

Exploring Research Methodology: Review Article

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ABSTRACT

Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically. In it we study the various steps that are generally adopted by a researcher in studying his research problem along with the logic behind them. It is necessary for the researcher to know not only the research methods/techniques but also the methodology. Researchers not only need to know how to develop certain indices or tests, how to calculate the mean, the mode, the median or the standard deviation or chi-square, how to apply particular research techniques, but they also need to know which of these methods or techniques, are relevant and which are not, and what would they mean and indicate and why. Researchers also need to understand the assumptions underlying various techniques and they need to know the criteria by which they can decide that certain techniques and procedures will be applicable to certain problems and others will not. All this means that it is necessary for the researcher to design his methodology for his problem as the same may differ from problem to problem.

Keywords: Research, Methodology, Research Methodology, Research Techniques, Qualitative research, Quantitative Research

INTRODUCTION

Research in common parlance refers to a search for knowledge. One can also define research as a scientific and systematic search for pertinent information on a specific topic. In fact, research is an art of scientific investigation. The Advanced Learner's Dictionary of Current English lays down the meaning of research as "a careful investigation or inquiry specially through search for new facts in any branch of knowledge." [1] Redman and Mory define research as a "systematized effort to gain new knowledge." [2]

Methodology is the systematic, theoretical analysis of the methods applied to a field of study. It comprises the theoretical analysis of the body of methods and principles associated with a branch of knowledge. Typically, it encompasses

concepts such as paradigm, theoretical model, phases and quantitative or qualitative techniques. [3]

Research Methodology is science of studying how research is done scientifically. A way to systematically solve the research problem by logically adopting various steps. Methodology helps to understand not only the products of scientific inquiry but the process itself. Research Methodology aims to describe and analyze methods, throw light on their limitations and resources, clarify their limitations and resources, clarify their presuppositions and consequences, relating their potentialities to the twilight zone at the 'frontiers of knowledge'. [4]

Objectives of Research

The purpose of research is to discover answers to questions through the application of scientific procedures. The main aim of research is to find out the truth which is hidden and which has not been discovered as yet. Though each research study has its own specific purpose, we may think of research objectives as falling into a number of following broad groupings:

1. To gain familiarity with a phenomenon or to achieve new insights into it (studies with this object in view are termed as exploratory or formulative research studies);
2. To portray accurately the characteristics of a particular individual, situation or a group (studies with this object in view are known as descriptive research studies);
3. To determine the frequency with which something occurs or with which it is associated with something else (studies with this object in view are known as diagnostic research studies);
4. To test a hypothesis of a causal relationship between variables (such studies are known as hypothesis-testing research studies).^[5]

Types of Research

Research can be classified on the basis of time, purpose, settings, place and technique. Some researches have similarities and some have little variations. But all the types of research have its own significance.

Basic Research: It is also called as pure research. Research for the sake of enhancement of knowledge is termed as Basic Research. It is done with the intention of overpowering of the unknown facts. It is concerned with the generalizations and also with the formulation of new theory. Basic research may not produce solutions or results to the present problem but it contributes something to the scientific knowledge. Though its work may have zero importance, but it may become useful in the future.

Applied Research: It is also called as practical research or 'need based' research. The main intention is to find solutions to the

current problems being faced by an institution, society, business or in government offices. Research to identify social, political and economic changes, which has adverse effects in different sectors are some of the examples of applied research. This type of research is mainly carried on with the secondary data.

Empirical Research: It is often referred to as experimental research. In this primary data is collected, analyzed, interpretation is done and subjected to hypothesis testing. Researcher should develop his experimental designs and should provide working hypothesis before the commencement of his research for good output.

Qualitative Research: As the name itself suggests, this research is concerned with the qualitative process. It generally works with the study of human behavior. By this research one can find the body language, attitude, opinions, feelings etc. from the opposite person through observation. It is mainly helpful for Psychiatrists and interviewers. Many techniques are being used like word association test, sentence completion, drawing pictures, Thematic Apperception Test. It is needed in times where quantitative research does not work. Hence, it is also called as 'Motivation Research'.

Quantitative Research: This research is mainly concerned with the measurement of phenomenon in terms of quantity. Many a times a debate is conducted between qualitative and quantitative terms. An example for the quantitative research is carrying out senses for collecting population, social, economic statistics of a particular area. They are subjected to statistical analysis. It relays mainly on primary data like survey method and questionnaire method. However, one can observe the inter-dependence between one another.

