Research Methodology

PART 2 : Selecting & Formulating Research Problem

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Selecting & formulating research problem

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**

- **Selecting research problems**
  - sources
  - criteria
- **Grilling the problem**
- **Dos & don'ts**
- **Still can't clearly formulate?**
- **Steps in formulating research problem**
- **Main steps in conducting research**

Selecting Research Problem*

Criteria

I ***INTERNAL***
1. Researcher's interest
2. Researcher's competence
3. Researcher's own resources, i.e., finance, time, etc.

II ***EXTERNAL***
1. Researchability, i.e., amenability (problems having solutions)
2. Importance and Urgency, i.e., relative importance & significance of problem (utility of findings)
3. Novelty or originality
4. Feasibility
   - Availability of data
   - Suitable methodology
   - Co-operation of organisations & individuals
   - Available time
5. Facilities/ infrastructure
6. Usefulness and social relevance
7. Research personnel

Sources

1. Reading
2. Academic experience
3. Daily experience
4. Exposure to field situations
5. Consultations
6. Brainstorming
7. Research
8. Intuition

* Here 'problem' is not 'trouble'.

Grilling the problem

Questions to be asked when an idea is born

1. Is the idea viable ?
2. Is it practicable ?
3. The time factor ?
4. Has it been done before ?
5. What result is expected ?
6. What do colleagues think ?
7. Will a statistician be needed ?
8. What will you personally do ? (individual's role in the study)

More questions while formulating problem

- The originating question - What one wants to know
- The rationale - Why
- The specifying the question - Possible answers to the originating question

Selection of Research Problem – Dos & Don'ts

1. Research problems cannot be borrowed; researcher has to find his own problem
2. Guide can only help to choose a subject / topic
3. Right question must be addressed; Having a topic to read about is different from having a problem to solve. This leads to aimless and endless gathering of data and no way of knowing when we have enough. Further, this leads to a struggle to decide what to include in report
4. Have unbiased & unattached approach; No mother complex; Be objective
5. Be uncommitted (i.e., hanging loose) before selection
6. Have more than one problem to ponder, i.e., keep alternatives
7. Never settle initially itself on a particular approach
8. Interact with experts & practitioners
9. Avoid superficial & obvious problems

Selection of Research Problem – Dos & Don'ts contd…

10. Avoid overdone subjects & controversial subjects
11. Avoid too narrow or too vague problems (Avoid the risk of settling on a broad topic with 4 or 5 words)
12. Have a preliminary study (quick & dirty study) and / or a brief feasibility study (examine methodology, etc.)
13. Problems should suit your interest, competence & ability
14. Identify gaps through literature survey
15. Check availability of required data and co-operation of people concerned
16. Problem should be novel, significant and useful to practitioners; utility of the expected findings should be judged
17. Spend lot of time in writing and note taking to understand
18. Make preliminary outlines, disagree with what is read, draw diagrams to connect disparate facts, summarise sources, record random thoughts, discard later if necessary, start writing at the very beginning as you go to encourage critical thinking, to understand sources better and draft more effectively

Still can't clearly formulate?

- ✓ Begin early thinking to save time and later panic.
- ✓ *Ask for help:* Discuss with others, but then not restrict or limit your research; Examine whether a smaller part of bigger part be selected
- ✓ *Look for problems as you read:* Gap, error, misunderstanding, contradictions, inconsistencies, incomplete explanations; Do more than just pointing out
- ✓ *Look for the problem that your claim solves;* work backward to formulate a better, more interesting problem than the one that is started

Tip: Most common way research problem is discovered is by disagreeing with sources; There are standard contradictions (Booth, 2003)

Steps in Formulating Research Problem

1. Stating problem in a general way (& developing a title)
2. Understanding the nature of problem (& building a conceptual model)
3. Surveying available literature & past studies
4. Developing ideas through discussion - experience survey (setting investigative questions)
5. Rephrasing the problem
   - ➢ Objectives and/ or hypotheses
   - ➢ Title
   - ➢ Terms & concepts
   - ➢ Assumptions & postulates

contd…

Steps in Formulating Research Problem contd…

- ➢ Significance & value
- ➢ Suitability in terms of ability, time, money, data, etc.
- ➢ Scope & limitations
  - Time & space co-ordinates
  - Unit of analysis
  - Environmental conditions

6. Methodology *(third part, see synopsis)*

Note: Formulation has all the benefits of a good research plan or design and hence can be considered as part of it

Main Steps for Conducting Research

(i) Selection and formulation of research problem and working hypothesis
(ii) Literature survey
(iii) Overall design or planning the strategy of the study
(iv) Sampling and sampling strategy or plan
(v) Measurement and scaling techniques
(vi) Pilot study
(vii) Data collection
(viii) Processing and analysis of data
(ix) Testing of hypotheses
(x) Interpretation, generalisation and realisation of objectives
(xi) Preparation, writing, presentation and dissemination of research results

