Meaning of Research

**Research** is a scientific and systematic search for various information about a specific topic. It is just like a search for truth and knowledge. The English Dictionary meaning of Research is “a careful investigation or inquiry especially through search for new facts in any branch of knowledge.” information about a subject can be collected by deliberate effort and it is presented in a new form after analyzing thoroughly in research work.

Research is an academic activity. It is a movement from the known to the unknown, which may be called a discovery. Different definitions of research are given by the experts.

**According to Redman and Mory,** “Research is a systematized effort to gain new knowledge.”

1. **Slesinger and M Stephenson define research as,** “the manipulation of things, concepts or symbols for the purpose of generalizing to extend correct or verify knowledge whether that knowledge aids in construction of theory or in the practice of an art ”

**According to P.M. Cook,** “Research is an honest, exhaustive, intelligent searching for facts and their meanings or implications with reference to a given problem.”

**J.M. Francis Rumel defines,** “Research is an endeavour to discover, develop and verify knowledge.”

**Clifford Woody, defines** “Research is a careful enquiry or examination in seeking facts or principles a diligent investigation to ascertain something.”

**Objectives**

The main purpose of research is to discover answers to the meaningful questions through scientific procedures and systematic attempt. The hidden truths which are not discovered yet can easily come to light by research.

**The main objectives of Research are**

1. To gain familiarity or to achieve new insights into a phenomenon. This is known as Exploratory or Formularize Research studies.
2. To describe the accurate characteristics of a particular individual, situation or a group. This is known as Descriptive Research studies.
3. To determine the frequency with which something occurs or with which it is associated with other things. This is known as Diagnostic Research studies.
4. To test a hypothesis of a casual relationship between variables. Such studies are known as Hypothesis-testing Research studies.

**Characteristics of Research**

1. Research is directed towards the solution of a problem.
2. Research gathers new knowledge or data from primary sources.
3. Research is based upon observable experience or experimental evidence.
4. Research is logical and objective, applying every possible test to verify the data collected and the procedures employed.
5. Research is expert, systematic and accurate investigation.
6. Research demands accurate observation and description.
7. Research requires patience and courage. The researcher should courageously face the unpleasant consequences of his finding if any.
8. Research is highly purposive. It deals with a significant problem which must be solved.
9. Research is carefully recorded and reported. Everything must be carefully defined and described in detail.
10. Research activity is characterized by carefully designed procedures which are to be analyzed thoroughly.

**Research Methods**

All those methods which are used by the researcher during the course of studying his research problems are called as Research Methods. Methods of research may be classified from different points of view.

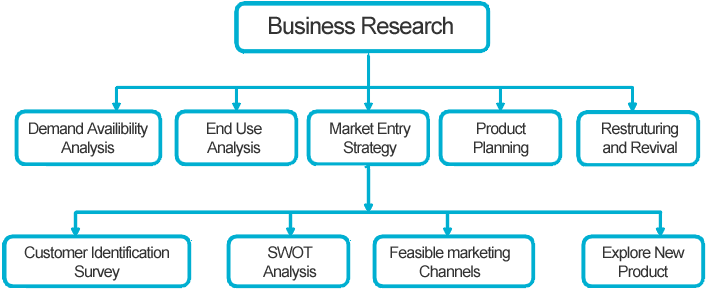
**These are:**

1. The fields to which applied-Education, Philosophy, Psychology.
2. Purpose-Description, Prediction. Determination of status and causes.
3. Place where it is to be conducted-in the field or in the laboratory.
4. Application-Pure research or applied research
5. Data gathering devices employed-Testing, rating scales, questionnaires etc.
6. Character of the data collected-Objective, Subjective, Quantitative, and Qualitative.
7. Forms of thinking-Deductive and Inductive.
8. Control of factors-Controlled and Uncontrolled.

# Business Research, Types Of Research and Process of Research

### ****BUSINESS RESEARCH****

Business research is a field of practical study in which a company obtains data and analyzes it in order to better manage the company. Business research can include financial data, consumer feedback, product research and competitive analysis. Executives and managers who use business research methods are able to better understand their company and  the position it holds in the market.



**Fig. Business Research**

**HOW TO IMPROVE THE POSITION OF ANY COMPANY?**

* **Financial Data**

Financial data takes qualitative information–such as sales reports, revenues and cost reports–to see what areas make money and what costs money. By reviewing data, managers can find the products, staff and departments that are most efficient and determine areas of unnecessary costs.

* **Consumer Feedback**

Understanding what the public says about the products and services a company provides is essential to making sure the company is meeting consumer needs. Customer feedback includes case studies, focus groups, customer surveys and questionnaires.

* **Product Research**

Product research seeks to improve the product to meet the needs of consumers. This may include technological advancements, improved customer service or access to the product through a variety of distribution channels.

* **Competitive Analysis**

Competitive analysis is when one company compares its products and services to those of another company. This can be done to improve the product, create a niche or determine a more attractive price point to lure customers.

* **Industry Data**

Using research tools such as the information compiled by Dun & Bradstreet can help a company to understand how the industry as a whole is doing. This can help executives make decisions based on economic factors affecting their industry that are not limited to their own products.

## **RESEARCH:-**

Systematic investigative process employed to increase or revise current knowledge by discovering new facts.

### ****Types of research:-****

### ****(1)Applied Research****

Applied research “aims at finding a solution for an immediate problem facing a society, or an industrial/business organization. Applied research is considered to be non-systematic inquiry and it is usually launched by a company, agency or an individual in order to address a specific problem.

ex:-Improve agricultural crop production, treat or cure specific disease.



**Fg. Basic and Applied research**

### ****(2) Basic Research****

Basic research, also called pure research or fundamental research, is scientific research aimed to improve scientific theories for improved understanding or prediction of natural or other phenomena.Applied research, in turn, uses scientific theories to develop technology or techniques to intervene and alter natural or other phenomena. Though often driven by curiosity, basic research fuels applied science’s innovations. The two aims are often coordinated in research and development.

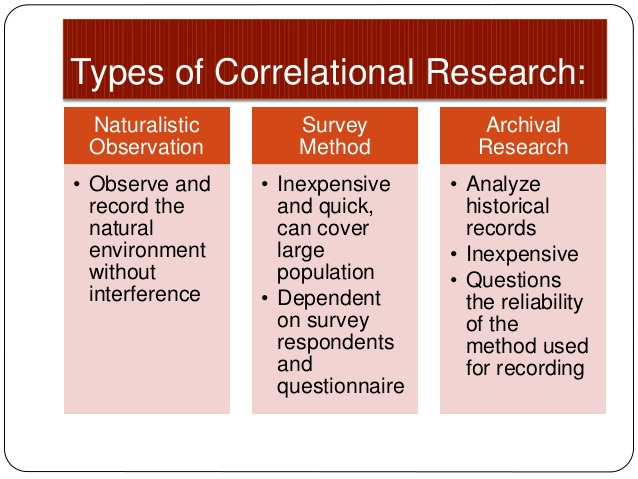
Ex:- how did the universe begin?

What are protons , neutron , etc.

### ****(3) Correlational Research****

In general, a co-relational study is a quantitative method of research in which you have 2 or more quantitative variables from the same group of participants, & you are trying to determine if there is a relationship (or co-variation) between the 2 variables (that is, a similarity in pattern of scores between the two variables, not a difference between their means). Theoretically, any 2 quantitative variables from the same group of participants can be correlated.

For example:- midterm scores & final exam scores, or midterm scores and number of body piercings!) as long as you have numerical scores on these variables from the same participants; however, it is usually a waste of time to collect & analyze data when there is little reason to think these two variables would be related to each other.



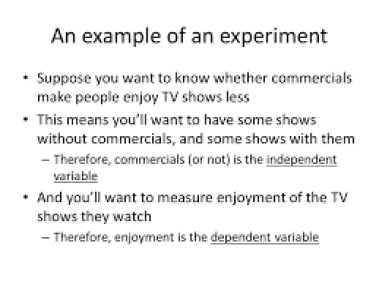
**Fig. Correlational Research**

### ****(4)**** ****Experimental Research****

This is an experiment where the re-searcher manipulates one variable, and control/randomizes the rest of the variables. It has a control group, the subjects have been randomly assigned between the groups, and the researcher only tests one effect at a time. It is also important to know what variable(s) you want to test and measure.

