

Research Methodology

PART 3 Research Design & Plan

M S Sridhar
Head, Library & Documentation
ISRO Satellite Centre
Bangalore 560017

E-mail: sridhar@isac.gov.in & sridharmirle@yahoo.com

Research Design & Plan

Synopsis

1. [Introduction to Research & Research methodology](#)
2. [Selection and formulation of research problem](#)
3. **Research design and plan**
4. Experimental designs
5. Sampling and sampling strategy or plan
6. Measurement and scaling techniques
7. Data collection methods and techniques
8. Testing of hypotheses
9. Statistical techniques for processing & analysis of data
10. Analysis, interpretation and drawing inferences
11. Report writing

1. Significance of research design
2. Meaning & process of design / plan
3. Writing the plan (protocol)
4. Contents of the plan (protocol)
5. Qualities of good research design
6. Choice of research topic, method/ approach and methods of data collection
7. Types of research design
8. Comparison of research designs
9. Action & Applied Research
10. Correlational, Ex post facto, Ethnogenic & Triangulation Studies

Significance of Research Design

1. Smooth & efficient sailing (sets boundaries & prevents blind search)
2. Yields maximum information (avoids collection of unnecessary data)
3. Costs least in terms of effort, time & money
4. Maximizes reliability of results
5. Provides firm foundation to the endeavor
6. Averts misleading conclusions & thoughtless futile exercise
7. Helps organising ones ideas
8. Gives chance to foresee flaws & inadequacies (anticipates problems)
9. Incorporates by learning from others critical comments & evaluations
10. Like a successful journey,
 - ✓ Broadens your mind
 - ✓ Gives fascinating & exciting experience
 - ✓ Gives insight into world around you
 - ✓ Provides opportunity to meet people
 - ✓ Gives fun and reward, but at times, very tedious & monotonous too

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Research Design and Plan

A. MEANING

- a conceptual structure
- a blueprint
- an outline of what the researcher will do

B. THE PLANNING PROCESS

1. Selection of a problem
2. Formulation of the selected problem
3. Formulation of hypothesis
4. Conceptualization
5. Research plan or design

C. SYNOPSIS : must specify

1. The problem
2. Sources & types of information
3. Population & sample
4. Approach & methods
5. Procedure & techniques for collection & analysis of data
6. Time & cost budget

D. HOW? (STEPS)

1. A **tentative outline** (plan, blueprint & scheme) of proposed research work
2. A **decision making process** similar to building design; Decisions regarding what, where, when, how much & by what means concerning research
3. Logical & systematic **planning & directing** of the process of research
4. Creating the **conceptual structure & blueprint** for collection, measurement & analysis of data
5. A conscious efforts to create well conceived & carefully thought out **strategy**
6. An **arrangement of conditions** for collection & analysis of data so as to combine relevance to the purpose with economy in procedure

Research Design and Plan contd....

7. **An analogy of a journey** with definite points of departure and arrival and in between sequence of activities
 - ❖ **Where you want to go and why** (what & why)
 - Journey vs. destination (academic vs. professional research)
 - ❖ **Knowing the geography** (scope)
 - ❖ **Resources** (time, money & effort) required
 - Balance between pleasure of journey & reward of arrival
 - Leisurely research is most expensive & difficult to justify
 - External sponsorship & constraints imposed
 - Use 'Quick & Dirty Research' as a basis to plan
 - ❖ **Means of transport**: More different methods & techniques used, the more difficult to control & handle the project
 - ❖ **Prepare a plan** (synopsis): Systematises work ; sets goal & direction; imposes discipline; provides contingency; allows for monitoring & correcting; mitigate the feelings of confusion & uncertainty; Do costing: Decide number of days of work for each stage & other costs
 - ❖ **Aim to arrive on time**: Have project scheduling with deadline for each activity; Monitor the progress
 - ❖ **Tell others all about it**: Research report, articles, presentation

