Business Research Methods

Unit 1

Introduction:
WHAT IS RESEARCH?
- Research in common words refers to a search for knowledge
- It can be called as "a scientific and systematic search pertinent information on a specific topic". It is, in fact, an art of scientific investigation.
- According to Lundberg(1942), Scientific methods consist of systematic observation, classification, and interpretation of data.
- Fred Kerlinger(1986), Scientific research is a systematic, controlled and critical investigation of propositions about various phenomena"
- Management research is unbiased, structured and sequential method enquiry, directed towards a clear implicit of explicit business objective. This enquiry might lead to validating the existing postulates or arriving at new theories and models.

Objectives of Business Research:
- To gain familiarity with a business or economic phenomenon or to achieve new insights into it. (exploratory or formulative)
- To portray accurately the characteristics of a particular individual, situation or a group. (descriptive).
- To determine the frequency with which something occurs or with which it is associated with something else. (diagnostic)
- To test a hypothesis of causal relationship between variables(hypothesis-testing)

Types of Research:
Based on the objectives of research, it is classified as follows:
Research can either be applied(action oriented research) or fundamental (basic or pure research).
- ▶ Applied Research aims at finding a solution for an immediate problem facing society or an industrial/business organization.

 Example: Accidents increases in southern part of india-Why? And solution.
Attrition rate is very high in software industries
- ▶ Fundamental Research is mainly concerned with generalizations and with the formulation of a theory

Example: Why the East Asia is vulnerable to earthquake?
- ▶ Exploratory Research
  - Conducted to resolve ambiguity
  - Used to gain a deeper understanding of something.
  - Provides direction in order to initiate a more structured research.

Examples:Availability of market opportunities to a prospective entrepreneur
Identifying problem in supply chain of a product
Different ways that women professionals adapt to manage work-family conflict .
Limitations:
- ❖ Studies of this nature may be less structured , and are not conducted to test or validate any preconceived propositions.

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- ❖ Additional point to remember:
- ❖ more flexible in approach
- ❖ Also done as pilot or feasibility study
- ▸ Conclusive Research
  Conducted to test and authenticate the propositions revealed by exploratory research.
  Usually quantitative in nature.
  More structured and definite.
  Variables and constructs are clearly defined and explicitly quantifiable.

Example: Testing the impact of new data monitoring programme on the inventory management system.

Here the impact needs to be clearly recognized for management to install the monitoring system.

Exploratory Vs Conclusive:

EXPLORATORY RESEARCH	CONCLUSIVE RESEARCH
Loosely structure in design	Well-structured and systemic in design
Are flexible and investigative in methodology	Have a formal and definitive methodology that needs to be followed and tested.
Do not involve testing of hypotheses	Hypotheses involved
Findings might be topic specific	Findings are significant as they have a theoretical or applied implications

- ▸ Descriptive Research:
  Aims at elucidating the data and primary characteristics about the object/situation/concept under study.
  Contemporary, topical and time bound

Example: Census carried out by the Govt. of India

Study to distinguish between characteristics of the consumers who buy normal petrol and those who buy premium petrol.

What is the level of involvement of middle level vs senior level managers in a company's stock related decisions?

Descriptive research is otherwise called as "Ex post facto research".

- ▸ Causal Research:
  Concerned with exploring the effect of one variable on another.
  Requires a rigid sequential approach to sampling, data collection and data analysis.

Example: to study the impact of flexi-time polices turnover intentions.

Other types of research: Quantitative Vs Qualitative (Based on the nature of data):
  This distinction may be described as approaches to research:

➤ Quantitative Research
❖ Quantitative research is based on the measurement of quantity or amount.
❖ It is applicable to phenomena that can be expressed in terms of quantity.
❖ **Example: Research on Economic Growth**
➤ Qualitative Research
❖ Quantitative research is concerned with qualitative phenomena.
❖ Example: Research on human behaviour
❖ Statement to remember: many research studies are quantitative and qualitative in nature.

Other Types of research: Conceptual Vs Empirical (Based on the extent of theory):
➤ Conceptual
Conceptual research is that related to some abstract idea or theory.
It is generally used by philosopher and thinkers to develop new concepts or to reinterpret existing ones.
Example: Research on quality of management education: How modern management education differs from traditional management education.
➤ Empirical
Relies on experience or observation alone, often without due regard for system and theory.
It is data based research coming up with conclusions.
In such research, it is necessary to get at facts first hand, at their source, and actively to go about doing certain things to stimulate the production or desired information.
It may also be called as experimental type of research.

Other Types of research: (Based on the Time Dimension):
➤ On the basis of time dimension, it can be:
   ✚ Cross sectional research
   ✚ Time series research
   ✚ Panel Study
➤ Cross sectional research:
Cross-sectional studies (also known as **cross-sectional analyses**, **transversal studies**, **prevalence study**) are one type of observational study that involves data collection from a population, or a representative subset, *at one specific point in time*.
It may reveal how those variables are represented in a cross-section of a population.
Example:
A type of analysis an investor may conduct on a company in relation to that company's industry or industry peers.
Advantages:
   ➤ Data on many variables
   ➤ Data on attitudes and behaviours
   ➤ Generates hypotheses
Disadvantage:
   ➤ Increased chances of error
   ➤ Increased cost with more subjects and location
➤ Time Series Research

Time series design collects data on the same variable at regular intervals in the form of aggregate measures of population.
This allows the researcher to measure changes in variables over time.
For example, GDP, Consumer Price index, poverty rates, profitability.
Advantages:

- ▶ Easy to collect data
- ▶ Easy present in graphs
- ▶ Easy to interpret

Disadvantages:

- ▶ Difficult to show more than one variable at a time
- ▶ Needs qualitative research to explore fluectations.

What is the process of research?
- • The process of research is cyclic in nature and is interlinked at every stage.

Process of Research:
- • Management Dilemma
- • Defining the Research Problem

Review of Literature to know more about the problem
- • Formulating the Research Hypotheses

Research Questions, Objectives & Hypotheses
- • Developing Research Proposal

- • Management Dilemma
  - ▫ Triggered by the need and desire to know more.
    - · to discover and reinstate some relationships
    - · to uncover some new perspectives to existing phenomena.
    - · to take immediate business decision that requires additional information
- • Defining research Problems
  - ▫ A prelude to the end result to be achieved
  - ▫ Requires considerable thought and analysis.
  - ▫ Clear definition of:
    - · What
    - · What purpose
    - · The first step in the formulation of research problem is to make the problem concrete and explicit.
    - · The formulation of the topic into a research problem should be influenced primarily by the requirements of scientific procedure.
      - • systematic immersion in the subject matter through first hand observation;
      - • the study of existing literature; and
      - • discussion with persons who have accumulated practical experience in the area of study..
    - · Example: work family conflict on turnover intentions
    - · Variables are: Role conflict, work commitment etc.

Extensive Literature Survey:

- Search for existing literature
- Prepare a working bibliography
- Write in index cards; group together references from
  a.books
  b.journalsandperiodicals
  c. unpublished material
- Examine each material, then decide which ones will actually be included in your review.
- Broaden Knowledge Base
- Ensuring originality in the conduct of one's research
- Clarity and focus
- Gaps : findings and conclusions of past studies
- Formulating the theoretical and conceptual framework
- Literature review helps the researcher to formulate research objective, variables and finally hypothesis

Research Questions, Objectives & Hypotheses:
- 1.Begin the research questions with the words what or how.
- Tell the reader that the study will do one of the following:
  - discover
  - explain
  - Investigate
  - ascertain
  - explore a process, and
  - describe the experiences.
- 2. Pose questions that are non-directional. Avoid the words with a directional orientation, such as affect, influence, impact, determine, cause and relate
- 3. Expect the research questions to evolve and **change during the study**. Often, in qualitative research, the **questions are under continuous review and reformulation.**
- 4. Use open-ended questions without reference to theory; and
- 5. Use a single focus and specify the research site in the research questions.

Research Problems and Research Questions:

STATE OF KNOWLEDGE OF THE PROBLEM	TYPE OF RESEARCH QUESTIONS	TYPE OF STUDY
Knowing that a problem exists but knowing little about its characteristics or possible causes.	• What is the nature/magnitude of the problem? • Who is affected? How do the affected people behave? What do they know, believe, think about the problem and its causes?	*Exploratory studies,* or *Descriptive studies:* • Descriptive case studies • Cross-sectional surveys
Suspecting that certain factors contribute to the problem.	• Are certain factors indeed associated with the problem? (e.g., Is lack of pre-school education related to low school performance? Is low fibre diet related to carcinoma of the large intestine?)	*Analytical (comparative) studies:* • Cross-sectional comparative studies • Case-control studies • Cohort studies
Having established that certain factors are associated with the problem: desiring to establish the extent to which a particular factor causes or contributes to the problem.	• What is the cause of the problem? • Will the removal of a particular factor prevent or reduce the problem? (e.g., stopping smoking, providing safe water)	• Cohort studies *Experimental or quasi-experimental studies*
Having sufficient knowledge about cause(s) to develop and assess an intervention that would prevent, control or solve the problem.	• What is the effect of a particular intervention/strategy? (e.g., treating with a particular drug; being exposed to a certain type of health education) • Which of two alternate strategies gives better results? Which strategy is most cost-effective?	Experimental or quasi-experimental studies

Research Objectives:
- Stated in a formal research statement.
- act as a guidelines for various steps in research process
- Formulation of objectives is more important because it determines
  - data which are to be collected
- characteristics of data which are relevant
  - relations which are to be explore
  - the choice of techniques to be used
- the form of final report

Research Hypotheses:
- Hypothesis is the presupposition of the expected direction of the results of a research.
- Conversion of the defined research problem into a working hypothesis.
- Null hypothesis
- Alternative hypothesis

INTER-RELATIONSHIP BETWEEN RESEARCH PROBLEM, OBJECTIVES, QUESTIONS AND HYPOTHESES:
- **RESEARCH PROBLEM**

Adoption of improved technique of production in an industrial organization.

- **RESEARCH QUESTIONS**
- 1. is the manager aware of the improved technology?
- 2. Are the workers capable of working with improved technique of production?
- 3. How serious the management is to adopt improved technique of production?
- 4. What is the impact of adopting the improved technique on the employment of existing workers?
- 5. What is the impact of adopting the improved technique on the cost of production?
-
- **RESEARCH OBJECTIVES**
- 1. to determine the manager's awareness of improved technique
- 2. to measure the management's satisfaction with the existing technique of production
- 3. to identify the costs and benefits of improved technique of production
- 4. to determine the impact of adopting improved technique of production on the employment of existing workers.
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- **RESEARCH HYPOTHESIS**
- 1. Manager is aware of improved technique of production
- 2. Management is not satisfied with the existing technique of production;
- 3. Adoption of improved technique of production results in the removal of some of the existing workers.
- 4. Benefits are more than costs in adopting improved technique of production.

Research Proposal:

Questions you must ask	Steps you will take	Important elements of each step
What is the problem and why should it be studied?	Selection, analysis and statement of the research problem	- problem identification - prioritising problems - analysis - justification
What information is available?	Literature review	- literature and other available information
Why do we want to carry out the research? What do we hope to achieve?	Formulation of research objectives	- general and specific objectives - hypotheses
What additional data do we need to meet our research objectives? How are we going to collect this information?	Research methodology	- variables - types of study - data collection techniques - sampling - plan for data collection - plan for data processing and analysis - ethical considerations - pre-test or pilot study
Who will do what, and when?	Work plan	- human resources - timetable
What resources do we need to carry out the study? What resources do we have?	Budget	- material support and equipment - money
How will the project be administered? How will utilisation of results be ensured?	Plan for project admin-istration and utilisation of results	- administration - monitoring - identification of potential users
How will we present our proposal to relevant authorities, community and the funding agencies?	Proposal summary	- briefing sessions and lobbying

Research Framework and Design:
- Identify the framework you intend to use to arrive at answers to the research questions framed by you.
- A research design is based on a framework and provides direction to the investigation being conducted in the most efficient manner.
- Research design involves:
  - The means of obtaining the information
  - The availability and skills of researcher and his staff if any.
  - Explanation of the way in which selected means of obtaining information
  - The time available for research
  - Cost factor relating to research

Data Collection Plan , Instrument Design, Pilot Testing & Sampling Plan :
- Data collection plan:
  - What type of data to be collected?
  - How much of data to be collected?