Descriptive Research: As the name itself indicates, this research directly deals with description. It includes different data collection like survey method and fact-finding techniques. The main character of

this research is that, the researcher does not have control over the variables. He should describe what has happened and what is happening. Most Ex post facto projects use descriptive research.

Some other types of research: Apart from the above types of research, there are many other classifications like

Longitudinal Research which is spread over for a long period of time. In this change takes place gradually.

Historical Research which is concerned with the collecting of auto biographies, letters, documents, enquiries for knowing the past.

Simulation Research deals with the creation of an artificial environment which is quite similar to real environment.

Depending upon the need of the situation we can create and adjust to it. [6]

Significance of Research

- It helps in framing of policies: Research helps in the framing of various government policies. Nearly all the government policies and budgets are planned and executed through research with the help of researcher. Annual budget, monthly budget, monetary and economic policies are all framed by the government. The government is assisted by various organizations for framing the policies through research.
- Basic aim is to gain knowledge: It leads to many ideas and changes old facts.
- It is used in business organization: Many business companies hire researcher to work on various things. It is used in studying the changes taking place in the market. It helps in capital budgeting, tax management and cost saving policies.
- It leads to discovery and innovation of unknown facts and unexplored theories. It leads to the growth of the society and its citizens. It gives chance to the researcher to go deep into the subject and to innovate it.
- It avoids superstitious beliefs, myths and prejudices: Many people are still not aware of the research activities and its importance. Many ancient beliefs and

myths have been proven wrong with the help of research.

- It leads to development of social welfare and society.
- It is useful for PhD students to write their thesis.

Thus, Research is a fountain of knowledge, which helps in solving all government policies, business problems, avoids superstitious beliefs and helps in the development and maturity of society and its citizens. [6]

Research Process:

1. Formulating the research problem:

There are two types of research problems, viz., those which relate to states of nature and those which relate to relationships between variables. At the very outset the researcher must single out the problem he wants to study, i.e., he must decide the general area of interest or aspect of a subject-matter that he would like to inquire into. Initially the problem may be stated in a broad general way and then the ambiguities, if any, relating to the problem be resolved. Then, the feasibility of a particular solution has to be considered before a working formulation of the problem can be set up. The formulation of a general topic into a specific research problem, thus, constitutes the first step in a scientific enquiry. Essentially two steps are involved in formulating the research problem, viz., understanding the problem thoroughly, and rephrasing the same into meaningful terms from an analytical point of view.

- #### **2. Extensive literature survey:** Once the problem is formulated, a brief summary of it should be written down. It is compulsory for a research worker writing a thesis for a Ph.D. degree to write a synopsis of the topic and submit it to the necessary Committee or the Research Board for approval. At this juncture the researcher should undertake extensive literature survey connected

with the problem. For this purpose, the abstracting and indexing journals and published or unpublished bibliographies are the first place to go to. Academic journals, conference proceedings, government reports, books etc., must be tapped depending on the nature of the problem. In this process, it should be remembered that one source will lead to another. The earlier studies, if any, which are similar to the study in hand should be carefully studied. A good library will be a great help to the researcher at this stage. ^[5]

3. Developing a working hypothesis: A research in any field of study do not give proper results unless and until we develop a working hypothesis. It is a tentative statement or assumption regarding the solution to the problem of study. It is an assumption which is used to draw the logical consequences. It is the key point of study and hence it should be limited and should contain much knowledge. It is helpful for researcher for predictions and also maintains complete focus on the study. It should be precise and clearly defined. It gives an idea of the type of data to be used and type of method or techniques for the study. In some research activities like exploratory or formulative, hypothesis is not used for testing. ^[6]