### Aims of Experimental Research:-

Experiments are conducted to be able to predict phenomenon. Typically, an experiment is constructed to be able to explain some kind of causation. Experimental research is important to society – it helps us to improve our everyday lives.

**Fig. Experimental Research**

### ****(5)**** ****Exploratory Research****

Exploratory research is research conducted for a problem that has not been studied more clearly, intended to establish priorities, develop operational definitions and improve the final research design.[1] Exploratory research helps determine the best research design, data-collection method and selection of subjects. It should draw definitive conclusions only with extreme caution. Given its fundamental nature, exploratory research often concludes that a perceived problem does not actually exist.

Exploratory research often relies on techniques such as:-

* Secondary research – such as reviewing available literature and/or data
* Informal qualitative approaches, such as discussions with consumers, employees, management or competitors
* Formal qualitative research through in-depth interviews, focus groups, projective methods, case studies or pilot studies.

#### **Aims of Research**

The general aims of research are:-

* Observe and Describe
* Predict
* Determination of the Causes
* Explain

Purpose of Research – Why do we conduct research? Why is it necessary?

### ****(6) Ground Theory Research****

Grounded theory (GT) is a systematic methodology in the social sciences involving the construction of theory through methodic gathering and analysis of data. Grounded theory is a research methodology which operates inductively, in contrast to the hypothetico-deductive approach. A study using grounded theory is likely to begin with a question, or even just with the collection of qualitative data. As researchers review the data collected, repeated ideas, concepts or elements become apparent, and are tagged with codes, which have been extracted from the data. As more data is collected, and re-reviewed, codes can be grouped into concepts, and then into categories. These categories may become the basis for new theory. Thus, grounded theory is quite different from the traditional model of research, where the researcher chooses an existing theoretical framework, and only then collects data to show how the theory does or does not apply to the phenomenon under study.

**Stages of analysis:-**

* Codes – Identifying anchors that allow the key points of the data to be gathered
* Concepts – Collections of codes of similar content that allows the data to be grouped
* Categories – Broad groups of similar concepts that are used to generate a theory
* Theory – A collection of categories that detail the subject of the research.

## **ALL RESEARCH CAN BE CLASSIFIED INTO TWO GROUPS:-**

### ****Qualitative Research****

### ****Quantitative Research****

## **Qualitative Research:**

Qualitative research is a method of inquiry employed in many different academic disciplines, including in the social sciences and natural sciences[citation needed], but also in non-academic contexts including market research, business, and service demonstrations by non-profits.

Qualitative research is a broad methodological approach that encompasses many research methods. The aim of qualitative research may vary with the disciplinary background, such as a psychologist seeking to gather an in-depth understanding of human behavior and the reasons that govern such behavior. Qualitative methods examine the why and how of decision making, not just what, where, when, or “who”, and have a strong basis in the field of sociology to understand government and social programs. Qualitative research is popular among political science, social work, and special education and education researchers.

### ****Methods of Qualitative Research:-****

Qualitative researchers use their own eyes, ears, and intelligence to collect in-depth perceptions and descriptions of targeted populations, places, and events. Their findings are collected through a variety of methods, and often, a researcher will use at least two or several of the following while conducting a qualitative study.

### Direct observation

With direct observation, a researcher studies people as they go about their daily lives without participating or interfering. This type of research is often unknown to those under study, and as such, must be conducted in public settings where people do not have a reasonable expectation of privacy. For example, a researcher might observe the ways in which strangers interact in public as they gather to watch a street performer.

### ****Open-ended surveys****

While many surveys are designed to generate quantitative data, many are also designed with open-ended questions that allow for the generation and analysis of qualitative data. For example, a survey might be used to investigate not just which political candidates voters chose, but why they chose them, in their own words.

### ****Focus group****

In a focus group, a researcher engages a small group of participants in a conversation designed to generate data relevant to the research question. Focus groups can contain anywhere from 5 to 15 participants. Social scientists often use them in studies that examine an event or trend that occurs within a specific community. They are common within market research too.

### ****In-depth interviews****

Researchers conduct in-depth interviews by speaking with participants in a one-on-one setting. Sometimes a researcher approaches the interview with a predetermined list of questions or topics for discussion but allows the conversation to evolve based on how the participant responds. Other times, the researcher has identified certain topics of interest but does not have a formal guide for the conversation, but allows the participant to guide it.

* **Oral history**

The oral history method is used to create a historical account of an event, group, or community, and typically involves a series of in-depth interviews conducted with one or multiple participants over an extended period of time.

Participant observation: This method is similar to observation, however with this one, the researcher also participates in the action or events in order to not only observe others but to gain first-hand experience in the setting.

* **Ethnographic observation**

Ethnographic observation is the most intensive and in-depth observational method. Originating in anthropology, with this method, a researcher fully immerses herself into the research setting and lives among the participants as one of them for anywhere from months to years.

## **Quantitative Research:**

In natural sciences and social sciences, quantitative research is the systematic empirical investigation of observable phenomena via statistical, mathematical or computational techniques.[1] The objective of quantitative research is to develop and employ mathematical models, theories and hypotheses pertaining to phenomena. The process of measurement is central to quantitative research because it provides the fundamental connection between empirical observation and mathematical expression of quantitative relationships. Quantitative data is any data that is in numerical form such as statistics, percentages, etc.

Quantitative research is generally made using scientific methods, which can include:-

* The generation of models, theories and hypotheses.
* The development of instruments and methods for measurement.
* Experimental control and manipulation of variables.
* Collection of empirical data.
* Modeling and analysis of data.

### ****PROCESS OF RESEARCH:-****

Research involves a systematic process that focuses on being objective and gathering a multitude of information for analysis so that the researcher can come to a conclusion. This process is used in all research and evaluation projects, regardless of the research method (scientific method of inquiry, evaluation research, or action research). The process focuses on testing hunches or ideas in a park and recreation setting through a systematic process. In this process, the study is documented in such a way that another individual can conduct the same study again. This is referred to as replicating the study. Any research done without documenting the study so that others can review the process and results is not an investigation using the scientific research process. The scientific research process is a multiple-step process where the steps are interlinked with the other steps in the process.

### ****Step 1: Identify the Problem****

The first step in the process is to identify a problem or develop a research question. The research problem may be something the agency identifies as a problem, some knowledge or information that is needed by the agency, or the desire to identify a recreation trend nationally. In the example in table 2.4, the problem that the agency has identified is childhood obesity, which is a local problem and concern within the community. This serves as the focus of the study.

### ****Step 2: Review the Literature****

Now that the problem has been identified, the researcher must learn more about the topic under investigation. To do this, the researcher must review the literature related to the research problem. This step provides foundational knowledge about the problem area. The review of literature also educates the researcher about what studies have been conducted in the past, how these studies were conducted, and the conclusions in the problem area. In the obesity study, the review of literature enables the programmer to discover horrifying statistics related to the long-term effects of childhood obesity in terms of health issues, death rates, and projected medical costs. In addition, the programmer finds several articles and information from the Centers for Disease Control and Prevention that describe the benefits of walking 10,000 steps a day. The information discovered during this step helps the programmer fully understand the magnitude of the problem, recognize the future consequences of obesity, and identify a strategy to combat obesity (i.e., walking).

### ****Step 3: Clarify the Problem****

Many times the initial problem identified in the first step of the process is too large or broad in scope. In step 3 of the process, the researcher clarifies the problem and narrows the scope of the study. This can only be done after the literature has been reviewed. The knowledge gained through the review of literature guides the researcher in clarifying and narrowing the research project. In the example, the programmer has identified childhood obesity as the problem and the purpose of the study. This topic is very broad and could be studied based on genetics, family environment, diet, exercise, self-confidence, leisure activities, or health issues. All of these areas cannot be investigated in a single study; therefore, the problem and purpose of the study must be more clearly defined. The programmer has decided that the purpose of the study is to determine if walking 10,000 steps a day for three days a week will improve the individual’s health. This purpose is more narrowly focused and researchable than the original problem.