- ▫ Where to be collected?
- Instrument Design:
  - ▫ What instrument to be used?
    - · Questionnaire, interview schedule (structured or unstructured)
    - · How it would be used? (Mode of reaching respondents.
- Pilot testing and sampling plan:
  - ▫ Pilot testing as to check the appropriateness of data and instrument design and samples.
  - ▫ Size of sample
  - ▫ Type of sampling: Probability or Non probability

Data Collection:
- Primary data
  - ▫ By observation
  - ▫ Through personal interview
  - ▫ Through telephone interview
  - ▫ By mailing questionnaire
  - ▫ Through interview schedule
- Secondary data
  - ▫ The information that has been collected and compiled.

Data Refining and Preparation of Analysis:
- The collected data should be edited and refined for any omissions and irregularities.
- Coding and tabulation for statistical testing.

Data Analysis and interpretation of findings:
- A Single variable-Univariate data analysis method.
- Two variables-Bivariate analysis method.
- More than two variables-Multivariate Analysis
- Interpretations Vs Inferences.
- The process of interpretation may quite often trigger off new questions which is in turn may lead to further researches.

Research Report and Implications for the manager's dilemma.:
- Preliminary pages or prefatory items
- Body items
  - ▫ Introduction
  - ▫ Review of Literature
  - ▫ Research Framework and Design
  - ▫ Results, Analysis and Discussions
  - ▫ Summary of Findings, Conclusions and Recommendations.
- Terminal items.
  - ▫ Annexure
  - ▫ Bibliography
  - ▫ Index

Should be written in a concise and objective style in simple language avoiding vague expressions.

RESEARCH DESIGN & MEASUREMENT:

What is research design?
- A research design is based on a framework and provides direction to the investigation being conducted in the most efficient manner.
- RD is the framework that has been created to seek answers to research questions.
- According to Thyer(1993), "A traditional research design is a blueprint or detailed plan for how a research is to be completed-operationalizing variables so they can be measured, selecting a sample of interest to study, collecting data to be used as a basis for testing hypotheses, and analysing the results.

What research design does?
- Converting the research question and the stated assumption/hypotheses into operational variables that can be measured.
- Specify the process that would be followed to complete the above task as efficiently as possible.
- Specify the control mechanisms that would be used to ensure that the effect of other variables that could impact the outcome of the study have been controlled.

  Example: To investigate the consumer decision-making process for organic food products and to segment the market according to the basket size.
- Converted into: To investigate the consumer decision-making process for organic food products and to segment the market-existing and potential-according to their psychographic profile.

Variables-A basic idea:
- Independent Variable
    - Also known as explanatory variable.
    - A variable which influences or explains the variation in the other variables.
    - Value in the independent variable may be manipulated.
    - Example. Use of fertilizer influences the yield of a crop.
- Dependent Variable
    - A dependent variable is one which depends on an independent variable.
    - Example: Expenditure on R&D on sales.
- Moderating Variable
    - It may be third variable,(but not an independent variable), but forms strong contingent/contextual effect on the relationship between independent and dependent variable.
    - Example: Training and performance in an organization.
        - 'Willingness to learn ' is neither independent nor dependent but moderating.
- Intervening Variable
    - It is a variable that might affect the dependent variable, but cannot be directly observed or measured.
    - Example: Sales of a retail store and increasing discounts
        - Monthly prize to randomly selected customers can not be measured, but its impact can be observed.
- Extraneous Variable
    - Extraneous variable is one that is outside or external to the situation under study and its impact on dependent variable is beyond ethe scope of the study.

▫ Example. Family income of students could be taken as extraneous variable while studying performance of MBA students.

Classification(Types) of research design :
- Phase I - Exploratory
- Phase II - Descriptive
- Phase III - Explanatory

Classification of research design:
- Exploratory Research Design
    ▫ Simplest and most loosely structured designs
    ▫ Flexible in its approach and involves qualitative investigation in most cases.
    ▫ The basic objective of the study is to explore and obtain clarity about the problem situation.
    ▫ Techniques for conducting an exploratory research:
        · Secondary Analysis: contains the details of previously collected findings and can be represented in a relatively easier and inexpensive way.
        · Comprehensive case method: is intricately designed and reveals a complete presentation of facts as they occur in a single entity.
        · Expert opinion survey: conducted when no previous information or data is available on a topic of research. It is formal and structured in general.
        · Focus group discussion: Alternative approach to interviewing is to carry out discussions with significant individuals associated with the problems.

Two-tiered research design :
- Once an exploratory study using a loosely structured exploratory design is over, it is to evolve more structured research through:
    ▫ Formulating research questions
    ▫ Designing the framework.

Descriptive Research Design:
- Descriptive research designs provide a comprehensive and detailed explanation of the phenomena under study.
- Two types: Cross sectional and longitudinal
    ▫ Cross sectional studies design helps:
        · Investigate a specific chunk of the population under study.
        · Carry out at a single moment in time and thus the applicability is most relevant for a specific period.
        · E.g. Attitude of Indian consumers pre and post budget.
- Longitudinal research(time series study) designs help studies
    ▫ A single sample of the identified population over a stretched period of time.
        · Otherwise called as time series design.
            • Eg. Attitude of students over time

Explanatory(Causal/Relational) Research Design :
- Explanatory research design helps study the impact of one variable on the other and also the relationship between two variables.
- The relevance of causal study arises only when there exists correlation between two variables.
    ▫ For example, sales and advertising expenses.

- ▫ Sales is the dependent variable
- ▫ Advertising is independent variable
- ▫ Incidentally, causal variable is also called as explanatory variable as it explains the effect or impact on the dependent variable.

Sampling
What is sampling?
Data for research may be collected through secondary sources, where as the rest may be obtained through primary sources.
The primary methods are:
- • Observation method
- • Personal interview with questionnaire
- • Telephone survey and mail surveys

Survey respondents should be selected using the appropriate procedures, otherwise the researchers may not be able to get the right info to solve the problems.
**The process of selecting the right individuals, objects or events for the study is known as sampling. Sampling involves the study of a small number of individuals, objects chosen from a larger group.**

Sampling concepts:
- • Population
  - ▫ Refers to the total of items about which information is desired.
  - ▫ Population and universe are interchangeably use.
  - ▫ Is population different from universe?
    - · Yes, universe refers to the total of items or units in any field of inquiry.
  - ▫ Population may be finite or infinite
    - · Finite population consists of fixed number of elements which is possible to be enumerated.
    - · Infinite is impossible to enumerate.
- • Sampling Frame
  - ▫ Sampling frame comprises all the elements of population with proper identification that is available to us for selection at any state of sampling.
    - · Example: a list of registered voters; telephone directory; the number of students registered with university.
  - ▫ When population size is very large, it becomes virtually impossible to form a sampling frame.
    - · Example: consumers of soft-drinks.
- • Sample: It is a subset of the population. It comprises only some elements of the population.
  - ▫ Example: if out of 91 MBA students, 9 are surveyed with regard to the selection of best teaching methods, these 9 are sample.
- • Sample unit: A sampling unit is a single member of the sample.
  - ▫ Example: Each MBA student is a sample

- Sampling error: Sample survey do imply the study of a small portion of the population and as such there would naturally be a certain amount of inaccuracy in the information collected.
    - SE=Frame error+ Chance error+ Response error
- Frame errors occurs when the list of population carries errors. Say for example, a record of population from the registrar' office contains errors. Class roasters.
- Confidence Level and Significance level
    - The confidence level or reliability is expected percentage of times that the actual value will fall within the stated precision limits.
    - Example, a confidence level of 95%, then we mean that there are 95 chances in 100 (or .95 in 1). In this case, significance level is 5 chances in 100 or .05 in 1

SAMPLING BREAKDOWN
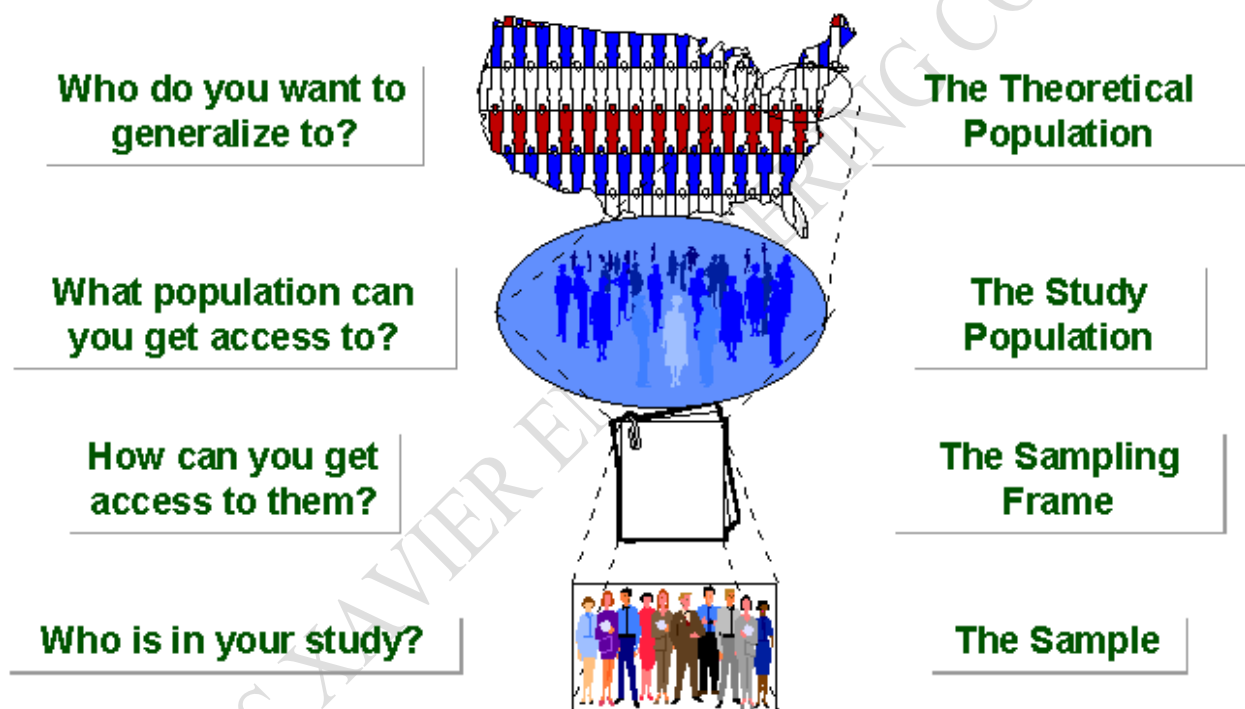
Need for sampling & Sampling Process:
    - Need for Sampling
        - Resources (time, money) and workload.
        - Gives results with known accuracy that can be calculated mathematically.
    - Sampling Process
        - Defining the population of concern
        - Specifying a sampling frame, a set of items or events possible to measure
        - Specifying a sampling method for selecting items or events from the frame
        - Determining the sample size
        - Implementing the sampling plan
        - Sampling and data collecting
        - Reviewing the sampling process

Types of Sampling:
- Probability (Random) Samples
  - Simple random sample
  - Systematic random sample
  - Stratified random sample
  - Multistage sample
  - Multiphase sample
  - Cluster sample
- Non-Probability Samples
  - Convenience sample
  - Purposive sample
  - Quota

Probability Vs Non-probability:
- With *probability sampling*, all elements (e.g., persons, households) in the population have some opportunity of being included in the sample, and the mathematical probability that any one of them will be selected can be calculated.
- With *non-probability sampling*, in contrast, population elements are selected on the basis of
  - availability (e.g., because they volunteered) or
  - because of the researcher's personal judgment that they are representative.

The consequence is that an unknown portion of the population is excluded (e.g., those who did not volunteer).
  - Example: Convenience Sampling

Probability sampling:
- A **probability sampling** scheme is one in which every unit in the population has a chance (greater than zero) of being selected in the sample, and this probability can be accurately determined.
- . When every element in the population *does* have the same probability of selection, this is known as an 'equal probability of selection' (EPS) design. Such designs are also referred to as 'self-weighting' because all sampled units are given the same weight.

