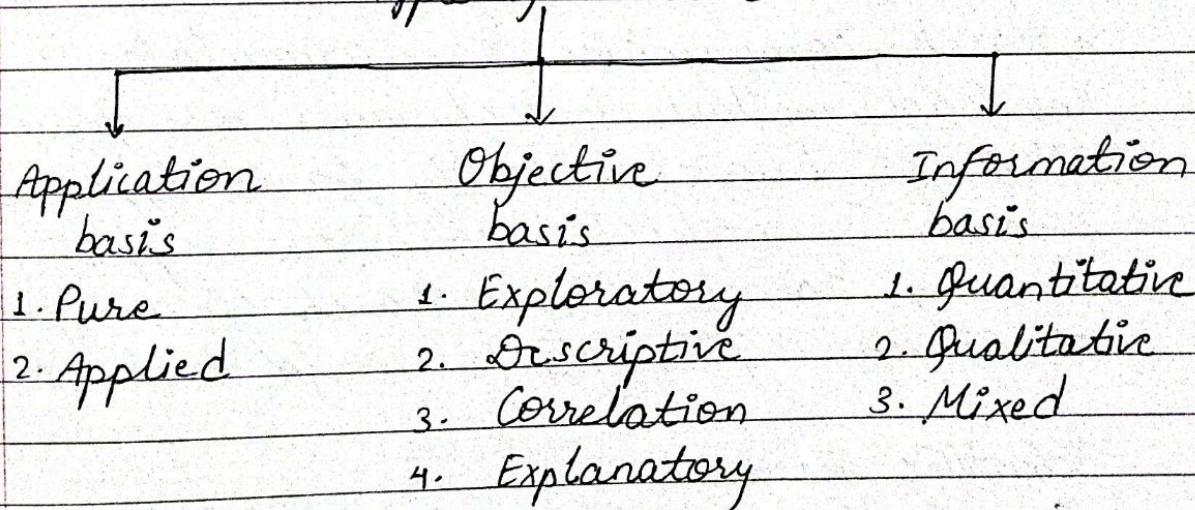


Research is discovery of knowledge. It is the systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions. In the broader sense, the definition of research includes any gathering of data, information and fact for the advancement of knowledge. But one thing we have to pay attention to research is that the heart of research is not on statistics but the thinking behind a research. So it may consist how we really want to find out facts, how we build our arguments about ideas & concepts & what evidence we can support to persuade people to accept researcher argument.

Types of research



1) Pure Research

The scientific research which aims to enhance scientific theories for improved knowledge or predictions of natural and other phenomena refers to pure research.

Pure research is also known as basic or fundamental research. This research doesn't have immediate commercial potentials and it is conducted for the improvement of knowledge. Hence this research is used for later research into more specific and profitable applications so it is also called fundamental research.

2. Applied Research → solve problem now?

The systematic inquiry involving practical solution for problems to modern world and practical application of science is called applied science. The meaning of this research is to analyze & solve the social & real life problems & improve human conditions. It is generally conducted in large scale & is normally expensive in nature. It is practically implemented for the research communities to accumulate theories, knowledge, methods & techniques for specific client or business. Mostly these type of research is conducted with the support of financing agencies like research centres, grant commission, NGOs, INGOs, world bank etc.

Scientific Research replicable

Scientific Research is the application of scientific method to the investigation of relationship among different variables to find out solution of the problem or develop a new theory. Scientific Research is a systematic procedures that focuses on goal or gathering a

multitude of facts for evaluation so that a research can come into a conclusion. This study needs to document in such a way that another character can conduct the identical study again which is also called the replication of the study.