### ****Step 4: Clearly Define Terms and Concepts****

Terms and concepts are words or phrases used in the purpose statement of the study or the description of the study. These items need to be specifically defined as they apply to the study. Terms or concepts often have different definitions depending on who is reading the study. To minimize confusion about what the terms and phrases mean, the researcher must specifically define them for the study. In the obesity study, the concept of “individual’s health” can be defined in hundreds of ways, such as physical, mental, emotional, or spiritual health. For this study, the individual’s health is defined as physical health. The concept of physical health may also be defined and measured in many ways. In this case, the programmer decides to more narrowly define “individual health” to refer to the areas of weight, percentage of body fat, and cholesterol. By defining the terms or concepts more narrowly, the scope of the study is more manageable for the programmer, making it easier to collect the necessary data for the study. This also makes the concepts more understandable to the reader.

### ****Step 5: Define the Population****

Research projects can focus on a specific group of people, facilities, park development, employee evaluations, programs, financial status, marketing efforts, or the integration of technology into the operations. For example, if a researcher wants to examine a specific group of people in the community, the study could examine a specific age group, males or females, people living in a specific geographic area, or a specific ethnic group. Literally thousands of options are available to the researcher to specifically identify the group to study. The research problem and the purpose of the study assist the researcher in identifying the group to involve in the study. In research terms, the group to involve in the study is always called the population. Defining the population assists the researcher in several ways. First, it narrows the scope of the study from a very large population to one that is manageable. Second, the population identifies the group that the researcher’s efforts will be focused on within the study. This helps ensure that the researcher stays on the right path during the study. Finally, by defining the population, the researcher identifies the group that the results will apply to at the conclusion of the study. In the example in table 2.4, the programmer has identified the population of the study as children ages 10 to 12 years. This narrower population makes the study more manageable in terms of time and resources.

### ****Step 6: Develop the Instrumentation Plan****

The plan for the study is referred to as the instrumentation plan. The instrumentation plan serves as the road map for the entire study, specifying who will participate in the study; how, when, and where data will be collected; and the content of the program. This plan is composed of numerous decisions and considerations that are addressed in chapter 8 of this text. In the obesity study, the researcher has decided to have the children participate in a walking program for six months. The group of participants is called the sample, which is a smaller group selected from the population specified for the study. The study cannot possibly include every 10- to 12-year-old child in the community, so a smaller group is used to represent the population. The researcher develops the plan for the walking program, indicating what data will be collected, when and how the data will be collected, who will collect the data, and how the data will be analyzed. The instrumentation plan specifies all the steps that must be completed for the study. This ensures that the programmer has carefully thought through all these decisions and that she provides a step-by-step plan to be followed in the study.

### ****Step 7: Collect Data****

Once the instrumentation plan is completed, the actual study begins with the collection of data. The collection of data is a critical step in providing the information needed to answer the research question. Every study includes the collection of some type of data—whether it is from the literature or from subjects—to answer the research question. Data can be collected in the form of words on a survey, with a questionnaire, through observations, or from the literature. In the obesity study, the programmers will be collecting data on the defined variables: weight, percentage of body fat, cholesterol levels, and the number of days the person walked a total of 10,000 steps during the class.

The researcher collects these data at the first session and at the last session of the program. These two sets of data are necessary to determine the effect of the walking program on weight, body fat, and cholesterol level. Once the data are collected on the variables, the researcher is ready to move to the final step of the process, which is the data analysis.

### ****Step 8: Analyze the Data****

All the time, effort, and resources dedicated to steps 1 through 7 of the research process culminate in this final step. The researcher finally has data to analyze so that the research question can be answered. In the instrumentation plan, the researcher specified how the data will be analyzed. The researcher now analyzes the data according to the plan. The results of this analysis are then reviewed and summarized in a manner directly related to the research questions. In the obesity study, the researcher compares the measurements of weight, percentage of body fat, and cholesterol that were taken at the first meeting of the subjects to the measurements of the same variables at the final program session. These two sets of data will be analyzed to determine if there was a difference between the first measurement and the second measurement for each individual in the program. Then, the data will be analyzed to determine if the differences are statistically significant. If the differences are statistically significant, the study validates the theory that was the focus of the study. The results of the study also provide valuable information about one strategy to combat childhood obesity in the community.

# Research Design, and it’s Function

**RESEARCH DESIGN**

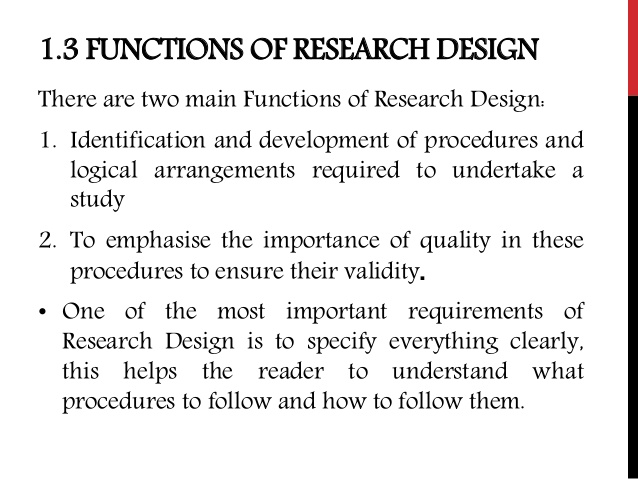
A research design is the set of methods and procedures used in collecting and analysing measures of the variables specified in the research problem. The design is the structure of any scientific work. It gives direction and systematizes the research. Different types of research designs have different advantages and disadvantages.

**Design types and sub-types:**

There are many ways to classify research designs, but sometimes the distinction is artificial and other times different designs are combined. Nonetheless, the list below offers a number of useful distinctions between possible research designs. A research design is an arrangement of conditions or collections.

* Descriptive (e.g., case-study, naturalistic observation, survey)
* Correlational (e.g., case-control study, observational study)
* Semi-experimental (e.g., field experiment, quasi-experiment)
* Experimental (experiment with random assignment)
* Review (literature review, systematic review)
* Meta-analytic (meta-analysis)

**Function of Research Design:**

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**Research Design** is defined as a framework of methods and techniques chosen by a researcher to combine various components of research in a reasonably logical manner so that the research problem is efficiently handled. It provides insights about “how” to conduct research using a particular methodology.

**Types of Research Design**

A researcher must have a clear understanding of the various types of research design to select which type of research design to implement for a study. Research design can be broadly classified into quantitative and qualitative research design.

1. **Qualitative Research Design**

Qualitative research is implemented in cases where a relationship between collected data and observation is established on the basis of mathematical calculations. Theories related to a naturally existing phenomenon can be proved or disproved using mathematical calculations. Researchers rely on qualitative research design where they are expected to conclude “why” a particular theory exists along with “what” respondents have to say about it.

1. **Quantitative Research Design**

Quantitative research is implemented in cases where it is important for a researcher to have statistical conclusions to collect actionable insights. Numbers provide a better perspective to make important business decisions. Quantitative research design is important for the growth of any organization because any conclusion drawn on the basis of numbers and analysis will only prove to be effective for the business.

Further, research design can be divided into five types :

**(I) Descriptive Research Design:** In a descriptive research design, a researcher is solely interested in describing the situation or case under his/her research study. It is a theory-based research design which is created by gather, analyze and presents collected data. By implementing an in-depth research design such as this, a researcher can provide insights into the why and how of research.

**(II) Experimental Research Design:** Experimental research design is used to establish a relationship between the cause and effect of a situation. It is a causal research design where the effect caused by the independent variable on the dependent variable is observed. For example, the effect of an independent variable such as price on a dependent variable such as customer satisfaction or brand loyalty is monitored. It is a highly practical research design method as it contributes towards solving a problem at hand. The independent variables are manipulated to monitor the change it has on the dependent variable. It is often used in social sciences to observe human behavior by analyzing two groups – effect of one group on the other.