Simple Random Sampling:
- Applicable when population is small, homogeneous & readily available
- All subsets of the frame are given an equal probability. Each element of the frame thus has an equal probability of selection.
- It provides for greatest number of possible samples. This is done by assigning a number to each unit in the sampling frame.
- A table of random number or lottery system is used to determine which units are to be selected.
  - Simple random sampling with replacement
    - In this case, the first unit of sample is chosen with a probability of 1/1000 and second one is selected with the sample probability.
  - Simple random sampling without replacement
    - In this case, the first unit of sample is chosen with a probability of 1/1000 and second on is selected with the probability of 1/999 and so on.
- **Advantages:**

▫ Estimates are easy to calculate.
- **Disadvantages**
  - ▫ If sampling frame large, this method impracticable.
  - ▫ Minority subgroups of interest in population may not be present in sample in sufficient numbers for study.

Systematic Sampling:

- **Systematic sampling** relies on arranging the target population according to some ordering scheme and then selecting elements at regular intervals through that ordered list.
- Systematic sampling involves a random start and then proceeds with the selection of every *k*th element from then onwards. In this case, *k*=(population size/sample size).
- It is important that the starting point is not automatically the first in the list, but is instead randomly chosen from within the first to the *k*th element in the list.
  - ▫ A simple example would be to select every 10th name from the telephone directory (an 'every 10th' sample, also referred to as 'sampling with a skip of 10').

Stratified Random Sampling:

Where population embraces a number of distinct categories, the frame can be organized into separate "strata." Each stratum is then sampled as an independent sub-population, out of which individual elements can be randomly selected.

- Every unit in a stratum has same chance of being selected.
- Using same sampling fraction for all strata ensures proportionate representation in the sample.
- Adequate representation of minority subgroups of interest can be ensured by stratification & varying sampling fraction between strata as required.

Cluster Sampling:

- Cluster Sampling is an example of 'two-stage sampling' .
- First stage a sample of areas is chosen;
- Second stage a sample of respondents *within* those areas is selected.
- Population divided into clusters of homogeneous units, usually based on geographical contiguity.
- Sampling units are groups rather than individuals.
- A sample of such clusters is then selected.
- All units from the selected clusters are studied.
- Two types of cluster sampling methods.
- **One-stage sampling**. All of the elements within selected clusters are included in the sample.
- **Two-stage sampling**. A subset of elements within selected clusters are randomly selected for inclusion in the sample.
- **Identification of clusters**
  - List all cities, towns, villages & wards of cities with their population falling in target area under study.
  - Calculate cumulative population & divide by 30, this gives sampling interval.
  - Select a random no. less than or equal to sampling interval having same no. of digits. This forms 1st cluster.
  - Random no.+ sampling interval = population of 2nd cluster.
  - Second cluster + sampling interval = 4th cluster.

- Last or 30th cluster = 29th cluster + sampling

Non-probability Sampling:
- Convenience Sampling
  - Used to obtain information quickly and inexpensively.
  - The criteria is the convenience of the researcher or the investigator.
  - The sampling unit may either be self-selected or selected bcs of ease of availability. E.g.
    - People interviewed in a shopping centre for their political opinion for a TV programme.
    - Researcher visiting a few shops near his residence to observe purchasing behaviour.
  - Commonly used in exploratory research. This is because the purpose of an exploratory research is to gain an insight into the problem.

Judgemental Sampling:
- Experts in a particular field choose what they believe to be the best sample for the study in question.
- Judgemental sampling calls for special efforts to locate and gain access to the individuals who have required information.
  - Example, shoppers at a shopping complex may serve to represent the residents of a city.
  - Limitations: May not produce empirically satisfactory results and may therefore curtail generalisability of the findings.

Snowball sampling:
- Used when it is difficult to identify the members of the desired population, e.g. deep sea drivers, doctors specialized in a particular ailment.
- Limitation:
  - Making the initial contact is very difficult.
  - Identification of potential respondents who are similar to themselves.

Quota sampling:
- In quota sampling, the sample includes a minimum number from each specified subgroup in the population.
- For example,
  - if organization is having 10 percent, 15 percent, 35 percent and 40 percent for class I, II, III & IV respectively.
  - If a sample of 200 employees is to be selected from the organization, then 20, 30, 70 and 80 employees from class I, II, III & IV.
  - Now, various investigators may be assigned quotas from each class.

Theory is a term originated from Greek word "theorein" meaning "to look at". In other words, it means a knowledgeable outlook. In a sense, since every individual has a world outlook, he has his own theory. Scientific theory provides systematic world outlook. Theory could be understood as a conceptual scheme designed to explain observed relationships between two or

more variables. Theory is meant to catch the world. It also rationalizes, explains and masters it. Theoretical system is a body of logically interdependent generalized concepts of empirical reference. The intention of theory is to summarize existing knowledge, to provide explanation for observed events and to predict the occurrence of events on the basis of explanatory principles embodied in the conceptual scheme. The term "theory" in social sciences refers to some logical explanation about social phenomena, logically constructed and systematically organized, that underscores the relationship between two well defined variables. Theory represents a symbolic construction. Theory building is a matter creative achievement. Theory stands for symbolic dimension of experience. Theory is a part of the world which stands in some way for the whole. No theory is absolutely true since there is no absolute truth. No theory is a final formulation because ripples of new knowledge are splashing in all the time. These ripples of new knowledge modify or even repudiate existing theory. Theories which stand repudiated today will have their days of glory. The goal of theory is to provide a working replica of the real world.

Empirical research and theory may be regarded as co-travelers proceeding toward continuous increments of knowledge. Theory is an integral part of research and research derives its meaning by reference to theory from which it is generated. Each has an important contribution to make to the other. A scientist may take theory or research as his starting point, but he must consider at some point of his exercise the bearing of his work on the interrelation between theory and research. A scientist coming from theory to research, he has to focus his attention on truth, the nature of reality, process of knowing and the logic of meaningful statements. If the scientist starts from empirical research to theory, he turns his attention to measurement of phenomena, translation of hypotheses into operational terms, reliability of empirical indicators and so on. The apparent conflict between theory and empirical research arises because of speculative philosophy not amenable for empirical research, neglect of theory by empirical research, presence of abundant facts devoid of theoretical framework. Two way movements between theory and research generate useful insights of a phenomenon leading to generation of new knowledge. In fact, science is marked by a constant oscillation, back and forth, between the empirical and theoretical researches. Cumulative knowledge can be developed only when empirical research is theory oriented and theory is empirically confirmable.

Research in an Evolutionary Perspective

PHILOSOPHY OF SOCIAL RESEARCH:
Philosophy is mother of all sciences in the world. Social science is regarded as a 'prodigal' son of philosophy. Like any other sciences, social science has its own philosophical foundation. Generally, social sciences have tended to look at their bases in philosophy when their findings start loosing confidence or significance. In social science research, philosophical questions are to be answered as clearly as possible before empirical investigations. The relationship between social sciences and philosophy has historical, logical and conceptual dimensions. Many thinkers like Plato, Karl Marx, Webbers, among others, have their contributions to the development of philosophical bases of social sciences. In the late 19th and early 20th centuries, natural sciences had profound influence on the ways of thinking about the study of human social life. Economics is no exception to this influence. It is because of this, social scientists tried to create sciences of

human behaviors. However, it is a debatable issue whether the study of social life could be like the study of nature.

Philosophy seeks to develop criteria for distinguishing between true and untrue. Besides this, it is also concerned with the nature of knowledge, nature of being, and nature of matter and so on so forth. In fact, answers to philosophical questions raise questions of intellectual authority.

In the Western philosophy, one dominant question is 'what is the character of our knowledge of the world?' In other words, the epistemological question is 'how what exists is made known?' Another related question to it is 'what exists in the world? This is an ontological question. In fact, these two questions are interrelated. Answers to these questions can not be provided through empirical investigations. These questions are concerned with the nature and significance of empirical investigation. Answers to these philosophical questions are to be found by reason only. Philosophical issues can be resolved by an argument that shows how a set of conclusions follow from premises that are agreed upon. However, it is very difficult to have commonly agreed upon premises. There are different ways in which facts of life are known. They are experimental methods, procedures of analysis, authoritative sources, age, experience, spiritual inspiration and others. These are to be accepted by the public from which intellectual authority is derived. However, the assent by the public about these ways may not guarantee the knowing about facts. Reasoning is important in claiming knowledge of a phenomenon. Claiming of knowledge about a phenomenon requires framework, besides argument and evidence. This framework depends on the conception of life which possibly differs from man to man. Personal prejudices enter into this framework. Thus, deviation arises between what is real and what is believed as real. Thus, objectivity in belief is required to know the reality of life. Thus, there is a need to find out an indisputable foundation of human knowledge. The objective beliefs are the source of intellectual authority. However, there is no universal assent to these objective beliefs. Moreover, the conceptions of the world have changed historically. Our forefathers had different ideas about the world from our own. For example, in 17th century (Locke) principles of human knowledge were discussed on the basis of two premises about the order of nature and man's place in it. They are: 1. the nature is fixed and stable; and 2. dualism exists between matter and mind. This conception about the world provided ontological description of the world and epistemological prescriptions about how the world could be investigated. Thus, intellectual validity was provided to various disciplines of knowledge by the extent to which it conforms to the above conception of the world. However, the above conception of the world was accepted only upto the 19th century. But now, the idea of evolution and changing universe no longer supports the above conception of the world. Thus, the issue of relativity of knowledge emerges. Now, two questions about knowledge remain. They are: 1. what is the universal source of intellectual authority? And 2. Is the knowledge relative to society and the period in which we live? These questions help us to understand what we are doing when we engage ourselves in social research to produce knowledge. Paradigm shifts arise when there is a change in the conception of the world.

PHILOSOPHY AND THE PROCESS OF RESEARCH: Broadly speaking, research is carried out in order to discover something about the world. The world is conceived in terms of

concepts that characterize a discipline (i.e., economics). A social researcher is trained in preparing a questionnaire, learning principles of survey design and analysis, statistical techniques, computer programming and modeling and so on. These research methods are regarded as technology. Every research tool is embedded in a particular conception of the world. Thus, relevance of philosophy to research process exists. The validity of every research tool should depend upon epistemological justifications. Research methods are closely related to a theory. Research methods operate only within a set of assumptions about the nature of society, the nature of human beings, and the relationship between the two. Social researchers must be concerned with philosophical inquiry for practical guidance. There is a strong relationship between philosophy and social sciences. However, the direction of social research is questioned now because, it is moving away from philosophical basis. Scientific status of social sciences is an issue to be debated. Scientific status of economics is also questioned. Inspite of economics, there are economic crises often leading to blames by economists and politicians on each other. Analysis of social life by social sciences is not as convincing as those produced by the natural sciences of the natural world.

THE ROLE OF THEORY IN RESEARCH

Interaction between theory and research is a continuous process of science leading to consolidation of existing knowledge and additions to it.

1. Theory provides significant guidelines for the empirical research by pointing to areas in which meaningful relationships are likely to be found. Theory narrows down range of facts to be studied. Theory provides the research a definite point of view helping him enquires into relationships between certain variables selected infinite array of variables. A theory provides fruitful hypotheses and new perspectives. It also points to gaps in our knowledge.

2. Theory increases the meaning of the findings of empirical research by helping us to perceive them as special cases of a set of abstract statements of relationships. Research findings will have meaning only when they are put into a theoretical perspective. Theory summarizes relationships amongst variables in a conceptual framework.

3. Proper linkage between theory and research findings provides a more secure ground for prediction about future events.

4. Research findings in theoretical framework provide a secure basis for drawing inferences about consequences in remote areas from the central area to which the findings relate.

5. Theory attests to the truth of research findings.

6. Theory helps in bridging the gaps in knowledge with intuition.

ROLE OF RESEARCH IN THEORY:
One major function of empirical research is to test hypotheses deduced from existing theories.

1. Research initiates theory: scientific research may lead to findings that may press for new formulation of a theory. New formulation of a theory is like climbing mountains, gaining new and wider views, discovering unexpected connections between our starting point and its rich environment. Observing an unintended phenomenon sparks off new hypothesis whose confirmation may result in a new theory. Discovery of penicillin is not intended.

