RESEARCH METHODOLOGY

WEEK 1: INTRODUCTION

DEFINITION

What is Research?

"...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."

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.

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

1. To gain familiarity with a phenomenon or to achieve new insights into it (studies with this object in view are termed as *exploratory* research studies);

2. To portray accurately the characteristics of a particular situation, subject or a group (studies with this object in view are known as *descriptive* research studies);

3. To determine the frequency with which something occurs or with which it is associated with something else (studies with this object in view are known as *diagnostic* research studies);

4. To test a hypothesis of a causal relationship between variables (such studies are known as *hypothesis-testing* research studies).

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:-

1. Academic i.e. desire to get a research degree along with its consequential benefits

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

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

4. Desire to be of service to society;

5. Desire to get respectability.

Others may be 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.

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.

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. Most *Ex post facto research* projects are used for descriptive studies in which the researcher seeks to measure such items as, for example, frequency of shopping, preferences of people, or similar data.

Ex post facto studies also include attempts by researchers to discover causes even when they cannot control the variables.

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.

(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 behaviour (i.e., why people think or do certain things), we quite often talk of 'Motivation Research', an important type of qualitative research. This type of research aims at discovering the underlying motives and desires, using in depth interviews for the purpose

(iv) ***Conceptual vs. Empirical:*** *Conceptual research* is that 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 e.g. proof a concept. On the other hand, *empirical research* relies on experience or observation alone, often without due regard for system and theory. It is data-based research, coming up with conclusions which are capable of being verified by observation or experiment.

RESEARCH APPROACHES

The above description of the types of research brings to light the fact that there are ***two basic approaches*** to research i.e *quantitative approach* and the *qualitative approach*.

1. *Quantitative approach* involves the generation of data in quantitative form which can be subjected to rigorous quantitative analysis in a formal and rigid fashion.

This approach can be further sub-classified into:-

a) ***Inferential approach***to research is to form a data base from which to infer characteristics or relationships of population. This usually means survey research where a sample of population is studied (questioned or observed) to determine its characteristics, and it is then inferred that the population has the same characteristics.

b) ***Experimental approach*** is characterized by much greater control over the research environment and in this case some variables are manipulated to observe their effect on other variables.

c) ***Simulation approach*** involves the construction of an artificial environment within which relevant information and data can be generated. This permits an observation of the

dynamic behavior of a system (or its sub-system) under controlled conditions. The term 'simulation' in the context of business and social sciences applications refers to "the operation of a numerical model that represents the structure of a dynamic process.

2. *Qualitative approach* to research is concerned with subjective assessment of attitudes, opinions and behavior. Research in such a situation is a function of researcher's insights and impressions.

   Such an approach to research generates results either in non-quantitative form or in the form which are not subjected to rigorous quantitative analysis.

   Generally, the techniques of focus group interviews, projective techniques and depth interviews are used. All these are explained at length in chapters that follow.

SIGNIFICANCE OF RESEARCH

Research instills scientific and inductive thinking and it promotes the development of logical habits of thinking and organization.

The role of research in several fields of applied economics, whether related to business or to the economy as a whole, has greatly increased in modern times.

The increasingly complex nature of business and government has focused attention on the use of research in solving operational problems.

Research, as an aid to economic policy, has gained added importance, both for government and business.

Research provides the basis for nearly all government policies in our economic system.

For example, government's budgets rest in part on an analysis of the needs and desires of the people and on the availability of revenues to meet these needs.

The cost of needs has to be equated to probable revenues and this is a field where research is most needed.

Through research we can devise alternative policies and can as well examine the consequences of each of these alternatives.

RESEARCH METHODS VERSUS METHODOLOGY

Research methods may be understood as all those *methods/techniques* that are used for conduction of research.

Research techniques refer to the behavior 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. For example, the difference between *methods* and *techniques* of data collection can better be understood from the details given in the following chart

