

Module Name: Research Methodology

Module Code: MGM 423

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Week: 01

Lecture No: 01

Lecture Topic: Introduction to Research and Research Methodology

What is Research?

Research is a careful investigation or inquiry specially through search for new facts in any branch of knowledge.

-Advanced Learner's Dictionary of Current English

Research comprises defining and redefining problems, formulating hypothesis or suggesting problems; collecting, organizing and evaluating data; making deductions and reaching conclusions; and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis or not.

-Clifford Woody

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

So any investigation or examination to find out any result through a certain process can be called a research. Research can be done at the lab (scientific or diagnostic research), at the place of an accident or murder (crime or investigative research), to launch a new product (market research) or to formulate the acceptability of a theory (hypothetical research) that we will deal with throughout all of course of this semester.

Objectives of Research-

The main purpose of research is to find out the truth that has not been discovered yet. Each researcher has/her own objectives(s) of research. However, the main objectives of research are-

1. to gain familiarity with a phenomenon (exploratory or formulative research).
2. to portray the characteristics of a particular individual, group or situation (descriptive research).
3. to determine the frequency with which something occurs or with which it is associated with something else (diagnostic research), and
4. to test a hypothesis of a casual relationship between variables (hypothetical research).

Motivation in Research-

Why do people undertake research? What motivates them in doing such labourious or complex task? The answers may be one or more of the following-

1. to get a research degree(M. phill, P. hd).
2. to face the challenge of an unsolved problem.
3. to get intellectual joy of doing some creative work.
4. desire to be of service to society.
5. desire to get respectability.

Types of Research-

There are several types of research depending on the motive of the researcher. They are-

(A)Descriptive Vs. Analytical:

Descriptive research includes surveys and fact finding enquiries of different kinds. The major purpose of this kind of research is to describe the state of affairs as it exists at present. The main characteristic of this type is that the researcher has no control over the variables. He can only report what has happened or what is happening; for example, frequency of shopping and preference of people. In analytical research, on the other hand, one has to use the facts or information already available, and analyze these to make a critical evaluation of the material.

(B)Applied Vs. Fundamental:

Research can be either applied (action) or fundamental(basic or pure). Applied research aims at finding a solution for an immediate problem facing by a society or an industrial/business organization; whereas fundamental research is mainly concerned with generalizations and with the formulation of a theory.

(C)Quantitative Vs. Qualitative:

Research based on measurement of quantity or amount is quantitative research. Qualitative research, on the other hand, related to qualitative phenomenon, that is, phenomenon relating to quality of kind.

(D)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 on experience or observation alone, often without due regard for the system and theory- also called experimental research.

The Research Process-

Research process consists of series of actions of steps necessary to carry out the research effectively and the desired sequencing of these steps. The process consists of a number of closely related activities. We can see from that the activities overlap continuously rather than following a prescribed sequence. If the subsequent procedures have not been taken into account in the early stages, serious difficulties may arise at the later stages which

may even prevent the completion of the study. However, the following orders concerning various steps provides a general procedural guideline of a research process-

1. *Formulation of research problem*
2. *Extensive literature survey*
3. *Development of research hypothesis*
4. *Preparing research design*
5. *Determination of sample design*
6. *Collecting the data*
7. *Execution of the project*
8. *Analysis of collected data*
9. *Hypothesis testing*
10. *Generalization and interpretation*
11. *Preparation of the final report or presentation*

Week: 02

Lecture No: 02

Lecture Topic: Methods of Data Collection

Data and Information-

In research, often we hear the words data and information. But there is a basic difference between that two. Data is a raw information which is not processed yet. Information is the processed data.

Primary and Secondary Data-

The data which have been just collected and not been used yet is/are primary data. For example, if a researcher interviews five people and gets some data they are the primary one.

The data which have been already collected and used by some other researcher are called secondary data. For example, data recorded on the Census Bureau are the secondary data.

The researcher would have to decide which sort of data he would be using for his study and accordingly he will have to select one or the other method of data collection. The methods of collecting primary and secondary data differ since primary data are to be originally collected, while in case of secondary data the nature of data collection is merely that of compilation.

Collection of Primary Data-

We collect primary data during the course of doing experiments in an experimental research but in case of descriptive type and survey(sample or census), then the primary data can either be collected through observation or through direct communication with respondents in one form or another through personal interviews. Therefore, in case of a survey, data can be collected by one or more of the following ways-

(A)By Observation: This method implies the collection of information by using investigator's/observer's own observation, without interviewing the respondents. The information obtained relates to what is currently happening and is not complicated by either past behavior or future intentions or attitudes of respondents. The main advantage of this method is that subject bias is eliminated, if observation is done accurately. Secondly, the information obtained under this method gives the researcher a clear idea of what is happening without the influence of past behavior or future intention or attitude. Thirdly, this method is independent of respondents' willingness to respond and as such is relatively less demanding of active cooperation on the part of respondents as happens in case of interview or questionnaire method. This method is particularly suitable in studies which deals with the subjects (respondents) who are not capable of giving verbal reports of their feelings because of fear, shame or security. A good example might be the observation of sexually harassed girls.

