Chapter 2: Scientific Research

1- Meaning of Research:

According to Rajasekar et. al. (2006), research is a logical and

systematic search for new and useful information on a particular topic. It is an investigation of finding solutions to scientific and social problems through objective and systematic analysis. It is a search for knowledge, that is, a discovery of hidden truths. Here knowledge means information about matters. The information might be collected from different sources like experience, human beings, books, journals, nature, etc. A research can lead to new contributions to the existing knowledge.

Research in common parlance refers to a search for knowledge. Once can also define research as a scientific and systematic search for pertinent information on a specific topic. In fact, research is an art of scientific investigation.

Redman and **Mory** define research as a "systematized effort to gain new knowledge.

Some people consider research as a movement, a movement from the unknown to the known.

2- The Steps of Scientific Research (Systematic View)

Research is systematic in that it follows ordered and logical steps:

-Understand the nature of the problem being studied and identify fields of knowledge related to such a problem.

-Establish the state of the art, meaning to collect and study the literature to understand how other researchers have approached the problem.

-Collect data in an organized and controlled manner to arrive at valid decisions.

-Analyze the data relevant to the studied problem.

-Draw necessary conclusions and make appropriate generalizations.

3- 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 yet. Though each research study has its own specific purpose, we may think of research objectives as falling into a number of following broad groupings:

-To produce new scientific knowledge

-To enrich existing knowledge

-To make new discoveries

-To provide innovative solutions (improvements) to complex problems

-To investigate the laws of nature (causes/effects that operate on all phenomena)

-To develop new products

-To enhance our lives while considering the state of the planet

-To advance science and knowledge

3- Motivation in research

What makes people to undertake research? This is a question of fundamental importance. The possible motives for doing research may be either one or more of the following:

3.1. Desire to get a research degree along with its consequential benefits;

3.2. Desire to face the challenge in solving the unsolved problems, i.e., concern over practical problems initiates' research;

3.3. Desire to get intellectual joy of doing some creative work;

3.4. Desire to be of service to society;

3.5. Desire to get respectability.

However, this is not an exhaustive list of factors motivating people to undertake research studies. Many more factors such as directives of government, employment conditions, curiosity about new things, desire to understand causal relationships, social thinking and awakening, and the like may as well motivate (or at times compel) people to perform research operations

4- Characteristics of Research:

Research is a process of collecting, analyzing and interpreting information to answer questions. But to qualify as research, the process must have certain characteristics: it must, as far as possible, be controlled, rigorous, systematic, valid and verifiable, empirical and critical. • **Controlled** - in real life there are many factors that affect an outcome. The concept of control implies that, in exploring causality in relation to two variables (factors), you set up your study in a way that minimizes the effects of other factors affecting the relationship.

• **Rigorous -** you must be scrupulous in ensuring that the procedures followed to find answers to questions are relevant, appropriate and justified. Again, the degree of rigor varies markedly between the physical and social sciences and within the social sciences.

• **Systematic** - this implies that the procedure adopted to undertake an investigation follow a certain logical sequence. The different steps cannot be taken in a haphazard way. Some procedures must follow others.

• **Valid** and verifiable - this concept implies that whatever you conclude based on your findings is correct and can be verified by you and others.

• **Empirical** - this means that any conclusions drawn are based upon hard evidence gathered from information collected from real life experiences or observations.

• **Critical** - critical scrutiny of the procedures used and the methods employed is crucial to a research enquiry. The process of investigation must be fool proof and free from drawbacks. The process adopted and the procedures used must be able to withstand critical scrutiny. For a process to be called research, it is imperative that it has the above characteristics.

5-Types of Research:

Research can be classified based on time, purpose, settings, place and technique. Some researchers have similarities and some have little variations. But all the types of research have its own significance.

5-1- Basic Research: It is also called as pure research. Research for the sake of enhancement of knowledge is termed as Basic Research. It is done with the intention of overpowering of the unknown facts. It is concerned with the generalizations and with the formulation of new theory. Basic research may not produce solutions or results to the present problem but it contributes something to the scientific knowledge. However, its work may have zero importance, but it may become useful in the future.

5-2- Applied Research: It is also called as practical research or „need based" research. The main intention is to find solutions to the current problems being faced by an institution, society, business or in government offices. Research to identify social, political and economic changes, which has adverse effects in different sectors are some of the examples of applied research. This type of research is mainly carried on with the secondary data.

5-3-Empirical Research: It is often referred to as experimental research. In this primary data is collected, analyzed, interpretation is done and subjected to hypothesis testing. Researcher

should develop his experimental designs and should provide working hypothesis before the commencement of his research for good output.

5-4-Qualitative Research: As the name itself suggests, this research is concerned with the qualitative process. It generally works with the study of human behavior. By this research, one can find the body language, attitude, opinions, feelings etc. from the opposite person through observation. It is mainly helpful for Psychiatrists and interviewers. Many techniques are being used like word association test, sentence completion, drawing pictures, Thematic Apperception Test. It is needed in times where quantitative research does not work. Hence, it is also called as „Motivation Research".

5-5-Quantitative Research: This research is mainly concerned with the measurement of phenomenon in terms of quantity. Many a times a debate is conducted between qualitative and quantitative terms. An example for the quantitative research is carrying out senses for collecting population, social, economic statistics of a particular area. They are subjected to statistical analysis. It relays mainly on primary data like survey method and questionnaire method. However, one can observe the inter-dependence between one another.

5-6-Descriptive Research: As the name itself indicates, this research directly deals with description. It includes different data collection like survey method and factfinding techniques. The main character of this research is that, the researcher does not have control over the variables. He should describe what has happened and what is happening. Most Ex post facto projects use descriptive research.