



RESEARCH METHODOLOGY

Introduction



Meaning of the Research

- Search for knowledge
- A scientific and systematic search for pertinent information on a specific topic
- Art of scientific investigation
- “A careful investigation or inquiry specially through search for new facts in any branch of knowledge.”
- Systematized effort to gain new knowledge
- An academic activity
- Defining and redefining problems, formulating hypothesis or suggested solutions; collecting, organising and evaluating data; making deductions and reaching conclusions; and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis.
- “The manipulation of things, concepts or symbols for the purpose of generalising to extend, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art.”

Objectives of Research

- To discover answers to questions through the application of scientific procedures.
- To find out the truth which is hidden and which has not been discovered as yet
- Three categories:
 - *exploratory* or *formulative* research studies
 - *descriptive* research studies
 - *diagnostic* research studies
 - *hypothesis-testing* research

Types of Research

- Descriptive vs analytical
 - Descriptive
 - surveys and fact finding enquiries
 - Description of the state of affairs as **it exists at present.**
 - **Ex post facto research**
 - Researcher has no control over the variable
 - Only report what has happened or what is happening.
 - Analytical
 - Has to use facts or **information already available** and analyse these to make a **critical evaluation of the material.**

Applied vs. Fundamental research

- Applied:
 - *Applied research* aims at finding a solution for an **immediate problem** facing a society or an industrial/business organization
 - to **discover a solution** for some **pressing practical problem**

- Fundamental:
 - Generalizations and with the **formulation of a theory**
 - “**Gathering knowledge for knowledge’s sake** is termed **‘pure’ or ‘basic’** research

Quantitative and Qualitative research

- Quantitative: How many?
 - Measurement of quantity or amount
 - Applicable to phenomena that can be expressed in terms of quantity
- Qualitative:
 - Concerned with qualitative phenomenon
 - Investigating the reasons for human behavior
 - Aims at discovering the underlying motives and desires, using in depth interviews for the purpose

Conceptual vs. Empirical research

- **Conceptual:**
 - Related to some **abstract idea(s)** or theory.
 - Used by **philosophers and thinkers** to develop **new concepts** or to **reinterpret existing ones**
- **Empirical:**
 - Relies on **experience or observation** alone
 - **Data-based** research
 - Capable of being **verified by observation or experiment**
 - Researcher must first provide himself with a **working hypothesis** or guess as to the probable results
 - Empirical research is appropriate **when proof is sought** that **certain variables** affect other **variables in some** way

Some other types of Research

- Types is based on either the “Purpose of the research”, or the time required to accomplish research or on the environment in which it is done.
- Time
 - One-time
 - Longitudinal research
- Field setting research or laboratory research or simulations
- Clinical or diagnostic research
- Historical research

Research Approaches:- Quantitative approach/research

- The generation of data in quantitative form which can be subjected to rigorous quantitative analysis in a formal and rigid fashion
- **Inferential**- to form a data base from which to infer characteristics or relationships of population
- **Experimental**- much greater control over the research environment and in this case some variables are manipulated to observe their effect on other variables
- **Simulation**- construction of an artificial environment within which relevant information and data can be generated

Qualitative approach/research

- Subjective assessment of attitudes, opinions and behavior
- Function of researcher's insights and impressions.
- Generates results either in non-quantitative form or in the form which are not subjected to rigorous quantitative analysis
- The techniques of focus group interviews, projective techniques and depth interviews are used

Research methods vs. Methodology

- Methods
 - All those methods which are used by the researcher during the course of studying his research problem are termed as research methods
- Nature/types of methods
 - Concerned with the collection of data
 - Statistical techniques which are used for establishing relationships between the data and the unknowns
 - To evaluate the accuracy of the results obtained.

