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1.0 Introduction
Research is a careful search, scholarly inquiry/investigation with the aim of discovery of new facts and findings. It may relate to collection of information, interpretation of facts in the light of new facts or evidence.

According to Advanced Learner’s Dictionary “research as a careful investigation or inquiry specially through search for new facts in any branch of knowledge.”

In short, research is the search for knowledge through objective and systematic method of finding solution to a problem is research.

1.1 Why research is conducted?
There are particular reasons for undertaking research at various levels to discover something new. Thus research is conducted may be to find out something we do not already know or to enhance our understanding of phenomena that we already know something about. For example, in the business arena, research may be conducted in order to achieve one or more of the following objectives:

1. To gain competitive advantage.
2. To test new services
3. To solve a management/organizational problem.
4. To provide information this may help to avoid future business problems.
5. To forecast future sales.
6. To better understand consumers’ attitudes and tastes.
7. To enhance profitability.
8. To reduce operational costs.
9. To enable management to prioritize strategic options for the future.

1.2 Objective of Research
The purpose of research is to discover answers to the 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.

Thus research is conducted for number of reasons, which in turn depend on the objectives of any particular ‘research problem’. Following are the research objectives:

1. To get familiarity with a phenomenon or to achieve new insights into it. Studies with this objective are termed as exploratory or formulative research studies.
2. To portray accurately the characteristics of a particular individual, situation or a group. It describes phenomena and attempts to explain why behavior is the way it is. Studies with this objective are termed 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 are known as diagnostic research.

4. To test the hypothesis of a causal relationship between variables such studies are known as hypothesis-testing research studies.

1.3 Types of Research

1. Descriptive Vs. Analytical research:
Descriptive research includes surveys and fact-finding enquiries of different kinds. The major purpose of descriptive research is description of the state of affairs as it exists at present. In social science and business research we quite often use descriptive research studies. The main characteristic of this method is that the researcher has no control over the variables; he can only report what has happened or what is happening. The methods of research utilized in descriptive research are survey methods of all kinds, including comparative and correlation methods.

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.

2. Applied (or action)Vs. Fundamental Research( or to basic or pure):
Applied research aims at finding a solution for an immediate problem facing a society or an industrial/business organization. Research aimed at certain conclusions or solution facing a concrete social or business problem is an example of applied research. Thus, the central aim of applied research is to discover a solution for some pressing practical problem.
Applied research is conducted when a decision must be made about a specific real-life problem the aim of researcher conducting applied research is to improve human conditions. It is directly related to social and policy issues. Examples of applied research include an investigation to improve agricultural crop production.
Fundamental research is mainly concerned with generalizations and with the formulation of a theory. Research concerning some natural phenomenon or relating to pure mathematics are example of fundamental research.

3. Qualitative Vs. Qualitative research:
Quantitative research is based on the measurement of quantity or amount. It is applicable to the phenomena that can be expressed in terms of quantity.
Qualitative research is concerned with qualitative phenomenon. i.e. reasons of human behavior i.e. why people think or do certain things etc.

4. Conceptual Vs. Empirical research:
Conceptual research is related to some abstract ideas or theory. It is generally used by philosophers and thinkers to develop new concepts or to reinterpret existing ones. Empirical research relies on experience or observation alone, often without due regards for system and theory. It is data based research, coming up with conclusions which are capable of being verified by observation or experiment.

1.4 Significance of Research
All progress is born of inquiry. Doubt is often better than overconfidence, doubt leads to inquiry, and inquiry leads to invention. Thus increased amount of research make progress possible. Research inculcates scientific thinking and it promotes the development of logical habits of thinking and organization. Thus decision making may not be a part of research, but research certainly facilitates the decisions of the policy maker. Research has its special significance in solving various operational and planning problems of business and industry.

1.5 Research Method Vs. Research Methodology
Research method and research methodology are not the same thing! A research method is a way of conducting and implementing research. Research methods may be understood as all those methods/techniques that are used for conduction of research. A distinction also made between research techniques and research methods. Research techniques refer to the instruments we use in performing research operations such as making observations, recording data, techniques of processing data and the like. Research methods refer to the behaviour and instruments used in selecting and constructing research technique.

