

## Chapter Two: Research Problem and Hypotheses

### Research problem

The first step in the research process is the choice of suitable problem for investigation. Problem is any question or matter involving doubt, uncertainty or difficulty. Problem also denotes here a question proposed for solution or discussion. On the other hand research problem refers to a problem that someone would like to investigate; a situation that needs to be changed or addressed. These problems usually consist of area of concern, condition to be improved, difficulties to be eliminated, and questions seeking answer. A research problem also defined as an issue or concern that an investigator presents and justifies in research study.

A problem exists when we do not have enough information to answer a question.

This may happen

1. When there is noticeable gap in the results of investigations. Those questions which have remained unanswered by earlier investigations may make us aware of the problem. Collection of data with a view to fill this gap is thus indicated. A **problem** occurs when there is a difference between the current conditions and a more preferable set of conditions. In other words, a gap exists between the way things are now and a way that things could be better. The gap can come about in a number of ways
  - A. Business performance is worse than expected business performance. For instance, sales, profits, and margins could be below targets set by management. This is a very typical type of problem analysis. Think of all the new products that fail to meet their targeted goals. Trend analysis would also be included in this type of problem. Management is constantly monitoring key performance variables. Previous performance usually provides a benchmark forming expectations. Sales, for example, are generally expected to increase a certain percentage each year. When sales fall below this expectation, or particularly when they fall below the previous year's sales, management usually recognizes that they have a potential problem on their hands
  - B. Actual business performance is less than possible business performance. Realization of this gap first requires that management have some idea of what is possible. This

may form a research problem in and of itself. Opportunity-seeking often falls into this type of problem-definition process.

- C. Expected business performance is greater than possible business performance. Sometimes, management has unrealistic views of possible performance levels—either too high or too low.
2. When a result of several enquires, disagree.
3. When a fact exists in the form of a bit of unexplained information. Fore example, when the production or sales targets are not being met or the cost of production or rate of absenteeism or the number of accidents is going up without there being sufficient explanation for such developments.
4. When there is desire for innovation For example, a manufacture may think of conducting research in new methods of productions, packing or sale even when there is no problem existing in any of these areas.

The problem for research should ordinarily be expressed in an interrogative form. For example

- ✓ What are the effects on workers' performance of different types of incentives?
- ✓ Does anxiety affect achievement?

The goal of research in all these cases would be to seek answers to these questions.

The identification of research problem is difficult, but it is an important phase of the entire research process. It requires a great deal of patience and logical thinking on the part of the researcher. Beginners find the tasks of identifying a research problem a difficult one. Most of the time researchers select a problem because of their own unique needs and purposes. There are, however, some important sources which are helpful to a researcher for selecting problem to be investigated.

#### **Sources of a research problem**

Research problem / Idea originate from many sources. We discuss four of these sources for the time being: Every day life, practical issue, past research (literature), and Inference from theory.

1. Every day life: is one common source of research problem / idea. Based on Questioning and inquisitive approach, you can draw from your experiences, and come up with many research problems. For example think about what type of management

practices in businesses you believe work well or do not work well. Would you be interested in doing a research study on one or more of those practices?

2. Practical Issue: this is one of most important source of research problem especially when you are practitioner. What are some current problem facing business developments? What research topic do you think can address some of these problems? By such types of inquisitive approach with regard to the practical issue you can come up with research problem.
3. Past research (literature): Among the sources of research problems one has to be very familiar with the literature in the field of one's interest. Past research is probably the most important source of research idea / problem. That is because, importantly research usually generate more questions that it answers. This also the best way to come with a specific idea that will fit in to and extend the research literature.
4. Theory (Explanations of phenomenon): inference from theory can be a source of research problem. The application of general principles involved in various theories to specific situation makes an excellent starting point for research. The following question gives illustration how theory can be a source of research problem.
  - Can you summarized and integrate a set of post studies in to a theory?
  - Are there any theoretical predictions needing empirical testing?
  - Do you have any theories that you believe have merit? Test them.
  - If there is little or no theory in the area of interest to you, then think about collecting data to help you to generate a theory.