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Decisions to be made

1. What the study is about?
2. Why ?
3. Scope
4. Objectives
5. Propositions to be tested
6. Major concepts to be defined
7. Criteria for measurements
8. Place, time & duration of study & for each stage
9. Design typology
10. Data-types, sources, collection methods, tools, processing, analysis techniques
11. Sample - design, size, techniques

12. Significance of the study
13. Target audience for report
14. Cost

FOUR PARTS OF RESEARCH DESIGN

(Based on design decisions)

1. The sample design
2. The observation design (conditions under which observations to be made)
3. The statistical design
4. The operational design (techniques needed for 1,2, & 3)

Writing the Plan (Research Protocol)

1. Planning should be directed towards producing a written protocol
2. It forces the planner to define
 - (i) Precisely his aims & objectives
 - (ii) The nature of the measurements to be made
 - (iii) The population to be studied
 - (iv) The way in which he hopes to interpret the results
 - (v) It ensures that all involved in the project have a clear idea of the aims to be achieved and procedures to be adopted
3. Produce a sufficiently clear and detailed protocol which can be used by all, submitted to committee for approval, for grant, helps for more detailed arrangements and discussion with others

Contents of Research Plan (Protocol):

1. INTRODUCTION
 - Background, need & precise interest
2. PROBLEM - Definition; Core nature & importance (significance)
 - The basic organization: The investigators; Place & time of study; Likely duration

Contents of Research Plan (Protocol) contd...

3. REVIEW OF PAST RESEARCH - Significant Achievements
 - Gaps & Justification for Present Study
4. AIMS, OBJECTIVES, HYPOTHESES & CONCEPTUAL MODEL OR THEORETICAL FRAMEWORK
 - Reasonable no. of challenging but not impossible special objectives (Grouped as primary & secondary)
 - Formation & development of structure of relationships among variables indicating delineated logical connections & assumptions as framework or model
 - Conceptually clear, specific & anticipated outcomes as hypotheses
5. OPERATIONAL DEFINITION OF CONCEPTS (& TERMS)
 - For ease of measurements
6. SCOPE & LIMITATIONS
 - Marking of boundaries to make it manageable

Contents of Research Plan (Protocol) contd...

Delimiting the scope & dimensions w.r.t.

- i. Topic scope (Breadth & Depth)
 - ii. Geographical Area (Space Coordinate)
 - iii. Reference Period (Time Coordinate)
 - iv. Units of Analysis
 - v. Type of Institutions / Respondents
 - vi. Issues to be analysed (Characteristics of special Interest)
 - vii. Environmental Conditions
7. SIGNIFICANCE OF THE STUDY & EXPECTED UTILITY OF THE FINDINGS
How it enriches theory or practice

8. METHODOLOGY

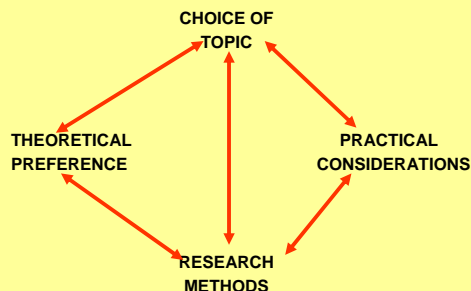
- Typology of research design
- 9. SAMPLING STRATEGY
 - Method, Size & Process
- 10. DATA COLLECTION METHODS & TOOLS
 - Primary data
 - Secondary data
 - Materials
 - quantity, quality & sources
- 11. PLAN OF ANALYSIS
 - Statistical techniques to be used
- 12. TIME SCHEDULE
- 13. BUDGET
- 14. CHAPTER SCHEME
- 15. END OF PROTOCOL
 - References
 - Draft number
 - Date