**(III) Correlational Research Design:** Correlational research is a non-experimental research design technique which helps researchers to establish a relationship between two closely connected variables. Two different groups are required to conduct this research design method. There is no assumption while evaluating a relationship between two different variables and statistical analysis techniques are used to calculate the relationship between them.

Correlation between two variables is concluded using a correlation coefficient, whose value ranges between -1 and +1. If the correlation coefficient is towards +1, it indicates a positive relationship between the variables and -1 indicates a negative relationship between the two variables.

(IV) Diagnostic Research Design: In the diagnostic research design, a researcher is inclined towards evaluating the root cause of a specific topic. Elements that contribute towards a troublesome situation are evaluated in this research design method.

There are three parts of diagnostic research design:

* Inception of the issue
* Diagnosis of the issue
* Solution for the issue

(V) Explanatory Research Design: In exploratory research design, the researcher’s ideas and thoughts are key as it is primarily dependent on their personal inclination about a particular topic. Explanation about unexplored aspects of a subject is provided along with details about what, how and why related to the research questions.

**Features of a Good Research Design**

The features of good research design is often characterized by adjectives like flexible, appropriate, efficient, economical and so on. Generally, the design which minimizes bias and maximizes the reliability of the data collected and analyzed is considered a good design. The design which gives the smallest experimental error is supposed to be the best design in many investigations. Similarly, a design which yields maximal information and provides an opportunity for considering many different aspects of a problem is considered most appropriate and efficient design in respect of many research problems. Thus, the question of good design is related to the purpose or objective of the research problem and also with the nature of the problem to be studied. A design may be quite suitable in one case, but may be found wanting in one respect or the other in the context of some other research problem. One single design cannot serve the purpose of all types of research problems.

A research design appropriate for a particular research problem, usually involves the consideration of the following factors:

1. The means of obtaining information;
2. The availability and skills of the researcher and his staff, if any;
3. The objective of the problem to be studied;
4. The nature of the problem to be studied; and
5. The availability of time and money for the research work.

Unit-2

# Problem in Measurement in Management Research: Validity And Reliability

Problems in Measurement should be precise and unambiguous in an ideal research study. This objective, however, is often not met with in entirety. As such the researcher must be aware about the sources of error in measurement. The following are the possible sources of error in measurement.

* **Respondent:** At times the respondent may be reluctant to express strong negative feelings or it is just possible that he may have very little knowledge but may not admit his ignorance. All this reluctance is likely to result in an interview of ‘guesses.’ Transient factors like fatigue, boredom, anxiety, etc. may limit the ability of the respondent to respond accurately and fully.
* **Situation:** Situational factors may also come in the way of correct measurement. Any condition which places a strain on interview can have serious effects on the interviewer-respondent rapport. For instance, if someone else is present, he can distort responses by joining in or merely by being present. If the respondent feels that anonymity is not assured, he may be reluctant to express certain feelings.
* **Measurer:** The interviewer can distort responses by rewording or reordering questions. His behaviour, style and looks may encourage or discourage certain replies from respondents. Careless mechanical processing may distort the findings. Errors may also creep in because of incorrect coding, faulty tabulation and/or statistical calculations, particularly in the data-analysis stage.
* **Instrument:** Error may arise because of the defective measuring instrument. The use of complex words, beyond the comprehension of the respondent, ambiguous meanings, poor printing, inadequate space for replies, response choice omissions, etc. are a few things that make the measuring instrument defective and may result in measurement errors. Another type of instrument deficiency is the poor sampling of the universe of items of concern.
* Researcher must know that correct measurement depends on successfully meeting all of the problems listed above. He must, to the extent possible, try to eliminate, neutralize or otherwise deal with all the possible sources of error so that the final results may not be contaminated.

**RELIABILITY**

A test must also be reliable. Reliability is “Self-correlation of the test.” It shows the extent to which the results obtained are consisted when the test is administered. Once or more than once on the same sample with a reasonable gap. Consistency in results obtained in a single administration is the index of internal consistency of the test and consistency in results obtained upon testing and retesting is the index of temporal consistency. Reliability thus, includes both internal consistency as well as temporal consistency. A test to be called sound must be reliable because reliability indicates the extent to which the scores obtained in the test are free from such internal defects of standardization, which are likely to produce errors of measurement.

**Types of Reliability:**

(i) Internal reliability

(ii) External reliability

* **Internal Reliability;** Internal reliability assesses the consistency of results across items within a test.
* **External Reliability;** External reliability refers to the extent to which a measure varies from one use to another.

**Errors in Reliability:**

At a time scores are not consistent because some other factors also affect reliability e.g.

**Noise**

**Health**

**Time**

There is always a chance of 5% error in reliability which is acceptable.

**VALIDITY**

Validity is another prerequisite for a test to be sound. Validity indicates the extent to which the test measure what it intends to measure, when compared with some outside independent criteria. In other words it is the correlation of the test with some outside criteria. The criteria should be independent one and should be regarded as the best index of trait or ability being measured by the test. Generally, validity of a test is dependent upon the reliability because a test which yields inconsistent results (poor reliability) is ordinarily not expected to correlate with some outside independent criteria.

**TYPES OF ERRORS**

(i) Random error

(ii) Systematic error

**(i) Random error**

Random error exists in every measurement and is often major source of uncertainty. These errors have no particular assignable cause. These errors can never be totally eliminated or corrected. These are caused by many uncontrollable variables that are inevitable part of every analysis made by human being. These variables are impossible to identified, even if we identify some they cannot be measured because most of them are so small.

**(ii) Systematic error**

Systematic error is caused due to instruments, machines, and measuring tools. It is not due to individuals. Systematic error is acceptable we can fix and handled it.

**WAYS OF FINDING RELIABILITY:**

Following are the methods to check reliability

* Test-retest
* Alternate form
* Split –half method

**TEST-RETEST METHOD**

It is the oldest and commonly used method of testing reliability. The test retest method assesses the external consistency of a test. Examples of appropriate tests include questionnaires and psycho metric tests. It measures the stability of a test over time.

A typical assessment would involve giving participants the same test on two separate occasions. Each and every thing from start to end will be same in both tests. Results of first test need to be correlated with the result of second test. If the same or similar results are obtained then external reliability is established.

The timing of the test is important if the duration is to brief then participants may recall information from the first test which could bias the results. Alternatively, if the duration is too long it is feasible that the participants could have changed in some important way which could also bias the results.

Utility and worth of a psychological test decreases with time so the test should be revised and updated. When tests are not revised systematic error may arise.

**ALTERNATE FORM**

In alternate form two equivalent forms of the test are administered to the same group of examinees. An individual has given one form of the test and after a period of time the person is given a different version of the same test. The two form of the rest are then correlated to yield a coefficient of equivalence.

Positive point

In alternate form no deal to wait for time.

Negative point

It is very hectic and risky task to make two test of equivalent level.

**SPLIT-HALF METHOD**

The split half method assesses the internal consistency of a test. It measures the extent to which all parts of the test contribute equally to what is being measured. The test is technically spitted into odd and even form. The reason behind this is when  we making test we always have the items in order of increasing difficulty if we put (1,2,—-10) in one half and (11,12,—-20) in another half then all easy question/items will goes to one group and all difficult questions/items will goes to the second group.

When we split the test we should split it with same format/theme e.g. Multiple questions – multiple questions or blanks – blanks.