### **Selecting and Defining a research problem**

#### Selecting a research problem

The research problem undertaken for the study must be carefully selected. The task is difficult one, although it may not appear to be so. The research problem as identified and defined for the purpose of inquiry should be an amenable to scientific research. As such every research problem selected for research must satisfy the following criteria.

1. **It should be original:** It should be problem that is being inquired for the first time. It should not be a problem of repeated nature and should not have been already probed with some valid reasons. For this purpose the researcher must attempt a thorough review of the existing literature. It is useful for identification of specific problems,

eliminating the duplication of works, improving the research techniques over those used earlier in similar research, avoiding the hounding points of earlier researchers, identification of gaps, and gathering knowledge of new concepts and technical aspects. Therefore, a preliminary survey of the existing literature in the proposed area of research should be carried out to find out the possibility of making original contribution

Knowledge about the previous research will serve the following five useful purposes

- ✓ It will enable the researcher to identify his specific problems for research
  - ✓ It will eliminate the possibility of unnecessary duplication of effort.
  - ✓ It will give him valuable information on the merits and demerits of various research techniques, which have been used in the past.
  - ✓ It will tell him where others have floundered so that he may be cautious,&
  - ✓ It will enrich his knowledge of the characteristics concepts and terminology in his area of specialization
2. It should neither very general nor very specific. It should be a problem of less general nature and most of specific treatment. In other word research problem should be moderate and compromising between the spaces sets out above. A problem of general nature may lead to vague treatment and too specific problem may end in narrow focus without any consequence.
  3. ***It should be solvable or researchable:*** Sometimes the problem may be significant but may not be a single enquiry. A solvable problem improves the conditions immediately. A problem remains insolvable for two reasons. They are:
    - (a) That it may concern supernatural or amorphous phenomena. For example a research problem to know who is responsible to the creation of the world is beyond one's research exercise.
    - (b) That it cannot be operationally defined. The problem may not be possible for measurement. For instance measurement of anxiety, creativity etc, are too difficult to measure.
  4. ***The research problem undertaken should be feasible for implementation:*** The feasibility of carrying out research on the selected problem should be checked against the following considerations;

- i) Study design,
- ii) Access to organization and respondents,
- iii) Sample or universe to be studied,
- iv) Source of data,
- v) Method of collecting data,
- vi) Type of variables (nominal/ordinal) involved,
- vii) Selection of scale of measurement and statistics
- viii) Character of distribution of variables:
  - Normal (allowing for parametric Statistics)
  - Non-normal (requiring non-parametric Statistics)

5. **The selection of a problem must be proceeding by preliminary study:** This may not be necessary when the problem requires the conduct of research closely similar to one that has already been done. But when the field of enquiry is relatively new and does not have available set of well developed techniques, a brief feasibility study must always be undertaken.

If the problem for research selected properly by observing the above mentioned points and fulfill the features of good research problem indicated in the box here under, the research will not be difficult to implement.

#### **Necessity of Defining the Problem**

Quite often we all hear that a problem clearly stated is a problem half solved. This statement signifies the need for defining a research problem. The problem to be investigated must be defined unambiguously for that will help to discriminate relevant data from the irrelevant ones. A proper definition of research problem will enable the researcher to be on the track whereas an ill-defined problem may create hurdles. Questions like: What data are to be collected? What characteristics of data are relevant and need to be studied? What relations are to be explored? What techniques are to be used for the purpose? And similar other questions crop up in the mind of the researcher who can well plan his strategy and find answers to all such questions only when the research problem has been well defined. Thus, defining a research problem properly is a prerequisite for any study and is a step of the highest importance. In fact, formulation of a problem is often more essential than its solution. It is only on careful detailing the

research problem that we can work out the research design and can smoothly carry on all the consequential steps involved while doing research.

#### Technique Involved In Defining a Problem

Let us start with the questions: What does one mean when he / she want to define a research problem? The answer may be that one wants to state the problem along with the bounds within which it is to be studied. In other words, defining a problem involves the task of laying down boundaries within which a researcher shall study the problem with a pre-determined objective in view.