Features of Scientific Research

- 1) Purposiveness : exact purpose & to conduct & to
- 2) Testability : sol' chrt crit & to test
- 3) Replicability
- 4) Objectivity
- 5) Rigor = trustable
- 6) Generalizability

Scientific research process

Steps:

1. Defining problem
 2. Reviewing literature
 3. formulating hypothesis/research questions
 4. Selecting the research design and then collecting and analysing data
 5. Developing conclusion or building concepts/theories.
- Q. Diff b/w scientific & non-scientific research

	Scientific Research	Non-scientific Research
Approach	Systematic, structured and methodical	Unstructured, informal, and subjective
Objective	To discover, explain, or predict phenomena using facts.	To express opinions, share experiences or explore ideas
Verification	Results are testable and repeatable by others	Results may not be verifiable or replicable
Data	Quantitative and qualitative collection methods (surveys, experiments)	Informal methods (interviews, observations, personal insight)
Example	Physics experiments, medical trials, social science surveys	Journalism, personal essays, philosophical discussions
Outcome	Generates theories, laws or models	Provides opinions, narratives or general insights
Use of hypothesis	Formulates and tests hypothesis	May or may not involve hypothesis.

Evaluation research - implement ~~PRIME~~ and ~~PRIME~~ to measure achievements, to suggest improvements

Policy research : national, province level PRIME policy formulate
~~PRIME~~, trend analysis - invert PRIME data check PRIME

Managerial research : specific problem to sol? PRIME, helps in decision making

- Descriptive study - in depth study

Qualitative - Can study - scenario create PRIME

- Feasible study - right time, place ~~PRIME~~ check PRIME, appropriate ~~PRIME~~

Unit 2 : Research Design

- Question 1ai answer IV.
- strategy of conducting research
- Once the research problem is formulated, a specific topic is assigned and the hypothesis is formulated, the next stage is to work out a research design. Kerlinger defines a research design as "the plan, structure and strategy of investigation purporting to answer research question and control variance."
- Research design is a strategy of conducting research
- Research design describes the general framework of collecting, analyzing and evaluating data after identifying;
 - a) what you want to know?
 - b) what has to be dealt with in order to obtain required information?

Research design always address certain key issues such as;

- 1) Who will be studied?
- 2) How these people will be selected? and
- 3) What information will be gathered from or about them?

- We have to decide which research design is undertaken and then to develop methods.
- We have to choose the research design according to our goals of research.

Research design should be able to provide answer to the following queries:

- 1) What is the study about & what type of data are required?
- 2) What is the purpose of the study? What is its scope?
- 3) What are the sources of the needed data?
- 4) What should be the place or area of study?
- 5) What time, approximately, is required for the study?
- 6) What should be the amount of material or number of cases for the study?
- 7) What type of sampling should be used?
- 8) What method of data collection would be appropriate?
- 9) How will the data be analyzed?
- 10) What should be the approximate expenditure?
- 11) What would be the methodology of study?
- 12) What should be the specific nature of study?

Essentials of good Research design

- 1) Overall plan for the activities
- 2) Serves as the framework for the study
- 3) Guide the researcher / researcher
- 4) A blue print of specifying the method
- 5) A strategic
- 6) Objectivity
- 7) Reliability
- 8) Validity
- 9) Generalizability

key elements of research design.

- Research Question

- Clear and Focused : should be specific, concise and leave no room for ambiguity
- Feasible and Relevant : Ensure it's achievable with your resources and time constraints, and relevant to your field of study

- Research Objectives :

• SMART Goals

specific, measurable, achievable, relevant, and time-bound objectives that align with your research question.

- Research Design Type :

* Match Approach to Question : Choose the design that best suits your inquiry
(descriptive, correlational, experimental, case study)

* Consider :

- Descriptive : Explore new topics or collect data for further research
- Correlational : Identify potential relationships between variables, not cause-effect
- Experimental : Establish cause-effect through manipulation & observation, but can be challenging & expensive
- Case Studies : Provide in-depth analysis of a single subject, useful for generating new ideas or detailed descriptions.

- Data Collection Methods:

- * Select Appropriate Methods: Choose methods that align with your design and provide reliable data. Some common options include:
 - Surveys: Gather data from a sample population through questionnaires.
 - Interviews: Conduct one-on-one or group discussions to gain deeper insights.
 - Observations: Watch and record behaviors in natural settings.
 - Document Analysis: Extract relevant information from existing documents or records.