However, observation has various limitations as well. Firstly, it is an expensive method. Secondly, information provided by this method is very limited. Thirdly, sometimes unforeseen factor may interfere with the observational task. At times, the fact that some people are rarely accessible to direct observation creates crates obstacles fort his method to collect data effectively. Thus, this method is not suitable in inquiries where large samples are concerned.

(B) By Interview: The interview method involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses. This method again, can be applied in two ways- personal interview and telephone interview.

(B.1) Personal Interview:

This method requires a person (may be more), known as interviewer and a respondent known as interviewee. The investigator/interviewer generally follows a rigid procedure and seeks answers to a set of pre-conceived questions through personal interviews.

The chief merits of this method are as follows-

1. *More information in greater depth can be obtained.*
2. *Interviewer can overcome the resistance if any, of the respondents. This is a perfect method if the sample size is normal.*
3. *There is greater flexibility under this method as the opportunity is always there.*
4. *This method can be applied with observation method while recording verbal answers to verbal questions.*
5. *Personal information can easily be obtained.*
6. *Samples can be controlled more effectively as there arises no difficulty of missing returns; non response generally remains very low.*
7. *The interview can easily control the respondent that is not possible in case of mailed questionnaire.*
8. *The language of interview can be adapted to the ability or educational level of the person interviewed and as such misinterpretations concerning questions can be avoided.*
9. *The interviewer can also collect supplementary information about the respondent's personal characteristics and environment which is often of greater value in interpreting results.*

But there are also certain drawbacks of the interview method. Among the major ones the following can be noted-

1. *It is a very expensive method, specially when large and widely spread geographical sample is taken.*
2. *There is the possibility of bias of interviewer as well as that of the respondent.*
3. *Certain types of respondents such as high officials or income groups may not be easily approachable and thus, the extent of collected may prove inadequate.*
4. *This method is more time consuming, specially when the sample size is large and re-calls upon the respondents are necessary.*

5. *This method is expensive as it requires selection, training and supervision of the interviewers.*

(B. 2) Telephone Interview:

Telephone interview method requires collecting data through contacting respondents through making phone calls to them. It is not a widely used method, but plays an important part in industrial or market surveys, particularly in the developed regions. The main advantages of this method are-

1. *It is flexible and cheaper.*
2. *It is faster than any other method, a quick way of obtaining information.*
3. *Recall is easier; callbacks are simple and economical.*
4. *There is a higher rate of response in this method; non response is generally very low.*
5. *Replies can be recorded without causing the embarrassment to respondents.*
6. *Access can be gained more easily to the respondents who otherwise cannot be contacted for one reason or the other.*
7. *No field staff is required.*
8. *Representative and wider distribution of sample can be possible.*

But the system, as well, like every other method is not free from demerits. Some of them may be highlighted.

1. *Little time is allotted for considered answers.*
2. *Surveys are restricted who have telephone facilities.*
3. *Extensive geographical coverage may get restricted by cost considerations.*
4. *It is not suitable for intensive surveys where comprehensive answers are required for various questions.*
5. *Possibility of the bias of the interviewer is relatively more.*

(C) By Questionnaire: This method of data collection is quite popular, specially in case of big enquiries. This method is used by private individuals, research workers, private and public organizations and even by the governments (census). In this method, a questionnaire is sent to the (usually by post) persons concerned with a request to answer and return it back. The questionnaire consists of a number of questions printed in a definite order on a form or set of forms. Then it is mailed to the respondents who are expected to read and understand the questions and write down the reply in the space provided.

The merits in favour of the questionnaire method are as follows-

1. Cost is low when the sample size is large and widely spread geographically.
2. It is free from the bias of the interviewer; answers are in respondents' own words.
3. Respondents have adequate time to give well thought answers.
4. Respondents who are not easily approachable, can be reached conveniently.
5. As the large sample can be used, the result can be more dependable and reliable.

The main demerits of this method are listed below-

1. Low rate of return of the questionnaire.
2. Can be used only when respondents are well educated and cooperating.
3. Inflexibility or misunderstanding of the questions.
4. There might be ambiguous replies.
5. It is difficult to know whether willing respondents are truly representative.
6. This method is likely to be the slowest one.