Research is not a simple linear activity

- Researchers never move in a straight line from finding a topic to stating a thesis to filling in note cards to drafting and revision
- Real research loops back and forth, moving forward a step or two, going back and moving ahead again, anticipating stages not yet begun
- However carefully you plan, research follows a crooked path, taking unexpected turns, even looping back on itself; Work through step-by-step; When you can manage the parts, you can manage the whole
- Research is not like going a well marked path to a familiar destination; it is more like struggling through overgrown woods, searching for something you won't know until you find it
- No one can solve the world's great problems in a tiny project, but choosing smaller questions, knowing answers can lead to great solutions. A good researchers takes us one step further in understanding great problem by making us better understanding the problem

Research is a **complex process**

- it also involves many implicit mysterious creative processes
  - ➢ Turning a vague interest into a problem worth posing and solving
  - ➢ Building an argument that motivates readers to accept your claim
  - ➢ Anticipating the reservations of thoughtful but critical readers and then responding appropriately
  - ➢ Creating an introduction and conclusion that answer the toughest of questions, So *what?*
  - ➢ *Reading your own writing as others may, and thereby learn when and how to revise it*

Additional notes for planning the project (Booth, 2003)

Four steps to plan

1. Finding a topic specific enough to master a reasonable amount of information on it
2. Asking questions about the topic until something catches interest
3. Determining what kind of evidence is expected in support of answer
4. Determining whether sources with such data exist

Note: steps are neither linear nor mutually exclusive

Four steps to move from topic to question

1. From an interest to a broad topic

Some problems are already 'in the air', widely debated and deeply researched

Answer to the question should also be significant to others; others should think that it is worth solving.

Skim texts, talk to others, visit library, internet, scan headings for topics; get references

2. From a broad topic to a focused one

Narrow down by adding special kind of words and phrases like conflict, development, etc.

Using nouns derived from verbs, the topic becomes a step closer to a claim that readers might find significant. For example "the history of commercial aviation" presupposes "commercial aviation has a history" contd…

Four steps to move from topic to question contd.

3. From a focused topic to questions

'Rushing from a topic to a data dump' is **Beginners mistake**

Identify the parts and how they are interrelated and how is the topic part of the larger system

Trace its own history and its role in a larger history:

Identify its characteristics and the categories that include it

Determine its value

Evaluate questions

When you run out of questions, start evaluating them.

Avoid those for which readymade answers are found in reference works.

Combine smaller questions into larger, more significant ones

Settle on a questions or two

A question narrows the search for data to what is required to answer it. On the other hand, if we have only a topic, we will never know when to stop hunting for data.

4. From a merely interesting question to its wider significance

Start by asking so what? Why should readers be interested in it?

Make sentence specific statement

Add a question (indirect) about the topic

Motivate your question; It gives a claim on your readers interest

References

1. Best, Joel. Damned lies and statistics. California: University of California Press, 2001.
2. Best, Joel. More damned lies and statistics; how numbers confuse public issues. Berkeley: University of California Press, 2004
3. Body, Harper W Jr. et.al. Marketing research: text and cases. Delhi: All India Traveler Bookseller, 1985.
4. Booth, Wayne C, et. al. The craft of research. 2 ed. Chicago: The University of Chicago Press, 2003.
5. Chicago guide to preparing electronic manuscripts: For authors and publishers. Chicago: The University of Chicago Press, 1987.
6. Goode, William J and Hatt, Paul K Methods on social research. London; Mc Graw Hill, 1981.
7. Gopal, M.H. An introduction to research procedures in social sciences. Bombay: Asia Publishing House, 1970.
8. Koosis, Donald J. Business statistics. New York: John Wiley,1972.
9. Kothari, C.R. Research methodology: methods and techniques. 2 ed., New Delhi: Vishwaprakashan, 1990.
10. Miller, Jane E. The Chicago guide to writing about numbers. Chicago: the University of Chicago Press, 2004.

References contd.

11. Rodger, Leslie W. Statistics for marketing. London: Mc-Graw Hill, 1984.
12. Salvatoe, Dominick. Theory and problems of statistics and econometrics (Schaum's outline series). New York: McGraw-Hill, 1982.
13. Spiegel, Murray R. Schauim's outline of theory and problems of statistics in SI units. Singapore: Mc Graw Hill , 1981.
14. Simpson, I. S. How to interpret statistical data: a guide for librarians and information scientists. London: Library Association, 1990.
15. Slater, Margaret ed research method in library and information studies. London: Library Association, 1990.
16. Turabian, Kate L. A manual for writers of term papers, theses, and dissertations. 6 ed. Chicago: The University of Chicago, 1996.
17. Young, Pauline V. Scientific social surveys and research. New Delhi: Prentice-Hall of India Ltd., 1984.
18. Walizer, Michael H and Wienir, Paul L. Research methods and analysis: searching for relationships. New york: Harper & Row, 1978.
19. Williams, Joseph M. Style: towards clarity and grace. Chicago: The University of Chicago Press, 1995.

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