- Data Analysis Plan:

- Outline Analysis strategy: Define how you will process and interpret your collected data. This depends on your design & data type.
 - Quantitative: Use statistical methods for numerical data. scenario, roleplay
 - Qualitative: Employ thematic analysis or other methods for non-numerical data. be detecting T/F

- Ethical Considerations:

- Protect Participants: Ensure you conduct your research responsibly and ethically. This includes obtaining informed consent, protecting confidentiality, and minimizing any potential harm to participants.

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- **Validity & Reliability:** These are two important concepts in research design that ensure the quality of your research. Validity refers to whether your research is measuring what it is intended to measure. Reliability refers to whether your research would produce the same results if it were repeated.
 - **Research methodology:** This is the overall approach you will take to collect & analyze data. There are two main types of research methodologies:
 - i) Quantitative
 - It relies on numerical data.
 - ii) Qualitative
 - It relies on non-numerical data such as text or images.
 - **Research question or hypothesis:** This is the central question that your research aims to answer or the prediction you want to test. It should be clear, concise, and specific.
 - **Literature Review:**
 - Conduct a thorough review of existing research on your topic.
 - Identify relevant theories, findings and gaps in knowledge.
 - Use the review to inform your research question and design.
 - **Sampling:**
 - Define the population you want to study and

select a representative sample.

- Determine the appropriate sampling method (e.g. random, convenience, purposive).
- Address potential sampling bias and ensure generalizability.

- Research Timeline and Budget :

- Develop a realistic timeline for your research activities and milestones.
- Create a budget that includes all research expenses.

- Pilot Testing product fully launch Tg Step #
sample launch Tt

- Conduct a pilot test of your data collection instruments and procedures before full implementation.
- Identify and address any issues before collecting actual data.

- Limitations of the Study :

- Acknowledge any limitations of your research design, sampling, data collection, or analysis.
- Discuss potential factors that may affect the generalizability of your findings.

- Data Management Plan:

- Develop a plan for storing, organizing, and securing your research data.
- Ensure data protection and accessibility throughout the research process.

Types

1) Historical research design

- Record of past events.
- Purpose is to collect, verify, and synthesize evidence from the past to establish facts that defend or refute a hypothesis.
- Involves the careful study and analysis of data about past events.
- Relies on available data which are in form of diaries, letters, newspaper, reports and so on.
- Covers categories such as historical legal, documentary, bibliographical, biographical, institutional, ideational and organizational events.
- Steps of H.R are Data collection (Primary sources or first hand information : Remains or relics, fossils, skeletons, tools, weapons, utensils, clothing, furniture, pictures, painting, coins & art objects), evaluation of the data, and presentation of the facts.
- After evaluating the authenticity and accuracy of historical data, the researcher must bring the material together to analyse it in to test the research hypotheses.
- The organization of historical material can also be done in topical, thematic or functional arrangement.
- Methods and tools use in HRD are contemporaneous corroboration, photography, historical revisionism, charge log
- Normally, data collection tools are oral history, case study, historical facts

2) Descriptive Research Design

- Describes events and then organizes, tabulates, depicts and describes the data collection
- Conducted to assess the opinion, behaviour, or characteristics of a given population & to describe the situation and events occurring at present
- In a D.R.D, a researcher is solely interested in describing the situation or case under their research study.
- It is a theory-based design method which is created by gathering, analyzing, and presenting collected data.
- This allows a researcher to provide insights into the why and how of research. D.D helps others better understand the need for the research.
- The purpose is to describe some event, situation, people, group or community or some phenomena
- Usually a D.D involves detailed numerical descriptions, such as distribution of the population of a community by age, sex, caste or education.
- The researcher may also take recourse to descriptive design for estimating the proportion of people in a particular geographical locality in respect of their specific views or attitudes.
- Is accumulation of information which is solely descriptive. It doesn't necessarily seek to explain relationships, test hypothesis, make predictions, or get at meaning and implications.

- classmate
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- D.R.D is an extension of an exploratory research. Unlike exploratory research, it is usually formal & rigid. It may be both qualitative and quantitative.
 - If the problem statement is not clear, you can conduct exploratory research.