2. Research helps in recasting of theory: Empirical research helps improve the theoretical model through repeated observations of hitherto neglected facts. For example, relationship between inputs and output can not neglect social conditions.

3. Empirical research refocuses theory. Research leads to invention of research procedure. This invention shifts the focus of theory toward new areas of knowledge.

4. Empirical research helps in clarifying theory. Empirical research develops and refines concepts currently use in a discipline. Concepts are the essential building blocks of a theory. Operationalisation, construction of indices and formalization of research findings enhance the clarity of theoretic concepts and variables. The significance of empirical research lies in the theoretical implications that may be read into them. The interaction between theory and research is a matter of striking a judicious balance between quantity and quality. Theory and research, for purposes of analysis, be conceived of as distinct operations but as necessary complementary components of scientific endeavor. They have to be together. Neither is complete without the other.

Hypothesis
- Hypothesis may be fined as an assumption or some supposition to be proved or disproved. But for a researcher, hypothesis is formal question that he intends to resolve.
- Null hypo
    - Eg. If we compare method A with method B about its superiority and if we proceed on the assumption that both methods are equally good, then this assumption is termed as null hypothesis.
    - Symbolized as Ho
- Alterative hypo
    - E.g. As against this, we may think that the method A is superior or the method B is inferior, it is termed as alternative hypo.
    - Symbolized as Ha

Data Collection:
- Data collection begins after a research problem has been defined and research design/plan chalked out.
- Two types of data
    - Primary data
        - Those which are collected afresh and for the first time, and thus happen to be original in character.
        - Problem and project specific

- High monetary and resource implications
  - Secondary data
    - Those which have already been collected by someone else and which have already been passing through the statistical process.
    - Not too expensive
    - Readily available and quickly collected

Point to remember here is that What is primary and original for one researcher would essentially become secondary and historical for someonelse

Sources of research information:
- Data Sources

Primary Methods

Internal

Fully Processed

Need further Analysis

Secondary Methods

External

Published

Electronic Database

Syndicated Sources

Internal Sources of Secondary data :
- **Company Records**
  - **Eg. Policy documents, mission and vision statement**
- **Employee Records**
  - **Eg. Attrition, Attendance , performance Appraisal**
- **Accounting & Financial Reports**
- **Sales Force Report**
  - **Eg. Sales report, Sales persons' call records**
- **Internal Experts-** These are people who are heading the various departments. They can give an idea of how a particular thing is working.
- **Miscellaneous Reports-** These are what information you are getting from operational reports.

External sources of Secondary data :

External Sources

   Government Sources

   Non-government Sources

   Syndicate Services

Government Publications- Government sources provide an extremely rich pool of data for the researchers. In addition, many of these data are available free of cost on internet websites. There are number of government agencies generating data. These are:

   Registrar General of India- It is an office which generate demographic data. It includes details of gender, age, occupation etc.

- **Central Statistical Organization-** This organization publishes the national accounts statistics. It gives information about the total number of workers employed, production units, material used and value added by the manufacturer.
- **Director General of Commercial Intelligence-** This office operates from Kolkata. It gives information about foreign trade i.e. import and export. These figures are provided region-wise and country-wise.
- **Ministry of Commerce and Industries-** This ministry through the office of economic advisor provides information on wholesale price index. These indices may be related to a number of sectors like food, fuel, power, food grains etc. It also generates All India Consumer Price Index numbers for industrial workers, urban, non manual employees and cultural labourers.
- **Planning Commission-** It provides the basic statistics of Indian Economy.
- **Reserve Bank of India-** This provides information on Banking Savings and investment. RBI also prepares currency and finance reports.
- **Labour Bureau-** It provides information on skilled, unskilled, white collared jobs etc.
- **National Sample Survey-** This is done by the Ministry of Planning and it provides social, economic, demographic, industrial and agricultural statistics.
- **Department of Economic Affairs-** It conducts economic survey and it also generates information on income, consumption, expenditure, investment, savings and foreign trade.
- **State Statistical Abstract-** This gives information on various types of activities related to the state like - commercial activities, education, occupation etc.
- **Non Government Publications-** These includes publications of various industrial and trade associations, such as
    - The Indian Cotton Mill Association
    - Various chambers of commerce
    - The Bombay Stock Exchange (it publishes a directory containing financial accounts, key profitability and other relevant matter)
    - Various Associations of Press Media.
    - Export Promotion Council.
    - Confederation of Indian Industries (CII)
    - Small Industries Development Board of India

The only disadvantage of the above sources is that the data may be biased. They are likely to colour their negative picture.

- **Syndicate Services-** These services are provided by certain organizations which collect and tabulate the marketing information on a regular basis for a number of clients who are the subscribers to these services.

  In collecting data from household they use three approaches
    - **Survey-** They conduct surveys regarding - lifestyle, sociographic, general topics.
    - **Mail Diary Panel-** It may be related to 2 fields - Purchase and Media.
    - **Electronic Scanner Services-** These are used to generate data on volume.

Various syndicate service providers are Operations Research Group (ORG) and The Indian Marketing Research Bureau (IMRB) & The Hindu Economic Survey

Research Applications of secondary data:

- Problem Identification and Formulation stage

- Existing information on the topic under study is useful in giving a conceptual framework.
- Hypotheses Designing
  - Previous research studies done in the area as well as the industry trends and market facts could help in speculating the directions of the study results.
    - Example: GDP & FDI-the expected relationship is direct and influence each other.
    - Attrition & Productivity – the expected relationship is inverse
- Sampling Considerations
  - Information about population, nature of population and their contact details.
  - Determining size of samples
- Primary Base
  - The secondary information can be adequately used to design the primary data collection instruments.
- Validation and Authentication board
  - Earlier data, records and studies as well as the data pool can also be used to support and validate the information collected or results found out.

What Secondary data should possess?
- Reliability of data
  - Who collected the data?
  - What were the sources of data?
  - Were they collected by using proper methods?
  - At what time they were collected?
  - Was there any bias of the compiler?
  - What level of accuracy was desired?
  - Was it achieved?
- Suitability of data
  - Requires careful scrutiny of definition of various terms and units of collection.
- Adequacy of data
  - Data collected should not be inadequate.

Methods of Primary(Qualitative) Data Collection :
- We collect primary data for
  - Experiments
  - Descriptive research
  - Survey
- Important Methods of Collecting Primary data
  - Observation
  - Interview
  - Through Questionnaires
  - Through Schedules
  - Other Methods
    - Warranty Cards
    - Distributors audits
    - Pantry audits

- Consumer Panels
- Using mechanical devices
- Through projective techniques
- Depth Interview
- Content Analysis

Methods of Primary(Qualitative) Data Collection:

- Observation Method
  - Most commonly used
  - Information is sought by way of investigator's own direct observation without asking from the respondent.
  - Observation becomes a scientific tool when
    - It serves formulated research purpose
    - Systematically planned and recorded
    - Subject to checks and controls on validity and reliability.
  - Advantages
    - Subjective bias is eliminated.
    - Data /events of currently happening which is neither the info of past behaviour or future attitude/intention.
    - Respondents' willingness to respond may not be required and requires less demanding of active cooperation from the respondents.
  - Limitation
    - Expensive method
    - Information provided by this method is very limited.
    - Unforeseen factors may interfere with the observational task.
- While adopting this method, the researcher should keep in mind:
  - What should be observed?
  - How the observations should be recorded?
  - How the accuracy of the observation can be ensured?
- Systematic observation is one when:
  - It is characterized by a careful definition of the units to be observed.
  - Style of recording the observed information
  - Standardized conditions of observation
  - Selection of pertinent data of observation

Types of observation:

- Based on the participation
  - Participation
    - If the observer is making observation as one of the members of the group and let other members share the same experience, it is called participative.
  - Non Participative
    - If the observer observes as a detached emissary
- Based on situation
  - When observation takes place as per the definite pre-arranged plans involving experimental procedure
  - Uncontrolled observation
    - No attempt is made to use precision instruments.

Interview Method:
- The interview method of collecting data involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses.
- Methods of Interview
  - Personal Interview
  - Telephonic Interview
- Personal Interview
  - Personal interview method requires a person known as the interviewer asking questions generally face to face contact to the other person or persons.
    - Carried out in a structured way
    - Direct oral examination(Contact directly the persons concerned)
    - Indirect oral examination(cross examining other persons)
- Structured Interview
  - Involves the use of a set of predetermined questions and of highly standardized techniques of recording.
- Unstructured Interview
  - Unstructured interviews do not follow a system of predetermined questions and standardized techniques of recording information.
- Categorization of Personal Interviews
  - At home interviews:
    - This face to face interaction takes place at the respondent's residence.
    - Interviewer needs to initially contact the respondent to ascertain the interview time.
    - Cost and time involved is considerably high.
  - At Mall Intercept:
    - Involves conducting interviews with the respondents as they are shopping in malls.
      - Product testing
      - Product reactions
  - Computer Assisted personal interviewing (CAPI):
    - Carried out with the help of computer.
- Merits
  - More information and that too in greater depth can be obtained.
  - Interviewer by his own skill can overcome resistance.
  - Non-response remains very low
  - Interviewer may catch the informant off guard and may secure the most spontaneous reactions.
  - Language of the interview can be adopted to the ability or educational level of the person.
- Demerits
  - Very expensive.
  - More time consuming
  - Many respondents of executive in nature may not be easily available.

Interview Method: Telephonic Interview:
- Contacting respondents on telephonic itself.

- Merits:
    - More flexible in comparison to mailing method.
    - Father than other methods
    - Cheaper
    - No field staff is required
    - Representative and wider distribution of sample is possible.
- Demerits:
    - Restricted to respondents who have telephone facilities
    - Interview can't take much time.
    - Reactions can't be observed.

Through Questionnaire:
- What is Questionnaire?
    - A questionnaire consists of a number of questions printed or typed in a definite order on a form or set of forms.
    - Questionnaire is mailed to respondents who are expected to read and understand the questions and write down the reply in the space meant for the purpose in the questionnaire itself.
- The researcher and the respondents do come in contact with each other.
- Very popular
- Merits
    - Low cost even when the respondents are widely spread geographically.
    - Adequate time to give well thought-out answers
    - Respondents who are not easily approachable can also be reached conveniently.
- Demerits
    - It can be used only when respondents are educated and cooperating.
    - Possibility of ambiguous replies and omission of replies.

Through schedules:
- It is very much like the collection of data through questionnaire with a little difference where are being filled in by the enumerators who are specially appointed for the purpose.
    - In certain cases, schedules may be handed over to respondents and enumerators may help them in recording their answers.
        - Very useful in extensive enquiries and can lead to fairly reliable results.
        - But expensive.
        - Eg. Population census

Other methods:
- **Distributor or Store audits:** Distributor or Store audits are performed by distributors as well as manufacturers through their salesmen at regular intervals. Distributors get the retail stores audited through salesmen and use such information to estimate market size, market share, seasonal purchasing pattern and so on. The data are obtained in such audits not by questioning but by observation.
- **Pantry audits:** Pantry audit technique is used to estimate consumption of the basket of goods at the consumer level. In this type of audit, the investigator collects an inventory of types, quantities and prices of commodities consumed. Thus in pantry audit data are recorded from the examination of consumer's pantry. The usual objective in a pantry audit is to find out what types of consumers buy certain products and certain brands, the

assumption being that the contents of the pantry accurately portray consumer's preferences.

- An extensionof thepantry audit approach on a regular basis is known as 'consumer panel', where a set of consumers are arranged to come to an understanding to maintain detailed daily records of their consumption and the same is made available to investigator on demands. In other words, a consumer panel is essentially a sample of consumers who are interviewed repeatedly over a period of time.
- Mostly consume panels are of two types viz.,
  - the transitory consumer panel and
  - the continuing consumer panel.
  - A transitory consumer panel is set up to measure the effect of a particular phenomenon. Usually such a panel is conducted on a before –and-after-basis. Initial interviews are conducted before the phenomenon takes place to record the attitude of the consumer.
  - A contiuing consumer panel of interviews is carried out after the phenomenon has taken place to find out the consequent changes that might have occurred in the consumer's attitude. It is a favorite tool of advertising and of social research.
- Use of mechanical devices
  - Psychogalvanometer- measuring the extent of body excitement
  - Projective techniques
  - Interfering underlying motives, urges or intentions which are such that the respondent either resists to reveal them or is unable to figure out himself.