Qualities of Good Research Design

It is easy to suggest a problem but difficult to make a good research design

- Each problem / research work is unique & demands unique research design & unique combination of methods & techniques
- A good research design is half the battle
- No ideal design; TRADE OFF between efforts & fruits
- COMPREHENSIVE: Consider many different aspects
- FLEXIBLE
- APPROPRIATE (PURPOSE / OBJECTIVE)
- Efficient, economical, maximum reliability, minimum biases & smallest error
- Identify & delimit variables
- Cautious about differences concerning cause & effect (Illustration)
- Chooses appropriate combination of methods and techniques based on:
 1. Objectives
 2. Possible implications of results
 3. Overall environment
 4. Current knowledge
 5. Suitability to problem
 6. Available resources
 7. Competence of researcher & staff
 8. Kind of data required

Relation among choice of Topic, Methods, Theoretical and Practical considerations



Choice of Method / Approach for Design

1. EXPERIMENTAL

- Proof oriented
- Larger & costlier
- Decisive

EXPLORATORY (EX POST FACTO, i.e. REVERSE OF EXPERIMENTAL)

- Insight oriented
- Cheaper, smaller & flexible
- No definite conclusions

Two kinds: 1. Co-relational study or causal research 2. Criterion group study or causal comparative study

2. QUANTITATIVE

- Objective explanation by statistical description & manipulation
- Highly structured instruments
- Statistical (random) samples

QUALITATIVE

- Understanding of event or behavior from actor's perspective
- Less structured instruments
- Convenience or purposive (non random) samples

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Choice of Methods / Approach contd...

3. SURVEY

- Poor man's experiment
- Descriptive
- Can't show causal connections

4. CROSS SECTIONAL

- Different respondents at different time

• CASE STUDY

- To explore issues (to probe deeply & analyse intensively)
- To gain holistic understanding
- provides frame of reference for a more quantitative analysis (analytical studies, content analysis)
- A typology of observation studies

• LONGITUDINAL (follow up/ cohort/ panel/ trend) STUDY

- Data over extended period of time
- Successive measurements from the same respondents are taken at different points of time
- Multiplicity of factors of same respondent over a period
- To prove cause & effect

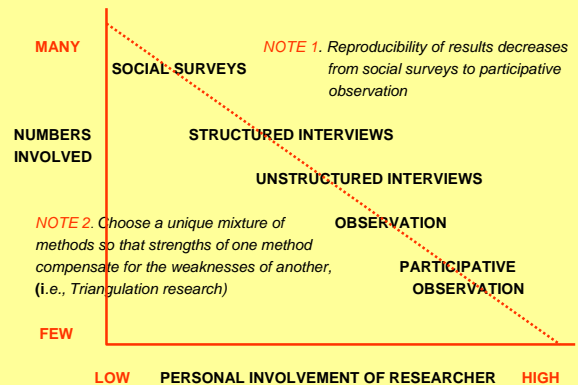
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Contd...

13

Choice of Data Collection Methods



Categorization of Research Design (Design Typology Criteria)

1. The degree of formulation of problem

- Exploratory or Formulated
- Descriptive, Diagnostic, Analytical

2. The topical scope

- Historical study
- Survey, Delphi Study
- Case study (History material), Accounts, Episodes, Story of experience
- Statistical study

3. The search environment, i.e., the field or lab setting

- Field survey
- Lab experiment

4. The time dimension

- Cross Sectional (one time)
- Longitudinal, Trend, Developmental (Follow up or Cohort Studies in UK & Panel Studies in USA)

5. The mode of data collection

- Survey
- Observational

6. The manipulation of the variables under study

- Experimental (Hypothesis Testing)
- Ex post facto

7. The nature of the relationship among variables

- Causal/ Prediction
- Descriptive/ Relational (i) Association (ii) Correlation

8. a. Conceptual (Fundamental, Basic, Pure)

9. b. Empirical (Applied, Action)

9. a. Conclusion oriented

9. b. Decision oriented

10. a. Qualitative

10. b. Quantitative

Note: Only first typology is explicitly discussed in this material.