How to define a research problem is undoubtedly a phenomenal task. However, it is a task that must be tackled intelligently to avoid the perplexity encountered in a research operation. The usual approach is that the researcher should himself pose a question (or in case someone else wants the researcher to carry on research, the concerned individual, organization or an authority should pose the question to the researcher) and set-up techniques and procedures for throwing light on the question concerned for formulating or defining the research problem. But such an approach generally does not produce definitive results because the question phrased in such a fashion is usually in broad general terms and as such may not be in a form suitable for testing.

Defining a research problem properly and clearly is a crucial part of a research study and must in no case be accomplished hurriedly. However, in practice this frequently overlooked which causes a lot of problems later on. Hence, the research problem should be defined in a systematic manner, giving due weight age to all relating points. The technique for the purpose involves the undertaking of the following *steps* generally one after the other: (i) statement of the problem in a general way; (ii) understanding the nature of the problem; (iii) surveying the available literature (iv) developing the ideas through discussions; and (v) rephrasing the research problem into a working proposition. A brief description of all these points will be helpful.

(i) Statement of the problem in a general way: First of all the problem should be stated in a broad general way, keeping in view either some practical concern or some scientific or intellectual interest. For this purpose, the researcher must immerse himself thoroughly in the subject matter concerning which he wishes to pose a problem. In case of social research, it is considered advisable to do some field observation and as such the

researcher may undertake some sort of preliminary survey or what is often called pilot survey. Then the researcher can himself state the problem or he can seek the guidance of the guide or the subject expert in accomplishing this task. Often, the guide puts forth the problem in general terms, and it is then up to the researcher to narrow it down and phrase the problem in operational terms. In case there is some directive from an organizational authority, the problem then can be stated accordingly. The problem stated in a broad general way may contain various ambiguities which must be resolved by cool thinking and rethinking over the problem. At the same time the feasibility of a particular solution has to be considered and the same should be kept in view while stating the problem.

(ii) Understanding the nature of the problem: The next step in defining the problem is to understand its origin and nature clearly. The best way of understanding the problem is to discuss it with those who first raised it in order to find out how the problem originally came about and with what objectives in view. If the researcher has stated the problem himself, he should consider once again all those points that induced him to make a general statement concerning the problem. For a better understanding of the nature of the problem involved, he can enter into discussion with those who have a good knowledge of the problem concerned or similar other problems. The researcher should also keep in view the environment within which the problem is to be studied and understood.

(iii) Surveying the available literature: All available literature concerning the problem at hand must necessarily be surveyed and examined before a definition of the research problem is given. This means that the researcher must be well-conversant with relevant theories in the field, reports and records as also all other relevant literature. He must devote sufficient time in reviewing of research already undertaken on related problems. This is done to find out what data and other materials, if any, are available for operational purpose. "Knowing what data are available often serves to narrow the problem itself as well as the technique that might be used." This would also help a researcher to know if there are certain gaps in the theories, or whether the existing theories applicable to the problem under study are inconsistent with each other, or whether the findings of the different studies do not follow a pattern consistent with the theoretical expectations and so on. All this will enable a researcher to take new strides in the field for furtherance of knowledge i.e., he can move up starting from the existing premise. Studies on related

problems are useful for indicating the type of difficulties that may be encountered in the present study as also the possible analytical shortcomings. At times such studies may also suggest useful and even new lines of approach to the present problem.

(iv) Developing the ideas through discussions: Discussion concerning a problem often produces useful information. Various new ideas can be developed through such an exercise. Hence, a researcher must discuss his problem with his colleagues and others who have enough experience in the same area or in working on similar problems. This is quite often known as an experience survey. People with rich experience are in a position to enlighten the researcher on different aspects of his proposed study and their advice and comments are usually invaluable to the researcher. They help him sharpen his focus of attention on specific aspects within the field. Discussions with such persons should not only be confined to the formulation of the specific problem at hand, but should also be concerned with the general approach to the given problem, techniques that might be used, possible solutions, etc.

