Research Fundamentals

Research Methodology

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Learning Objectives

- Meaning of Research
- Objectives and Characteristics of Research
- Research Categories
- Features of Good Research Study
- Types of Research Studies
- Scientific Method
- Comparison of Scientific and Non Scientific Method
- Research Methods and Research Methodology
- Organizing Research Function
- Issues and Trends in Research

Meaning of Research

Research in common parlance refers to a search for knowledge. Research is an art of scientific investigation. Dictionary definition of research is a careful investigation or inquiry specially through search for new facts in any branch of knowledge. Some people consider research as a movement from the known to the unknown.

Meaning of Research

- "*Research is a systematized effort to gain new knowledge*."

—Redman and o Mory

- "*Research is the systematic process of collecting and analyzing information (data) in order to increase our understanding of the phenomenon about which we are concerned or interested*."

—Dr. S.L. Gupta

- "*Research is to re-search from available primary and secondary data into relevant information to form a substantial knowledge*."

—Hitesh Gupta

- *The manipulation of things, concepts or symbols for the purpose of generalizing to extend, correct or verify Knowledge, whether that knowledge aids in construction of theory or in the practice of an art.*

  - D. Slesinger and M. Stephenson in the Encyclopedia of Social Sciences

- *Research comprises defining and redefining problems, formulating, hypothesis or suggested solution: collecting , organizing and evaluating data: making deductions and formulating hypothesis.*

  - ***- Clifford Woody***

OBJECTIVES OF RESEARCH

The purpose of research is to discover answers to questions through the application of scientific procedures. The main aim of research is to find out the truth which is hidden and which has not been discovered as yet. Through each research study has its own specific purpose, we mention some general objectives of research below:

- To obtain familiarity of a phenomenon.

- To portray accurately the characteristics of a particular individual, situation or a group.
- To determine the frequency with which something occurs or with which it is associated with something else.
- To test a hypothesis of a casual relationship between variables.

Characteristics of Research

- Research is directed towards the solution of a problem.
- Based upon observable experience or empirical evidence.
- Demands accurate observation and description.
- Involves gathering new data from primary sources or using existing data for a new purpose.
- Requires expertise
- Objective and logical
- Involves the quest for answers to unsolved problems.
- Requires courage.
- Should be carefully recorded and reported.

Research Categories

- Basic Research
  - Conducted to verify the acceptability of a given theory or to know more about certain concepts.
  - Also known as fundamental research, ‘theoretical’ research or ‘pure’ research.
- Applied Research
  - conducted when a decision must be made about a specific real-life problem.
  - It is of two types:
    - Applied Research can further be divided into two groups:
    - Problem Solving Research
    - Problem Oriented Research

FEATURES OF GOOD RESEARCH

- **Objectivity**
- **Control**
- **Generalisability**
- **Free from Personal Biases**
- **Systematic**
- **Reproducible**

TYPES OF RESEARCH STUDIES

The basic types of research are as follows:

- ***Descriptive vs. Analytical:*** Descriptive research includes surveys and fact-finding enquiries of different kinds. The major purpose of descriptive research is description of the state of affairs as it exists at present. In social science and business research we quite often use the term *Ex post facto research* for descriptive research studies. The main characteristic of this method is that the researcher has no control over the variables: he can only report what has happened or what is happening. The methods of research utilized in descriptive research are survey methods of all kinds, including comparative and correlational methods.

  In *analytical research*, the researcher has to use facts or information already available, and analyze these to make a critical evaluation of the material.

- ***Applied vs. Fundamental:*** *Applied research* aims at finding a solution for an immediate problem facing a society or an industrial/ business organization, whereas *fundamental research* is mainly concerned with generalizations and with the formulation of a theory.

  Research concerning some natural phenomenon or relating to pure mathematics are examples of fundamental research. Similarly, research studies, concerning human behavior carried on with a view to make generalizations about human behavior, are also examples of fundamental research. Research to identify social, economic or political trends that may affect a particular institution, marketing research, evaluation research are examples of applied research. Thus, the central aim of applied research is to discover a solution for some pressing practical problems, whereas basic research is directed towards finding information that has a broad base of applications and thus, adds to the already existing organized body of scientific knowledge.

- ***Quantitative vs. Qualitative:*** Quantitative research is based on the quantitative measurements of some characteristics. It is applicable to phenomena that can be expressed in terms of quantities.

