

Research Methodology

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What is Research?

Definition

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

- Reference: The Advanced Learner's Dictionary of Current English

Definition for Research

Definition

A systematized effort to gain new knowledge.

- Reference: L.V. Redman and A.V.H. Mory, The Romance of Research, 1923, p.10

One More Definition for Research

Definition

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.

- Reference: The Encyclopaedia of Social Sciences, Vol. IX, MacMillan, 1930

Research is, thus, an original contribution to the existing stock of knowledge making for its advancement

Objectives of Research

- To gain familiarity with a phenomenon or to achieve new insights into it (**exploratory or formulative research studies**)
- Characterizing a particular individual, situation or a group (**descriptive research studies**)
- To determine the frequency with which something occurs or with which it is associated with something else (**diagnostic research studies**)
- To test a hypothesis of a causal relationship between variables (**hypothesis-testing research studies**)

- The term research may mean many things depending on the purpose and perspective
- Though there is a common theme, the approach and techniques to be employed for research depends on
 - Type of research objectives
 - Subject Areas

Research Typology 1

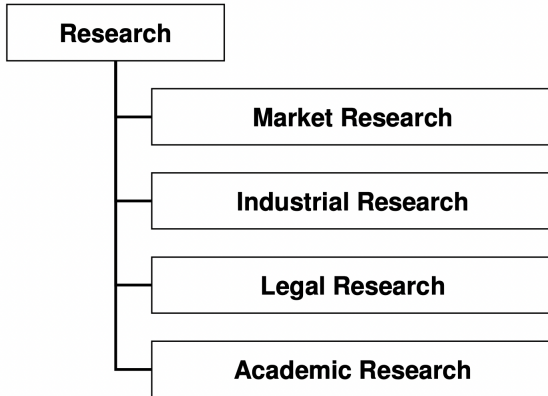


Figure: Research Typology

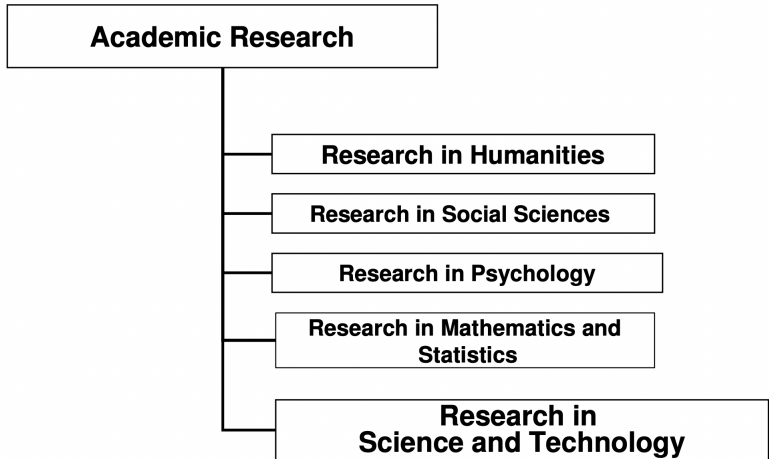


Figure: Research Typology

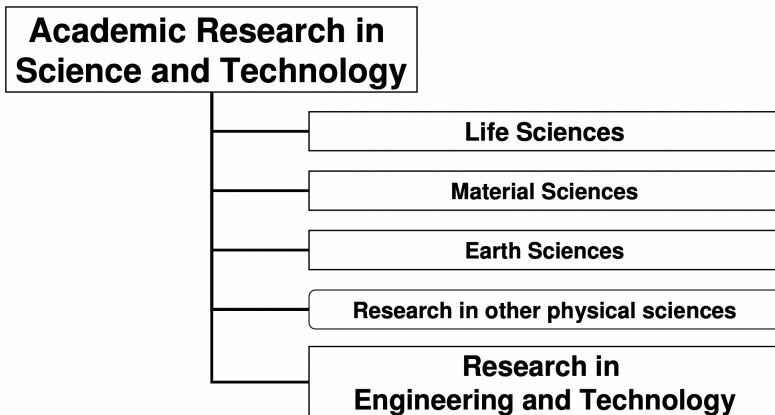


Figure: Research Typology

Research Motivations

- Motivations for Industrial, Market and Legal Research are generally well defined at the outset
- Industrial research by the industry is often linked with development of a product or a process
- Industrial Research is also carried out within academic institutions. Motivations for such research, are generally
 - Acquiring facilities for teaching or academic research
 - Funding for research fellows