4. Preparing the research design: The research problem having been formulated in clear cut terms, the researcher will be required to prepare a research design, i.e., he will have to state the conceptual structure within which research would be conducted. The preparation of such a design facilitates research to be as efficient as possible yielding maximal information. In other words, the function of research design is to provide for the collection of relevant evidence with minimal expenditure of effort, time and money. But how all these can be achieved depends mainly on the research purpose. Research purposes may be grouped into four

categories, viz., (i) Exploration, (ii) Description, (iii) Diagnosis, and (iv) Experimentation. A flexible research design which provides opportunity for considering many different aspects of a problem is considered appropriate if the purpose of the research study is that of exploration. But when the purpose happens to be an accurate description of a situation or of an association between variables, the suitable design will be one that minimises bias and maximises the reliability of the data collected and analysed. There are several research designs, such as, experimental and non-experimental hypothesis testing. Experimental designs can be either informal designs (such as before-and-after without control, after-only with control, before-and-after with control) or formal designs (such as completely randomized design, randomized block design, Latin square design, simple and complex factorial designs), out of which the researcher must select one for his own project. The preparation of the research design, appropriate for a particular research problem, involves usually the consideration of the following: (i) the means of obtaining the information; (ii) the availability and skills of the researcher and his staff (if any); (iii) explanation of the way in which selected means of obtaining information will be organised and the reasoning leading to the selection; (iv) the time available for research; and (v) the cost factor relating to research, i.e., the finance available for the purpose. ^[5]

5. Determining sample design: The researcher must decide the way of selecting a sample or what is popularly known as the sample design. In other words, a sample design is a definite plan determined before any data are actually collected for obtaining a sample from a given population. A brief mention of the important sample designs is as follows:

- Deliberate sampling
- Simple random sampling

- Systematic sampling
 - Stratified sampling
 - Quota sampling
 - Cluster sampling and area sampling
 - Multi-stage sampling
 - Sequential sampling [5]
- 6. Collecting the data:** The method of gathering or collecting the data is planned in data collection design. There are many types for collecting the data. The two types of collecting data are Primary data and Secondary data.

Some of the important methods for collecting the Primary data are as follows:

Questionnaire: The method of collecting data in vast geographical areas is done through Questionnaire method. Hence questionnaires are mailed to the research areas and they are distributed among the respondents. It is a time saving and economical method but the main drawback is that the answers given by the respondents are not accurate.

Interview: The investigators prepare a set of questions and ask them in a serial wise to the respondents. There are different types of interview like personal, group, mock and telephone interview. It is fast procedure. We can get extra information which is related to the topic. But it is costly. Some respondents may try to hide some answers. It saves much time of the investigator.

Observation: This is also one type of collecting data primarily. In this researcher observes the day to day process of the society or a single person. Sometimes researcher has to involve in the process. It discovers the human behavior of the respondent. No doubt this method is cost effective but the data collected is also limited. It can't predict the happenings of the future.

Secondary data can be collected through books, published articles, internet and syndicate services. Syndicate services are companies which collect and sell data to various people who are in need. It is suitable for researcher who wants to survey on large population. The disadvantage of this method

is that the researcher will not enjoy extra information and it is very costly.

- 7.** Though the data can be collected in a short span of time but the accuracy cannot be stated. [6]

Execution of the project: After preparing a good design for the process of research, the researcher should move on to the next step of execution. From this stage the researcher starts executing the research design. Training should be given to the surveyors and a working manual should be given to them. The collection of data should be carefully handled. [6]

8. Analysis of data: Soon after the collection of data, the researcher turns to the process of analyzing the collected data. The raw data will be tuned. There are many things used for analysis like coding, tabulation, editing and statistical analysis. Data will be collected in the form of questionnaires or schedules. Hence the data collected in short forms will be elaborated through coding. Editing can be done at the time of collecting or collecting the data. Through editing the researcher removes all the mistakes in the project. It will be polished. Through tabulation the researchers do the work of preparing the tables.

9. Hypothesis-testing: After analysing the data as stated above, the researcher is in a position to test the hypotheses, if any, he had formulated earlier. Do the facts support the hypotheses or they happen to be contrary? This is the usual question which should be answered while testing hypotheses. Various tests, such as Chi square test, t-test, F-test, have been developed by statisticians for the purpose. The hypotheses may be tested through the use of one or more of such tests, depending upon the nature and object of research inquiry. Hypothesis-testing will result in either accepting the hypothesis or in rejecting it. If the researcher had no hypotheses to start with, generalisations established on the basis of data may be stated as

hypotheses to be tested by subsequent researches in times to come.

