# CHAPTER THREE

# The Research Process

# Research Process (1)

- A process consists of series of actions or steps necessary to effectively carry out research and
  - The desired sequencing of these steps
- Consists of a number of closely related activities.
  - But such activities can overlap continuously rather than following a strictly prescribed sequence.
    - At times, the first step determines the nature of the last step to be undertaken.

# Research Process (2)

- Steps are not exhaustive, nor mutually exclusive, but a series of closely related, continuously overlapping and interdependent nonlinear steps/ actions.
- One should remember that the various steps involved in a research process are not mutually exclusive; nor they are separate and distinct.
  - ✓ They do not necessarily follow each other in any specific order
  - ✓ The researcher has to be constantly anticipating at each step in the research process the requirements of the subsequent steps.

# Research Process (3)

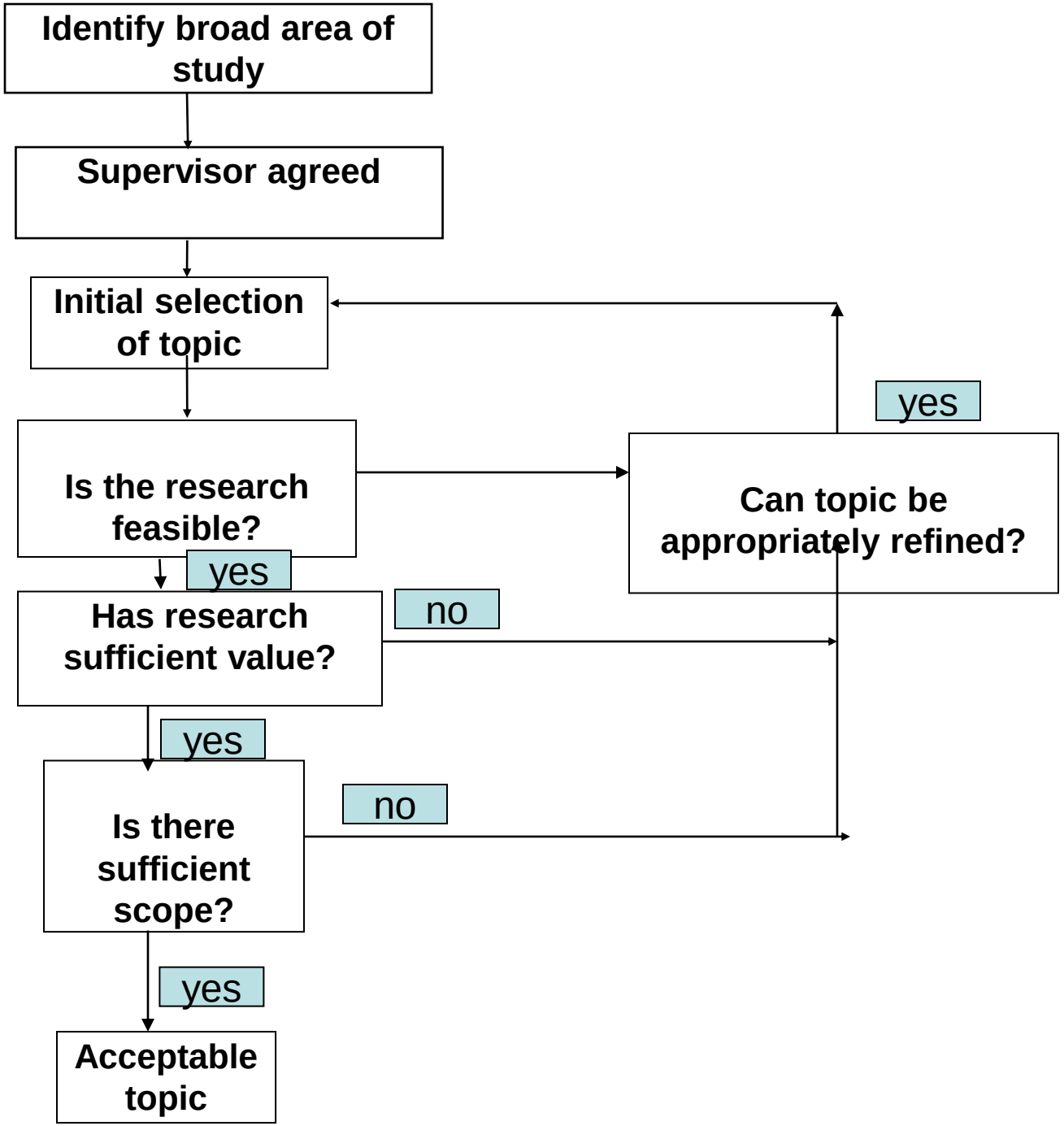
1. Selecting a broad area of study
2. Problem definition
3. Literature review
4. Developing objectives and hypothesis/research question formulation
5. Design of Research/Research Methodology
6. Execution of the project: Data collection, analysis and generalization and interpretation.
7. Reporting/Writing research findings in report form