# Methods of Data Collection-Primary and secondary sources

### ****Methods of Data Collection****

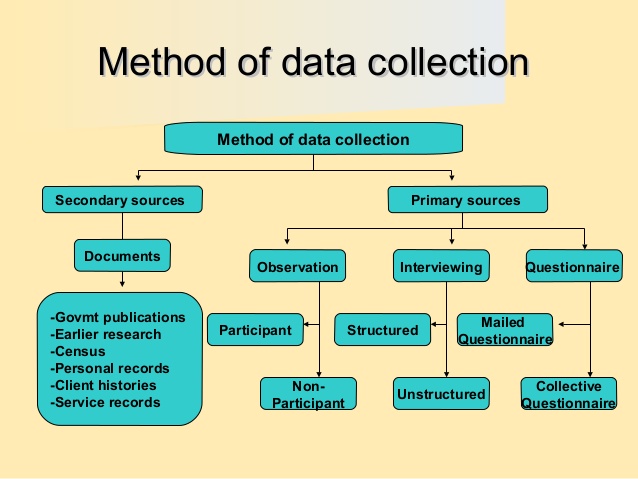
Data are the special type of information generally obtained through observations, surveys, inquiries, or are generated as a result of human activity. Methods of data collection are essential for anyone who wish to collect data.  Data collection is a fundamental aspect and as a result, there are different methods of collecting data which when used on one particular set will result in different kinds of data. Collection of data refers to a purpose gathering of information and relevant to the subject-matter of the study from the units under investigation. The method of collection of data mainly depends upon the nature, purpose and the scope of inquiry on one hand and availability of resources, and the time to the other. The statistical Data may be classified into primary and secondary depending upon the nature and mode of collection.

Data collection is a very important part of science. Meteorologists data related to weather over time to keep a record and makes forecasts on basis of it. Other example include Oceanographers collecting data on the salinity (saltiness) of seawater studying changes in trends of our Earth’s oceans. Although have been collected by hand for thousands of years, the technology to collect data electronically has been around for fewer than 80 years and made significant development in this time period. Only in the last 20 years this technology and advanced methods have been available to us.

### ****Data Collection Methods:****

Data collection is a process of collecting information from all the relevant sources to find answers to the research problem, test the hypothesis and evaluate the outcomes. Data collection methods can be divided into two categories: secondary methods of data collection and primary methods of data collection.

#### **Methods of data collection for primary and secondary Data**



### ****(1) PRIMARY DATA****

Primary data are original observations collected by the researcher or his agent for the first time for any investigation and used by them in the statistical analysis.

The primary data is the one type of important data. It is collection of data from first hand information.

This information published by one organization for some purposes. This type of primary data is mostly pure and original data.

The primary data collection is having three different data collection methods are:-

* **Data Collection through Investigation:**

In this method, trained investigators are working as employees for collecting the data. The researchers will use the tools like interview and collect the information from  the individual persons.

* **Personal Investigation Methods:**

The researchers or the data collectors will conduct the survey and hence they collect the data. In this method we have to collect more accurate data and original data. This method is useful for small data collection only not big collection of data projects.

* **Data Collection through Telephones:**

The data researcher uses the tools like telephones, mobile phones to collect the information or data. This is accurate and very quick process for data collection. But information collected is not accurate and true.

### ****(2) SECONDARY DATA****

The secondary data is the other type of data, which is collection of data from second hand information. This information is known as, given data is already collected from any one persons for some purpose, and it has available for the present issues. And mostly these secondary data’s are not relevant and pure or original data

**TWO IMPORTANT METHODS:**

**a) Official methods:**

Data collecting from the ministry of finance, Agriculture, Industry and etc. These data collection methods are official methods. This methods are used the tools of phone calls and surveys.

**b) Semi–official methods:**

This is the method of data collection from Railway boards, banks, population committee etc. This methods only used for the focusing groups, and interviews, and electronic mail surveys.

### ****Ways of Collections****

In this case the data’s are already available, it means the data’s are already collected and analyzed by someone else. It can be either published or unpublished data. When using the secondary data, the following characteristics must be followed:

* Reliability
* Suitability
* Adequate data

**These data’s can be collected from the following places:-**

1. a) Official
2. b) Newspapers and journals
3. c) Research organizations like universities.

#### **Secondary sources are data that already exist**

* Previous research
* Official statistics
* Mass media products
* Diaries
* Letters
* Government reports
* Web information
* Historical data and information

Data Processing: Editing, Coding, Tabulating

[THEINTACTFRONT](https://theintactone.com/author/theintactfront/)[12 APR 2018](https://theintactone.com/2018/04/12/brm-u3-topic-6-data-processing-editing-coding-tabulating/)[3 COMMENTS](https://theintactone.com/2018/04/12/brm-u3-topic-6-data-processing-editing-coding-tabulating/#comments)

After collecting data, the method of converting raw data into meaningful statement; includes data processing, data analysis, and data interpretation and presentation.

Data reduction or processing mainly involves various manipulations necessary for preparing the data for analysis. The process (of manipulation) could be manual or electronic. It involves editing, categorizing the open-ended questions, coding, computerization and preparation of tables and diagrams.

**Editing data:**

Information gathered during data collection may lack uniformity. Example: Data collected through questionnaire and schedules may have answers which may not be ticked at proper places, or some questions may be left unanswered. Sometimes information may be given in a form which needs reconstruction in a category designed for analysis, e.g., converting daily/monthly income in annual income and so on. The researcher has to take a decision as to how to edit it.

Editing also needs that data are relevant and appropriate and errors are modified. Occasionally, the investigator makes a mistake and records and impossible answer. “How much red chilies do you use in a month” The answer is written as “4 kilos”. Can a family of three members use four kilo chilies in a month? The correct answer could be “0.4 kilo”.

Care should be taken in editing (re-arranging) answers to open-ended questions. Example: Sometimes “don’t know” answer is edited as “no response”. This is wrong. “Don’t know” means that the respondent is not sure and is in a double mind about his reaction or considers the questions personal and does not want to answer it. “No response” means that the respondent is not familiar with the situation/object/event/individual about which he is asked.

**Coding of data:**

Coding is translating answers into numerical values or assigning numbers to the various categories of a variable to be used in data analysis. Coding is done by using a code book, code sheet, and a computer card. Coding is done on the basis of the instructions given in the codebook. The code book gives a numerical code for each variable.

Now-a-days, codes are assigned before going to the field while constructing the questionnaire/schedule. Pose data collection; pre-coded items are fed to the computer for processing and analysis. For open-ended questions, however, post-coding is necessary. In such cases, all answers to open-ended questions are placed in categories and each category is assigned a code.

Manual processing is employed when qualitative methods are used or when in quantitative studies, a small sample is used, or when the questionnaire/schedule has a large number of open-ended questions, or when accessibility to computers is difficult or inappropriate. However, coding is done in manual processing also.

Data classification/distribution:

Sarantakos (1998: 343) defines distribution of data as a form of classification of scores obtained for the various categories or a particular variable. There are four types of distributions:

1. Frequency distribution
2. Percentage distribution
3. Cumulative distribution
4. Statistical distributions

1. **Frequency distribution:**

In social science research, frequency distribution is very common. It presents the frequency of occurrences of certain categories. This distribution appears in two forms:

Ungrouped: Here, the scores are not collapsed into categories, e.g., distribution of ages of the students of a BJ (MC) class, each age value (e.g., 18, 19, 20, and so on) will be presented separately in the distribution.

Grouped: Here, the scores are collapsed into categories, so that 2 or 3 scores are presented together as a group. For example, in the above age distribution groups like 18-20, 21-22 etc., can be formed)

**2. Percentage distribution:**

It is also possible to give frequencies not in absolute numbers but in percentages. For instance instead of saying 200 respondents of total 2000 had a monthly income of less than Rs. 500, we can say 10% of the respondents have a monthly income of less than Rs. 500.

**3. Cumulative distribution:**

It tells how often the value of the random variable is less than or equal to a particular reference value.

**4. Statistical data distribution:**

In this type of data distribution, some measure of average is found out of a sample of respondents. Several kind of averages are available (mean, median, mode) and the researcher must decide which is most suitable to his purpose. Once the average has been calculated, the question arises: how representative a figure it is, i.e., how closely the answers are bunched around it. Are most of them very close to it or is there a wide range of variation?

**Tabulation of data:**

After editing, which ensures that the information on the schedule is accurate and categorized in a suitable form, the data are put together in some kinds of tables and may also undergo some other forms of statistical analysis.

Table can be prepared manually and/or by computers. For a small study of 100 to 200 persons, there may be little point in tabulating by computer since this necessitates putting the data on punched cards. But for a survey analysis involving a large number of respondents and requiring cross tabulation involving more than two variables, hand tabulation will be inappropriate and time consuming.