10. Generalisations and interpretation: If a hypothesis is tested and upheld several times, it may be possible for the researcher to arrive at generalisation, i.e., to build a theory. As a matter of fact, the real value of research lies in its ability to arrive at certain generalisations. If the researcher had no hypothesis to start with, he might seek to explain his 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.

11. Preparation of the report or the thesis: Finally, the researcher has to prepare the report of what has been done by him. Writing of report must be done with great care keeping in view the following: 1. The layout of the report should be as follows: (i) the preliminary pages; (ii) the main text, and (iii) the end matter. In its preliminary pages the report should carry title and date followed by acknowledgements and foreword. Then there should be a table of contents followed by a list of tables and list of graphs and charts, if any, given in the report. The main text of the report should have the following parts: (a) Introduction: It should contain a clear statement of the objective of the research and an explanation of the methodology adopted in accomplishing the research. The scope of the study along with various limitations should as well be stated in this part. (b) Summary of findings: After introduction there would appear a statement of findings and recommendations in non-technical language. If the findings are extensive, they should be summarised. (c) Main report: The main body of the report should be presented in logical sequence and broken-down into readily identifiable sections. (d) Conclusion: Towards the end of the main text, researcher should again put down the

results of his research clearly and precisely. In fact, it is the final summing up.

Research Approach

Research approach can be divided into three types:

1. Deductive Research approach
2. Inductive Research approach
3. Abductive Research approach

The relevance of hypotheses to the study is the main distinctive point between deductive and inductive approaches. Deductive approach tests the validity of assumptions (or theories/hypotheses) in hand, whereas inductive approach contributes to the emergence of new theories and generalizations. Abductive research, on the other hand, starts with 'surprising facts' or 'puzzles' and the research process is devoted their explanation. [7]

In Deductive Research Approach if you have formulated a set of hypotheses for your dissertation that need to be confirmed or rejected during the research process you would be following a deductive approach. Alternatively, inductive approach does not involve formulation of hypotheses. It starts with research questions and aims and objectives that need to be achieved during the research process. In abductive approach, the research process is devoted to explanation of 'incomplete observations', 'surprising facts' or 'puzzles' specified. [7]

Major Changes in Research Environment

- **Information Technologies in Research:** The continued exponential rise in the power of information and computing technologies has had a dramatic impact on research across many disciplines. These technologies have not only increased the speed and scope of research but have made it possible to conduct investigations that were not possible before. Information technology advances have enabled new forms of inquiry such as those based on numerical simulation of physical and biological systems and the analysis of

massive datasets to detect and assess the nature of relationships that otherwise would go unseen.

- **The Globalization of Research:** Because knowledge passes freely across national borders, scientific research has always been an international endeavor. But this internationalization has intensified over the past two decades. Nations have realized that they cannot expect to benefit from the global research enterprise without national research systems that can absorb and build on that knowledge. As a result, they have incorporated science and technology into national plans and have established goals for increased R&D investments.
- **Relevance of Research Results to Policy and Political Debates:** Research also comes into play in debates and decisions over numerous contentious policy issues. Science is not the only factor in these discussions. Many considerations outside of science influence policy choices, such as personal and political beliefs, lessons from experience, trial-and-error learning, and reasoning by analogy. To contribute to public policy decisions, researchers must be able to separate their expertise as scientists from their views as advocates for particular public policy positions. ^[8]

Criteria of Good Research

Whatever may be the types of research works and studies, one thing that is important is that they all meet on the common ground of scientific method employed by them. One expects scientific research to satisfy the following criteria:

1. The purpose of the research should be clearly defined and common concepts be used.
2. 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.

3. The procedural design of the research should be carefully planned to yield results that are as objective as possible.

4. The researcher should report with complete frankness, flaws in procedural design and estimate their effects upon the findings.

5. The analysis of data should be sufficiently adequate to reveal its significance and the methods of analysis used should be appropriate. The validity and reliability of the data should be checked carefully.

6. 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.

7. Greater confidence in research is warranted if the researcher is experienced, has a good reputation in research and is a person of integrity. ^[5]

CONCLUSION

Research is a voyage of discovery; a journey; an attitude; an experience; a method of critical thinking; an activity caused by instinct of inquisitiveness to gain fresh insight/find answers to question/acquire knowledge.

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How to cite this article: Patel M, Patel N. Exploring research methodology: review article. International Journal of Research and Review. 2019; 6(3):48-55.