(D) Online Questionnaire: This type of interviews are now widely in use in the western countries. Most online questionnaires present the respondents with a series of questions. Typical computerized interviews present questions in a multiple choice format, one at a time, the applicant is expected to respond to the questions on the screen by pressing a key. For example, a sample interview question might be:

How do you rate your service skills?

- a. Outstanding b. Average c. Below average d. Very poor

The questions come in a rapid sequence and require the applicant to concentrate. A specific time frame is allocated to answer each question, within which the applicant has to answer it.

The general advantages of online questionnaire are-

1. Access to large number of respondents.
2. Quick and less costly.
3. Less biased than the formal questionnaire.

The main disadvantages are as follows-

1. Everyone do not have internet access.
2. Difficult for the respondents to understand the questions sometimes because of specific time frame.

Some other types of collecting data are-

(E) **Warranty Cards:** Warranty cards are usually postal sized cards which are used by dealers of consumer durables to collect information regarding their products. The information sought are printed in the form of questions on the "warranty cards" which is placed inside the package along with the product with a request to the consumer to fill in the card and post it back to the dealer.

(F) **Consumer Panel:** A consumer panel is a sample of consumers who are interviewed repeatedly over a period of time. Usually such panels are conducted on a 'before and after basis'. Initial interviews are conducted before the purchase takes place to record the attitude of the consumer. A second set of interviews is carried out after the purchase has taken place to find out the consequent changes that might have occurred in consumers' attitude. It is a favourite tool of advertising and social research and such panels are used in the area of consumer expenditure, public opinion and market research.

(G) **Case Study Method:** Case study method is a very popular form of qualitative analysis and involves a careful and complete observation of a social unit, be that unit a person, a family, an institution, a cultural group or even the entire community. It is a method of study in depth rather than in breadth. The method places more emphasis on a full analysis on a limited number of events or conditions. Thus, case study is essentially an intensive investigation of the particular unit under consideration. The objective of the method is to locate the factors that account for the behavioural patterns of the given unit as an integrated totality.

The important characteristics of the case study method are as under-

1. *Under this method, the researcher can take one single social unit or more of such units for his study purpose. He may even take a situation to study the same comprehensively.*
2. *Intensive study of the selected unit. Generally, the study extends over a long period of time to ascertain the natural history of the unit to obtain enough information for drawing correct inferences.*
3. *Through this method, researchers try to understand the complex of factors that are operative within a social unit as an integrated totality.*
4. *The approach of this method is qualitative not quantitative. Every possible effort is made to collect information concerning all aspects of life. For example, under this method, we not only study how many crimes a man has done, but also try to find out the factors that forced him to commit crimes when we make a case study of a man as a criminal.*
5. *In respect of the case study method, an effort is made to know the mutual interrelationships of casual factors.*
6. *Under case study method, the behavioural pattern of the concerning unit is studied directly and not by an indirect or abstract approach.*

There are several advantages of the case study method that follow from the various characteristics outlined above. The important ones may be noted as under-

1. Being an exhaustive study of a social unit, the case study method enables us to understand fully the behavioural pattern of the concerned unit.
2. This method enables the researcher to trace out the natural history of the social unit and its relationship with the social factors and the forces involved in its surrounding environment.
3. It helps in formulating relevant hypothesis along with the data which may be helpful in testing them. Case studies, thus, enables the generalized knowledge to get richer and richer.
4. This method facilitates the intensive study of social units which is generally not possible if we use either the observation method or the method of collecting information through questionnaire. This is the reason why method is being frequently used, particularly in social research.
5. Information collected under this method helps a lot to the researcher in the task of constructing the appropriate questionnaire for the said task requires through knowledge of the concerning universe.
6. The researcher can use one or more of the several research methods under the case study method depending upon the prevalent circumstances. In other words, the use of different methods such as depth interviews, questionnaires, documents, study reports for individuals, letters, and the like is possible under this method.
7. This method is a means to well understand the past of a social unit because of its emphasis of historical analysis. Besides, it is also a technique to suggest measures for improvement in the context of the present environment of the concerned social units.
8. Case studies constitute the perfect type of sociological material as they represent a real record of personal experiences which very often escape the attention of most of the skilled researchers using other techniques.
9. Case study method enhances the experience of the researcher and this in turn increases his analytical ability and skill.
10. Case study techniques are indispensable for therapeutic and administrative purposes. They are also of immense value in taking decisions regarding several management problems. Case data are quite useful for diagnosis, therapy and other practical case problems.