**Usefulness of tables:**

Tables are useful to the researchers and the readers in three ways:

1. The present an overall view of findings in a simpler way.
2. They identify trends.
3. They display relationships in a comparable way between parts of the findings.

By convention, the dependent variable is presented in the rows and the independent variable in the columns.

Unit-3

Census & Sample Surveys

In Statistics, the basis of all statistical calculations or interpretation lies in the collection of data. There are numerous methods of data collection. Both are suitable in different cases and the knowledge of these methods is important to understand when to apply which method.

These two methods are the Census method and Sampling method.

**Census Sampling**

Census method is the method of statistical enumeration where **all members of the population** are studied. A population refers to the set of all observations under concern. For example, if you want to carry out a survey to find out student’s feedback about the facilities of your school, all the students of your school would form a part of the ‘population’ for your study.

At a more realistic level, a country wants to maintain information and records about all households. It can collect this information by surveying *all* households in the country using the census method.

In our country, the Government conducts the **Census of India**every ten years. The Census appropriates information from households regarding their incomes, the earning members, the total number of children, members of the family, etc. This method must take into account all the units. It cannot leave out anyone in collecting data. Once collected, the Census of India reveals *demographic information* such as birth rates, death rates, total population, population growth rate of our country, etc. The last census was conducted in the year 2011, and due in 2021.

**Sampling Method**

Like we have studied, the population contains units with some similar characteristics on the basis of which they are grouped together for the study. In the case of the Census of India, for example, the common characteristic was that all units are Indian nationals. But it is not always practical to collect information from all the units of the population.

It is a time-consuming and costly method. Thus, an easy way out would be to collect information from some representative group from the population and then make observations accordingly. This representative group which contains some units from the whole population is called the **sample**.

The first most important step in selecting a sample is to determine the population. Once the population is identified, a sample must be selected. A good sample is one which is:

* Small in size.
* It provides adequate information about the whole population.
* It takes less time to collect and is less costly.

In the case of our previous example, you could choose students from your class to be the *representative sample* out of the population (all students in the school). However, there must be some rationale behind choosing the sample. If you think your class comprises a set of students who will give unbiased opinions/feedback or if you think your class contains students from different backgrounds and their responses would be relevant to your student, you must choose them as your sample. Otherwise, it is ideal to choose another sample which might be more relevant.

Again, realistically, the government wants estimates on the average income of the Indian household. It is difficult and time-consuming to study all households. The government can simply choose, say, 50 households from each state of the country and calculate the average of that to arrive at an *estimate*. This estimate is not necessarily the actual figure that would be arrived at if all units of the population underwent study. But, it approximately gives an idea of what the figure might look like.

**Different**

|  |  |  |
| --- | --- | --- |
|  | **Census** | **Sample Survey** |
| Definition | A statistical method that studies all the units or members of a population. | A statistical method that studies only a representative group of the population, and not all its members. |
| Calculation | Total/Complete | Partial |
| Time involved | It is a time-consuming process. | It is a quicker process. |
| Cost involved | It is a costly method. | It is a relatively inexpensive method. |
| Accuracy | The results obtained are accurate as each member is surveyed. So, there is a negligible error. | The results are relatively inaccurate due to leaving out of items from the sample. The resulting error is large. |
| Reliability | Highly reliable | Low reliability |
| Error | Not present | The smaller the sample size, the larger the error. |
| Relevance | This method is suited for heterogeneous data. | This method is suited for homogeneous data. |

Sampling Design

**SAMPLE DESIGN**

A sample design is the framework, or road map, that serves as the basis for the selection of a survey sample and affects many other important aspects of a survey as well. In a broad context, survey researchers are interested in obtaining some type of information through a survey for some population, or universe, of interest. One must define a sampling frame that represents the population of interest, from which a sample is to be drawn. The sampling frame may be identical to the population, or it may be only part of it and is therefore subject to some under coverage, or it may have an indirect relationship to the population.

**Sample Design for Managerial Research**

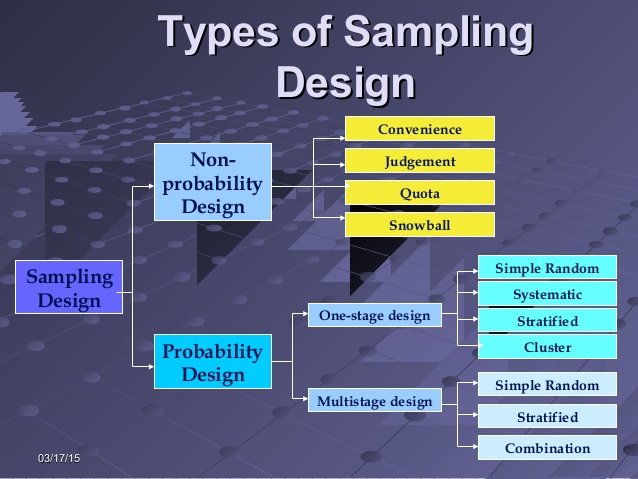
In business research, companies must often generate samples of customers, clients, employees, and so forth to gather their opinions. Sample design is also a critical component of marketing research and employee research for many organizations. During sample design, firms must answer questions such as: – What is the relevant population, sampling frame, and sampling unit? – What is the appropriate margin of error that should be achieved? – How should sampling error and non-sampling error be assessed and balanced?

**STEPS IN SAMPLE DESIGN**

While developing a sampling design, the researcher must pay attention to the following points:

* **Type of universe:** The first step in developing any sample design is to clearly define the set of objects, technically called the Universe, to be studied. The universe can be finite or infinite. In finite universe the number of items is certain, but in case of an infinite universe the number of items is infinite, i.e., we cannot have any idea about the total number of items. The population of a city, the number of workers in a factory and the like are examples of finite universes, whereas the number of stars in the sky, listeners of a specific radio programme, throwing of a dice etc. are examples of infinite universes.
* **Sampling unit:** A decision has to be taken concerning a sampling unit before selecting sample. Sampling unit may be a geographical one such as state, district, village, etc., or a construction unit such as house, flat, etc., or it may be a social unit such as family, club, school, etc., or it may be an individual. The researcher will have to decide one or more of such units that he has to select for his study.
* **Source list:** It is also known as ‘sampling frame’ from which sample is to be drawn. It contains the names of all items of a universe (in case of finite universe only). If source list is not available, researcher has to prepare it. Such a list should be comprehensive, correct, reliable and appropriate. It is extremely important for the source list to be as representative of the population as possible.
* **Size of sample:** This refers to the number of items to be selected from the universe to constitute a sample. This a major problem before a researcher. The size of sample should neither be excessively large, nor too small. It should be optimum. An optimum sample is one which fulfills the requirements of efficiency, representativeness, reliability and flexibility. While deciding the size of sample, researcher must determine the desired precision as also an acceptable confidence level for the estimate. The size of population variance needs to be considered as in case of larger variance usually a bigger sample is needed. The size of population must be kept in view for this also limits the sample size. The parameters of interest in a research study must be kept in view, while deciding the size of the sample. Costs too dictate the size of sample that we can draw. As such, budgetary constraint must invariably be taken into consideration when we decide the sample size.
* **Parameters of interest:** In determining the sample design, one must consider the question of the specific population parameters which are of interest. For instance, we may be interested in estimating the proportion of persons with some characteristic in the population, or we may be interested in knowing some average or the other measure concerning the population. There may also be important sub-groups in the population about whom we would like to make estimates. All this has a strong impact upon the sample design we would accept.
* **Budgetary constraint:** Cost considerations, from practical point of view, have a major impact upon decisions relating to not only the size of the sample but also to the type of sample. This fact can even lead to the use of a non-probability sample.
* **Sampling procedure:**Finally, the researcher must decide the type of sample he will use i.e., he must decide about the technique to be used in selecting the items for the sample. In fact, this technique or procedure stands for the sample design itself. There are several sample designs (explained in the pages that follow) out of which the researcher must choose one for his study. Obviously, he must select that design which, for a given sample size and for a given cost, has a smaller sampling error.