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<th>Methods</th>
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<td>Analysis of historical records</td>
<td>Recording of notes, content analysis</td>
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<td>2.</td>
<td>Analysis of documents</td>
<td>Statistical compilation, manipulations reference and content analysis</td>
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<tr>
<td>3.</td>
<td>Direct observation</td>
<td>Observational behavioural scales, use of score cards etc.</td>
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<td>4.</td>
<td>Participant observation</td>
<td>Interactional recording, use of tape recorder, photo graphic techniques.</td>
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<td>5.</td>
<td>Mass observation</td>
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Dr. Kishor G. Nawale, Shri Shahu Mandir Mahavidyalaya, Parvati, Pune- 09
independent observers in public places.

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(However in practice, the two terms are taken as interchangeable and when we talk of research methods we do, by implication, include research techniques within their compass.)

Thus, research methods are the methods the researchers use in the performing research operations. In other words, all those methods which are used by the researcher during the course of studying his research problem are termed as research methods.

**Research methodology** is the philosophy behind all research. It goes into the heart of how we know what we know and allows us to understand the very strict constraints placed upon our concept of what knowledge actually is. It allows us to understand the different ways in which knowledge can be created.

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. Researcher not only need to know how to develop certain indices or tests, how to calculate the mean, mode, median or the standard deviation or chi-square, how to apply particular techniques, but also need to know which of these technique is relevant and which are not and what would they mean and why. Researcher also needs to understand the assumptions underlying varying techniques. **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.** For example, an architect, who designs a building, has to consciously evaluate the basis of his decisions, i.e. he has to evaluate why and on what basis he select particular size, number and location of doors, windows and ventilators, uses particular materials etc. Similarly in research a researcher has to specify very clearly and precisely what decisions he selects and why he selects them so that they can be evaluated by others also.

Thus, We can say that research methodology has many dimensions and research methods do constitute a part of the research methodology. The scope of research methodology is wider than that of research methods. **Thus, when we talk of research methodology we not only talk of the research methods but also consider the logic behind the methods we use in the context of our research study and 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.**
Why a research study has been undertaken, how the research problem has been defined, in what way and why the hypothesis has been formulated, what data have been collected and what particular method has been adopted, why particular technique of analyzing data has been used and a host of similar other questions are usually answered when we talk of research methodology concerning a research problem or study.

1.6 Why Knowledge of Research Methodology is Important?

The study of research methodology gives the student the necessary knowledge about gathering and arranging of material, participation in the field work when required and also training in techniques for the collection of data appropriate to a particular problem, use of statistics, questionnaires and controlled experimentation and in recording evidence, sorting it out and interpreting it. In fact, importance of knowing the methodology of research or how research is done is very important.

1. Knowledge of methodology enables researcher to do better research. It helps him to develop disciplined thinking to observe the field objectively.

2. The knowledge of research methodology inculcates the ability to evaluate and use research results with reasonable confidence. In other words, we can state that the knowledge of research methodology is helpful in various fields such as government or business administration, community development and social work where persons are increasingly called upon to evaluate and use research results for action.

1.7 Research Process

Research process consists of series steps necessary to effectively carry out research. The following order concerning various steps provides a useful/IMPORTANT procedural guideline regarding the research process:

1st. Formulating the research problem
2nd. Extensive literature survey
   • Review concepts and theories
   • Review previous research finding
3rd. Statement of the objectives and developing the hypothesis
4th. Preparing the research design
5th. Determining sample design
6th. Collecting the data (Execution)
7th. Analysis of data
8th. Hypothesis testing
9th. Generalizations and interpretation
10th. Preparation of the report or presentation of the results i.e. formal write-up of the conclusions reached.

Step 1: Formulating the research problem:
In research process, the first and foremost step happens to be that of selecting and properly defining a research problem. “A research problem refers to some difficulty which a researcher experiences in the context of either a theoretical or practical situation or wants to obtain a solution for the same.” There are two types of research problems, 1) Those related to states of nature and 2) those which relate to relationships between variables.

At the very first, researcher 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. Thus, formulating of general problem is the first step in a scientific enquiry. Essentially two steps are involved in formulating the research problem, viz., 1) understanding the problem thoroughly, and 2) rephrasing the same into meaningful terms from an analytical point of view.

The best way of understanding the problem is to discuss it with one’s own colleagues or with those having some expertise in the matter or from guide who is usually an experienced in that particular field. These people will put forth the problem in general terms and it is up to the researcher to narrow it down and phrase the problem in operational terms.