Important limitations of the case study method may as well be highlighted-

1. Case situations are seldom comparable and as such the information gathered in case studies are often not comparable. Since the subject/respondent under the case study tells history in his/her own words, logical concepts and units of scientific classification have to be read into it or out of it by the investigator himself.
2. The danger of false generalizations is always there in view of the fact that no set rules are followed in collecting information and only few units are studied.
3. It consumes more time and requires a lot of expenditure.

Week: 03

Lecture No: 03

Lecture Topic: Selection of Appropriate Method of Data Collection

Selection of Appropriate Method:

There are various methods of data collection. As such the researchers must select the appropriate method of collecting data depending on his/her own need. The following factors should be considered when collecting the data-

(a) Nature, scope and object of the enquiry: The most important factor affecting the choice of a particular method. The method selected should be such that it suits the type of enquiry that is to be conducted by researcher. This factor is also important in deciding whether the data already available (secondary data) are to be used or the data not yet available (primary data) are to be collected.

(b) Availability of fund: Availability of funds for the research project determines to a large extent the method to be used for the collection of data. When the funds at the disposal of the researcher are very limited, he will have to select a comparatively cheaper method which may not be efficient and effective as some other costly method. Finance, in fact, is a big constraint in practice and the researcher has to act within this limited.

(c) Time factor: Availability of time has also to be taken into consideration in deciding a particular method of data collection. Some methods take relatively more time (case study, questionnaire), whereas with the other, data can be collected in a comparatively shorter period of time (interview). The time at the disposal of the researcher, thus, affects the selection of the method by which the data can be collected.

(d) Precision required: Precision is yet another important factor to be considered at the time of collecting data. The more precise the information, the more correct the result will be.

(e) Sample size: Sample size also determines the method of data collection. If the respondents are spread geographically wide, then the researcher will apply such techniques that will be easily approachable to most of them (telephone and online interview), and if they live in the close area, then techniques like personal interview may be applied.

(f) Technological availability: Technology can determine the method of data collection. For example, online and telephone interviews of data collection are widely used methods in the countries that are technologically advanced.

Week: 04

Lecture No: 04

Lecture Topic: Preparation of a Questionnaire

Questionnaire method is one of the popular methods of data collection. The questionnaire is often used in cases where the sample size is quite large. A questionnaire is a set of questions printed in a specific format or set of forms and usually is mailed to the respondents with a request to write down the reply on the space provided and send it back to the researcher through mail. Again such questionnaires may be used to take the interview of a respondent face to face (structured interview).

Before using such method, it is always advisable to conduct a 'pilot study' or 'pilot survey' for testing the questionnaire specially in a big enquiry where a big amount of time, money and effort is involved. In fact, pilot survey is a replica and rehearsal of the main survey. As such surveys are done by experts, brings to the light of weakness (if any) of the questionnaire and also of survey techniques. From such study, improvements can be gained if needed.

Main aspects of a questionnaire-

A questionnaire is considered as the heart of a survey operation or research. Therefore, a careful and well-constructed questionnaire is the main pre-condition of an effective research. If the questionnaire is not properly set up, the survey is bound to fail. Such fact requires us to study the three main aspects of a questionnaire-the general form, question sequence and question formulation and wording.

(i) **General form:** The general form of a questionnaire can be either structured or unstructured. Structured questionnaire has definite, concrete or pre-determined questions. The questions are presented with exactly the same wording and in the same order to all the respondents. Such question forms are prepared to ensure that all respondents reply to the same sort of questions. The form of the question may either be closed (yes or no type) or open (free response). Structured questionnaires may also have fixed alternative answers (multiple choice questions) in which responses are limited to the stated alternatives. Thus a highly structured questionnaire is the one in which all the questions and answers are specified and comments of respondents own words are held to be minimum.

Another form of the questionnaires is unstructured questionnaire where the interviewer is provided with a general guide on the type of information to be obtained, but the exact formulation of questions is largely his/her own responsibility and the replies are to be taken down in the respondents' own words to the extent possible. In some situations, the answers may be recorded.

A semi-structured questionnaire is the combination of both the unstructured and structured questionnaires.

Structured questionnaire is simple and relatively inexpensive to analyze. Sometimes, the provision of alternative replies helps to understand the meaning of the questions clearly. However, such a questionnaire has some limitations too. For example, wide range of data and qualitative information like respondents' behaviour, attitude and intelligence can not be obtained by such questionnaire. They are not suitable for the research when a problem is first being explored and working hypothesis is sought.

Unstructured questionnaires are useful for the research where the information in detail is necessary. But such questionnaire may be biased from the part of the researcher because he can apply his/her partiality to different respondents.