# Selecting a Research Area/Topic (1)

- Look for a subject that interests you and will maintain your interest throughout the various stages of research that will help you to obtain the maximum self-development from the research.
  - ✓It should be related with your career.
- Some preliminary reading will help you to determine the extent of your interest.
- Keep in mind the time allotted to you and the expected length of the research paper.

# Selecting a Research Area/Topic (2)

- You commonly begin with fairly general topic and then refine it by research and thought into a more specific one.
- Commonly begin with fairly general topic and then refine it into a more specific one.
- Try to narrow your **topic/idea** by focusing on a particular aspect of a particular approach.
- Be original as much as you can, avoid duplicate work on a specific topic/idea by review literatures.
- The eventual successful completion of a research study is dependent on the selection of an appropriate topic.
- Before beginning the research, make sure you understand the amount and depth of research required, & the type of paper expected.


Identify broad area of study
Supervisor agreed
Initial selection of topic
Is the research feasible?
yes
Has research sufficient value?
no
Can topic be appropriately refined?
yes
yes
Is there sufficient scope?
no
yes
Acceptable topic

# Formulating the Research Problem (1)

- The task of formulating/defining a research problem is the core point in the entire research process.
- The task of formulating, or defining a research problem is a step of greatest importance in the entire research process. Because:
  - It determines the data to be collected,
  - It determines the characteristic of the data which are relevant,
  - It determines the type of techniques to be used,
  - It determines the form of the final report.
- Therefore, the researcher must single out the problem he/she wants to study.

# Formulating the Research Problem (2)

- The researcher must decide the general area of interest or aspect of a subject matter that he/she would like to inquire into/study.
- The best way of **formulating the research** problem is:
  - ✓ To discuss it with colleagues.
  - ✓ To discuss it with those that have some experience with the issue.

**Note:-If** A problem clearly stated is a problem half solved.

# Formulating the Research Problem (3)

- Some general principles in problem formulation
  - Be sure the problem really exists.
  - Learn as much as possible about the problem to be solved.
  - Consider alternative formulations in case one is not feasible.
  - Be aware that the problem formulation may influence the phenomena being studied.

# Formulating the Research Problem (4)

- Evaluation of a research problem (some questions to be asked):
  - Is the problem in line with my goals or expectations and the expectation of others?
  - Will the solution of the problem advance knowledge?
  - What is the value of potential outcome? (who are the beneficiaries?)
  - Do I possess or can I acquire the necessary skills, abilities and background knowledge to study the problem? (Researcher's capability and interest).
  - Will the data be accessible?
  - Do I have access to the necessary resources (time, money, tools, equipment's, laboratory, subjects, etc.) to conduct the investigation?

# Literature Survey (1)

- The researcher should also examine all available literatures to get himself acquainted/familiar with the selected problem.
- May continue from beginning to end.
- It is important in defining problems and hypotheses formulation as well as selection of methods.
- Extensive review is required to know
  - ✓ What others have done in the area?
  - ✓ How did they do it?
  - ✓ What were the research variables?
  - ✓ How were the variables measured?
  - ✓ What were the constraints?
  - ✓ What could possibly be modified?

# Literature Survey (2)

- The Researcher may **review two types of literature**
  - ✓ Conceptual literature: Concerning the **concepts** and **theories**.
  - ✓ Empirical literature: Consisting of studies made earlier which are similar to the one proposed.
- Basic Outcomes of the Review
  - ✓ To understand what data and other materials are available for operational purposes which will enable the researcher to specify his own research problem in a meaningful context.