- Institutional motivations for Academic Research may be
 - Social mandate to contribute to the body knowledge
 - As a means to improve the “rating” of the institution
 - As a means to attract bright faculty
 - As an aid to improving the quality of teaching

- Personal motivations of a faculty for Academic Research may be
 - Academic/Scientific curiosity
 - Urge to contribute to the body knowledge
 - As a training ground for future research guidance
 - Career advancement teaching

Research Motivations of a Ph D Scholar

- What motivates a PhD aspirant?
 - Genuine quest to learn more
 - Entry to Academic or Research Career
 - Career Advancement (if already employed)
 - To fulfill long cherished ambition (Retired, senior citizens)
 - To keep oneself engaged
 - Between the jobs, stop gap(?)
 - Away from the kitchen/ family business

Some Suggestions for the Ph.D Aspirants

- PhD aspirants should honestly attempt to discover their own motivations for seeking a PhD research career before making a commitment
- Working towards PhD calls for
 - Some sacrifice
 - Postponement of worldly comforts
 - Financial loss (Not Applicable for TCG CREST Students)
 - Credit rating (no car/home loan)
 - Substantial stress
 - Especially for the part-timers who are employed elsewhere, also for ladies with children
 - Motivations should be strong enough for having mental commitment to go through the sacrifices and stresses

Suggestions Contd.

- Lack of clarity about own motivation for a PhD aspirant may lead to
 - Lack of enthusiasm → slow progress
 - Psychological stresses and inner conflicts
- Even registered scholars should check their motivating factors from time to time
 - Ground realities might have changed since you took the plunge
- Worst coming to worst you can cut losses and call it quits

- Descriptive vs. Analytical: Descriptive research includes surveys and fact-finding enquiries of different kinds whereas in analytical research, on the other hand, the researcher has to use facts or information already available, and analyze these to make a critical evaluation of the material.

For detail consult: Research Methodology : Methods And Techniques, C.R. Kothari.

Types of Research Contd.

- Applied vs. Fundamental: Applied research aims at finding a solution for an immediate problem facing a society or an industrial/business organisation, whereas fundamental research is mainly concerned with generalisations and with the formulation of a theory.
 - Applied and Fundamental Research work hands on hands
 - However, our Governmental Organizations (DST, MeitY etc.), those are more inclined towards funding Applied Research

For detail consult: Research Methodology : Methods And Techniques, C.R. Kothari.

Types of Research Contd.

- Quantitative vs. Qualitative : Quantitative research is based on the measurement of quantity or amount. It is applicable to phenomena that can be expressed in terms of quantity. Qualitative research, on the other hand, is concerned with qualitative phenomenon, i.e., phenomena relating to or involving quality or kind.
 - Qualitative research is specially important in the behavioural sciences where the aim is to discover the underlying motives of certain human behaviour

For detail consult: Research Methodology : Methods And Techniques, C.R. Kothari.

Types of Research Contd.

- Conceptual vs. Empirical: Conceptual research is that related to some abstract idea(s) or theory. It is generally used by philosophers and thinkers to develop new concepts or to reinterpret existing ones. On the other hand, empirical research relies on experience or observation alone, often without due regard for system and theory.
 - Empirical Research is data-based research, coming up with conclusions which are capable of being verified by observation or experiment. We can also call it as experimental type of research.

For detail consult: Research Methodology : Methods And Techniques, C.R. Kothari.

Some Other Types of Research

- Based on the environments the research is continuing, it can be named as follows.
 - field-setting research
 - laboratory research
 - simulation research
- Based on the outputs the research, it can be called as
 - Clinical or Diagnostic Research
 - Historical Research
 - Conclusion-oriented and Decision-oriented Research:

Operations research is an example of decision oriented research since it is a scientific method of providing executive departments with a quantitative basis for decisions regarding operations under their control
 - Exploratory and Formalized Research:

The objective of exploratory research is the development of hypotheses rather than their testing, whereas formalized research studies are those with substantial structure and with specific hypotheses to be tested

What is a Good Research?