Exploratory or Formulative Design

- The main purpose of exploratory study is to gather information which will help in future for formulation of a precise research problem.
- On the basis of the collected facts, the researcher may be able to formulate sound hypotheses for further research.
- The aim of an exploratory or formulative study may be clarification of concepts establishing priorities for future research and collection of data about the actual conditions which affect an intended research.
- Requirement of Exploratory Design:
 - a) Review of pertinent literature
 - b) Experience Survey
 - c) Analysis of Insight stimulating cases

3) Development Research Design

- Carried out for the purpose of predicting future trends.

→ similar data, Time related

- The forms of D.R.D are as:

I Longitudinal study: Under such research designs, phenomena are studied over time either continuously or repeatedly. This study tries to measure nature and rate of change in a sample at different stages of development. Data are collected from same group of individuals at different points of time. Longitudinal study is normally quantitative. It is further divided into:

A. Trend study

When the information are gathered at intervals spread over a period of time, called a trend study. This is designed to establish pattern of change in the past in order to predict future patterns or conditions.

- Trend study provides the information about changes, e.g. population of Nepal
- This is designed for combination of information from different or various several studies of the same population to show the changes.

B. Cohort study

Cohort study is a study of specific group who share common characteristics of experiences within a defined period e.g. birth cohort of 2015

- It is a systematic follow up of group of people for defined period of time or until a specified time
- Data are compiled for the same population over time to form cohort studies.

(ex post facto) relationship
[dependent & independent] *causal effect*
discrete

C. Panel study:

- A panel is a group of individuals that have agreed to provide information to a researcher over a period of time.
- In such study, some people are taken and their attitudes towards particular phenomena over time are studied.
 - It is useful to study change of phenomena. It reveals both type of change, that is net or gross.

II Cross-sectional study

- Involves observation of same items of the population all at the same time.
- This study focuses on comparing and describing the groups of the population.
- This type of study usually uses survey strategy.
- It takes place at a single point of time whereas longitudinal study takes place in a series of measurement over a period of time.

Characteristics and steps in developmental research
(Issac 1978)

- 1) It focuses on the study of variables and their development over a period of time, e.g. patterns, rates, direction, sequence of growth.
- 2) Limited number of subjects that are followed over the years.
- 3) Longitudinal method does not lend itself to

improvements in techniques

- 4) Cross sectional study usually includes more subjects
- 5) Sampling is complicated in cross-sectional study
- 6) Trend studies are vulnerable to unpredictable factors that modify or invalidate trends based on the past

4) Case Study Research Design

- It needs to be both comprehensive & systematic
- Case study is detailed study of units that may be individuals, groups, organizations, institutions, events, situations etc.
- Topology of case study

- A. Snapshot case study : Detailed study of one unit
- B. Longitudinal case study : Study of the same unit at multiple time points.
- C. Pre-post case study : Undertaken at two time points separated by a critical event
- D. Cross-case study : Study of multiple case studies for the purpose of comparison.

- The features of case study

- 1) In-depth investigation
- 2) Tends to examine small number of units
- 3) Intensive and insight
- 4) Narrow focus on few units
- 5) Not generalizable

5. Correlational research design

- In correlational research design two variables are related. This relationship shows the influence of variables.
- Correlational research is a non-experimental research design technique that helps researchers establish a relationship between two closely connected variables.
- This type of research requires two different groups. There is no assumption while evaluating a relationship between two different variables, and statistical analysis techniques calculate the relationship between them.
- A correlation coefficient determines the correlation between two variables, whose value ranges between -1 and +1. If the correlation coefficient is towards +1, it indicates a positive relationship between the variables and -1 means a negative relationship between the two variables.
- Relationships may be close, moderate, or unrelated.
- The types of correlation are:
 - (a) positive
 - (b) negative and
 - (c) no relation
- Correlations measure over a scale @ like
 - (a) negative (-1, 0)
 - (b) positive (+1, 0)
 - (c) no relation (0, 0)
- It does not prove ~~cause~~ causality, but indicates how strongly two or more variables are related.
- The features of correlational research are:
 - 1) The complexity of relationship
 - 2) Measurement of relationship
 - 3) Degree of relationship