The researcher must at the same time examine all available literature to get himself acquainted with the selected problem. The basic outcome of this review of literature will be the knowledge as to what data and other materials are available for operational purposes which will enable the researcher to specify his own research problem in a meaningful context. Thus, the task of formulating a research problem is a step of greatest importance in the entire research process. The problem to be investigated must be defined unambiguously for that will help discriminating relevant data from irrelevant ones. However care must be taken of following points by a researcher in selecting a research problem or a subject for research:
1. Subject which is repeated should not be normally chosen, for this it will be a difficult task to throw any new light in such a case.
2. Controversial subject should not become the choice of an average researcher.
3. To narrow or too vague problem should be avoided.
4. The subject selected for research should be familiar and feasible so that the related research material or sources of research are within one’s reach.
5. The importance of the subject, the costs involved, the time factor are few other factors must be considered in selecting a problem. Therefore, before the final
selection of a problem is done, a researcher must ask himself the following questions:

- Whether he is well-equipped in terms of his background to carry out the research?
- Whether the study falls within the budget he can afford?
- Whether the necessary cooperation can be obtained from those who must participate in research as subjects?

If the answers to all these questions are in the affirmative, one may become sure the practicability of the study is concerned.

6. The selection of the topic must be preceded by a preliminary study.

**Techniques Involved in Defining a Problem**

Defining a problem involves the task of laying down boundaries within which a researcher shall study the problem with a pre-determined objective in view. The technique for the purpose involves the undertaking of the following steps generally one after the other (1) Statement of the problem in a general way; (2) understanding the nature of the problem; (3) surveying the available literature (4) Developing the ideas through discussions; (5) rephrasing the research problem into a working proposition.

1. **Statement of the problem in a general way:** First of all the problem should be stated in a broad general way. Keeping in view some practical or intellectual interest. At this stage, it is advisable to do some field observation what is often called pilot survey. Then the researcher can himself state the problem or seek the guidance of the guide.

2. **Understanding the nature of the problem:** Next problem is to understand its origin and nature clearly. i.e. find out how the problem originally came about and with what objectives in view.

3. **Surveying the available literature:** All the available literature concerning the problem at hand must necessarily be surveyed and examined before a definition of the research problem is given. Researcher must devote sufficient time in reviewing of research already undertaken on related problems.

4. **Developing the ideas through discussions:** Researcher must discuss his problem with his colleagues and others who have enough experience in the same area or in working on similar problems. This is quite often known as an experience survey. People with rich experience are in a position to enlighten the researcher on different aspects of his proposed study and their advice and comments are usually invaluable to the researcher. They help him sharpen his
focus of attention on specific aspects within the field. Discussion with such persons should also concern with techniques that might be used, possible solutions etc.

5. **Rephrasing the research problem:** Finally, the researcher must sit to rephrase the research problem into a working proposition. Through rephrasing, the researcher puts the research problem in as specific terms as possible so that it may become operationally viable and may help in the development of *working hypotheses*.

To conclude, a proper defined research problem will enable the researcher to be on the track whereas an ill-defined problem may create hurdles. Questions like: What data are to be collected? What characteristics of data are relevant and need to be studied? What relations are to be explored? What techniques are to be used for the purpose? etc. and find answers to all such questions only when the research problem has been well defined.

**Step 2. Extensive Literature Survey:**

Once the problem is formulated, a brief summary of it should be written down. At this stage 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 materials, government reports, books etc. must be collected depending on the nature of the problem. A good library will be a great help to the researcher at this stage.

Researcher may review two types of literature 1) the conceptual literature concerning the concepts and theories, and 2) the empirical literature consisting of studies made earlier which are similar to the one proposed.

**Step 3. Statement of the objective and development of working hypothesis**

Statement of the objective is of basic importance because it determines the data which are to be collected, relevant data, relations which are to be explored, the choice of techniques to be used in these explorations and the form of the final report.

**Development of working hypothesis:**

The word Hypothesis is a combine of two words hypo and thesis and hypo means under or below and thesis means a reasoned theory of rational view point. In other words, hypothesis is a theory which is not fully reasoned. Hypothesis is a theory entertained for studying the facts and examining the validity of the theory.
Hypothesis is nothing but a provisional formulation or possible solution or tentative explanation or suggested answer to the problem facing the researcher. First step of the project report is identification of hypothesis. Thus hypothesis is the statement i.e. base for the data collection and forward suggestions to solve it.

