Chapter 1

Introduction to Research

What is Research?

The word research is composed of two syllables, *re* and *search*.

- **re** is a prefix meaning again, anew or over again
- **search** is a verb meaning to examine closely and carefully, to test and try, or to probe.

Together they form a noun describing a careful, systematic, patient study and investigation in some field of knowledge, undertaken to establish facts or principles.
Research is a structured enquiry that utilizes acceptable scientific methodology to solve problems and create new knowledge that is generally applicable. Scientific methods consist of systematic observation, classification and interpretation of data.

Research means "Search for Knowledge". It aims at discovering the truth. It is the search for knowledge through objective and systematic method of finding solution to problems. It is carried on both for discovering new facts and verification of old ones. Therefore, research is a process of systematic and in-depth study or search of any particular topic, subject or area of investigation backed by collection, computation, presentation and interpretation of relevant data.

تعريف

أهداف البحث

Aims 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.

1. To gain familiarity with a phenomenon or to achieve new insights into it
2. To portray accurately the characteristics of a particular individual, situation or a group
3. To determine the frequency with which something occurs or with which it is associated with something else
4. To test a hypothesis of a causal relationship between variables

أنواع الأبحاث

Types of Research

The basic types of research are as follows:

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

ii). **Applied vs. Fundamental**: Research can either be applied (or action) research or fundamental (to basic or pure) research. Applied research aims at finding a solution for an immediate problem facing a society or an industrial/business organisation, whereas fundamental research is mainly concerned with generalisations and with the formulation of a theory. "Gathering knowledge for knowledge's sake is termed 'pure' or 'basic' research." 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.

iii). **Quantitative vs. Qualitative**: Quantitative research is based on the measurement of quantity or amount. It is applicable to phenomena that can be expressed in terms of quantity. Qualitative research, on the other hand, is concerned with qualitative phenomenon, i.e., phenomena relating to or involving quality or kind. For instance, when we are interested in investigating the reasons for human behavior, we quite often talk of 'Motivation Research', an important type of qualitative research. Qualitative research is especially important in the behavioral sciences where the aim is to discover the underlying motives of human behavior. Qualitative research in practice is relatively a difficult job and therefore, while doing such research, one should seek guidance from experimental psychologists.

iv). **Conceptual vs. Empirical**: Conceptual research is related to some abstract idea(s) or theory. It is generally used by philosophers and thinkers to develop new concepts or to reinterpret existing ones. On the other hand, empirical research relies an experience or observation alone, often without due regard for system and theory. It is databased research, coming up with conclusions which are capable of being verified by observation or experiment. Empirical research is appropriate when proof is sought that certain variables affect other variables in some way. Evidence gathered through experiments or empirical studies is today considered to be the most powerful support possible for a given hypothesis.

v). **Some Other Types of Research:** All other types of research are variations of one or more of the above stated approaches, based on either the purpose of research, or the time required to accomplish research, on the environment in which research is done, or on the basis of some other similar factor.

a). ***One Time Research:*** From the point of view of time, we can think of research either as one-time research or longitudinal research. In the former case the research is confined to a single time-period, whereas in the latter case the research is carried on over several time-periods.

b). ***Laboratory Research:*** Research can be *field-setting research or laboratory research or simulation research*, depending upon the environment in which it is to be carried out. Research can as well be understood as *clinical or diagnostic research*.

c). ***Exploratory Research:*** The research may be *exploratory* or it may be formalized. The objective of exploratory research is the development of hypotheses rather than their testing, whereas formalized research studies are those with substantial structure and with specific hypotheses to be tested.

d). ***Historical Research:*** *Historical research* is that which utilizes historical sources like documents, remains, etc., to study events or ideas of the past, including the philosophy of persons and groups at any remote point of time.

e). ***Conclusion-oriented Research:*** Research can also be classified as *conclusion-oriented* and decision-oriented. While doing conclusion-oriented research, a researcher is free to pick up a problem, redesign the enquiry as he proceeds and is prepared to conceptualize as he wishes. Decision-oriented research is always for the need of a decision maker and the researcher in this case is not free to embark upon research according to his own inclination.

Process of Research

However, the following order concerning various steps provides a useful procedural guideline regarding the research process:

1) Formulating the research problem;
2) Extensive literature survey;
3) Developing the hypothesis;
4) Preparing the research design;
5) Determining sample design;
6) Collecting the data;
7) Execution of the project;
8) Analysis of data;
9) Hypothesis testing;
10) Generalisations and interpretation, and
11) Preparation of the report or presentation of the results, i.e., formal write-up of conclusions reached.

1. 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. Initially the problem may be stated in a broad general way and then the ambiguities, if any, relating to the problem be resolved.

Then, the feasibility of a particular solution has to be considered before a working formulation of the problem can be set up. The formulation of a general topic into a specific research problem, thus, constitutes the first step in a scientific enquiry.