Type	*Methods*	*Techniques*
1. Library Research	(i) Analysis of historical records	Recording of notes, Content analysis, Tape and Film listening and analysis.
	(ii) Analysis of documents	Statistical compilations and manipulations, reference and abstract guides, contents analysis.
2. Field Research	(i) Non-participant direct observation	Observational behavioural scales, use of score cards, etc.
	(ii) Participant observation	Interactional recording, possible use of tape recorders, photo graphic techniques.
	(iii) Mass observation	Recording mass behaviour, interview using independent observers in public places.
	(iv) Mail questionnaire	Identification of social and economic background of respondents.
	(v) Opinionnaire	Use of attitude scales, projective techniques, use of sociometric scales.
	(vi) Personal interview	Interviewer uses a detailed schedule with open and closed questions.
	(vii) Focused interview	Interviewer focuses attention upon a given experience and its effects.
	(viii) Group interview	Small groups of respondents are interviewed simultaneously.
	(ix) Telephone survey	Used as a survey technique for information and for discerning opinion; may also be used as a follow up of questionnaire.
	(x) Case study and life history	Cross sectional collection of data for intensive analysis, longitudinal collection of data of intensive character.
3. Laboratory Research	Small group study of random behaviour, play and role analysis	Use of audio-visual recording devices, use of observers, etc.

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. In it we study the various steps that are generally adopted by a researcher in studying his research problem along with the logic behind them.

It is necessary for the researcher to know not only the *research methods/techniques* but also the *methodology.*

Researchers 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 and *why*.

Researchers also need to understand the *assumptions underlying various techniques* and they need to know the criteria by which they can decide that certain techniques and procedures will be applicable to certain problems and others will not.

All this means that it is necessary for the researcher to *design his methodology* for his problem as the same may differ from *problem to problem*. For example, an architect, who designs a building, has to consciously evaluate the basis of his decisions, i.e., he has to evaluate why and on what basis he selects particular size, number and location of doors, windows and ventilators, uses particular materials and not others and the like.

Importance of Knowing How Research is Done

The study of research methodology gives the student the necessary training in:-

- Gathering material and indexing them,
- Participation in the field work when required,
- Training in techniques for the collection of data appropriate to particular problems e.g. use of statistics, questionnaires and controlled experimentation and in recording evidence,
- Sorting it out and interpreting it. In fact, importance of knowing the methodology of research or how research is done stems from the following considerations:

(i) The knowledge of methodology provides good training especially to the new research worker and enables him to do better research. It helps him to develop disciplined thinking or a 'bent of mind' to observe the field objectively. Hence, those aspiring for careerism in research must develop the skill of using research techniques and must thoroughly understand the logic behind them.

(ii) Knowledge of how to do research will instill the ability to evaluate and use research results with reasonable confidence. In other words, we can state that the knowledge of research methodology is helpful in various fields such as government or business administration, community development and social work where persons are increasingly called upon to evaluate and use research results for action.

(iii) When one knows how research is done, then one may have the satisfaction of acquiring a new intellectual tool which can become a way of looking at the world and of judging every day experience. Accordingly, it enables *us to make intelligent decisions* concerning problems

facing us in practical life at different points of time. Thus, the knowledge of research methodology provides tools to look at things in life objectively.

(iv) In this scientific age, all of us are in many ways consumers of research results and we can use them intelligently provided we are able to judge the adequacy of the methods by which they have been obtained. The knowledge of methodology helps the consumer of research results to evaluate them and enables him to take rational decisions.

CRITERIA OF GOOD RESEARCH

Whatever may be the types of research works and studies, one thing that is important is that they all meet on the common ground of scientific method employed by them. One expects scientific research to satisfy the following:-

1. The purpose of the research should be *clearly defined* and common concepts be used.
2. The *research procedure used should be described in sufficient detail* to permit another researcher to repeat the research for further advancement, keeping the continuity of what has already been attained.
3. The *procedural design of the research* should be carefully planned to yield results that are as objective as possible.
4. The researcher should report with *complete frankness*, flaws in procedural design and estimate their effects upon the findings.
5. The analysis of data should be *sufficiently adequate to reveal its significance* and the methods of analysis used should be appropriate. The validity and reliability of the data should be checked carefully.
6. Conclusions should be *confined* to those justified by the data of the research and limited to those for which the data provide an adequate basis.
7. Greater *confidence in research* is warranted if the researcher is experienced, has a good reputation in research and is a person of integrity.

IN SUMMARY THE CHARACTERISTICS OF GOOD RESEARCH ARE:-

a) *Good research is systematic:* It means that research is structured with specified steps to be taken in a specified sequence in accordance with the well defined set of rules.

Systematic characteristic of the research does not rule out creative thinking but it certainly does reject the use of guessing and intuition in arriving at conclusions.