- Purpose clearly defined.
- Research process detailed.
- Research design thoroughly planned.
- High ethical standards applied.
- Limitations frankly revealed.
- Findings presented unambiguously.
- Conclusions justified

What is a Good Research?

A Good Research is

- Systematic
- Logical
- Empirical
- Replicable
- Creative
- Use of multiple methods

- For many scholars, research is a life long activity
- For a PhD scholars, the PhD research activity is best organised as a project
- A project has a definite starting time and is expected to have a finite life time
- A PhD research project, therefore, has a life cycle, composed of defined activities
- The group of activities are also called steps.

The steps are not rigidly defined and are sometimes flouted to suit situations

- There are a few possible types of life cycles for PhD research
 - The waterfall, cascade or the Common life cycle
 - Expanding or Evolving Spiral Life Cycle
 - Gradually increasing the scope (zoom in) of research
 - From specific to general
 - Contracting Spiral Life Cycle
 - Gradually narrowing (zoom out) the area of enquiry
 - Meandering Life Cycle
 - Apparently changing directions now and then
 - Based on findings of previous results

Research Life Cycle-3



Artificial Cascade



Spirals



Meandering River

Figure: Ph.D Research Life Cycle

Ref: Research Methodology, Prof. T. K. Ghosal, Jadavpur University, 2013

- The supervisor generally prescribes the Life Cycle type to suit. It depends on
 - The type of problem
 - Background of the student
 - Own personal likings
- In some cases the life cycle could be hybrid, changing the cycle type in mid course
- We would discuss the “common life cycle” as it covers most of the activities

Common Research Life Cycle

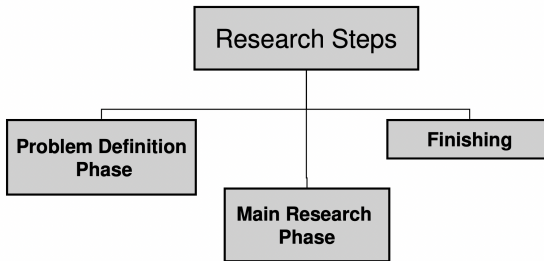


Figure: Ph.D Research Life Cycle

Ref: Research Methodology, Prof. T. K. Ghosal, Jadavpur University, 2013

Common Research Life Cycle-II

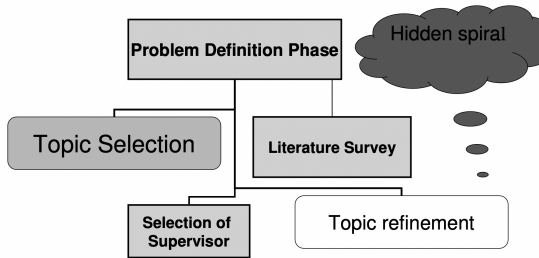


Figure: Ph.D Research Life Cycle

Ref: Research Methodology, Prof. T. K. Ghosal, Jadavpur University, 2013

Common Research Life Cycle-III

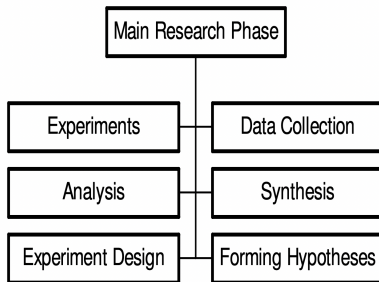


Figure: Ph.D Research Life Cycle

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Common Research Life Cycle-IV