Essentially two steps are involved in formulating the research problem, viz., understanding the problem thoroughly, and rephrasing the same into meaningful terms from an analytical point of view. The best way of understanding the problem is to discuss it with one's own colleagues or with those having some expertise in the matter.

the Problem

2. 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 a 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. For this purpose, the abstracting and indexing journals and published or unpublished bibliographies are the first place to go to. Academic journals, conference proceedings, government reports, books, etc., must be tapped depending on the nature of the problem.

3. 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.

Hypothesis should be very specific and limited to the piece of research in hand because it has to be tested. Thus, working hypotheses arise as a result of a priori thinking about the subject, examination of the available data and material including related studies and the counsel of experts and interested parties.

4. Preparing the Research Design

The research problem having been formulated in clear-cut terms, the researcher will be required to prepare a research design, i.e., he will have to state the conceptual structure within which research would be conducted. In other words, the function of research design is to provide for the collection of relevant evidence with minimal expenditure of effort, time and money. Research purposes may be grouped into four categories, *viz.*,

a). Exploration,
b). Description,
c). Diagnosis,
d). Experimentation.

A flexible research design which provides opportunity for considering many different aspects of a problem is considered appropriate if the purpose of the research study is that of exploration.

5. Determining Sample Design

All the items under consideration in any field of inquiry constitute a '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.

For instance, blood testing is done only on sample basis. Hence, quite often we select only a few items from the universe for our study purposes. The items so selected constitute what is technically called a sample. The researcher must decide the way of selecting a sample or what is popularly known as the sample design.

6. 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 several ways of collecting the appropriate data which differ considerably in context of money costs, time and other resources at the disposal of the researcher. Primary data can be collected either through experiment or through survey.

7. 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. If the survey is to be conducted by means of structured questionnaires, data can be readily machine-processed. In such a situation, questions as well as the possible answers may be coded. If the data are to be collected through interviewers, arrangements should be made for proper selection and training of the interviewers.

8. Analysis of Data

After the data have been collected, the researcher turns to the task of analysing 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.

Coding operation is usually done at this stage through which the categories of data are transformed into symbols that may be tabulated and counted. Editing is the procedure that improves

the quality of the data for coding.

Tabulation is a part of the technical procedure wherein the classified data are put in the form of tables. Computers not only save time but also make it possible to study large number of variables affecting a problem simultaneously.

Analysis work after tabulation is generally based on the computation of various percentages, coefficients, etc., by applying various well-defined statistical formulae.

9. Hypothesis Testing

After analysing the data as stated above, the researcher is in a position to test the hypotheses, if any, he had formulated earlier. 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.

10. Generalisations and Interpretation

If a hypothesis is tested and upheld several times, it may be possible for the researcher to arrive at generalisation, i.e., to build a theory. 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.

11. 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:

The layout of the report should be as follows:

(i) The preliminary pages;

(ii) The main text,

(iii) The end matter

In its preliminary pages the report should carry title and date followed by acknowledgements and 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:

(a) 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.

(b) Summary of findings: After introduction there would appear a statement of findings and recommendations in non-technical language. If the findings are extensive, they should be summarised.

(c) Main report: The main body of the report should be presented in logical sequence and broken-down into readily identifiable sections.

(d) 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.

Purpose of Research

1. Progress and Good Life

The purpose of all research is progress and good life. Progress results if the space of ignorance is occupied by knowledge and wisdom. Knowledge and wisdom drive the mankind to live an orderly good life.

2. Development of Scientific Attitude

One of the purposes of research is to develop scientific attitude. Scientific attitude is one that asks 'Why' and 'How' and answers are found. This 'Know-why' and 'Know-how' attitude nurtures talents and such intellectual talents are the great assets of society.

3. Creativity and Innovativeness

One of the purposes of research is encouragement to creativity and innovation. New products, new processes and new uses are the means through which the world goes dynamic. A dynamic world is not possible without newness introduced every now and then in every walk of life. And this is possible only through creativity and innovation.

4. Testing Hypothesis and Establishing Theories

A very important purpose of research is testing of hypothesis and establishing theories. As was already pointed out knowledge is power. That knowledge comes from testing hypotheses and establishing new theories.

5. Prediction and Control

Applied research has a great say in prediction and control in almost all walks of human endeavour Prediction is jumping into the future and the theories constitute the launch pad. Control looks for deviation between actual happening and predicted happening.

6. Purposive Development

Development = Growth + Change, Growth is uni-scaled while change is multi-scaled. In the natural process development does take place through trial and error through casual observations, through actual exposure and the like.

7. Problem Solving

The purpose of any research is problem solving. What is a problem? How can these be solved?

8. Schematic Evaluation

Research is also carried out to systematically evaluate a process or practice of an organisation to know its strengths and weaknesses so that areas for improvement process can be identified.

9. Impact Analysis

Research is undertaken to assess the impact of certain measures or change introduced on relevant variables.

10. Methodological Improvement

Another purpose of research is improving research methodology itself. To answer the question research needs to be done. Validation, revalidation and de-validation of methodological aspects thus constitute good piece of research.