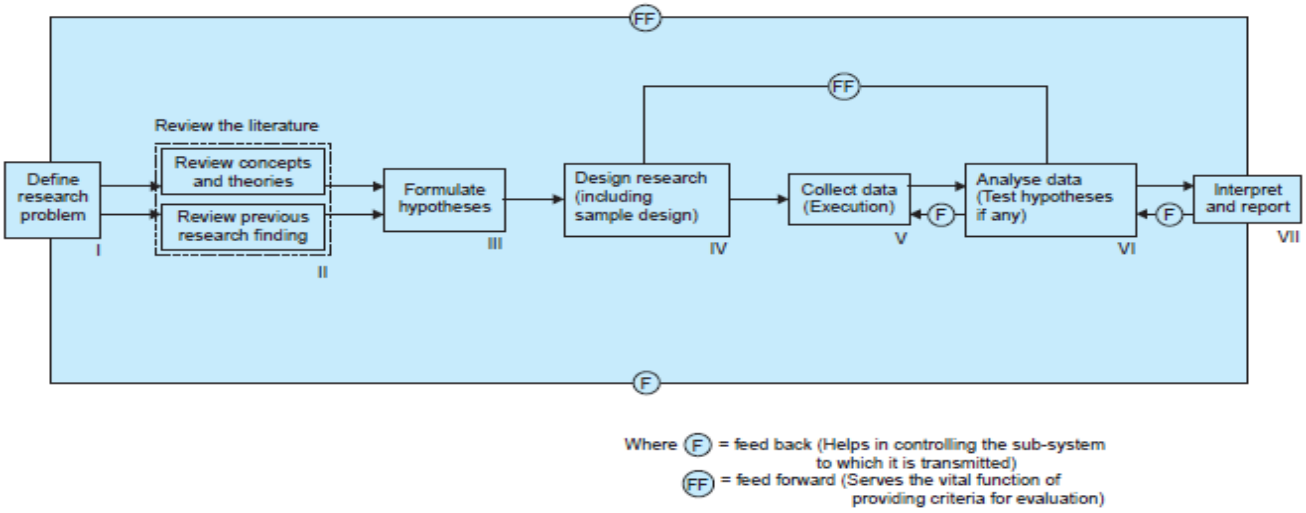
b) *Good research is logical:* This implies that research is guided by the *rules of logical reasoning* and the *logical process* of induction and deduction are of great value in carrying out research. Induction is the process of reasoning from a part to the whole whereas deduction is the process of reasoning from some premise to a conclusion which follows from that very premise. In fact, *logical reasoning* makes research more meaningful in the context of *decision making.*

c) *Good research is empirical:* It implies that research is related basically to one or more aspects of a real situation and deals with concrete data that provides a basis for external validity to research results.

d) *Good research is replicable:* This characteristic allows research results to be verified by replicating the study and thereby building a sound basis for decisions.

RESEARCH PROCESS

Before embarking on the details of research methodology and techniques, it seems appropriate to present a brief overview of the research process. Research process consists of series of actions or steps necessary to effectively carry out research and the desired sequencing of these steps. The chart shown in Figure 1.1 well illustrates a research process.



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 understanding the problem thoroughly, and rephrasing the same into meaningful terms from an analytical point of view.

2. ***Extensive literature survey:*** Once the problem is formulated, a brief summary of it should be written down. 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. In this process, it should be remembered that one source will lead to another. The earlier studies, if any, which are similar to the study in hand should be carefully studied. A good library will be a great help to the researcher at this stage.
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. As such the manner in which research hypotheses are developed is particularly important since they provide the focal point for research. They also affect the manner in which tests must be conducted in the analysis of data and indirectly the quality of data which is required for the analysis. In most types of research, the development of working hypothesis plays an important role. Hypothesis should be very specific and limited to the piece of research in hand because it has to be tested. The role of the hypothesis is to guide the researcher by delimiting the area of research and to keep him on the right track. It sharpens his thinking and focuses attention on the more important facets of the problem. It also indicates the type of data required and the type of methods of data analysis to be used.
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. The preparation of such a design facilitates research to be as efficient as possible yielding maximal information. 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. But how all these can be achieved depends mainly on the research purpose.

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. Even the slightest element of bias in such an inquiry will get larger and larger as the number of observations increases.
6. ***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.

   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. With coding the stage is ready for tabulation.

   Tabulation is a part of the technical procedure wherein the classified data are put in the form of tables. This makes it possible to study large number of variables affecting a problem simultaneously.
7. ***Hypothesis-testing:*** After analyzing 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. 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. If the researcher had no hypotheses to start with, generalizations established on the basis of data may be stated as hypotheses to be tested by subsequent researches in times to come.
8. ***Interpretation:*** If a hypothesis is tested and upheld several times, it may be 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.