Methodology

- A way to systematically solve the research problem
- A science of studying how research is done scientifically
- The various steps that are generally adopted by a researcher in studying his research problem along with the logic behind them
- To understand the assumptions underlying various techniques
- It is necessary for the researcher to design his methodology for his problem as the same may differ from problem to problem.
- Research methodology has many dimensions and research methods do constitute a part of the research methodology
- *Explain why we are using a particular method or technique and why we are not using others so that research results are capable of being evaluated either by the researcher himself or by others*

Research and Scientific method

- **Research**

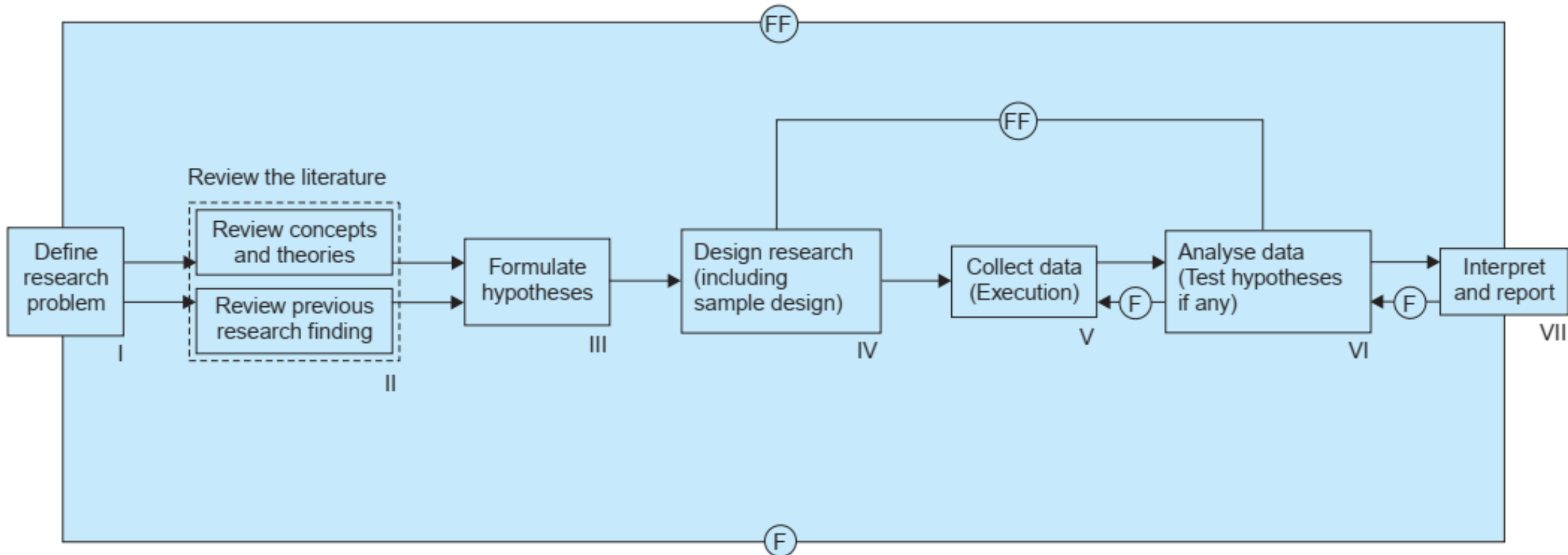
- an inquiry into the nature of, the reasons for, and the consequences of any particular set of circumstances, whether these circumstances are experimentally controlled or recorded just as they occur

- **Scientific methods**

- The **philosophy** common to all research methods and techniques, although they may vary considerably from one science to another
- **Karl Pearson** writes, “The scientific method is one and same in the branches (of science) and that method is the method of all **logically** trained minds
- The pursuit of truth as determined by logical considerations
- Ideal of science is to achieve a systematic interrelation of facts
- Achieve “this ideal by experimentation, observation, logical arguments from accepted postulates and a combination of these three in varying proportions
- **Empirical evidence**, **objective considerations**, **probabilistic predictions**.

Research Process/stages in research

RESEARCH PROCESS IN FLOW CHART



- Formulating **Research Problem**

- **To states of nature and those which relate to relationships between variables**
- Understanding the **problem thoroughly**, and **rephrasing the same into meaningful terms** from **an analytical point of view**

- Literature review/survey

- Two types of literature—the conceptual literature concerning the concepts and theories, and the empirical literature consisting of studies made earlier
- Brief summary of it should be written down.
- It will enable the researcher to specify his own research problem in a meaningful context

- Development of Working hypotheses

- tentative assumption made in order to draw out and test its logical or empirical consequences

- We do not need working hypotheses, specially in the base of exploratory or formulative research which do not aim at testing the hypothesis.