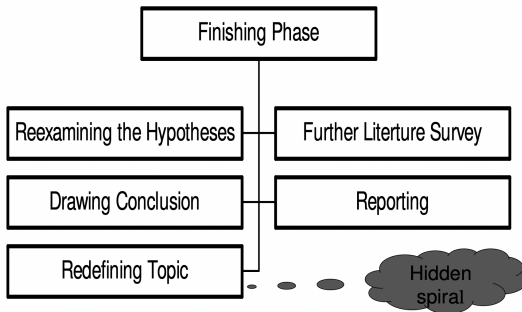


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Research Process

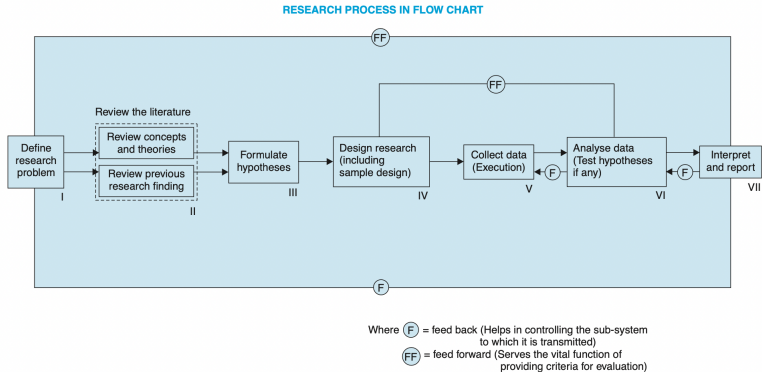


Figure: Ph.D Research Life Cycle

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First Few Steps towards Ph.D Research

- Motivating yourself for the journey towards Ph.D research
- The first few steps towards PhD is often messy and frustrating
- You have to simultaneously select your area of research and a prospective supervisor
- You, the research area and the supervisor must be compatible to each other
- Participants of this course have successfully taken the first step and crossed this threshold (For better or for worse :-))

First Few Steps towards Ph.D Research Contd.

- Lucky are the aspirants who has applied to work as a researcher in an advertised project.

The problem and the supervisor are already short listed.

- Also lucky are the aspirants where the institution proactively facilitates the process. (TCG CREST Students)
- Where institutional help is not available, one has to search back and forth for matching
 - 1 Interests of the aspirant
 - 2 Suitable area of research
 - 3 An Institute
 - 4 A prospective supervisor

First Few Steps towards Ph.D Research Contd.

- A recommended first step is to select one or a few B R O A D areas where the aspirant feels comfortable and/or interesting.

This seeds the search for the institution and the supervisor.

- The criteria for selection are:
 - 1 The area should be sufficiently broad so that a number of prospective supervisors may fit the bill
 - 2 The aspirant has or can quickly acquire some knowledge.
 - 3 The area should be of current interest; A little library work may be needed.

- Except in rare cases, a doctoral candidate has to choose one guide
- The research guide is variously called
 - doctoral advisor
 - dissertation advisor
 - doctoral supervisor
- In some cases, more than one guide may team up to supervise a doctoral student

Role of a Guide

- Help selection of coursework
- Facilitate research
- Provide continued guidance throughout the research life cycle
- Shape, refine and readjust the topic and extent of research as it evolves
- Be a member of the research advisory committee for the student
- Would tentatively decide whether the research is good enough for Ph.D

Institutional Ph.D Research committee

- Institutional PhD research committee also provides guidance at a broader level. The committee may meet infrequently, say twice a year
- In some universities, only a full professor is allowed to chair the PhD research committee. In case the guide is not a full professor, the PhD research committee may be chaired by the HOD or a senior and experienced professor

Window Shopping for a Supervisor

You are now in this phase.

However, following are the steps generally.

- In this phase, the aspirant is looking for a prospective supervisor, without making a firm commitment
- The first task is to prepare a short prioritized list of prospective supervisors
University website and Professors home pages would be useful for this
- The first few of this list should be further researched

Window Shopping for a Supervisor Contd.

- While researching about a prospective supervisor the candidate should try to figure out whether the prospect
 - 1 Is an expert in the area of interest
 - 2 Has the time; Not already overloaded
 - 3 Has reputation of high intellectual ability and integrity
 - 4 Has good track record
 - 1 Past PhD scholars
 - 2 Publications
 - 5 Has funding, where applicable

Window Shopping for a Supervisor Contd.

- Having short listed prospective supervisors comes the crucial question;

Why would the supervisor agree to supervise YOU?

- A supervisor would accept a PhD student if
 - ① the supervisor is not already overloaded and
 - ② the aspirant can convince that the candidate
 - ① Has adequate and clear research motivation
 - ② Has adequate background in the areas where the supervisor is currently working
 - ③ Can articulate findings in the form of a report/ paper
 - ④ Is recommended by a teacher