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15

Formulative & Exploratory Research Design

- Helps formulating problem
- Helps developing working hypothesis
- Emphasises discovery of ideas & insights
- Flexible design
- Uses following methods

A. SURVEY OF LITERATURE

- Simple & fruitful in formulating problem & developing hypotheses
- Reviewing past studies for their hypotheses, findings & proposed problems
- Knowing concepts & theories already developed & background of the problem

B. EXPERIENCE SURVEY

- Meeting people with practical experience for new outlook, ideas, advanced thinking, insight into relationship between variables
- Raises many issues & questions
- Provides practical possibilities

C. ANALYSIS OF 'INSIGHT STIMULATING INCIDENTS, EXAMPLES, ACCOUNTS & EPISODES'

- Consider areas with less experience & cases with sharp contrast
- Reactions of stranger, marginal individuals & those in transition (e.g., those leaving organisation, exit interviews, non users)
- Examining existing records & probing with unstructured interviews; Tries to draw together diverse information for unified interpretation

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16

Descriptive and Diagnostic Research Design

- Describing the characteristics of a particular individual or group
- Determining frequency with which something occurs or its association with something else
- Rigid design
- Approximately same as survey design
- Fact finding in nature; describes, analyses & interprets prevailing situation; suggests remedial measures or alternative course of action for future

Focuses attention on:

- What to measure (objective)
- Adequate methods of measuring
- Methods & instruments of data collection
- Definition of population
- Sampling strategy
- Protecting against biases & errors
- Maximizing reliability
- Pre-testing the instruments (pilot survey)
- Structured interviews
- Close supervision in data collection
- Pre-planned processing & analysis of data
- Communicating the findings

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17

Comparison of Research Designs

	Types of Design	
PARTS OF DESIGN	FORMULATIVE/ EXPLORATORY	DESCRIPTIVE / DIAGNOSTIC
Overall design	Flexible: provides opportunity & considers different aspects	Rigid Protection against bias & max. reliability
Sampling design	Non probability	Probability
Statistical design	No preplanned design	Preplanned design
Observational design	Unstructured Instruments	Structured instruments
Operational design	No fixed decisions	Advance decisions about procedure

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18

Action Research & Applied Research

Action Research is a small-scale intervention in the functioning of the real world and a close examination of the effects of such intervention

FEATURES

1. Situational (i.e., specific context)
2. Collaborative & Co-operative (teams of researchers and practitioners)
3. Participatory (involves direct or indirect implementation)
4. Self-evaluative (within the ongoing situation)

TWO STAGES

1. Diagnostic stage:- analysis of problems and development of hypotheses
2. Therapeutic stage:- Experimenting and testing of hypotheses.

Action Research Vs Applied Research

Action Research

- Scientific method is more loosely interpreted (flexibility & adaptability)
- Conditional & relaxed
- More extensive coverage
- Not keen on generalising

Applied Research

- Focus on establishing relationship
- Rigorous
- Involves large number of cases
- As much control as possible over variables
- Precise sampling technique
- Generalizes its finding

Some important types of studies/ research

(Cohen & Manion, 1980)

1. Historical
2. Developmental
3. Surveys
4. Case Studies
5. Correlational
6. Ex post facto
7. Experiments (Quasi – experiments & Single-case research)
8. Action Research
9. Accounts & episodes
10. Triangulation
11. Role-playing
12. Personal Constructs

Correlational Research

- Is there a relationship ?
- Is it association or correlation? If correlation, direction & magnitude?

Two types:

1. Relational studies
 - a. Exploratory to find relationship
 - b. For verification of hunches
2. Prediction studies

Based on firm knowledge & having substantial magnitude of relationship

Ex Post Facto Research

Ex post facto design corresponds to experimental design in reverse. It begins with groups that are already different in some respect and searches in retrospect for the difference. Two types of designs are Co-relation study (casual research) and Criterion group (causal comparative) study.