# Literature Survey (3)

- Literature survey and problem formulation are inter-related, because the problem can only be specifically defined if extensive literature survey is done.
  - ✓ For this purpose - Journals, Conference proceedings, published or unpublished bibliographies, Government Reports can be used.
- Remember – One Source leads to another.

# Developing objectives and Working Hypothesis (1)

- **Objectives**: Statements that indicate what a researcher intends to accomplish in a more **specific** term.
- **Hypothesis**
  - An assertion about the relationship between two or more concepts
  - Important bridges between empirical inquiry and theory

# Developing objectives and Working Hypothesis (2)

- Some guidelines in developing objectives:

  - Objectives must be **specific**, **concrete** and **achievable** statements

  - The objectives should **clearly** fit to the statement of the problem

  - The objectives must propose to do **things** as per the capability of the **design** of the study

  - Objectives should be in their **approximate** order of importance

# Developing objectives and Working Hypothesis (3)

- Developing research hypotheses is important since they provide the focal point of the research.
  - They indirectly **determine** the quality of data which is required for the **analysis**.
  - The role of the hypothesis is to guide the researcher and keep him on the right track.
  - Working hypotheses arise as a result of prior /past thinking about the subject.

# Developing objectives and Working Hypothesis (4)

- A hypothesis must be
  - ✓ Specific
  - ✓ limited to the piece of research in hand because it has to be tested
  - ✓ Conceptually clear in terms of common definitions
  - ✓ Testable (**verification or rejection**) by available techniques and resources
  - ✓ Related to a body of theory
  - ✓ Stated to provide direction for the research
  - ✓ Formulated as causal relationships

# Developing objectives and Working Hypothesis (4)

- Example of **hypothesis**
  - ✓Improved training provision will create a more productive reliable and satisfied workforce
  - ✓Smoking and lung cancer are independent
- As a general a rule, working with hypothesis is another basic step of the research process in most research problems --- but may not be always necessary. E.g. In Exploratory researches.

# Design of the Research (1)

- Once the research problem is formulated and working hypothesis developed, the researcher will be required to prepare a research **Design/methodology**
- Research design refers to the arrangement of the conditions for collection and analysis of data in a manner that will **satisfy or achieve** the objectives of a **research undertaking**
  - ✓ It is intended to enable the researcher to answer questions as **validly**, **objectively**, **accurately** and **economically** as much as possible;
  - ✓ It provides for the collection of relevant data with **minimum effort, time and budget.**

# Design of the Research (2)

- **Research Design**: Conceptual structure within which research would be conducted
- It sets up the framework for adequate tests of relationships among study variables.

# Design of the Research (3)

- The research design tells us:
  - What observations to make?
  - What variables to measure?
  - How to make them/measure them?
  - How to analyze the data?
  - Sample Design
  - Data collection tools/techniques
  - It also suggests how many observations to make.
  - The type of statistical analysis to be used.

# Design of the Research (4)

- The **research design preparation** should consider:
  - ✓ The time available for research.
  - ✓ The finance available for the purpose.
  - ✓ The availability and skills of the researcher and his/her staff (if any).
  - ✓ Identifying the study variables.
  - ✓ Identifying study subjects /experimental units,
  - ✓ The means of obtaining the information and reasoning leading to selection.
- The function of research design is to provide for the collection of relevant evidence with **minimal expenditure** of effort, time and money.

# Execution of the Research (1)

- It is a very important step in the research process.
- If the execution of the **research proceeds** on correct lines, the data to be collected would be adequate and dependable. Under this phase the following tasks will be done:
  - ✓ Data Collection
  - ✓ Data Analysis
  - ✓ Generalizations and Interpretation of the results

# Execution of the Research (2)

- **Data collection:** Data can be collected by any one or more of the data collection **techniques/tools** ways. It may involve:
  - ✓ Field survey /experiments
  - ✓ Laboratory
  - ✓ Questionnaire
  - ✓ Observation
  - ✓ Document Analysis
  - ✓ Interview, etc.
- The researcher should select one/more of these methods of collecting data by taking into consideration **the nature of investigation, objective and scope of the inquiry, financial resources, available time and the desired degree of accuracy.**