(ii) Question sequence: A researcher should pay attention to the question sequence in preparing a questionnaire to make it effective and to ensure quality to the replies received. A properly sequenced questionnaire reduces the chances of misunderstanding. The question sequence must be clear and understandable to the respondents keeping a link between one question to another. The easiest one should be put at the beginning. The opening question should not be too detail or unpleasant like 'how old are you?' Thus, question sequence should usually go from the general to the more specific and the researcher must always remember that the answer to a given question is a function not only of the question itself, but of all previous questions as well. For example, if one question deals with the price usually paid for coffee and the next with reason for preferring that particular brand, the answer to this latter question may be largely determined in terms of price differences.

(iii) Question formulation and wording: The researcher must remember that each question must be very clear for any sort of misunderstanding can damage the objectives of the research. Questions should also be impartial in order not to give a biased picture of a true state of affairs. Questions should be constructed forming a logical part of a well thought out plan. In general, all questions should meet the following standards- (a) easily understandable, (b) simplicity, and (c) should be concrete and should conform as much as possible to the respondents' way of thinking. For instance, instead of asking, "how many razor blades do you use annually?", the question should be, "how many razor blades did you use last month?"

The researcher must also pay attention to the wordings of questions as reliability and meaningful returns depend on it to a large extent. Since words are likely to affect responses, they must be properly chosen. Simple words, which are familiar to the respondents, should be used. Words with ambiguous meanings, danger words, catch-words or words with emotional attachments should be avoided. Caution must also be exercised in the use of phrases which reflect upon the prestige of the respondent. question wording, in no case, should bias the answer.

Essentials of a good questionnaire-

To be successful, a good questionnaire should be-

- i. *Short and simple in size as much as possible.*
- ii. *Technical terms and vague expressions should be avoided.*
- iii. *Should have the provision of cross-checking.*
- iv. *Questions affecting the respondents' sentiment should be avoided.*
- v. *Adequate space should be provided for answering.*
- vi. *Guidelines to fill the questions should be contained. And*
- vii. *The quality of paper and colour must be of good quality to have the first impressions.*

Guidelines for constructing questionnaires-

The researcher must pay attention to the following points in constructing an appropriate and effective questionnaire:

- (i) *The researcher must keep in view the problem he is going to study for it provides the starting point for developing the questionnaire. He must be clear about the various aspects of his research problem to be dealt with in the course of his research project.*
- (ii) *The researcher must decide whether to use close-end or open-end questions. Questions should be simple and must be constructed in a logical format.*
- (iii) *Rough draft of the questionnaire may be prepared maintaining the appropriate sequence of putting questions. Questionnaires previously drafted (if any) may be used for this purpose.*
- (iv) *Pilot study might be undertaken for pre-testing the questionnaire. It might be edited in the light of the results of the pilot study.*
- (v) *Questionnaire must contain simple but straight forward directions for the respondents so that they may not feel any difficulty in answering the questions.*

Week: 05

Lecture No: 05

Lecture Topic: Sampling Method

What is Sampling?

Sampling may be defined as the selection of some part of an aggregate or totality on the basis of which a judgment about the aggregate or totality is made. In other words, sampling is the process of obtaining information about an entire population by examining only a part of it. The researcher quite often selects only a few items from the universe for his study purpose. All this is done on the assumption that the sample he collected from the universe will represent the whole one.

Census and Sample survey-

All the items in an enquiry constitute a 'universe' or 'population'. A complete enumeration (counting) of all items in the universe is known as a census survey. Therefore, in census survey, each and every sample/respondent/item is considered when collecting data. A good example of census survey is population census where information about each and every person is obtained. On the other hand, in sample survey, the researcher collects data from one or two respondents/objects and it is assumed that they represent the whole universe. The typical example of a sample survey might be the quality control test where one or two samples are generally tested from the whole lot and the conclusion is done accordingly.

Why Sampling is done?

Sampling is used for a variety of reasons. The notable ones outlined here-

1. *Sampling can save time and money. A sample study is usually less expensive than a census study and produces results relatively at a faster speed.*
2. *Sampling may produce more accurate measurements as it is generally conducted by trained and experienced investigators.*
3. *Sampling remains the only way when population size is infinitely large.*
4. *Sampling remains the only way when a test involves the destruction of the item under study.*

Sampling Design-

A sample design is a plan for obtaining a sample from a given population. It refers the technique or the procedure the researcher adopts in selecting items for the sample. Sampling design is determined before the data are collected.

Characteristics of a good sampling design-

A good sampling has some characteristics as under-

- a. Sampling design must result in a truly representative sample.
- b. Sampling design must result in a small sampling error.
- c. Sampling design must be consistent with the funds available for the research study.
- d. Sampling design must be such that systematic bias can be controlled in a better way.
- e. Sampling results of the sample study can be applied for the universe with a reasonable level of confidence.