(v) Rephrasing the research problem: Finally, the researcher must sit to rephrase the research problem into a working proposition. Once the nature of the problem has been clearly understood, the environment (within which the problem has got to be studied) has been defined, discussions over the problem have taken place and the available literature has been surveyed and examined, rephrasing the problem into analytical or operational terms is not a difficult task. Through rephrasing, the researcher puts the research problem in as specific terms as possible to that it may become operationally viable and may help in the development of working hypotheses.

In addition to what has been stated above, the following points must also be observed while defining a research problem.

- Technical terms and words or phrases, with special meanings used in the statement of the problem, should be clearly defined.
- Basic assumptions or postulates (if any) relating to the research problem should be clearly stated.
- A straight forward statement of the value of the investigation (i.e., the criteria for the selection of the problem) should be provided.

- The suitability of the time-period and the sources of data available must also be considered by the researcher in defining the problem.
- The scope of the investigation or the limits within which the problem is to be studied must be mentioned explicitly in defining a research problem

### **HYPOTHESIS and HYPOTHESIS TESTING**

The hypothesis is a tentative solution of a problem. The research activities are planned to verify the hypothesis and not to find out the solution of the problem or to seek an answer of a question. It is very essential to a research worker to understand the meaning and nature of hypothesis. The researcher always plan or formulate a hypothesis in the beginning of the problem.

#### **MEANING OF HYPOTHESIS**

The word hypothesis consists of two words: Hypo + thesis = Hypothesis

‘Hypo’ means tentative or subject to the verification and ‘Thesis’ means statement about solution of a problem. The world meaning of the term hypothesis is a tentative statement about the solution of the problem. Hypothesis offers a solution of the problem that is to be verified empirically and based on some rationale.

Another meaning of the word hypothesis, which is composed of two words:

‘Hypo’ means composition of two or more variables, which is to be verified.

‘Thesis’ means position of these variables in the specific frame of reference.

This is the operational meaning of the term hypothesis. Hypothesis is the composition of some variables, which have some specific position, or role of the variables i.e. to be verified empirically. It is a proposition about the factual and conceptual’ elements. Hypothesis is called a leap into the dark. It is a brilliant guess about the solution of a problem.

#### **DEFINITIONS OF HYPOTHESIS**

The term hypothesis has been defined in several ways. Some important definitions have been given in the following way “It is a tentative supposition or provisional guess which seems to explain the situation under observation.” *James E. Greighton* “A hypothesis is a tentative generalization the validity of which remains to be tested. In its most elementary stage the hypothesis may be any hunch, guess, imaginative idea which becomes the basis for further investigation.” A Lungberg

“A hypothesis states what we are looking for. A hypothesis looks forward. It is a proposition, which can be put to a test to determine its validity. It may prove to be correct or incorrect” Goode and Han

“An expectation about events based on generalization of the assumed relationship between variables.” Bruce W. Tuckman,

“A hypothesis is a tentative statement of the relationship between two or more variables. Hypotheses are always in declarative sentence form and they relate, either generally or specifically variable and variables.”

The research team according to the hypothesis formulated for the study carries out the entire investigation. It is the basis for the statement of the objectives of the study. It helps in the decision-making with regard to the research design. Hypothesis formulation is not an end itself. The researchers must test the hypothesis in appropriate manner viz, by statistical techniques or by an in depth field enquires. In nonprofessional’s parlance, hypothesis is a kind of assumption that motivates or guides the researcher to proceed with the research design and its implementation.

***Characteristics of hypothesis:*** Hypothesis must possess the following characteristics:

- (i) 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.
- (ii) Hypothesis should be capable of being tested. In a swamp of untestable hypotheses, many a time the research programs have bogged down. Researcher may do some prior study 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.”
- (iii) Hypothesis should state relationship between variables, if it happens to be a relational hypothesis.
- (iv) 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.
- (v) All concerned should state hypothesis as far as possible in most simple terms so that the same is easily understandable. However, one must remember that simplicity of hypothesis has nothing to do with its significance.

- (vi) 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.
- (vii) 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 lifetime collecting data to test it.
- (viii) 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.