6. Causal comparative research design

- Causal comparative research establishes the causal relationships between variables.
- This type of research may be termed as exploratory studies, and also called ex post facto.
- This type of study focuses on the problems in order to explain cause-effect relationships of variables.
- According to Kerlinger (2000), ex post facto research is that research in which the independent variable or variables have already occurred and in which the researcher starts with the observation of a dependent variable or variables.
- This research design focuses on the independent variables in respect for their possible relations to, and effect on the dependent variables.
- Causal comparative research involves that there is control or comparison group, there is an intact group and the treatment has already occurred, not manipulated.
- There are 3 types of G.C.R.:
 - 1) Explorations of effect
 - 2) Exploration of causes
 - 3) Exploration of consequences
- There are other categories of variables which have different possibilities of relationships:
 - 1) Symmetrical relationship : two variables fluctuate together
 - 2) Reciprocal : mutually influence or re-enforce each other
 - 2) Asymmetrical : change in one variable (independent)

is responsible for changes in another variable
(dependent)

- This is like experimental research
- Experimental research design establishes a relationship between the cause and effect of a situation.
- It is a causal design where one observes the impact caused by the independent variable on the dependent variable.
- It is a highly practical research design method as it contributes to 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
- Discovering the causal relationships is the key to experimental research.

7) Action or interventional research design

- Action research involves a continuous gathering and analyzing of research data during the usual on-going operations of organization and institution.
- It is designed to identify effective ways of dealing with problems. It helps in changing the organization's mode of functioning
- The research strategy of Action research design is to pursue "action and knowledge"
- Action research is task-oriented form of study designed to provide feedback to the management for the interventions.

- This type of research design involves:
 - 1) to address practical problem
 - 2) to generate new knowledge
 - 3) to enact changes
 - 4) to make participatory
 - 5) to relies on cyclical process

- On the other hand, in interventional research studies the researcher intervenes or manipulates a situation to measure the effect of manipulation.
- For eg, study of job satisfaction, relationships between salary and job satisfaction, relationship between training and job satisfaction.
- Usually (but not always), two groups are compared on which the intervention takes place.

Sampling

Characteristics of sampling

- 1) Population
- 2) Size
- 3) Process / method
- 4) Representation
- 5) Neutrality
- 6) Careful
- 7) Systematic

Significance of sampling

- 1) Representation
- 2) Neutrality
- 3) Coverage
- 4) Manageable
- 5) Reduced cost and time
- 6) Reduced resource deployment
- 7) Accuracy of data
- 8) Intrinsic and exhaustive data
- 9) Apply properties to a larger population

Processes

- 1) Identify the population of interest
- 2) Specify a sampling frame
- 3) Specify a sampling method
- 4) Determine the sample size
- 5) Implement the plan

Types of samples

- 1) Probability Sampling
- 2) Non-Probability Sampling

1)-Sampling technique in which samples from a larger population are chosen using a method based on the theory of probability.

- There is no bias whatsoever in this type of sample

- Randomly selected

Types

- 1) Simple random sampling

Each member has an equal chance chance of being selected

- 2) Cluster/multistage

Similar characteristics to basis IT grouped

- 3) Systematic

Researcher chooses respondents at equal intervals from a population.

- 4) Stratified

- collectively represent the whole population

- dividing into distinctive but pre-defined parameters.

- Strata (group) → experts to collect info

- Respondents don't overlap

e.g.: Marketing → Researcher, Best to best
(top)

2. Non-probability

non-random selection based on convenience or other criteria

2.1 Convenience Sampling

- Most accessible (individual) selected by the researcher.

2.2 Purposive Sampling = Judgement sampling

- Involves the researcher using their expertise to select a sample that is most useful to the purposes of the research.

2.3 Quota Sampling

- Researcher sets a quota for different groups & selects participants until the quota is met.

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Q) Explain the various types of probability sampling.

→ Sampling is the process of collecting data from large group of people by selecting the representative of that group.