  Qualitative research, is concerned with qualitative phenomenon, i.e., phenomenon relating to or involving quality or kind. Attitude or opinion research i.e., research designed to find out how people feel or what they think about a particular subject or institution is also qualitative research. Qualitative research is specially important in the behavioural sciences where the aim is to discover the underlying motives of human behaviour.

- ***Conceptual vs. Empirical:*** Conceptual research is that related to some abstract ideas or theory. It is generally used by philosophers and thinkers to develop new concepts or to reinterpret existing ones.

  Empirical research relies on experience or observation alone, often without due regard for system and theory. It is data-based research. Its is also called as experimental type of research. Empirical research is appropriate when proof is sought that certain variables affect other variables in some way. Evidence gathered through experiments or empirical studies are considered to be the most powerful support possible for testing a given hypothesis.

Scientific Method

- It has three distinct characteristics.
  - **Objectivity:** It should enable to classify facts accurately and carefully, without any bias.
  - **Accuracy of Measurement:** Must be able to have observations of their correlation and sequence, which can be denied as a result of dissipation imagination and pains taking efforts of the scientists.
  - **Self- Criticism:** One should critically examine his own research as they are a group of people who are never sure that they have found the ultimate truth.

Scientific versus Non-Scientific Methods

- **Objectivity:** *Scientific method* is more objective
  - the reason being that development of scientific method is normally as a result of the long years of experience and good deal of thought by scientists.
  - Hypothesis, a back bone of scientific method, can be verified with the help of statistical techniques and principles. This ensures better and more objectivity as compared to subjectiveness in decision making by non-scientific methods.
- **Degree of Accuracy:** *Scientific method* is more precise
  - Though measurement is not always attempted in every scientific investigation, but whenever attempted even the quantitative concept can be defined precisely. measure effectively and helps in achieving results with higher degree of accuracy.
- **Systematic Knowledge:**
  - Scientific method takes cognizance of the existing knowledge. The results achieved by various researchers lend to the same conclusions. This helps in accumulation of systematic knowledge which is continuous and unending.
  - Same is not true in case of non-scientific method.

RESEARCH METHODS & RESEARCH METHODOLOGY

- All those methods which are used by the researcher during the course of studying his research problem are termed as ***Research Methods***. Research methods can be put into the following three groups:

1. In the first group we include those methods which are concerned with the collection of data. These methods will be used where the data already available is not sufficient to arrive at the required solution;

2. The second group consists of those statistical technique which are used for establishing relationships between the data and the unknowns;

3. The third group consists of those methods which are used to evaluate the accuracy of the results obtained.

Research methods falling in the above stated last two groups are generally taken as the analytical tools of research.