Survey VsExperiment :

- Surveys are conducted in case of descriptive research studies where as experiments are a part of experimental research studies.
- Survey-type research studies usually require larger samples, whereas, experimental studies generally need small samples.
- Survey is conducted on a mass scale with lots of data but experiment does not require mass data as it only requires qualitative data.
- The results of survey are never dependable as they are simply opinions and may show a certain bias, whereas the results of an experiment are the confirmed results that reflect the true nature of the product.
- Surveys are an example of field research whereas experiments generally constitute an example of laboratory research.
- Surveys may either be census or sample surveys, whereas in case of experiments, data are collected from several readings of experiments.

Survey Vs Observation:

- The goal of a survey is to identify each participant's wants within a group, whereas the goal of observation is to record what you see and hear during people's daily lives or work.
- Observation data can include photos and sketches, recordings of people speaking, videos of people performing tasks, transcriptions, visual aids such as maps, and records of the observers' thoughts and emotions during the research, whereas survey data are generally in the form of questionnaires or structured interviews.

Experimental Research Design

What is experiment?
- An experiment is generally used to infer a causality.
  - In an experiment, a researcher actively manipulates one or more causal variables and measures their effects on the dependent variables of interest.
  - Any change in the dependent variable caused by a number of other variables, the relationship between cause and effect tend to be probabilistic in nature.

Causality: An Important Concept in Research:
- Two things about causality
  - Virtually impossible to prove a causality.
  - Inference of cause-and-effect relationship is possible.

Example
- Case is that: the sales manager of a soft drink bottling company sends of his sales personal to a new sales training program.
- **A new sales training program of three months(Cause)**
- **Sales increased by 20 percent (effect)**
- Sales Manager's conclusion: Training program is effective and therefore, the sales force from other territories should also be sent for the same training program.
- **Sales manager 's Interference: sales training is causal variable and increased sales is the effect variable.**

Do we agree to this statement?
- This statement may not be true as the increase in sale may not be due to the sales training program alone.
- It could occur because of the host factors, e.g., reduction in the price of the soft-drink, a strike at the competitor's plant, increase in the price of the competitor's product, reduction in the quality of competing products, weather conditions and so on.

Objective of an Experiment:
- Is to measure the influence of the independent variables on a dependent variable while keeping the effect of other extraneous variables constant.

Experiments may be used to arrive at conclusive answers in the following situations:
  - Can a change in the package design of a product enhance its sales?
  - Can gift coupons to the bulk purchaser increase the sales?

Necessary conditions for making Causal Inferences:
- Concomitant Variation

Is the extent to which a cause X and effect Y occur together or vary together.
It means that there has to be a strong association between the training program and increased sale.
Will it imply causality?
May not imply causality due to the influence of extraneous factors which may be influencing both the variables or it may be of the result of random variations.
- Time order of Occurrence

The causal variable must occur prior to or simultaneously with the effect variable.
E.g. Sales training must have taken place either before or simultaneously with the increased sales.
It is quite possible for each of the two events to be both cause and effect of each other.
They alternatively feed each other.

Necessary conditions for making Causal Inferences:
- Absence of other possible cause factors
  - Increase in sales of soft drinks could have been due to many other factors besides the sales training.
  - The sales training programme may be a causal variable if all the other factors mentioned above were kept constant or otherwise controlled.

Concepts used in Experiments:
- Independent Variable
  - Also known as explanatory variables
- Test Units
  - Are those entities on which treatments are applied. The researcher is often interested in measuring the effect of treatment (IV) on test units.
- Dependent Variable
  - Is what you measure in experiment and what is affected during experiment.
- Extraneous Variable
  - Are those variables other than independent variables which influence the response.
    - These variables can weaken the results of the experiment performed to establish a cause and effect relationship.

Validity of Findings:
- For conducing an experiment, it is essential to specify:
  - Treatments (Independent variables) to be manipulated.
  - Test units to be used.
  - Dependent variables to be measured .
  - Procedure for dealing with the extraneous variables.
- The researcher has two goals while conducing an experiment:
  - To draw valid conclusions about the effect of treatments on the dependent variables.(Internal Validity)
  - To make generalizations about the results of a wider population. (External Validity)

Internal & External Validity:

Internal Validity
- Internal Validity tries to examine whether the observed effect on a dependent variable is actually caused by the treatments(IV) in question.
  - For an experiment possessing internal validity, all the other causal factors except the one whose influence is being examined should be absent.
  - Possible to draw inferences about the causal relationship if the observed effects on test units are influenced by extraneous variables.
  - Control of extraneous variables is a necessary condition for inferring causality.

External Validity
- External Validity refers to the generalization of the results of an experiment.
  - Concern is whether the result of an experiment can be generalized beyond the experimental situations.

- To remove the influence of an extraneous variable, a researcher may set up an experiment with artificial setting, thereby increasing its internal validity. In the process, external validity will be reduced.

Factors Affecting Internal Validity of the Experiment :

- There is a need to control the influence of extraneous variables so as to ensure that the experiment has not been confounded. The following extraneous variables may threaten the internal validity of an experiment.
- History
  - History refers to those specific events that are external to the experiment but occur at the same time as the experiment.
  - Consider the following experiment:

O_1 X O_2

Where, X denotes treatment(sales training programme); the symbols O_1 and O_2 may represent the sale before and after the training programme .

The difference ($O_2 - O_1$) may indicate the treatment effect. Even if this difference is positive, this may not be attributed to the training programme as this may be due to an improvement in the general economic condition between O_1 and O_2. As a matter of fact, the higher the time difference between two observations, higher are the changes of history confounding an experiment.

Factors Affecting Internal Validity of the Experiment:

- Maturation:
  - Maturation is similar to history except that it is concerned with the changes in a test unit occurring with the passage of time. These changes are not to impact of treatments.

Example: Malnutrition

With our example, sales people might have gained maturity as with passage of time. They become experienced and understand their job better

- Again the longer the time difference between O_1 and O_2, greater are the chances of maturation effect to occur.
- Testing:
  - It is concerned with the possible effect on the experiment of taking a measurement on the dependent variable before presentation of treatment.
    - Testing effects are of two kinds:
      - Main testing effect, and Reactive or interactive effect

Example: if sales people know that they are being sent for the training to know its effectiveness, they would become 'sensitized' and behave differently.

- Instrumentation
  - Refers to the effect caused by the changes in measuring instrument used for taking an observation.
  - At times, a measurement instrument may be modified during the course of an experiment resulting in confounding of that particular experiment.

Example: change in price during the time interval could make a substantial difference in the inference.

- A change in price would be the change of instrumentation.

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- Statistical Regression
  - The effect of statistical regression occurs when the test units with extreme scores (either extremely favourable or extremely unfavourable) are chosen for exposure to the treatment.
  - The effect is that test units with extreme scores tend to move towards an average score.
- Selection Bias
  - This refers to the improper assignment of test units to treatment.
- Test unit of Mortality
  - Some of the units might drop out from the experiments while it is in progress or some may refuse to continue with the experiment.

Measurement and Scaling:
What is measurement?
- The term, 'measurement' means assigning number or some other symbols to the characteristics of certain objects.
  - We don't measure the object but some characteristics of it.
- Two reasons why numbers are used:
  - Number permits statistical analysis of the resulting data.
  - Numbers facilitate the communication of measurement results.
- Important Rule:
  - Numbering is done based on certain rules.
    - Should identify the characteristics
    - Should cover the minimum and maximum measurements
    - In the interval scale, the most favoured should be given the highest number.
- Example, we don't measure consumers, but their perceptions, attitude or income.
What is Scaling?
- Scaling is an extension of measurement. Scaling involves creating a continuum on which measurements on objects are located.
- Example
  - Satisfaction level towards Kingfisher Airlines
  - Scale of 1-11 is used for said purpose indicating that 1=extremely dissatisfied and 11=extremely satisfied.
- Difference between Measurement and Scale
  - Measurement is the actual assignment of a number from 1 to 11, whereas
  - Scaling is the process of placing the respondents on a continuum with respect to their satisfaction level.
Different types of scaling:
- **Nominal**
- **Ordinal**
- **Interval, and**
- **Ratio Scales**
- Nominal

- ◦ This is the lowest level of measurement. Here, numbers are assigned for the purpose of identification of the objects.
  - ◦ Examples of nominal case:
    - · What is your religion?
      - (a) Hinduism
      - (b) Sikhism
      - (c) Christianity
      - (d) Islam
      - (e) Any other, (please specify)
- Any religion which is assigned a highest number is in no way superior to the one which is assigned a lower number.
  - ◦ Other examples of nominal scale;
  - ◦ Are your married?
    - · (a) Yes
    - · (b) No
- Numbers assigned in a nominal scale cannot be added, subtracted, multiplied, or divided. The only arithmetic operation that can be carried out are the count of each category.
- Ordinal Case
  - ◦ This is the next higher level of measurement than the nominal scale measurement.
  - ◦ An ordinal scale measurement tells whether an object has more or less of characteristics than some other objects.

Limitation: it can't answer how much more or how much less, i.e., it tells us the relative positions of the objects and not the difference between the magnitude of the object.

- Example
  - ◦ Ranking the following attributes while choosing a restaurant for dinner
  - ◦ In the ordinal case, the assigned ranks can not be added, multiplied, subtracted or divided.
  - ◦ The best statistical method is rank order correlation coefficient

Attributes	Rank
Food Quality	
Price	
Menu Variety	
Ambience	
Service	

Interval Scale:
- Next higher level of measurement
- It is assumed that the respondent is able to answer the question on a continuum scale.

- Mathematical form of data on the interval scale may be written us
       Y=a+bX   where a≠0 i.e, non zero origin OR lack of true zero
- Takes care of the limitation of the ordinal scale measurement where the difference between the score does not have any meaningful interpretation.
- The numbers on this scale can be added, subtracted, multiplied or divided. Respondents can answer the questions on a continuum scale.
- Limitation is that if the ratio is taken in the interval scale, it may not have a meaningful interpretation.

Very Likely	Likely	Neutral	Unlikely	Very unlikely
5	4	3	2	1

Ratio Scale:
- This is the highest level of measurement and takes care of the interval scale measurement where the ratio of measurement on the scale does not have a meaningful interpretation.
- Mathematical form Y=bX, in this case there is a natural zero(origin).
- Ex. Weight, distance travelled, income and sales
    ◦ How many chemist shops are there in your locality?
    ◦ How many students are there in the MBA programme at FXEC?
    ◦ Through ratio scale, one can make a comparative statement. E. g. GDP of 2011 is twice as good as that of GDP 2001.

Errors of measurement:
- Measurement errors occur when the observed measurement on a construct or concept deviates from its true values.
- The observed need not be equal to the true measurement. The observed measurement can be written as:
O=T+S+R
Whereas, o=observed measurement
T= True score, S= Systematic error & R=Random error
- Total error consists of two components:
    ◦ Systematic Error:
        · Causes a constant bias in the measurement.
E.g.A weighing scale that weighs 50 gm less for every one kg of product being weighed. The error would consistently remain the same irrespective of the kind of product and the time at which the product is weighed.
        ◦ Randon Error:
            · Involves influences that bias the measurement.
E.g. If we use different weighing scales to weigh one kg of a prduct and if systematic error is assumed to be absent, we may find that recorded weights may fall within a range around the true value of the weigh, thereby causing random error.
Constructing Instruments:

- **Research Instrument** is where the Researcher chooses the data collection tool, such as a survey,(questionnaire interview schedule(experiment etc. to achieve the **Research Objective.**
- The choice & development of the **Research Instrument** must be done in conjunction
  - Operationalization
  - the development of the **Strategy for Data Collection**

Validity, Reliability & Sensitivity of Instruments (measurements):

- Reliability
  - Concerned with consistency, accuracy and predictability of the scale. It refers to the extent to which a measurement process is free from random errors.
- Validity
  - Refers to the question whether we are measuring what we want to measure. It also refers to the extent to which the measurement process is free from both systematic and random errors.
    - Content Validity
      - This is also called as face validity. It involves subjective judgment by an expert for assessing the appropriateness of the construct. Omission may incur.
      - Example: perception of a customer towards Spicejet
- Validity
  - Concurrent validity
    - Used to measure the validity of the new measuring techniques by correlating them with the established techniques.
  - Predictive validity
    - Involves the ability of a measured phenomena at one point of item to predict another phenomenon at a future point of time.
    - Eg. Price and sales

 Score in the CAT and admission into MBA

- Sensitivity
  - It is important measurement concept when changes in attitudes are under investigation.
  - Refers to an instrument's ability to accurately measure the variability in a concept.
  - A dichotomous response category such as agree or disagree does not allow the recording of any attitude changes.