**Establishing a hypothesis should follow rules like:**

- ✓ The variables must be clearly specified and measurable by some techniques we know
- ✓ The relationship between them must be stated precisely.

**The Role of the Hypothesis**

In research, a hypothesis serves several important functions:

- It guides the direction of the study.
- It identifies facts that are relevant and those that are not.
- Represents specific objective, which determine the nature of the data needed to test the proposition
- It suggests which form of research design is likely to be most appropriate: Offer basis for selecting the sample, the research procedure, and the statistical analysis needed
- It provides a framework for organizing the conclusions that result.
- Keeps the study restricted in scope thereby preventing it from becoming too broad

**Source of Hypothesis**

The inspection for hypothesis comes from a number of sources w/h includes the following:

1. *Professional Experience*: The daily life experience or the day to day observation of the relationship (correlation) between different phenomena leads the researcher to

hypothesize a relationship and to conduct a study if his/ her assumptions are confirmed.

2. *Past Research or Common beliefs*: Hypothesis can also be inspired by tracing past research or by commonly held beliefs.
3. *Through direct analysis of data or deduction from existing theory*: Hypothesis may also be generated through direct analysis of data in the field or may be deduced from a formal theory. Through attentive reading, the researcher may be able to get acquaintance with relevant theories, principles and facts that may alert him or her to identify valid for his/her study
4. *Technological and social changes*: Directly or indirectly exerts an influence in the function of an organization. All such changes bring about new problems for research.

**What Is a Strong Hypothesis?** A strong hypothesis should fulfill three conditions:

- Adequate for its purpose.
- Testable.
- Better than its rivals

***Checklist for Developing a Strong Hypothesis***

Criteria	Interpretation
<b>Adequate for Its Purpose</b>	<input type="checkbox"/> Does the hypothesis reveal the original problem condition? <input type="checkbox"/> Does the hypothesis clearly identify facts that are relevant and those that are not? <input type="checkbox"/> Does the hypothesis clearly state the condition, size, or distribution of some variable in terms of values meaningful to the research problem (descriptive)? <input type="checkbox"/> Does the hypothesis explain facts that gave rise to the need for explanation (explanatory)? <input type="checkbox"/> Does the hypothesis suggest which form of research design is likely to be most appropriate? <input type="checkbox"/> Does the hypothesis provide a framework for organizing the conclusions that result?
<b>Testable</b>	<input type="checkbox"/> Does the hypothesis use acceptable techniques? <input type="checkbox"/> Does the hypothesis require an explanation that is plausible given known physical or psychological laws? <input type="checkbox"/> Does the hypothesis reveal consequences or derivatives that can be deduced for testing purposes? <input type="checkbox"/> Is the hypothesis simple, requiring few conditions or assumptions?
<b>Better Than Its Rivals</b>	<input type="checkbox"/> Does the hypothesis explain more facts than its rivals? <input type="checkbox"/> Does the hypothesis explain a greater variety or scope of facts than its rivals? <input type="checkbox"/> Is the hypothesis one that informed judges would accept as being the most likely?

**Forms of Hypothesis**

Hypothesis is the statistical statement about the characteristics of population made based on sample evidence. A statistical hypothesis is some assumption or statement, which may or may not be true, about a population or equivalently about the probability distribution

characterizing the given population, which we want to test based on the evidence from a random sample. Hypothesis can be formulated in either of the following two ways:

- (i) **Null Hypothesis ( $H_0$ ):** It states that there is no much (significant) difference between the parameter and statistic. In other words,  $H_0$  states that the difference between sample statistic and the claimed population parameter is due to chance variation in sampling. Null hypothesis is normally preferred in testing process. It enables the researcher to test it. The random selection of the samples from the given population makes the tests of significance valid for us. For applying any test of significance we first set up a hypothesis - a define statement about the population parameter(s). Such a statistical hypothesis, which is under test, is usually a hypothesis of no difference between statistical and parameter. Hence it is called Null hypothesis. In the words, null hypothesis is the hypothesis which is tested for possible rejection under the assumption that it is true.
- (ii) **Alternative Hypothesis ( $H_1$ ):** It is true when  $H_0$  is false; it is the statement about the population that must be true if null hypothesis is false. Any hypothesis, which is complementary to the null hypothesis, is called an alternative hypothesis. It is important to explicitly state the alternative hypothesis in respect of any null hypothesis, because the acceptance or rejection of  $H_0$  is meaningful only it is being tested against a rival hypothesis