In probability sampling candidates are randomly selected to collect the data. The types of probability sampling are:

i) Simple random sampling

In simple random sampling each individual has equal number of chances to be selected even from a large group. There are no any requirement while selecting individuals for the survey.

ii) Cluster / multistage

In cluster / multistage sampling the researcher groups the population based on their characteristics. Eg: Hardworking people are grouped into one group and researcher does their research on those groups.

Here, grouping on the basis of characteristics is done.

iii) Systematic sampling

In systematic sampling the researcher selects the individual at equal interval from a population. For eg: In a group of 4 people the researcher either selects odd no. of people or even no. of people if they are numbered from 1 to 4.

iii) Stratified Sampling

In stratified sampling the population is collectively used to represent the whole population. The groups are divided into distinctive but pre-defined parameters by forming strata. The top level of individuals are selected. For eg: In a group of company CEO's are selected to collect the overall data because the CEO knows the most about that company.

Q1) Describe any two research design.

→ Research design is the strategy of conducting a research. Research design is conducted so that data can be collected, analyzed and evaluated.

Any two research design are:

- i) Historical Research design
- ii) Case Study Research design

They are explained as below:

i) Historical Research design

In this type of research design the data are collected on the basis of history. Past events are taken into consideration in order to collect, verify and synthesize the data. Historical research design relies on the available data which are in the form of reports, newspaper, letters, photographs. To understand the context and significance of past occurrences, data is analyzed and interpreted. It mainly considers social, political, economic and cultural factors that influenced

historical events.

Historical research design helps in understanding how past events shape the present. It helps to identify patterns, trends and causes over time. It even allows for the study of rare or unique phenomena that cannot be replicated.

Historical research design faces several challenges. One major issue is source availability, as limited or missing historical records can hinder comprehensive analysis. Another challenge is bias and interpretation, requiring researchers to critically evaluate the accuracy, reliability and perspective of historical sources. Additionally, the process is time-consuming due to the extensive data collection, evaluation and analysis needed to produce accurate and meaningful conclusions.

ii) Case Study Research Design

Case study research design is a qualitative research method used to explore and analyze a specific individual, group, organization, event, or phenomenon in depth. It provides a comprehensive understanding of real-life situations by examining them in their natural context.

This design is widely used in social sciences, business, medicine and education to investigate complex issues that cannot be easily quantified.

Different topology of case study are:

- A. Snapshot case study: detailed study of one unit

- B. Longitudinal case study : Study of the same unit at multiple time points.
- C. Pre-post case study : Undertaken at two time points separated by a critical event.
- D. Cross-case study : Study of multiple case studies for the purpose of comparison.

Advantages :

- i) Provides deep understanding of complex issues in real-life context.
- ii) Useful for exploring new or rare phenomena where experimental methods are impractical.
- iii) Allows for the use of multiple data sources to enhance the credibility of findings.

Challenges :

- i) Limited Generalizability : Findings may not be applicable to broader populations.
- ii) Time-consuming : Collecting and analyzing detailed data requires significant time and resources.

(Q) A sample of 100 students is taken from a large population. The mean height of those students is 64 inches & standard deviation of 4 inches. Can it reasonably be regarded that in the pop' mean height is 66 inches. sol?

$$\text{sample size } (n) = 100$$

$$\text{sample mean } (\bar{x}) = 64$$

$$\text{Population s.d } (\sigma) = 4$$

$$\text{Population mean } (\mu) = 66$$

Step 1 : Hypothesis

Null Hypothesis (H_0) : The population mean height is 66 inches i.e. $H_0 : \mu = 66$

Alternative Hypothesis (H_1) : The population mean height is not 66 inches. i.e $H_1 : \mu \neq 66$

Step 2 :

$$Z_{c.v} = \frac{\bar{x} - \mu}{\sigma / \sqrt{n}}$$

$$= \frac{64 - 66}{4 / \sqrt{100}}$$

$$= -5$$

Step 3 : TTT

$$10s = 5\%$$

$$\text{Step 4: } Z_{TV} = 1.96$$

Step 5 :

$Z_{c.v} > Z_{TV}$ so it is significant. Hence H_0 is rejected.