<div align="center">Unit 4</div>

Data Processing:

- The critical job of the researcher begins after the data has been collected.
  - He has to use the information to assess whether he had been correct or incorrect while making certain assumptions in the form of hypothesis
- The process starts by validating the measuring instrument, which could be questionnaire or any other qualitative technique.
  - This is followed by editing, coding, classifying and tabulating the obtained data.
- **Data Editing**
- **Data Coding**

- **Data Classification**
- **Data Tabulation**
- **Exploratory Data Analysis**

Fieldwork Validation:
- The first step in processing begins post the questionnaire/ or primary data survey.
    - The researcher needs to validate the field work to check whether the execution of the study was handled properly.
    - He must meticulously go over all the raw data forms and check them for errors.
    - Find them whether the conducted interviews or schedules have followed a standardized set of instructions.
- Validation becomes more important in the following cases:
    - In case the form had been translated into another language, expert analysis to see whether the meaning of the questions in the two measures is the same or not.
    - If the survey was done in multiple locations and one has outsourced to an outside research agency.
        - Essential to carry out checks during field visit.

Data Processing-Editing:
- Editing of data is a process of examining the collected raw data to detect errors and omissions and to correct these when possible.
- Editing is done to assure
    - Data are accurate
    - Consistent with other facts gathered
    - Uniformly entered and
    - Data have been well arranged to facilitate coding and tabulation.
- Types of editing
    - Field editing
        - This is done by the investigator him/herself at the time of recording the respondent's response.
        - Review of the abbreviated and/or in illegible form
        - When individual writing styles often can be difficult for others to decipher.
    - Central editing take place
        - When all forms or schedules have been completed and returned to the office.

Data Processing-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.
    - This is essentially done in order to facilitate the researcher's use for interpreting the answers and classifying and then subsequently recording data.
    - Quantification and graphic representation of data into charts and figures become easier.

Unit 1 Column1	Occupation Column2	Vehicle Column 3	Km/day Column 4	Marital Status Column 5	Family Size Column6

1	4	1	20	1	3
2	3	2	25	1	3
3	1	2	40	2	5
4	5	1	15	1	4
5	2	2	35	1	5

Data Processing-Coding

Question No.	Variable	Coding Instruction	Symbol Used for Variable Name

Data Processing-Classification and Tabulation :
- ▶ Classification is the process of arranging data in groups or classes on the basis of common characteristics.
- ▶ Need for classification
  - ▶ The large volume of data must be reduced into homogeneous groups if we are to get meaningful interpretation.
- ▶ Types of Classification
  - ▶ Classification according to attributes:
    - ▶ Descriptive (such as literacy, sex, honesty etc.)
      - ☐ Qualitative
      - ☐ Only the presence or absence can be noticed.
    - ▶ Numerical (such as weight, height, income etc.)
  - ▶ Classification according to class intervals:
    - ▶ Data relating to income, production, age, weight come under this category.
    - ▶ Entire data may be divided into a number of groups or classes or class intervals. Each group of class interval, thus, an upper limit as well as lower limit(Class limit).
    - ▶ Three issues:
      - ☐ (i) How many classes should be there?
        - ▶ There can be no specific answer with regard to the number of classes.
        - ▶ 5-15 classes
        - ▶ Multiples of 2,5 and 10 preferred.
        - ▶ Determining the size of class interval (H.A. Sturges)
          - ▶ $i=R/(1+3.3logN)$
            - ▶ I=Size of class interval; R=Range , i.e., difference between the values of the largest

- items and smallestest items among the given items.
  - ▶ N=Number of items to be grouped.
- ▶ (ii) How to choose class limits?
  - ▶ Exclusive type class interval is the one where the upper limit of a class interval is excluded.
  - ▶ They are usually stated as follows:
    - ☐ 10-20
    - ☐ 20-30
    - ☐ 30-40
    - ☐ 40-50
  - ▶ Inclusive type class interval is the one where the upper limit of a class interval is included.
  - ▶ They are usually stated as follows:
    - ☐ 11-20
    - ☐ 21-30
    - ☐ 31-40
    - ☐ 41-50
- ▶ (iii) How to determine the frequency of each class?
  - ▶ This can be done either by tally sheets or by mechanical aids.

Tabulation & Exploratory data analysis:

- ▶ The process of summarising raw data and displaying the same in compact form.
- ▶ Orderly arrangement of data into array that is suitable for a statistical analysis.
- ▶ Using bar and pie charts
- ▶ Histogram

Non-Parametric Tests:

- • Contents
- • Relevance- Advantages and Disadvantages Tests for
  - ▫ Randomness of a Series of Observations - Run Test
  - ▫ Specified Mean or Median of a Population – Signed Rank Test
  - ▫ Goodness of Fit of a Distribution – Kolmogorov- Smirnov Test
  - ▫ Comparing Two Populations – Kolmogorov- Smirnov Test
  - ▫ Equality of Two Means – Mann - Whitney ('U')Test
- • Equality of Several Means
  - ▫ Wilcoxon - Wilcox Test
  - ▫ Kruskel -Wallis Rank Sum ('H') Test
  - ▫ Friedman's ('F')Test – Two Way ANOVA
- • Rank Correlation – Spearman's

Non-parametric tests are used when,

  - ▫ The assumption of normal distribution for the variable under consideration or some assumption for a parametric test is not valid or is doubtful.
  - ▫ The hypothesis to be tested does not relate to the parameter of a population
  - ▫ The numerical accuracy of collected data is not fully assured
  - ▫ Results are required rather quickly through simple calculations.

Disadvantages of Non-Parametric Tests:
- They ignore a certain amount of information.
- They are often not as efficient or reliable as parametric tests.
- The use of non-parametric tests, involves a trade – off. While the 'efficiency or reliability' is 'lost' to some extent, but the 'ability' to use 'lesser' information and to calculate 'faster' is 'gained'.

Test for Randomness in a Series of Observations: – The Run Test:
- This test has been involved for testing whether the observations in a sample occur in a certain order or they occur in a random order. The hypotheses are
- Ho : The sequence of observations is random
- H_1 : The sequence of observations is not random
- The only condition for validity of the test is that the observations in the sample be obtained under similar conditions

Procedure – Run Test:
- First, all the observations are arranged in the order they are collected.
- Then the median is calculated.
- All the observations in the sample larger than the median value are given a + sign and those below the median are given a – sign.
- If there are an odd number of observations then the median observation is ignored. This ensures that the number of + signs is equal to the number of – signs
- A succession of values with the same sign is called a run and the number of runs, R, gives an idea of the randomness of the observations.
- This is the test statistic. If the value of R is low, it indicates certain trend in the observations,
- If the value of R is high, it indicates presence of some factor causing regular fluctuations in the observations

T' Test:
- The statistic 'T' is defined as the minimum of the sum of positive ranks and sum of negative ranks
- The critical value of T at 5% level of significance is found using table
- If the calculated value, is less than the critical value, the null hypothesis not rejected and not rejected otherwise
- The criteria using rank methods is reverse of the parametric tests wherein the null hypothesis is rejected if the critical value exceeds the tabulated value.

Test for Goodness of Fit of a Distribution (One sample)
 - Kolmogorov - Smirnov
  - The test is used to investigate the significance of the difference between observed and expected cumulative distribution function for a variable with a specified theoretical distribution which could be Binomial, Poisson, Normal or an Exponential.
- It tests whether the observations could reasonably have come from the specified distribution
- Null Hypothesis
- Ho:The sample comes from a specified population
- Alternative Hypothesis

- H_1:The sample does not come from a specified population
- The testing procedure envisages calculations of observed and expected cumulative distribution functions denoted by Fo(x) and Fe(x), respectively, derived from the sample.
- The comparison of the two distributions for various values of the variable is measured by the test statistic
- D = | Fo(x) – Fe(x) |
- If the value of the difference of D is less, the null hypothesis is likely to be accepted. But if the difference is more, it is likely to be rejected.

Comparing of c^2 and K-S Test:
- The Chi-square test is the most popular test of goodness of fit.
- On comparing the two tests, we note that the K-S test is easier to apply.
- While c^2- test is specially meant for categorical data, the K-S test is applicable for random samples from continuous populations.
- The K-S statistic utilises each of the n observations. Hence, the K-S test makes better use of available information than Chi-square statistic

Comparing Two Populations - Kolmogorov-Smirnov Test
- This test is used for testing whether two samples come from two identical population distributions. The hypotheses are:
- H_0: F_1 (x) = F_2 (x)
- i.e. the two populations of random variables x and y are almost the same.
  H_1: F_1 (x) ≠ F_2 (x)
- i.e. the two populations are not same that is claimed
- There are no assumptions to be made for the populations. However, for reliable results, the samples should be sufficiently large say, 15 or more.
Procedure:
- Given samples of size n1 and n2from the two populations, the cumulative distribution functions F1(x)can be determined and plotted.
- The maximum value of the difference between the plotted values can thus be found and compared with a critical value obtained from the concerned Table.
- If the observed value exceeds the critical value the null hypothesis that the two population distributions are identical is rejected.

Equality of Two Means – Mann-Whitney 'U'Test:
- This test is used with two independent samples.
- It is an alternative to the 't' test without the latter's limiting assumptions of coming from normal distributions with equal variance
- For using the U test, all observations are combined and ranked as one group of data, from smallest to largest.
- The largest negative score receives the lowest rank. In case of ties, the average rank is assigned.
- After the ranking, the rank values for each sample are totaled. The U statistic is calculated as follows
-

$$U = n_1 n_2 + \frac{n_1(n_1+1)}{2} - R_1$$

where,
n1 = Number of observations in sample 1; n2= Number of observations in sample 2
Rl = *Sum* of ranks in sample 1;   R2 =*Sum* of ranks in sample 2.
For testing purposes, the smaller of the above two U values is used.

The Wilcoxon-Wilcox Test for Comparison of Multiple Treatments:
- This test is analogous to ANOVA, and is used to test the significance of the differences among means of several groups recorded only in terms of ranks of observations in a group.
- However, if the original data is recorded in absolute values it could be converted into ranks. The hypotheses, like in ANOVA are:
- Ho : m_1 = m_2 = m_3
- H_1 : All means are not equal

The Wilcoxon-Wilcox Test:
- There is one important difference between ANOVA and this test. While ANOVA tests only the equality of all means, this test goes beyond that to compare even equality of all pairs of means.

Kruskall-Wallis Rank Sum Test for Equality of Means:
- This test is used for testing equality of means of a number of populations, and the null hypothesis is of the type
- H_0 : m_1 = m_2 = m_3 (can be even more than 3)
- It may be recalled that H_0 is the same as in ANOVA. However, here the ranks of observations are used and not actual observations.