Sampling Theory-

Sampling theory is the study of relationships existing between a population and samples drawn from the population. Sampling theory is only applicable to the situation where population size is very large or infinite.

One of the objectives of sampling theory is to enable us to decide whether to accept or reject a hypothesis. The sampling theory helps in determining whether the observed differences are actually due to chance or whether they are really significant.

Sample Size and its determination-

In sampling analysis, the most important question is 'what should be the sample size?' or how large or small should be the size of 'n'? If the n is too small, it may not serve to achieve the objectives of the research or if it is too large, we may incur huge cost or waste resources. As a general rule, it may be said that sample size must be of an optimum size, that is, should not be excessively large or too small. Technically, the sample size should be large enough to give a confidence interval of desired width and therefore, the size of the sample must be chosen by some logical process before sampling is taken from the universe. Size of the sample should be determined by a researcher keeping in view of the following points-

- (i) **Nature of the universe:** Universe may be either homogenous or heterogeneous in nature. If the items of the universe are homogeneous, a small sample can serve the purpose. But, if the items are heterogeneous, a large sample would be required. Technically, this can be termed as 'dispersion' factor.
- (ii) **Number of classes proposed:** If many class groups (groups and sub groups) are to be formed, a large sample would be required because a small sample might not be able to give a reasonable number of items in each group.
- (iii) **Nature of the study:** If the items have to be intensively or continuously studied, the sample should be small. For a general survey the size of the sample should be usually large where in case of a technical survey, a small sample is considered appropriate.

(iv) **Type of sampling:** Sampling technique plays an important part in determining the size of the sample. A small random sampling is considered to be much superior than a larger but badly selected sample.

(v) **Standard of accuracy and acceptable confidence level:** If the standard of accuracy or the level of precision is to be kept high, we shall require a relatively larger sample.

(vi) **Availability of finance:** In practice, size of the sample depends upon the amount of money available for the study purposes. This factor should be kept in mind determining the size of sample as the large samples result in increasing the cost of sampling estimates.

(vii) **Other considerations:** Nature of units, size of population, size of questionnaire, availability of trained investigators, the conditions under which the sample is being conducted, the time available for completion of the study are a few other factors to be considered while selecting the size of the sample.

Assignment Submission:

Topic: Different methods of primary data collection and their relative advantages and disadvantages.

Submission Procedure: Individual.

Week: 06

Lecture No: 06

Lecture Topic: Processing Data

After the collection of data, they have to be processed and analyzed according to the outline laid down for the purpose at the time of developing the research plan. Processing implies editing, coding, classification and tabulation of collected data so that they are prepared for analysis. Analysis refers to the computation of certain measures along with searching for patterns of relationship that exists among data groups.

Processing operations-

Processing generally consists of the following four activities-

(a) **Editing:** Editing is the process of examining the collected raw data to detect errors and omissions and to correct these when possible. Editing is done to assure that the data are accurate, consistent with other factors gathered, uniformly entered, as complete as possible and have been all arranged to facilitate coding and tabulation.

(b) **Coding:** Coding refers to the process of assigning numerals or other symbols to answers so that responses can be put into a limited number of categories or classes. Such classes should be appropriate to the research problem under consideration. It is necessary for efficient analysis and several replies may be reduced to a small number of classes which contain crucial information for analysis.

(c) **Classification:** Most research studies result in a large volume of raw data which must be reduced into homogenous groups if we need to get meaningful relationships. This fact necessitates the classification of data which indicates the process of arranging the data in groups or classes on the basis of common characteristics.

(d) **Tabulation:** Tabulation is the process of summarizing raw data and displaying the same in correct form for further analysis. In a broader sense, tabulation is an orderly arrangement of data in columns and rows.

Statistics in research-

The role of statistics in research is to function as a tool in designing research, analyzing the data and drawing conclusions there from. Most research studies result in a large volume of raw data which must be suitably reduced so that the same can be read easily and can be used for further analysis.

The important statistical measures that are used to summarize the survey/research data are-

1. Measures of Central Tendency or Statistical Averages.
2. Measures of Dispersion.
3. Measures of Asymmetry (skewness).
4. Measures of Relationship
5. Other Measures.

In our study, we will mainly deal with measures of central tendency and measures of relationship.

Among the measures of central tendency, the three most important ones are mean, median and mode.

Among the measures of relationship, Karl Pearson's coefficient of correlation is the frequently used measure in case of statistics of variables.

Index number, analysis of time series, coefficient of contingency etc. are other measures that are notable.