Advantages: Ex post facto research

1. Suits where more rigorous approach is not possible
2. As a valuable exploratory tool, yields useful information concerning the nature of phenomena
3. More suitable where setting up of experiment causes artificiality
4. Suits where simple cause-and-effect relationships are being explored
5. Can give a sense of direction and fruitful source of hypotheses

Disadvantages: Lack of control and inability to manipulate the independent variable are key drawbacks of ex-post-facto research design

1. Problem of deciding which is the cause and which the effect (does not establish cause and effect)
2. Possibility of reverse causation
3. Classifying into dichotomous groups can be problematic
4. Difficulty of interpretation
5. Danger of the post hoc assumption being made
6. Bases its conclusions on too limited a sample or number of occurrences
7. Fails to single out the really significant factor or factors
8. Fails to recognise that events have multiple rather than single causes
9. Too flexible, lacks nullifiability and confirmation

Ex Post Facto Research ...contd.

Ex post facto designs

A. Co-relational (causal research) model

1. Attempts to identify the antecedent of a present condition.
2. We must not overlook the possibility of reverse causality
3. Two sets of data relating to the independent and dependent variables are gathered
4. Data on the independent variable (X) will be retrospective in character

Group	Ind. Var.	Dep. Var.
Experimental	X	O ₁
Control		O ₂

Where, X is independent variable and O is dependent variable

B. Casual comparative (criterion group) model

- Investigator hypothesizes the independent variable
- Compares two groups
- Experimental group (E) exposed to the presumed independent variable X
- Control group (C) is not exposed to variable X
- Examine two groups that are different in some way or ways and then try to account for the difference or differences by investigating possible antecedents
- Similar to an experimentally designed study
- Chief difference lies in the nature of independent variable
- Independent variable is beyond control, having already occurred (& hence non-manipulable)

Social Accounts & Episodes (Ethnogenic studies)

Five principles of ethnogenic approach:

1. Neither synchronic analysis (one time) nor diachronic analysis (study of stages) lead directly to discovery of universal social psychological principles or laws
2. Concentrates on 'meaning system', i.e., the whole sequence by which a social act is achieved in an episode
3. Concerned with speech which accompanies action (such speech is accounting)
4. Assumes that human being tend to be the kind of person his language, his tradition, his tacit and explicit knowledge tell him
5. Skills employed consists of common sense understanding of the social world

Uses the Qualitative Analysis of Accounts

- The total pattern of choice
- Similarities and differences
- Grouping items together
- Categorization of content
- Tracing a theme
- The study of omissions
- Reconstruction of a social life-world
- Generating and testing hypotheses
- Does network analysis of qualitative data

Triangulation

Involves use of two or more methods of data collection (like navigators, military strategists & surveyors)

Types of Triangulation in Research (Cohen and Manion, 1980)

1. Time triangulation
 - Cross sectional & longitudinal designs
2. Space triangulation
 - Cross cultural studies
3. Combined levels of triangulation
 - More than one level of analysis, i.e., individual, group (interactive) and collective (organisational, cultural or social) levels
4. Theoretical triangulation
 - Draws upon alternative or competing theories than one viewpoint
5. Investigator triangulation
 - More than one observer
6. Methodological triangulation
 - Same method on different occasions
 - Different methods on the same object of study

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25

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Research Methodology 3

26

About the Author

Dr. M.S.Sridhar is a post graduate in mathematics and business management and a doctorate in library and information science. He is in the profession for last 35 years. Since 1978 he is heading the Library and Documentation Division of ISRO Satellite Centre, Bangalore. Earlier he has worked in the libraries of National Aeronautical Laboratory (Bangalore), Indian Institute of Management (Bangalore) and University of Mysore. Dr. Sridhar has published four books ('User research: a review of information-behaviour studies in science and technology', 'Problems of collection development in special libraries', 'Information behaviour of scientists and engineers' and 'Use and user research with twenty case studies') and 74 research papers, written 19 course material for BLIS and MLIS, presented over 22 papers in conferences and seminars, and contributed 5 chapters to books. **E-mail:** sridharmirle@yahoo.com, mirlesridhar@gmail.com, sridhar@isac.gov.in ; **Phone:** 91-80-25084451; **Fax:** 91-80-25084475.



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27