Procedure:
- Assigning combined ranks to the observations in all the samples from smallest to largest.
- The rank sum of each sample is then calculated.
- The test statistics *H* is calculatedas follows

where
$$H = \frac{12}{n(n+1)} \sum_{j=1}^{k} \frac{T_j^2}{n_j} - 3(n+1)$$

Tj= Sum of ranks for treatment j
nj = Number of observations for treatment i
n = $\sum$nj = Total number of observations
k = Number of treatments

Test for Given Samples to be from the Same Population - Friedman's Test:
- Friedman's test is a non-parametric test for testing hypothesis that a given number of samples have been drawn from the same population.
- This test is similar to ANOVA but it does not require the assumption of normality and equal variance.
- This test is carried out with the data in terms of ranks of observations rather than their actual values, like in ANOVA. It is used whenever the number of samples is greater than

or equal to 3 (say k) and each of the sample size is equal (say n) like two-way analysis of variance.
- It is referred to as Two-Way ANOVA. The null hypothesis to be tested is that all the k samples have come from identical populations
- Under null hypothesis, the Friedman's test statistic is :
-

$$F = \frac{12}{nk(k+1)} \left(\sum_{j=1}^{k} Rj^2 \right) - 3n(k+1)$$

where,

k = Number of samples(brands) = 3 (in the illustration)

n = Number of observations for each sample(brand) = 6 (in the illustration)

Ri = Sum of ranks of jth sample (brand)

Friedman's Test Statistic:
- The statistical tables exist for the sampling distribution of Friedman's 'F', these are not readily for various values of n and k.
- The sampling distribution of 'F' can be approximated by a χ^2 (chi-square) distribution with k – l degrees of freedom.
- The chi-square distribution table value is compared with the calculated value.

Test for Significance of Spearman's Rank Correlation:
- The spearman's rank correlation has been discussed is defined as

$$r_s = \frac{\sum d_i^2}{n(n^2 - 1)}$$

- where n is the number of pairs of ranks given to individuals or units or objects,
- di is the difference in the two ranks given to ith individual / unit /object
- There is no statistic to be calculated for testing the significance of the rank correlation. The calculated value of rs   is itself compared with the tabulated value of   rs, given in Appendix , at 5% or 1% level of significance.
- If the calculated value is more than the tabulated value, the null hypothesis that there is no correlation in the two rankings is rejected
- The hypotheses are as follows

Ho :ρ$_s$ = 0

H$_1$:ρ$_s$ ≠ 0

Unit 5

Ethics in Business Research:

Ethical Principles in Business Research:

Ethical principles have been usefully broken down by Diener and Crandall (1978) into four main areas:

• **Whether there is harm to participants**

•**Whether there is a lack of informed consent**

• **Whether there is an invasion of privacy**

• **Whether deception is involved.**

Whether there is harm to participants
Research that is likely to harm participants is regarded by
most people as unacceptable.
 But what is harm?
Harm can entail a number of facets:
 Physical harm;
 Harm to participants' development or self-esteem
 Stress
 Harm to career prospects or future employment
- **Whether there is a lack of informed consent**
- The prospective research participants should be given as much information as might be needed to make an informed decision about whether or not they wish to participate in a study.
- **Whether there is an invasion of privacy**
    - **It is the issue of trust and confidentiality**
        - **Without consent of the client, the researcher should not reveal any aspect of the study.**
        - **Must ensure complete confidentiality of the findings till the research outcome has been converted into a business decision.**
        - **For example,**
            - ☐ **research on a new product potential**
            - ☐ **Study of potential candidates being considered for the role of the CEO, as the existing leader is due for retirement.**
- **Whether deception is involved**
    - Deception occurs when researchers represent their research as something other than what it is.

Other Ethical Issues:
- Copyright
    A further issue affected by legal considerations is copy-right.
    Copyright is an intellectual property right that protects the owner of copyright from unauthorized copying. Most research publications, reports, and books, as well as raw data such as spreadsheets and interview transcripts, are protected by copyright. For employed researchers, the first owner of copyright is usually the employer. However, many universities waive this right in relation to research data and publications and give it to the researcher.

Subjectivity in Research:
- Subjectivity refers to that the results are researcher-dependent.
- Different researchers may reach different conclusions based on the same interview.
- Researcher should ensure that subjectivity should neither affect nor impede the objectivity of the research.
- Subjectivity arises when:
    - Personal prejudices and bias
    - Value Judgments
    - Ethic dilemma
    - Complexity of social phenomenon.

Objectivity in Research:
- ▸ Objectivity pre-supposes an independent reality that can be grasped.
- ▸ If there is not independent reality, the objectivity cannot be accomplished.
- ▸ Measures for achieving objectivity in research
    - ▸ Patience and self-control
    - ▸ Open-mindedness
    - ▸ Use of standardized concepts
    - ▸ Use of quantitative method
    - ▸ Group research or cooperative research
    - ▸ Use of random sampling techniques.

Research Report:
- • Research report is the one which is a complete, detailed and concrete proof of the study that was undertaken. It is through the report that researcher wants to emphasis the contribution make by him in the pursuit of knowledge in the area.
- • It is through this report that the researcher conveys:
    - ◦ Why the research study was conducted?
    - ◦ How the research was conducted?
    - ◦ What was achieved by conducting the study?
    - ◦ What resources were used-literature, men, money and time.

Types of Research Reports.:
- • Brief Reports:
    - ◦ Brief reports are not formally structured and generally short, sometimes not running more than four to five pages.
    - ◦ The information provided is of a limited scope and is prepared either for immediate consumption or as a prelude to the formal structured report.
    - ◦ Designed in several ways. Importantly,
- • Working Papers or Basic report

Written for the purpose of collecting the process carried out in terms of scope and framework of the study, methodology followed and instrument designed. The results and findings would also be recorded here.
Detailed interpretation and inferences may be missing.

- • Survey Report:

The focus is to present findings in easy-to-comprehend format that includes figures, charts and tables. It presents the findings in a clear and usable format.
Essential for resolving business dilemma.

- • Detailed report
    - ◦ It is more formal and pedantic in their structure and constitute academic, technical or business reports.
    - ◦ Prepared either for academic or business purposes.
- • Technical report
    - ◦ It includes all elements of the basic reports as well as the interpretations and conclusions as related to the obtained results.

- ◦ This report would have a complete problem background and any additional past data/records that are essential for comprehending and interpreting the present study report.
- Business report
  - ◦ It is as same as technical report, but uses more of business terms rather than conceptual terms.

Contents(Structure) of the REPORT:

- **Preliminary Section or Prefatory Items**
  - ◦ Title Page
  - ◦ Letter of Transmittal
  - ◦ Acknowledgement
  - ◦ List of Abbreviations &Glossory
  - ◦ Table of Contents
  - ◦ Executive Summary
- **Background/Introductory Section**
  - ◦ Problem Statement
  - ◦ Introduction /Background of the topic
  - ◦ Scope and objectives
  - ◦ Review of Literature
- **Methodology Section**
- **Main Body of the Report**
  - ◦ Results
  - ◦ Analysis and Discussion
- **Concluding Section**
  - ◦ Summary of Findings,
  - ◦ Conclusions & Recommendations
- **Appendices**
- **Bibliography**

Preliminary Section:

Title Page & Letter of Transmittal:

- Title should be short and crisp.
- Title page includes
  - ◦ Report title which clearly states the purpose
  - ◦ Details of the person(s) for whom the report was prepared
  - ◦ Details of the person(s)who prepared the report
  - ◦ Name of the organisation
  - ◦ Date of the presentation of report.

Letter of Transmittal:

- ◦ What it is?
  - · It goes alongside the formalized copy of the final report and it refers to the purpose behind the study.
  - · One page, single space
  - · Keep the level of technicality low.
  - · Refer to your proposal: problem, objectives, scope.

- Show how the report meets/does not meet your proposal objectives.
- Define or redefine the scope of your project.
  ◦ Whom it is addressed?
    - Addressed to the person who commissioned the report.
  ◦ What it contains?
- **Introductory Paragraph:**
  ◦ Title and purpose (if not clear from the title) of the report
  ◦ Audience for the report (who is it written for?)
  ◦ Authorization— Who authorized the project?
  ◦ When?
  ◦ Is the report written for another class? refer to your proposal— Show how the report has met your objectives or how your objectives have changed.
- **Body Paragraph(s):**
- **Methods**
  ◦ briefly mention them, unless they are very important, in which case you could have a short paragraph on methods.
- **Results**
  ◦ Results: Give an overview of your results, point out the main results, or point out surprising results/findings.
  ◦ Conclusions of the final report:
    - **Focus here/ emphasize the conclusion**
    - Recommendations
- **Conclusion Paragraph** (call to action)
  ◦ Acknowledge assistance you received.
  ◦ Offer to assist with interpreting your report.
  ◦ Offer to assist with carrying out further work
  ◦ Make a call to action (recommendations).
  ◦ Add personal comments.

Acknowledgements :
- A list of names who helped the writer of the report
  ◦ Information
  ◦ Collection of data
  ◦ References
  ◦ Discussions and so on

Abstract /Executive Summary:
- This is the last and the most critical element of the preliminary section.
- ES/Abstract should be one page synopsis of the dissertation typed one and a half line spacing, Font style Arial Narrow and Font size 12.

The Abstract carries in sequence:
  ◦ Scope & Objectives
  ◦ methodology employed
  ◦ Major findings with concluding remark followed by the important recommendations.

Key words of minimum 5 should be given at the bottom of abstract.
Need for Executive Summary
       Business managers read only the executive summary in its complete details and just glance through the rest of the report.
List of Abbreviation (Acronyms) and Glossary   :
Abbreviation
ASSOCHAM Associated Chambers of Commerce and Industry in India
NATO   North Atlantic Treaty Organization
Glossary
Higher Education: Higher education includes secondary education and post secondary education including professional education
Background/Introductory Section:
- ◦ Problem Statement
  - ・ What has made the company to prepare this report.
- ◦ Introduction/Background of the topic
  - ・ About the broad area of the topic chosen
  - ・ About the specific area of the topic chosen
  - ・ Scope, Objectives & Significance of the report
- ◦ Review of Literature
- ◦ Organization of the Report
Chapterization of the report.
Review of Literature:
- Search for existing literature
- Review the concept
  - ◦ What is the meaning ?
  - ◦ What is the definition of the particular concept ?
- Review earlier findings
  - ◦ What has already been researched in that area?
- Literature review should be brief and conceptually sound.
- Try to bring out your variables
- Prepare a working bibliography
- Write in index cards; group together references from
  a. books
  b. journals and periodicals
  c. unpublished material
- Examine each material, then decide which ones will actually be included in your review
Methodology Section:
- ・ Type of Data
- ・ Sources of Data
- ・ Method of Collecting Primary data: Observation or Survey OR Focus Group Discussion
- ・ Type of Survey
- ・ Method of Sampling
- ・ Sample Size
- ・ Tool for Data Collection

- Tools for Analysis

Main Body of the Report :
- Results, Analysis and Discussion
  - Sub chapters

Concluding Section:
- Summary of Findings
- Conclusions and
- Recommendations

Terminal Items of the Report:
- Appendices
  - Questionnaire
  - Interview Schedule
- Bibliography
  - Books
  - Edited Volumes
  - Journals
  - Magazines and Reports
  - Newspapers
  - Websites

Basics of Report Writing:
- Defining Reports
- Determining the Report Purpose
  - Understanding the problem
  - Preliminary Investigation
  - Need for a clear statement of the problem
  - Determining Factors
- Gathering info needed
- Interpreting Findings
- Organizing the Report Information
- Writing the Report

Defining Reports:
- A business report
  - Orderly
  - Objective
  - Communication
  - Factual information, and
  - Business purpose

Determining the Report Purpose:
- Begins with the problem (Need)
- The preliminary investigation
  - Understanding the problem
  - Need for a Clear Statement of the Problem
  - A written statement
  - Takes one of three forms: (Research on the causes of corruption in private Sector)

- Infinitive Phrase: "To determine the causes of increasing corruption in private sector"
- Question: What are the causes of increasing corruption in private sector?
- Declarative Statement: "Corruption has risen, and private sector wants to know".