Measures of Central Tendency-

Measures of central tendency tell us the point about which items have a tendency to cluster. Such a measure is considered as the most representative figure for the entire mass of data. Measure of central tendency is also known as the statistical average. Mean, median and mode are the most popular averages. **Mean**, also known as arithmetic average, is the most common measure of central tendency and may be defined as the value which we get by dividing the total values of various given items in a series by the total number of items. We can work it out as under-

$$\text{Mean} = (\text{or } \bar{X}) = \frac{\sum x_i}{n} = \frac{x_1 + x_2 + \dots + x_n}{n}$$

- Where, \bar{X} = The symbol we use for mean (pronounced as X bar)
 \sum = Symbol for summation
 x_i = Value of i th item X, $i = 1, 2, \dots, n$
 n = Total number of items

Mean is the simplest measurement of central tendency and is a widely used measure. Its main use consists of summarizing the essential features of a series and in enabling data to be compared. It is a relatively stable measure of central tendency. But it suffers from some limitations as well. For example, it is unduly affected by extreme items. However, mean is better than other averages, specially in economic and social studies where direct quantitative measurements are possible.

Median is the value of the middle item of series when it is arranged in ascending or descending order. It divides the series into two halves; in one half all items are less than median, whereas in the other half, all items have values higher than median. If the values of the items, arranged in ascending order, are 60, 74, 80, 88, 90, 95 and 100, then the value of the 4th item, that is 88 is the value of median. We can also write thus-

$$\text{Median (M)} = \frac{(n+1)}{2} \text{th item}$$

It is a positional average and is used only in the context of qualitative phenomenon. Median is not important where items need to be assigned relative importance and weights. It is not frequently used in sampling statistics.

Mode is the most commonly or frequently occurring value in a series. The mode in a distribution is that item around which there is maximum concentration. In general, mode is the size of the item which has the maximum frequency, but at times such an item may not be mode on account of the effect of the frequencies of the neighboring items. Like median, mode is a positional average and is not affected by extreme items. It is, therefore, useful in all situations where we want to eliminate the effect of extreme variations. Mode is particularly useful in the study of popular sizes. For example, the manufacturer of a garment is usually interested in finding out the dress size so that he can manufacture that particular size in a large quantity. In other words, he wants a model size to be determined that can not be done by mean or median. Mode is unsuitable in cases where we want to give relative importance to items under consideration.

Index numbers: When the units in which two or more series are expressed happen to be different, statistical averages cannot be used to compare them. In such situations we have to rely upon some relative measurement which consists in reducing the figures to a common base. One such method is to convert the series into a series of index numbers. This is done when we express the given figures as percentages of some specific figure on a certain date. We can, therefore, define an index number as a number which is used to measure the level of a given phenomenon as compared to the level of the same phenomenon at some standard date. The use of index number weights more as a special type of average, meant to study the effect of such factors which are incapable of being measured directly. But one must always remember that index numbers measure only the relative changes.

$$\text{Index Number (I)} = \frac{P_1}{P_0} \times 100$$

Week: 07
Class Test

Where, P1= Price of the current year
P0= Price of the base year.
I = Index number

The base year is chosen very carefully by the researcher in this case as it represents the basis of comparison that we are going to assess.

Changes in various economic and social factors can be determined and compared through index numbers. Index numbers may measure the cost of living of different classes of people during a specified time period. In economic terms, index numbers are often described as 'economic barometers measuring the economic factors.'

But index numbers have their own limitations with which researcher must always keep himself aware. For instance, index numbers are only approximate indicators and give only a fair idea of changes but not accurate idea of why the changes are taking place.

Measures of Dispersion-

Range is a measure of dispersion and the simplest possible measure of dispersion and is defined as the difference between the values of the extreme items of a series.

Thus, Range= (Highest value of an item in a series-Lowest value of an item in a series)

The utility of range is that it gives an idea of the variability very quickly, but the drawback is that range is affected very greatly by fluctuations of sampling. Its value is never stable, being based on only two values of the variable. That's why range is only used as a rough measure of variability and is not considered as an appropriate measure in important studies.

The *standard deviation* is used most widely in research studies and is regarded as a very satisfactory measure of dispersion in a series. It is less affected by mathematical manipulation because the algebraic signs are not ignored in its calculation. It is less affected by fluctuations of sampling. These advantages make standard deviation and its coefficient a very popular measure of the dispersion of a series. It is popularly used in the context of estimation and testing of hypothesis.

Week: 08

Lecture No: 07

Lecture Topic: Writing a Research Proposal

Research Proposal

A research proposal is a formal proposal to the research supervisor to carry out research about a certain topic. It is the very first step of writing a dissertation. If the proposal is accepted by the supervisor, the researcher may go for writing a formal dissertation.