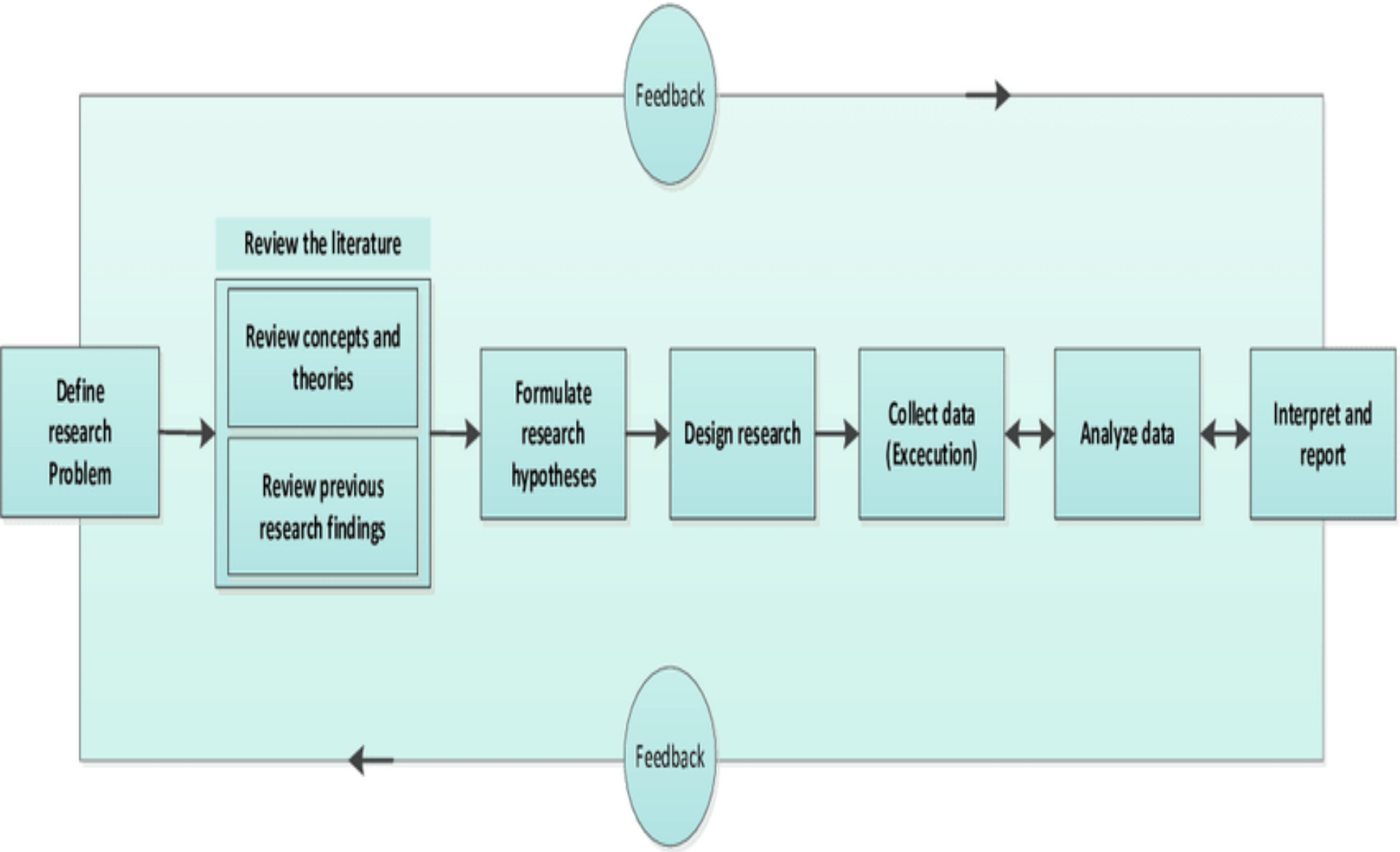
A distinction is also made between research techniques and research methods. Research techniques refer to the behaviour and instruments we use in performing research operations such as making observations, recording data, techniques of processing data and the like. Research methods refer to the behavior and instruments used in selecting and constructing research technique.

- ***Research methodology*** is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically.

  It is necessary for the researcher to know not only the research methods/techniques but also the methodology. Researcher not only need to know how to develop certain indices or tests, how to calculate the mean, the mode, the median or the standard deviation or chi-square, how to apply particular research techniques, but they also need to know which of these methods or techniques, are relevant and which are not, and what would they mean and indicate.

  The scope of research methodology is wider than that of research methods. Thus, when we talk of research methodology we not only talk of the research methods but also consider the logic behind the methods we use in the context of our research study and explain why we are using a particular method or technique and why we are not using others so that research results are capable of being evaluated either by the researcher himself or by others.

Research Process in Flow Chart



Steps involved in Research Process in Research Methodology

- **Formulating the research problem:** There are two types of research problems, viz., those which relate to states of nature and those which relate to relationships between variables. At the very outset the researcher must single out the problem he wants to study, i.e., he must decide the general area of interest or aspect of a subject-matter that he would like to inquire into.

- **Extensive literature survey:** Once the problem is formulated, a brief summary of it should be written down. It is compulsory for a research worker writing a thesis for a Ph.D. degree to write synopsis of the topic and submit it to the necessary Committee or the Research Board for approval. At this juncture the researcher should undertake extensive literature survey connected with the problem.

- **Development of working hypotheses:** After extensive literature survey, researcher should state in clear terms the working hypothesis or hypotheses. Working hypothesis is tentative assumption made in order to draw out and test its logical or empirical consequences. As such the manner in which research hypotheses are developed is particularly important since they provide the focal point for research.

How does one go about developing working hypotheses? The answer is by using the following approach:

- Discussions with colleagues and experts about the problem, its origin and the objectives in seeking a solution;
- Examination of data and records, if available, concerning the problem for possible trends, peculiarities and other clues;
- Review of similar studies in the area or of the studies on similar problems; and
- Exploratory personal investigation which involves original field interviews on a limited scale with interested parties and individuals with a view to secure greater insight into the practical aspects of the problem.

- **Preparing the research design:** the function of research design is to provide for the collection of relevant evidence with minimal expenditure of effort, time and money. But how all these can be achieved depends mainly on the research purpose. Research purposes may be grouped into four categories, viz.,

- Exploration,
- Description,
- Diagnosis, and
- Experimentation.