After extensive literature survey, researcher should state in clear terms the working hypothesis. Working hypothesis is tentative assumption (tentative solution) made in order to draw out and test its logical consequences. Thus a hypothesis is the focal point for research. The hypothesis affects the manner in which tests must be conducted in the analysis of data and indirectly the quality of data which is required for the analysis. Hypothesis should be very specific and limited to the piece of research in hand because it has to be tested. The role of the hypothesis is to guide the researcher by delimiting the area of research and to keep him on the right track. It sharpens his thinking and focuses attention on the more important facets of the problem. It also indicates the type of data required and the type of methods of data analysis to be used. To develop the working hypothesis, following approach should be used.

- Discussions with colleagues and experts about the problem, its objectives in seeking a solution.
- Examination of data and records, if available, concerning the problem.
- Review of similar studies in the area or of the studies on similar problems.
- Original personal field interviews on a limited scale with interested parties with a view to secure greater insight into the practical aspects of the problem.

Thus, working hypothesis arise as a result of a prior thinking about the subject, examination of the available data and material including related studies and the counsel of experts and interested parties. **Hypothesis is more useful when stated in precise and clearly defined terms.**

**Step 4. Preparation of research design:**

When the research problem is formulated in clear cut terms, the researcher will be required to prepare a research design. We need research design or plan in advance of data collection and analysis of our research. If the research study happens to be an exploratory or a formulative one, wherein the major emphasis is on discovery of ideas and insights, the research design most appropriated must be flexible enough to permit the consideration of many different aspects of a phenomenon.

Research design is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data. More explicitly, the design decisions happen to be in respect of:
(i). What is the study about?
(ii). Why is the study being made?
(iii). Where will be the study be carried out?
(iv). What type of data is required?
(v). Where can be required data be found?
(vi). What periods of time will the study include?
(vii). What will be the sample design?
(viii). What techniques of data collection will be used?
(ix). How will the data be analyzed?
(x). In what style will be the report be prepared?

Thus, decisions regarding what, where, when, how much, by what means concerning an inquiry or a research study constitute a research design.

Please note that research design must, at least contain – (a) a clear statement of the research problem (b) The objectives of the problem to be studied; (c) The nature of the problem to be studied (d) procedures and techniques to be used for gathering information i.e. sources and types of information relevant to the research problem; (e) the population to be studied; (f) the sample to be studied i.e. sampling design; (g) methods to be used in processing and analyzing data i.e. statistical design. (h) Limitations of the study i.e. the time and cost budget since most studies are done under these two constraints.

Step 5. Determination of sample design:
All the items under consideration in any field of inquiry constitute a ‘Universe’, or ‘Population’. It is not possible to consider entire population for enquiry. The researcher must decide the way of selecting a sample, popularly known as the sample design. Total population inquiry involves a great deal of time, money and inquiry. However total population inquiry is not possible in practice under many circumstances. Hence quite often we select only a few items from the population, for our study purpose. The items so selected constitute what is technically called a sample or sample design.

The researcher must decide the way of selecting a sample design. Thus, sample design is a definite plan determined before any data are actually collected for obtaining a sample from a given population. Thus, the plan to select 12 of a city’s 200 drug stores in a certain way constitutes a sample design. Samples can be either probability samples or non-probability samples. With probability samples each element has a known probability of being included in the sample but the non-probability samples do not allow the researcher to determine this probability. A brief mention of the important sample designs is as follows:
• **Deliberate sampling**: Deliberate sampling is known as non-probability sampling. This sampling method involves deliberate selection of particular units of the population for constituting a sample which represents the population. On the other hand, **judgment sampling** the researcher judgment is used for selecting items which he considers as representative of the population.

• **Simple random sampling**: where each and every item in the population has an equal chance of inclusion in the sample. For example, if we have to select a sample of 300 items from a universe of 15000 items, then we can put the names or numbers of all the 15000 items on slips of paper and conduct a lottery.

• **Systematic Sampling**: e.g. to select every 15\textsuperscript{th} name on a list or select every 10\textsuperscript{th} house on one side of a street and so on. Sampling of this type is known as systematic sampling.

• **Stratified Sampling**: If the population from which a sample is to be drawn does not constitute a homogeneous group, then stratified sampling technique is used to obtain representative sample. In this technique, the population is stratified into a number of non-overlapping subpopulations or strata and sample items are selected from each stratum. If the items selected from each stratum is based on simple random sampling the entire procedure, first stratification and then simple random sampling, is known as stratified random sampling.