### **Directional and Non directional Hypotheses**

If in stating the relationship between two variables or comparing two groups terms such as *positive, negative, more than, less than*, and the like are used, then these hypotheses are **directional** because the direction of the relationship between the variables (positive/negative), or the nature of the difference between two groups on a variable (more than/less than) is postulated.

#### **Example**

*The greater the stress experienced in the job, the lower the job satisfaction of employees.*

*Women are more motivated than men are* On the other hand, **non-directional** hypotheses are those that do postulate a relationship or difference, but offer no indication of the direction of these relationships or differences. In other words, though it may be conjectured that there would be a significant relationship between two variables, we may

not be able to say whether the relationship would be positive or negative. Likewise, even if we can conjecture that, there will be differences between two groups on a particular variable; we will not be able to say which group will be more and which less on that variable,

Example

*There is a relationship between age and job satisfaction.*

*There is a difference between the work ethic values of Ethiopian and Chinese employees*

Non-directional hypotheses are formulated either because the relationships or differences have never been previously explored or hence there is no basis for indicating the direction, or because there have been conflicting findings in previous research studies on the variables. In some studies, a positive relationship might have been found, while in others a negative relationship might have been traced. Hence, the current researcher might only be able to hypothesize that there would be a significant relationship, but the direction may not be clear

#### Procedure for Hypothesis Testing

The first and foremost problem in any testing procedure is the setting up of the null hypothesis. As the name suggests, it is always taken as a hypothesis of no difference. The decision maker or researcher should always adopt the neutral or null attitude on the part of the researcher before drawing the sample is the basis of the null hypothesis. The following points may be borne in mind in setting the hypothesis.

1. If we want to test significance of the difference between a statistic and the parameter or between two sample statistics then we set up the null hypothesis, that the difference is not significant. This means that the difference is just due to fluctuations of sampling.
2. Setting the level of significance: The hypothesis is examined on a predetermined level of significance. In other words the level of significance can be either 5% or 1% depending upon the purpose, nature of enquiry and size of the sample.

In hypothesis testing, two kinds of errors are possible viz., Type I error and Type II error. Type I error means rejection the null hypothesis when it happens to be true. Type II error means accepting null hypothesis when it is false.

The following tables being explain the type of error

Position of Hypothesis	Null Hypothesis-Accept	Null hypothesis-Reject
H <sup>o</sup> TRUE	Correct Decision	Type: I Error
H <sup>o</sup> FALSE	Type II Error	Correct Decision

For instance the level of significance is 5%. It means that five cases of out of 100 are rejecting the H<sup>o</sup> which is true. It is possible to reduce type I error by lowering down the level of significance. Both the type of errors cannot be reduced simultaneously. We have to balance between them.

3. The next step in the testing of hypothesis is calculation of Standard Error (SE). The standard deviation of the sampling distribution of a statistic is known as Standard Error. The concept of standard error (SE) is extremely useful in the testing of statistical hypothesis. Note that the SE is calculated differently for different statistical value.
4. Calculation of Significance ratio: Significance ratio is symbolically described as 't'. It is calculated by dividing the difference between parameter and statistic by the standard error
5. Deriving the inference: Compare the calculated value with critical value (table value). If the observed value is less it is insignificant and vice-versa.

The steps to be followed in hypothesis testing are:

1. State the null and the alternate hypotheses.
2. Choose the appropriate statistical test depending on whether the data collected are parametric or nonparametric (discussed in a later chapter).
3. Determine the level of significance desired ( $p = .05$ , or more, or less).
4. See if the output results from computer analysis indicate that the significance level is met.
5. When the resultant value is larger than the critical value, the null hypothesis is rejected, and the alternate accepted. If the calculated value is less than the critical value, the null is accepted and the alternate rejected.