## **Types of Samples**



**Types Of Sampling Design**

**Probability sampling (Representative samples)**

Probability samples are selected in such a way as to be representative of the population. They provide the most valid or credible results because they reflect the characteristics of the population from which they are selected (e.g., residents of a particular community, students at an elementary school, etc.). There are two types of probability samples: random and stratified.

**Random sample**

The term random has a very precise meaning. Each individual in the population of interest has an equal likelihood of selection. This is a very strict meaning — you can’t just collect responses on the street and have a random sample.

The assumption of an equal chance of selection means that sources such as a telephone book or voter registration lists are not adequate for providing a random sample of a community. In both these cases there will be a number of residents whose names are not listed. Telephone surveys get around this problem by random-digit dialling — but that assumes that everyone in the population has a telephone. The key to random selection is that there is no bias involved in the selection of the sample. Any variation between the sample characteristics and the population characteristics is only a matter of chance.

**Stratified sample**

A stratified sample is a mini-reproduction of the population. Before sampling, the population is divided into characteristics of importance for the research. For example, by gender, social class, education level, religion, etc. Then the population is randomly sampled within each category or stratum. If 38% of the population is college-educated, then 38% of the sample is randomly selected from the college-educated population.

Stratified samples are as good as or better than random samples, but they require fairly detailed advance knowledge of the population characteristics, and therefore are more difficult to construct.

**Non-probability samples (Non-representative samples)**

As they are not truly representative, non-probability samples are less desirable than probability samples. However, a researcher may not be able to obtain a random or stratified sample, or it may be too expensive. A researcher may not care about generalizing to a larger population. The validity of non-probability samples can be increased by trying to approximate random selection, and by eliminating as many sources of bias as possible.

**Quota sample**

The defining characteristic of a quota sample is that the researcher deliberately sets the proportions of levels or strata within the sample. This is generally done to insure the inclusion of a particular segment of the population. The proportions may or may not differ dramatically from the actual proportion in the population. The researcher sets a quota, independent of population characteristics.

Example: A researcher is interested in the attitudes of members of different religions towards the death penalty. In Iowa a random sample might miss Muslims (because there are not many in that state). To be sure of their inclusion, a researcher could set a quota of 3% Muslim for the sample. However, the sample will no longer be representative of the actual proportions in the population. This may limit generalizing to the state population. But the quota will guarantee that the views of Muslims are represented in the survey.

**Purposive sample**

A purposive sample is a non-representative subset of some larger population, and is constructed to serve a very specific need or purpose. A researcher may have a specific group in mind, such as high level business executives. It may not be possible to specify the population — they would not all be known, and access will be difficult. The researcher will attempt to zero in on the target group, interviewing whoever is available.

**Convenience sample**

A convenience sample is a matter of taking what you can get. It is an accidental sample. Although selection may be unguided, it probably is not random, using the correct definition of everyone in the population having an equal chance of being selected. Volunteers would constitute a convenience sample.

Non-probability samples are limited with regard to generalization. Because they do not truly represent a population, we cannot make valid inferences about the larger group from which they are drawn. Validity can be increased by approximating random selection as much as possible, and making every attempt to avoid introducing bias into sample selection.

Unit-5

**What is Report?**

**In every research, after coll**ecting and analysing the data, the researcher has to accomplish the task of drawing inferences followed by report writing. A report is a clearly structured document in which the writer identifies and examines issues, events, or findings of an investigation. Information obtained from research or from undertaking a project is delivered in a precise, concise writing style organised under a set of headings and sub-headings, which enable the reader to find data quickly. Graphs and tables can also be used to present data in the body of the report. Rather than commenting upon, comparing or evaluating ideas, as an essay does, a report frequently offers recommendations for action based on the information it has presented.

In other words, A report is a written presentation of factual information based on an investigation or research. Reports form the basis for solving problems or making decisions, often in the subjects of business and the sciences. In simple terms, a report is an interpretation of findings through which the factors that seem to explain what has been observed by researcher in the course of the study can be better understood and it also provides a theoretical conception which can serve as a guide for further researches.

Characteristics of an Ideal Report

An ideal report must have following characteristics-

* An ideal report should be Clear, concise, accurate and well organised with clear section headings.
* Easy for the audience to understand.
* Presentation is a key element in successful report writing. Formatting, revising and proof reading are important process for good report writing.
* All reports should have an executive summary that presents the essential elements of the report from the introduction through to the recommendations and outcomes.

Reports should be visually appealing and easy to read. Diagrams, figures, charts, tables and graphs can all add interest to a report.

# Purpose of Report Writing

Research report is an indispensable task of every research work in which findings of a research make known to others. Needs or purposes of research report can be outlined as follow:

* To provide the information regarding the findings of research work i.e. methods, data analysis, conclusion and so on in the systematic, scientific and accepted way.
* To elicit crucial facts for solution derived and decision making.
* To prove the worth and legitimacy of assigned research job.
* To provide the judgement tools for the judgement of quality and talent of researcher within and outside the academia.
* To communicate the research findings professionally.
* To pertain the credibility of the research.
* To develop appreciation of standards, consolidate arguments and identify the knowledge gaps.

# Significance of Report Writing

Major significance of report writing are as follows-

* Research task remains incomplete till the report has been presented and/or written.
* It is a communication of research result.
* It provides a framework for the work that can be conducted in the same or related areas.
* It provides the necessary guidance for taking appropriate actions
* Authenticates the quality of the work carried out.
* Establishes the strength of the findings obtained.

**Procedure of Research Report Writing**

Researchers can prepare report at their ease as there are no such set rules or procedure of writing reports. However, following general guidelines can help for writing research reports:

1. **Revising expectation:** Before starting report writing, researcher should revisit the purpose of research and expectation from the researcher. If the researcher is intended to submit academic reports, minimum steps and format are well designed. Hence, researcher should identify the answer of some questions as what is the objective of research? Is there any format of reports? Is there word limit? Who will read the report? What is the process of report evaluation? etc. Answers of such questions help to make a good report.
2. **Preparing outline:** On the basis of nature of data, objective of research, and requirement of the evaluating agency, researcher need to prepare outline i.e. roadmap to the research report. This helps to decide in how many chapters, in how many topics, whether descriptive or analytical report is required to prepare. In simple words, outline helps to arrange the idea before starting write up. It is the planning phase for the content of report for making it more effective. During this phase, researcher should also plan the time frame within which a report is to be completed and submitted.
3. **Arranging data:** On the basis of objectives, population and sample for the research, researcher collects the data from different sources. Different types of data are collected for the purpose. Such different data from different sources need to be processed and tabulated. Only relevant data are sequentially arranged so that right information will be obtained at the right time for the right purpose. For this different tables of data need to be prepared and named properly.
4. **Start writing:** Now, researcher should start writing the report. Report should start with introduction and proceed with the content and topic arranged on the outline. Each topic or section consists of specific feature and way of writing. Thus, instead writing haphazardly, researcher should follow the sections.
5. **Preparing the first draft:** The report completed with a single effort may not be excellent. Thus, researcher should update and upgrade the report with series of revisions. For this purpose, the first draft is to be prepared and revisit the whole draft

carefully. Add or remove the necessary descriptions, interpretations, and analysis as and when required.

1. **Review and rewrite:** Every report consists of scope of some improvement. It is true that in each reading, you can find something to rewrite or rearrange. This makes the report more interesting and excellent. Thus, researcher must read and reread the draft again and again. During this course of action, you need to compare the report with format (if any specific format is required), methodological conformation, values and data revisit as there may be some misprints, if possible, language expert need to be consulted. After rewriting the drafts, the final draft will be prepared which can be submitted to the concern authority.