Contents of a Research Proposal

A good research proposal should contain the following things in general-

(a) **Research Topic:** First of all, a topic should be selected for the research. The topic will be the main theme of research.

Example- The role of women in garment industry in Bangladesh.

(b) **Research Aim and Objectives:** Research aim and objectives indicates why the research will be done and how it will be helpful for the researcher/related academics in future. Usually there are three to five objectives provided for a research.

Example of objectives of the above research may be-

1. To find out the number of women working in garment industry as percentage of the total population.
2. To find out the reason why so many women are working in garment industry.
3. To find out how they are contributing to the national GDP as garment workers.
4. Problems faced by women working in the industry, and
5. Recommendations how to improve the working conditions for the women in garment industry.

(c) **Research Question or Research Hypothesis:** Research hypothesis is the pre-assumption that there is positive or negative relationship between two or more variables. Generally, the research is done to find out the cause and relationship of two incidents/variables. On the other hand, a research question is generally asked to find out the answer if there is any relationship between two variables or not. Research question is generally used as an alternative of research hypothesis.

A typical example of the research question might be- 'Is there any relationship between overwork and stress?'

An example of research hypothesis: 'There is a positive relationship between smoking and cancer.'

After the carrying out of the research, the research, the hypothesis might either be correct or incorrect.

(d) Research Process or Design: In this part of the proposal, the researcher will explain the process he/she will follow to carry out the whole research. The research process should include the following information-

1. The type of research such as analytical, descriptive, empirical etc.
2. Nature of data collection-primary or secondary.
3. If the data to be collected are primary, then, how they will be collected.
4. Design of the questionnaire.
5. Sample size- the number of respondents.
6. Areas in which the survey will be conducted.

(e) Critical Literature Review: It is the most important part of the research and generally covers 50% of the dissertation. Generally, critical literature review contains critical analysis of the theories explained concerning the research and their justification in doing the research.

(f) Research Methodology: Research methodology explains how the data collected will be sorted out and analyzed to make a final decision. It includes tabulation of data collected and use of specific method of finding a relationship.

(g) Possible Problems might be encountered and ways to avoid/solve them: In doing research, the researcher might experience several problems that usually highlighted in this part of the proposal and also with how to solve/avoid such problems are the content of this section.

(h) Research Plan: The researcher will draft a clear plan of the time frame within which the whole research process will be completed. For example, a research plan might be as follows:

Research Plan for Md. Mamunur Rashid

Time Frame	Activities
20/10/2011 to 31/10/2011	Writing and submission of research proposal
01/11/2011 to 31/12/2011	Writing of critical literature review
01/01/2012 to 10/01/2012	Preparation of questionnaire
11/01/2011 to 31/01/20	Collection of primary data
01/02/2012 to 16/02/2012	Writing of research methodology
17/02/2012 to 28/02/2012	Building the relationship and accepting/rejecting the hypothesis
01/03/2012 to 05/03/2012	Concluding the dissertation
05/03/2011 to 12/03/2012	Editing and proof reading of the dissertation written
15/03/2012	Submission to the supervisor

(i) Conclusion: Last part of the proposal. Generally the writer makes one or two concluding comments on his/ her proposal.

Week: 09

Lecture No: 08

Lecture Topic: Critical Literature Review-1

What is a Critical Literature Review?

The aim of a literature review is to show your reader (your tutor) that you have read, and have a good grasp of, the main published work concerning a particular topic or question in your field. This work may be in any format, including online sources. It may be a separate assignment, or one of the introductory sections of a report, dissertation or thesis. In the latter cases in particular, the review will be guided by your research objective or by the issue or thesis you are arguing and will provide the framework for your further work.

It is very important to note that your review should not be simply a description of what others have published in the form of a set of summaries, but should take the form of a critical discussion, showing insight and an awareness of differing arguments, theories and approaches. It should be a synthesis and analysis of the relevant published work, linked at all times to your own purpose and rationale.

According to Caulley (1992) of La Trobe University, the literature review should:

- compare and contrast different authors' views on an issue
- group authors who draw similar conclusions
- criticise aspects of methodology
- note areas in which authors are in disagreement
- highlight exemplary studies
- highlight gaps in research
- show how your study relates to previous studies
- show how your study relates to the literature in general
- conclude by summarising what the literature says

The purposes of the review are:

- to define and limit the problem you are working on
- to place your study in an historical perspective
- to avoid unnecessary duplication
- to evaluate promising research methods
- to relate your findings to previous knowledge and suggest further research

A good literature review, therefore, is critical of what has been written, identifies areas of controversy, raises questions and identifies areas which need further research.