DETERMINING THE FACTORS:
- What needs to be done to solve it?
- Looking for the factors of the problems
- Factors may be of three types
  - Subtopics of the overall topic
  - Hypotheses, and
  - Comparisons
- Use of subtopics in Information reports
  - Socio-economic conditions
  - Behaviour of employees
  - Code of Conduct and ethics
  - Recruitment and Selection procedures
  - Compensation policies
  - Internal control policies
- Hypotheses
  - Tentative statement
  - Think of possible explanation
  - Formulating Hypotheses
  - Socioeconomic conditions of employees have caused corruption to rising.
  - Behaviour of employees has caused the corruption to rising.
- Bases of comparison in Evaluation Studies
  - Comparison between departments
  - Comparison between periods

GATHERING INFO NEEDED:
- Experiments or surveys
- Library and online research
- Questionnaire
- Structured interview
- Observations

INTERPRETING THE FINDINGS:
- Interpretation based on reader's convenience.
- Advice for avoiding human error
  - Report the facts as they are
  - Don't interpret a lack of evidence as proof to the contrary.
  - Don't compare non-comparable data
    - Make sure that the variables have connection

- ◦ Don't draw illogical cause-effect conclusions
- ◦ Beware of unreliable and unpresentable data
- ◦ Don't oversimplify
- Appropriate Attitudes and Practices
    - ◦ Maintain a judicial attitude
        - ∙ No emotion and no prejudice
    - ◦ Consult with others
    - ◦ Test your interpretations
        - ∙ Test of experience
        - ∙ Negative test

How to write Bibliography?
- **Harvard System**
- **<u>Books</u>**

Abraham, K. (2001) Ethiopia: The Dynamics of Economic Reforms (Economic Liberalisation and Political Transformation), Addis Ababa: EIIPD (Ethiopian International Instt. for Peace and Development).
- **Edited Volume**

Aharoni, Y. (1991) "On Measuring the Success of Privatisation", in Ramamurthi, R. and Vernon, R. (eds) Privatisation and Control of State Owned Enterprises**.** Washington, D.C.: World Bank, pp.234-55.
- **Journals**

Boardman, S. and Vining, D. (1989) Ownership in Competitive Environments: A Comparison of the Performance of Mixed, Private and SOEs, Journal of Law and Economics, April, Vol. VII, No.2, p.10.
- **Web**

Ram Mohan, T.T. (2004) "Privatisation in China: Softly, Softly Does it", accessed on 02/10/2004at**http://www.iimahd.ernet.in/publications/public/Fulltext.jsp?wp-no=2004-09-04.**

- American Psychological Association
- **Book**

Mandelbaum, M. (2002). The ideas that conquered the world: Peace, democracy, and free markets in the twenty-first century. New York: Public Affairs.
- **Edited Volume:**

O'Neil, J.M., & Egan, J. (1992). Men's and women's gender role journeys: Metaphor for healing, transition, and transformation. In B.R. Wainrib (Ed.), *Gender issues across the life cycle* (pp. 107–123). New York: Springer.
- **Journals**

Harlow, H.F. (1983). Fundamentals for preparing psychology journal articles.*Journal of Comparative and Physiological Psychology, 55*, 893–896.
- **Web**

Engelshcall, R.S. (1997). Asian development indicators, March, 2007.Retrieved March 10, 2006, from http://httpd.apache.org/docs/1.3/mod/mod_rewrite.html

http://www.francisxavier.ac.in

Report Writing-Proof-Reading, Readability & Power Point Presentation

Proof Reading :

- Proofreading means examining your text carefully to find and correct typographical errors and mistakes in grammar, style, and spelling.
- While proof-reading, you need to:
- **Work from a printout, not the computer screen.**
- **Read out loud.** This is especially helpful for spotting run-on sentences, but you'll also hear other problems that you may not see when reading silently.
- **Use a blank sheet of paper to cover up the lines below the one you're reading.** This technique keeps you from skipping ahead of possible mistakes.
- **Use the search function of the computer to find mistakes you're likely to make.** Search for "it," for instance, if you confuse "its" and "it's;" for "-ing" if dangling modifiers are a problem; for opening parentheses or quote marks if you tend to leave out the closing ones.
- **If you tend to make many mistakes, check separately for each kind of error, moving from the most to the least important, and following whatever technique works best for you to identify that kind of mistake.**
  For instance, read through once (backwards, sentence by sentence) to check for fragments; read through again (forward) to be sure subjects and verbs agree.
- **End with a spelling check, using a computer spelling checker or reading backwards word by word.**
  But remember that a spelling checker won't catch mistakes with homonyms (e.g., "they're," "their," "there") or certain typos (like "he" for "the").

Features of a good research report :

- Clear report mandate
  - Research problem statement and study background needs to have focus, be precise and very explicit.
  - While writing the report, the researcher can not make an assumption that the reader has earlier insights into the problem situation.
- Clearly designed methodology
  - Logical justification for having used the study methods and techniques.
  - While writing about methodology, the language should be non-technical and reader friendly.
  - Any technical details must be provided in the appendix.
- Clear representation of findings
  - Sample size for each analysis, any special conditions and data treatment.
- Command over the medium
  - Verbal description and explanation in terms of why it was, how it was and what was the outcome.
  - Correct and effective communication.
- Phrasing protocol
  - Debate about whether or not one makes use of personal pronoun while reporting.

- ○ Use of personal pronouns such as "I think….." and " in my opinion….." lends a subjectivity and personalization of judgment.
        - ○ Should be grammatically correct and should avoid long sentences.
        - ○ Body of the report can be broken down into smaller sections
    - Simplicity of approach
        - ○ Avoiding technical jargons
        - ○ If it is imperative to use certain terminology, the definition of these terms can be provided in the glossary of terms.
        - ○ **Power of Revision.**
    - Report formatting and presentation
        - ○ In terms of paper quality, page margins and font size and style, a professional standard should be maintained.
            - Report should be printed using laser printer.
            - Report should have a uniform font.
            - Findings should be placed under appropriate headings and sub-headings.
            - Avoid over crowing of paragraphs.
            - Ensure that appropriate labels are assigned to every table, figure and graph.

Power Point Presentation:
- It demands more of creativity as compared to report writing.
- Color combination.
- Font size should be easily readable.
- Contain only few points and lines containing only most distinguishing words.
- Charts and graphs preferred over text.
- Avoid Verbs and adjectives.
- The last slide should express "Thanks" to the audience.

Construction of Questionnaire:

Guidelines for constructing Questionnaire/Schedule:
- ▶ The researcher must be very clear about the various aspects of his research problems.
- ▶ The researcher must decide whether to use closed or open-ended questions.
- ▶ Rough draft of the questionnaire/schedule should be prepared.
    - ▶ Due attention needs to be given to the sequence of questions.
- ▶ Pilot study should be undertaken for pre-testing the questionnaire.
- ▶ Questionnaire must contain simple, but straight forward directions for the respondents.

Process involved in the Design of a Questionnaire:
- ▶ Convert the research objectives into the info needed.
- ▶ Method of administering the questionnaire
- ▶ Content of the questions
- ▶ Motivating the respondent to answer
- ▶ Determining the type of questions
- ▶ Question design criteria
- ▶ Determine the questionnaire structure
- ▶ Physical presentation of the questionnaire

- ‣ Pilot testing
- ‣ Standardizing the questionnaire

Convert the research objectives into information areas:
- ‣ Spelt out clearly the specific research questions
- ‣ Converting these questions into statement of objectives
- ‣ Operationalized the variables to be studied.
- ‣ Identified the direction of the relation or any other assumption
- ‣ Specified the information needed for study.

Framework of Identifying information needs

Research Questions	Research Objectives	Variables to be studied	Information	Population to be studies
What is the nature of plastic bag usage among people in Tirunelveli?	To identify the different uses of plastic bags To find out who uses plastic bags To find out what is the level of consciousness that people have about the environment	Usage Behaviour Demographic details	Uses of plastic bags Disposal of plastic bags	Consumers Retailers

Method of administering questions:
- ‣ This is the step where the researcher needs to specify how the information should be collected.
- ‣ Methods:
  - ‣ Schedule
  - ‣ Questionnaire by mail /fax
  - ‣ Questionnaire by telephone
  - ‣ Questionnaire by email
  - ‣ Questionnaire by web-based
  - ‣ Modes of administration

	Schedule	Telephone	Email	Mail/Fax	Web-based
Admn. Control	High	Medium	Low	Low	Low
Response Rate	High	High	Low	Medium	Low
Interviewer bias	High	High	Low	Low	Low

Content of the questionnaire:

- ▶ Once the information needs and mode of administration has been decided, it is to determine the matter to be included as questions in the measure.
  - ▶ How essential is to ask the question?
    - ▶ Should not waste the time of the respondent.
  - ▶ Do we need to ask several questions instead of a single one?
    - ▶ Example, what do you like about……?
    - ▶ Who all in your household watch the serial?
    - ▶ How did you first hear about the serial?

Motivating the respondent to answer:
- ▶ Two hindrances to active participation by the subject:
  - ▶ The respondent might not be able to respond in the right manner.
  - ▶ The respondent might be unwilling to part with the information.
- ▶ Assisting the respondent to provide the required information
- ▶ Framing questions in such a way that the respondent should have knowledge about the question to answer.
  - ▶ Example. Instead of asking a question like "How do you evaluate the negotiation skills module? ", the researcher should know whether the respondent has ever undergone training or not?
- ▶ Does the person remember?
  - ▶ Example. How much did you spend on eating out last month?

Determining the type of questions:
- • Question Content
  Closed-ended
  Dichotomous
  Multiple Responses
  Scales
  Open-ended

Determining the type of questions:
- ▶ Open-ended question
  - ▶ Open ended question refers to the option given to respondent in one's own words.
  - ▶ It is other wise called as unstructured or free-response or free-answering questions.
  - ▶ E.g. What is your age?
    - ▶ How would you evaluate the work done by the present government?
- ▶ Closed-ended question
  - ▶ Both the question and response formats are structured and defined.
  - ▶ Dichotomous questions:
    - ▶ These are restrictive alternatives and provide the respondents only with two answers.
    - ▶ Eg. Are you diabetic?   Yes/No
    - ▶ What kind of petrol do you use in your car?   Normal/Premium
    - ▶ Your working hours in the organization are   Fixed/Flexible

▸ Multiple-Choice Questions;
  ▸ Unlike dichotomous questions, the person is given a number of response alternatives here. He might be asked to choose the one that is most applicable.
  ▸ For example: Will you consider selling organic food products in your store?
    ▸ Definitely not in the next one year
    ▸ Probably not in the next one year
    ▸ Undecided
    ▸ Probably in the next one year
    ▸ Definitely in the next one year.
▸ Scales
  ▸ Scales refer to the attitudinal scale.

1-Strongly Disagree……….5 Strongly Agree	1	2	3	4	5
1. The people in my company know their roles very clearly					
2. Existing systems are very effective					

Question Design Criteria:
▸ Clearly specify the issue
  ▸ By reading the question, the person should be able to clearly understand info.
▸ Use simple terminology
  ▸ Eg. Do you think the distribution of Mother Diary ice is adequate? (Incorrect)
  ▸ Do you think Mother Diary ice cream is readily available when you want to buy it? (Correct)
▸ Avoid ambiguity in questioning
  ▸ Eg. How often do you visit Pizza Hut?
    ▸ Never   (Incorrect)
    ▸ Occasionally
    ▸ Sometimes
    ▸ Often
    ▸ Regularly
  ▸ Rather it should be very specific like
    ▸ Less than once
    ▸ 1 or 2 times
    ▸ 3 or 4 times
    ▸ More than 4 times
▸ Avoid loaded questions
  ▸ Explore answers to sensitive issues.
  ▸ Example, Have you ever cheated your boss? (Incorrect)
  ▸   Do you think most people usually cheat their boss? (Correct)

Questionnaire Structure:
▸ Instructions

- Classification information (socio-economic and demographic traits)
    - It may appear first or last.
- Opening questions
- Study questions
- Acknowledgement

Physical Presentation of the questionnaire:
- Pretest and administer the questionnaire with ease and accuracy.
- Font style and Spacing used.
- Every question and response should be printed on the same page.
- Surveys for different groups could be on different colored paper. This may assist while grouping the responses from different segments.
- Questions should be properly numbered

Pilot Testing of the Questionnaire &Administering the questionnaire:
- Pilot Testing
    - Pilot testing involves the testing and administration of the designed instrument on a small group of people from the population under study.
    - Every experience of respondent with regard to questionnaire should be recorded.
    - Using a mix of experienced and inexperienced investigators.
    - The researcher must edit the questionnaire as required
- Administering the questionnaire
    - Once all the nine steps have been completed, the final instrument is ready for conduction and questionnaire needs to be administered according to the sampling plan.