# Report Writing Structure

Reports follow a standardised format. This allows the reader to find the information easily and focus on specific areas. Report can be divided into three major parts-

## Preliminary Parts

Report Structure

## Main text End Part



1. **Preliminary Parts:** In its preliminary portion the report should carry a title and date, followed by acknowledgements in the form of ‘Preface’ or ‘Foreword’. Then there should be a table of contents followed by list of tables and illustrations so that the decision-maker or anybody interested in reading the report can easily locate the location of required information.
2. **Main text:** The main text provides the complete outline of the research report along with all details. Title of the research study is repeated at the top of the first page of the main text and then follows the other details on pages numbered consecutively, beginning with the second page. Each main section of the report should begin on a new page. The main text of the report should have the following sections:
   1. **Introduction:** The purpose of introduction is to introduce the research project to the readers. It should contain a clear statement of the objectives of research i.e., enough background should be given to make clear to the reader why the problem was considered worth investigating. A brief summary of other relevant research may also be stated so that the present study can be seen in that context. The hypotheses of study, if any, and the definitions of the major concepts employed in the study should be explicitly stated in the introduction of the report. The methodology adopted in conducting the study must be fully explained. The statistical analysis adopted must also be clearly stated. In addition to all this, the scope of the study should be stated and the boundary lines be demarcated. The various limitations, under which the research project was completed, must also be narrated.
   2. **Statement of findings and recommendations:** After introduction, the research report must contain a statement of findings and recommendations in non-technical

language so that it can be easily understood by all concerned. If the findings happen to be extensive, at this point they should be put in the summarised form.

* 1. **Results:** A detailed presentation of the findings of the study, with supporting data in the form of tables and charts together with a validation of results, is the next step in writing the main text of the report. The result section of the report should contain statistical summaries and reductions of the data rather than the raw data. All the results should be presented in logical sequence and splitted into readily identifiable sections.
  2. **Implications of the results:** Toward the end of the main text, the researcher should again put down the results of his research clearly and precisely. He/she should, state the implications that flow from the results of the study, for the general reader is interested in the implications for understanding the human behaviour.
  3. **Summary:** It has become customary to conclude the research report with a very brief summary, resting in brief the research problem, the methodology, the major findings and the major conclusions drawn from the research results.

1. **End Matter:** At the end of the report, appendices should be enlisted in respect of all technical data such as questionnaires, sample information, mathematical derivations and the like ones. Bibliography of sources consulted should also be given.

The above discussion may summarise with the same headings in the following table as a ready reference-

|  |  |  |
| --- | --- | --- |
| **S.N.** | **Section** | **Purpose** |
| 1. | Title Page (Not part of the word count) | Gives the title of the report, the researcher’s name/number, the name of the person the report is being submitted to, and the completion date. |
| 2. | Table of Contents (Not part of the word count) | Shows the sections of the report. Gives the headings, subheadings and page numbers. |
| 3. | Abstract or Executive Summary | Gives a summary of the whole report. Outlines the report’s purpose, methodology, findings, main conclusions and recommendations. Mainly written in past tense, and prepared last. |
| 4. | Terms of Reference | Briefly states the purpose and scope of the report. This includes who requested the  report, the main issues or |

|  |  |  |
| --- | --- | --- |
|  |  | problems to be identified, the reason for undertaking the report and the due date of the report. |
| 5. | Procedure | Outlines the methods used to collect information e.g. interviews, questionnaires, observations and/or research. |
| 6. | Introduction (May be used instead of the Terms of Reference and Procedure) | Outlines the context, background and purpose of the report. Defines terms and sets limits of the investigation. The reader/audience can easily identify what the report is about, how information was gathered, and why the report is needed. Mainly uses past tense and can be written last – but is presented first. |
| 7. | Findings and/or Discussion For this section, avoid using the headings “Findings” or “Discussion”. Instead, create headings and sub- headings that identify the main issues or problems. | Findings: What was found during the research or investigation. Gives the facts only – no interpretation by the writer of the report. Tables, graphs or diagrams can be used. Must be relevant to the issues and problems identified in the Terms of Reference. Arranged in a logical order with headings and sub- headings. Discussion: You may also be required to analyse, interpret and evaluate the findings. The discussion draws together different parts of the findings and may refer to findings of other studies and/or theories. |
| 8. | Conclusions | Brief statements of the key findings of the report (full explanation is given in the Findings and/or Discussion).  Arranged so the major |

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|  |  | conclusions come first. Should relate directly to the objectives set out in the Terms of Reference or Introduction. Follow logically from the facts in the Findings and/or Discussion. Must be complete enough for recommendations to be made from them. |
| 9. | Recommendations (note: not all reports give recommendations) | The opinions of the writer of the report about possible changes, or solutions to the problems, including who should take action, what should be done, when and how it should be done. |
| 10. | References (Not part of the word count | A list of the sources that are used in and referred to in the report. Use APA referencing style. |
| 11. | Bibliography (Not always required) | Lists any sources that were read for the research but were not cited in the report. (Bibliography is not included in the word count). |
| 12. | Appendices (Not always required) | Additional relevant information. May include interview questions, surveys, glossary etc. (Appendices are not included in the word count). |

# Types of Research Report

"Research report can vary differently in its length, type and purpose. Kerlinger (2004) states that the results of a research investigation can be presented in number of ways via a technical report, a popular report, a monograph or at times even in the form of oral presentation." Some typology of research reports is more popular for business purposes can be as:

1. Formal and Informal report
2. Written and Oral report
3. Internal and external report
4. long and short report
5. Descriptive and Analytical report
6. Technical and popular report

But, for the academic report like Thesis, GRP or Project reports, only either descriptive or analytical report is prepared. A short description of each type of description and analytical report is given below:

### Descriptive Report

In descriptive report, researcher describes the facts, trends or opinions experienced or gathered during the research work. In such reports, data presentation and analysis are more importantly presented. Such reports are more suitable in case of describing current situations, etc. It is more popular method of report writing.

### Analytical report

As name given analytical, such reports are prepared with analysing and interpretation of the facts or trends or situations. This means analytical report is one step ahead than descriptive reports. Such reports follow the scientific investigation and reporting. Analytical reports also recommend some measures to improve the situation with stating different problems on the situation. Policy research and managerial research which are normally funded by any agencies seeking solution of prevailing problems demand analytical report.

# Points to be taken into consideration while writing a Research Report

Research report is a channel of communicating the research findings to the readers of the report. A good research report is one which does this task efficiently and effectively. As such it must be prepared keeping the following precautions in view:

* While determining the length of the report, one should keep in view the fact that it should be long enough to cover the subject but short enough to maintain interest.
* A research report should not be dull; it should be such as to sustain reader’s interest.
* Abstract terminology and technical jargon should be avoided in a research report.
* Objective of the study, the nature of the problem, the methods employed and the analysis techniques adopted must all be clearly stated in the beginning of the report in the form of introduction.
* Readers are often interested in acquiring a quick knowledge of the main findings and as such the report must provide a ready availability of the findings. For this purpose, charts, graphs and the statistical tables may be used for the various results in the main report in addition to the summary of important findings.
* The layout of the report should be well thought out and must be appropriate and in accordance with the objective of the research problem.
* The reports should be free from grammatical mistakes and must be prepared strictly in accordance with the techniques of composition of report-writing such as the use of quotations, footnotes, documentation, proper punctuation and use of abbreviations in footnotes and the like.
* A research report should show originality and should necessarily be an attempt to solve some intellectual problem. It must contribute to the solution of a problem and must add to the store of knowledge.
* Appendices should be enlisted in respect of all the technical data in the report.
* Bibliography of sources consulted is a must for a good report and must necessarily be given.

# Report Checklist

The main thoughts of research report writing are discussed in detail above while the following points as “Report Checklist” are important to recall the techniques of report writing which are as under-

* Have you determined what type of report to write?
* Have you determined the structure/ headings of your report?
* Have you collected the materials/ information you need to write the report?
* Have you drafted a timeline to complete the report on time?
* Have you written a draft and edited it carefully?
* Are all parts of the report, including appendices, completed?
* Have you submitted it on time and in the correct format?
* Have you kept a copy of your submitted report?

# Conclusion

Research report is the final stage of every research in which research procedure, analysis, findings and so forth aspects of research endeavours are presented in organized and systematic way. It is the process of scientific and professional communication regarding research findings. The general purpose of research report is to convey the sufficient details of research works. It not only convinces the readers but let them known about the findings of already carried out research or project work or the purpose of the work have been done. Writing a report is both an art as well as science so that it pertains certain skills, rules and format suited for proper delivery in orderly and scientific manner.