There are some hypothesis, which state the existence of empirical uniformities. These hypothesis frequently represents the scientific examination of commonsense proposition. For example, lower class people have a large population.
- Hypothesis concerned with complex ideal type  
This give statement of the little complex relationship. Somewhat complex. These hypothesis aims at testing the existence of logically derived relationship between empirical uniformities. Example is “low of demand”
- Hypothesis concerned with the relation of analytic variables  
There are certain hypothesis, which are concerned with the relation of analytical variables. It is concerned with the highest level of abstraction. This type of hypothesis deals with a study of analytic variables between the changes in one property and the change in the another. It describes variable relation in more complex terms

**SOURCE OF HYPOTHESIS****Four major sources**

- The general culture  
The general pattern of the culture helps to formulate the hypothesis. The hypothesis in social sciences in a particular society have always been put forth and tested in a particular cultural complex. They are the products of the cultural values.
- Science  
Science has the social relation and that the scientist must acquire the folkways of his discipline
- Analogies  
The causal observation of the nature or in the framework of another science may be the fertile source of hypothesis. Its meaning is similarity. And when it is observed it gives birth to new hypothesis.
- Personal experience  
Personal and idiosyncratic question will produce new question and thus it will form the new hypothesis.

**CHARACTERISTIC/FEATURE OF USABLE HYPOTHESIS**

Some important characteristics are:

- Hypothesis should be clear and precise. If the hypothesis is not clear and precise, the inferences drawn on its basis cannot be taken as reliable.
- Hypothesis should be capable of being tested. In a swamp of untestable hypotheses, many a time the research programmes have bogged down. Some prior study may be done by researcher in order to make hypothesis a testable one. A hypothesis “is testable if other deductions can be made from it which, in turn, can be confirmed or disproved by observation.”
- Hypothesis should state relationship between variables, if it happens to be a relational hypothesis.
- Hypothesis should be limited in scope and must be specific. A researcher must remember that narrower hypotheses are generally more testable and he should develop such hypotheses.
- Hypothesis should be stated as far as possible in most simple terms so that the same is easily understandable by all concerned. But one must

remember that simplicity of hypothesis has nothing to do with its significance.

- Hypothesis should be consistent with most known facts i.e., it must be consistent with a substantial body of established facts. In other words, it should be one which judges accept as being the most likely.
- Hypothesis should be amenable to testing within a reasonable time. One should not use even an excellent hypothesis, if the same cannot be tested in reasonable time for one cannot spend a life-time collecting data to test it.
- Hypothesis must explain the facts that gave rise to the need for explanation. This means that by using the hypothesis plus other known and accepted generalizations, one should be able to deduce the original problem condition. Thus hypothesis must actually explain what it claims to explain; it should have empirical reference.