The preparation of the research design, appropriate for a particular research problem, involves usually the consideration of the following:

- the means of obtaining the information;
- the availability and skills of the researcher and his staff (if any);
- explanation of the way in which selected means of obtaining information will be organized and the reasoning leading to the selection;
- the time available for research; and
- the cost factor relating to research, i.e., the finance available for the purpose.

- **Determining sample design:** All the items under consideration in any field of inquiry constitute ‘universe’ or ‘population’. A complete enumeration of all the items in the ‘population’ is known as a census inquiry. It can be presumed that in such an inquiry when all the items are covered no element of chance is left and highest accuracy is obtained. But in practice this may not be true.

- **Collecting the data:** In dealing with any real life problem it is often found that data at hand are inadequate, and hence, it becomes necessary to collect data that are appropriate. There are sever always of collecting the appropriate data which differ considerably in context of money costs, time and other resources at the disposal of the researcher.

- **Execution of the project:** Execution of the project is a very important step in the research process. If the execution of the project proceeds on correct lines, the data to be collected would be adequate and dependable. The researcher should see that the project is executed in a systematic manner and in time.

- **Analysis of data:** After the data have been collected, the researcher turns to the task of analyzing them. The analysis of data requires a number of closely related operations such as establishment of categories, the application of these categories to raw data through coding, tabulation and then drawing statistical inferences. The unwieldy data should necessarily be condensed into a few manageable groups and tables for further analysis. Thus, researcher should classify the raw data into some purposeful and usable categories.

- **Hypothesis-testing:** After analyzing the data as stated above, the researcher is in a position to test the hypotheses. Do the facts support the hypotheses or they happen to be contrary? This is the usual question which should be answered while testing hypotheses .Various tests, such as Chi square test, t-test, F-test, have been developed by statisticians for the purpose. The hypotheses may be tested through the use of one or more of such tests, depending upon the nature and object of research inquiry. Hypothesis -testing will result in either accepting the hypothesis or in rejecting it.

- **Generalizations and interpretation:** If a hypothesis is tested and upheld several times, it maybe possible for the researcher to arrive at generalization, i.e., to build a theory. As a matter of fact, the real value of research lies in its ability to arrive at certain generalizations. If the researcher had no hypothesis to start with, he might seek to explain his findings on the basis of some theory. It is known as interpretation. The process of interpretation may quite often trigger off new questions which in turn may lead to further researches.

- **Preparation of the report or the thesis:** Finally, the researcher has to prepare the report of what has been done by him. Writing of report must be done with great care keeping in view the following:

1. The layout of the report should be as follows:
   the preliminary pages;
- the main text, and
- the end matter.

In its preliminary pages the report should carry title and date followed by acknowledgement sand foreword. Then there should be a table of contents followed by a list of tables and list of graphs and charts, if any, given in the report.

The main text of the report should have the following parts:

- **Introduction:** It should contain a clear statement of the objective of the research and an explanation of the methodology adopted in accomplishing the research. The scope of the study along with various limitations should as well be stated in this part.
- **Summary of findings:** After introduction there would appear a statement of finding sand recommendations in non-technical language. If the findings are extensive, they should be summarized.
- **Main report:** The main body of the report should be presented in logical sequence and broken-down into readily identifiable sections.
- **Conclusion:** Towards the end of the main text, researcher should again put down the results of his research clearly and precisely. In fact, it is the final summing up.

At the end of the report, appendices should be enlisted in respect of all technical data. Bibliography, i.e., list of books, journals, reports, etc., consulted, should also be given in the end. Index should also be given specially in a published research report.

2. Report should be written in a concise and objective style in simple language avoiding vague expressions such as ‘it seems,’ ‘there may be’, and the like.

3. Charts and illustrations in the main report should be used only if they present the information more clearly and forcibly.

4. Calculated ‘confidence limits’ must be mentioned and the various constraints experience din conducting research operations may as well be stated.

Problems Encountered by Researchers in INDIA

- lack of a scientific training.
- Insufficient interaction.
- Lack of Confidence.
- Lack of code of conduct.
- Inadequate Assistance.
- Improper Library Management.
- High Cost of Publishing.

ISSUES &TRENDS IN RESEARCH

- **Intense Competition**
- **Importance of Research Strategy**
- **Product Variety and Customization**
- **Emphasis on Quality**
- **Advance in Technology**
- **Concern Regarding Business Environment**

THANK YOU