# Data Analysis

- After the data have been collected, the researcher turns to the task of analyzing them.
- The analysis of **data requires** a number of closely related operations.
- Before analyzing the data the following operation are processed on collected data
  - ✓ Coding
  - ✓ Editing
  - ✓ Tabulation and then drawing **statistical inferences.**
- Quantitative data analysis– quantitative figures
- Qualitative data analysis– analytical thinking
- Hypothesis testing

# Generalizations and Interpretation of the results

- If a hypothesis is **tested** and up held several times, it may be possible for the researcher to arrive at generalization, i.e., to **build a theory.**
  - ✓As a matter of fact, the real value of research lies in its ability to arrive at certain **generalizations**.
- If the researcher had no hypothesis to start with, he/she might seek to explain his/her findings on the basis of some theory. It is known as **interpretation**.
  - ✓The process of interpretation may quite often trigger off new questions which in turn may lead to further researches.

# Reporting/Writing Research Reports (1)

- Finally, the researcher has to prepare the report of what has been done.
- The result should be communicated to others.
  - ✓ Peers
  - ✓ Policy makers/Developers
  - ✓ Extension workers
  - ✓ General public
- Report should be written in a concise and objective style in simple language avoiding vague expressions such as 'it seems,' 'there may be', and the like.
- The style and content varies depending on to whom the research is written to.
  - ✓ The mode of presentation depends on the target audience.

# Reporting/Writing Research Reports (2)

- Some principal guidelines for writing reports of scholarly journals are
  - Avoid using first person pronouns: I, Me, My, We and so on
  - Be stylistically consistent with regard to tables, charts, graphs, section headings, and so forth.
    - Tables, for example, should follow the same format and should be numbered consecutively.
  - Clearly label all displays with meaningful title
    - Each table, graph, chart, or figure caption should accurately describe the **material presented** and its contribution to the report.
  - Use simple language (i.e. avoiding vague expressions)
    - Express findings clearly, simply, and accurately.

# Criteria of Good Research (1)

- Any types of research should meet the scientific research procedures
- To be a scientific research, the research should satisfy the following criteria: (The scientific research method employed ensures:)
  - Purpose/ objectives clearly defined in common concepts.
  - Procedure enumerated to keep continuity.
    - ✓ The research procedure used should be described in sufficient detail to permit another researcher to repeat the research for further advancement, keeping the continuity of what has already been attained.

# Criteria of Good Research (2)

- The procedural design of the research should be carefully planned to yield results that are as objective as possible.
- The researcher should report with complete frankness, flaws in procedural design and estimate their effects upon the findings.
- Adequate analysis of data with appropriate methods of analysis.
  - ✓ The analysis of data should be sufficiently adequate to reveal its significance and the methods of analysis used should be appropriate.
  - Carefully checked data for validity & reliability.

# Criteria of Good Research (3)

- **Conclusions** should be confined to those justified by the data of the research and limited to those for which the data provide an adequate basis.
- Confidence, competence/ reputation, experience, honesty & integrity of researcher.
    - Greater confidence in research is warranted if the researcher is experienced, has a good reputation in research and is a person of **integrity/honesty**.

# Criteria of Good Research (4)

- In other words, we can state the qualities of a good research as follows
  - Good research is systematic: It means that research is structured with specified steps to be taken in a specified sequence in accordance with the well defined set of rules.
  - Systematic characteristic of the research
    - Does not rule out creative thinking
    - Reject the use of guessing & intuition in arriving at conclusions

# Criteria of Good Research (5)

- **Good research is logical:** This implies that research is guided by rules of logical reasoning & logical process of induction & deduction.
  - The logical process of induction and deduction are of great value in carrying out research.
  - In fact, logical reasoning makes research more meaningful in the context of **decision making**.
- **Good research is empirical:** It implies that research is related basically to one or more aspects of a real situation and deals with concrete data that provides a basis for **external validity** to research results **(validation).**

# Criteria of Good Research (6)

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

  ✓Verified by replicating the study.

- **Good research is controlled:** variables are identified & controlled, wherever possible.

# THANK YOU!!!