• **Quota Sampling**:
• **Cluster sampling and area sampling**:
• **Multi-stage sampling**:
• **Sequential sampling**:

In practice, several of the methods of sampling described above may well be used in the same study in which case it can be called mixed sampling. The sample design to be used must be decided by the researcher taking into consideration the nature of the inquiry and other related factors.

**Step 6. Collecting the data**

In dealing with any real life problem of research, it is often found that data at hand are inadequate, and hence, it becomes necessary to collect data that are appropriate. There are several ways of collecting the appropriate data which differ considerably in context of money, cost, time and other resources at the disposal of the researcher.

Primary data can be collected either through experiment or through survey. If the researcher conducts an experiment, he observes some quantitative measurements, or the data, with the help of which he examines the truth contained in his hypothesis. But in case of a survey, data can be collected by any or more of the following ways:

A. **By Observation**: This method implies the collection of information by way of investigator’s own observation, without interviewing the respondents.
B. **Through personal interview:** The investigator follows a rigid procedure and seeks answers to a set of pre-conceived questions through personal interviews. In this method, the output is depend upon the ability of the interviewer to a large extent.

C. **Through telephone interviews:** It involves contacting the respondents on telephone itself.

D. **By mailing of questionnaires:** The researcher and the respondents do come in contact with each other if this method of survey is adopted. Questionnaires are mailed to the respondents with a request to return after completing the same. It is most extensively used method in various economic and business surveys. Before applying this method, usually a pilot study for testing the questionnaire is conducted this reveals the weaknesses, if any of the questionnaire.

Researcher should select one or two of these methods of collecting of collecting the data taking into consideration the nature of investigation, objective and scope of the inquiry, financial resources, available time and the desired degree of accuracy.

**Step 7. Analysis of data:**

After the data have been collected, the researcher turns to the task of analyzing them. Data analysis includes establishment of categories, the application of these categories to raw data through coding, tabulation and then drawing statistical inferences. Thus researcher should classify the raw data into some purposeful and usable categories. In the process of analysis, relationships or differences supporting or conflicting with original or new hypothesis should be subjected to tests of significance to determine with what validity data can be said to indicate any conclusions.

**Step 8. Hypothesis testing:**

After analyzing the data as stated above, the researcher is in a position to test the hypothesis, if any, he had formulated earlier. Do the facts support the hypothesis or they happen to be contrary? This is the usual question which should be answered while testing hypothesis. Various tests, such as Chi square test, t-test, F-test, have been developed by statisticians for the purpose. The hypothesis 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 hypothesis to start with, then generalizations established on the basis of data may be stated as hypothesis to be tested by subsequent researches in times to come.
Step 9. Generalizations and interpretations

If a hypothesis is tested and upheld (Supported) several times, it may be possible for the researcher to arrive at generalization. i.e. to build a theory. As a matter of fact, the real value of research lies in its ability to arrive at certain generalizations.

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 research.

Step 10. Preparation of the report or 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:

The layout of the report should be as follows: (i) the preliminary; (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 contain the detailed information of each chapter as decided in chapter scheme. And towards the end of the main text, researcher should again put down the results of his research clearly and precisely in the form of conclusion. In fact, it is the final summing up.

At the end of the report, appendices should been listed in respect of all technical data. Bibliography, i.e. list of books, journals, reports etc., consulted, should also be given in the end

Report should be written in a concise and objective style in simple language avoiding vague expressions such as ‘it seems’, ‘there may be’, and the like. These words should not be used in the report.

Charts and illustrations in the main report should be used only if they present the information more clearly and forcibly.

Calculated ‘confidence limits’ must be mentioned and the various constraints experienced in conducting research operations may be stated.

1.8 Criteria of Good Research

Whatever maybe the type of research work, one thing is important that they all must satisfy the following criteria:

1. The purpose of the research should be clearly defined.
2. The research procedure used should be described in sufficient detail to permit another researcher to repeat the research for further advancement. Research is structured with specified steps to be taken in a specified sequence in accordance with the well defined set of rules. There should not be the use of guessing and intuition in arriving at conclusions.

3. Research must be a logical: Logical process of induction and deduction are of great value in carrying research. Logical sequence makes research more meaningful in the context of decision making.

4. The design of the research should be carefully planned to yield perfect results.

5. Good research is empirical (empirical means based on experience and practical experience): It implies that research should be based on one or more aspects of a real situation and deals with concrete data that a basis for external validity to research results.

6. 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.

7. Conclusions should be confined to those justified by the data of the research and limited to adequate basis.