- Preparing the Research Design

- Conceptual structure within which research would be conducted

- to provide for the collection of relevant evidence with minimal expenditure of effort, time and money.

- can be achieved depends mainly on the research purpose

Determining Sample Design

-
- 100 → 10
▪ 'universe' or 'population'
 - A complete enumeration of all the items in the 'population' is known as a census inquiry
 - It is a definite plan determined before any data are actually collected for obtaining a sample from a given population
 - Probability samples
 - each element has a known probability of being included in the sample
 - Non-probability sample
 - do not allow the researcher to determine this probability

Brief mention of important sample designs:

- Purposive/non- probability
 - involves purposive or deliberate selection of particular units of the universe for constituting a sample which represents the universe
 - convenience sampling A B
 - judgement sampling
 - researcher's judgement is used for selecting items which he considers as representative of the population
 - used quite frequently in qualitative research
- Simple random sampling
 - chance sampling or probability sampling

-
-
- Systematic sampling
 - 15th name of the list, every 10th house on one side of the road
 - An element of randomness is usually introduced into this kind of sampling by using random numbers to pick up the unit

 - Stratified sampling
 - If the population from which a sample is to be drawn does not constitute a homogeneous group
 - to obtain a representative sample
 - the population is stratified into a number of nonoverlapping subpopulations or strata and sample items are selected from each stratum
 - first stratification and then simple random sampling, is known as *stratified random sampling*

-
-
- Quota sampling
 - the cost of taking random samples from individual strata is often so expensive that interviewers are simply given quota to be filled from different strata
 - the actual selection of items for sample being left to the interviewer's judgement.
 - Quota sampling is thus an important form of non-probability sampling
 - Cluster sampling
 - grouping the population and then selecting the groups or the clusters rather than individual
 - clusters might then be selected for the sample randomly
 - Area sampling
 - first divide the total area into a number of smaller non-overlapping areas, generally called geographical clusters, then a number of these smaller areas are randomly selected

-
-
- Multi stage sampling
 - further development of the idea of cluster sampling
 - If the technique of random-sampling is applied at all stages, the sampling procedure is described as multi-stage random sampling
 - Sequential sampling
 - the ultimate size of the sample is not fixed in advance but is determined according to mathematical decisions on the basis of information yielded as survey progresses

The sample design to be used must be decided by the researcher taking into consideration the nature of the inquiry and other related factors

Collection of data

- **Primary data** can be collected either through experiment or through survey
- Observations
 - the collection of information by way of investigator's own observation, without interviewing the respondents.
 - what is currently happening
- **Personal interviews**
 - follows a rigid procedure and seeks answers to a set of pre-conceived questions through personal interviews
- Schedules
 - the enumerators are appointed and given training. They are provided with schedules containing relevant questions.
 - Data are collected by filling up the schedules by enumerators on the basis of replies given by respondents

Analysis of data

- establishment of **categories**, the application of these categories to raw data through **coding**, **tabulation** and then drawing **statistical inferences**.
- researcher should classify the raw data into some purposeful and usable **categories**.
- *Coding* operation is usually done at this stage through which the categories of data are transformed into symbols that may be tabulated and counted
- *Editing* is the procedure that improves the quality of the data for coding
- *Tabulation* is a part of the technical procedure wherein the classified data are put in the form of tables

Hypothesis testing

- Do the facts support the hypotheses or they happen to be contrary?
- Various tests, such as Chi square test, t -test, F -test,
- Hypothesis-testing will result in either accepting the hypothesis or in rejecting it.
- If the researcher had no hypotheses to start with, generalizations established on the basis of data may be stated as hypotheses to be tested by subsequent researches in times to come.
- Generalizations and interpretations:
 - generalization, i.e., to build a theory
 - to explain his findings on the basis of some theory

Good research/ scientific research

- purpose of the research should be clearly defined
- research procedure used should be described in sufficient detail
- procedural design of the research should be carefully planned
- report with complete frankness
- analysis of data should be sufficiently adequate
- Conclusions should be confined to those justified by the data
- Systematic, logical- induction and deductions and empirical.