Q) A manufacturer claims that at least 90% of his goods supplied conform to specifications. A sample of 100 pieces has shown that 20 were faulty. Test his claim at 5% LOS (Use Table value of z at 5% level for one tail test : 1.645 & TTT : 1.960)

Sol:

$$\text{Sample size } (n) = 100$$

$$\text{Sample population of qualified good } (P) = \frac{100-20}{100} = 0.8$$

$$\text{Pop}' \text{ prop}' \text{ of qualified goods } (p) = 90\% = 0.9$$

$$\vartheta = 1 - 0.9 = 0.1$$

Now,

Step 1 : Hypothesis formulation

$H_0 : p = P$ i.e. manufacturer's claim is correct.

$H_1 : p > P$ i.e. manufacturer's claim is incorrect
(OTT)

Again,

Step 2 : Test statistics

$$Z_{\text{cal}} = \frac{p - P}{\sqrt{\frac{P\vartheta}{n}}} = \frac{0.8 - 0.9}{\sqrt{\frac{0.9 \times 0.1}{100}}} = -3.33$$

$$|Z_{\text{cal}}| = 3.33$$

Step 3 :

$$\text{LOS } (\alpha) = 5\%$$

Step 4 :

Critical value from table

$$|Z_{\text{tab}}| = 1.645 \text{ (OTT)}$$

Step 5 : Decision

Since, $|Z_{\text{cal}}| > |Z_{\text{tab}}|$. Thus, H_1 is accepted.

Therefore, Manufacturer's claim is incorrect.

Q In an urban district of Nepal, women's family planning measures adoption rate was 60 percent. To increase this rate, various awareness programs were implemented. After the end of the program phase, 500 married women of age 15-49 were taken randomly. Out of total samples, it was found that 400 were adopted family planning measures. Test your hypothesis whether the programs have been successful to increase family planning measures at 95 percent ($Z = 1.645$) and 99 percent ($Z = 2.326$) level of significance.

Sol:

$$\text{Sample size } (n) = 500$$

$$\text{Sample prop}^n \text{ of family who adopted family planning } (p) = \frac{400}{500} = 0.8$$

$$\text{Pop}^n \text{ prop}^n \dots \dots \dots (P) = 60\% = 0.6 \\ q = 0.4$$

Step 1: Hypothesis formulation

$H_0: p = P$ i.e. The awareness program have been unsuccessful

$H_1: p > P$ i.e. The awareness program have been successful.

Step 2: Test statistics

$$Z_{\text{cal}} = \frac{p - P}{\sqrt{\frac{PQ}{n}}} = \frac{0.8 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{500}}} = 9.12$$

$$\text{Step 3: } 10s(\alpha_1) = 100 - 95 = 5\%.$$

$$10s(\alpha_2) = 100 - 99 = 1\%.$$

Step 4:

$$\text{when } \alpha_1 = 5\%, |Z_{\text{tab}_1}| = 1.645$$

$$\text{when } \alpha_2 = 1\%, |Z_{\text{tab}_2}| = 2.326$$

Step 5: Decision

For $\alpha_1 = 5\%$,

$$|Z_{\text{cal}}| > |Z_{\text{tab}_1}|. \text{ Thus } H_1 \text{ is accepted}$$

For $\alpha_2 = 1\%$,

$$|Z_{\text{cal}}| > |Z_{\text{tab}_2}|. \text{ Thus, } H_1 \text{ is accepted.}$$

Therefore, for both level of confidence, it is found that the awareness program is successful i.e family planning adoption has been increased.

Unit 4 : Testing of Statistical Hypothesis

Statistical Hypothesis

Hypothesis = assumption

↳ guess statement

↳ diff parameter for diff pop or prob distribution

↳ & observation diff result random

Type of hypothesis

1) Descriptive & relationships

↳ one variable describes relation b/w two variables

2) Directional & Non-directional

↳ indicates particular

↳ formulated without clear direction b/w expected about +ve & -ve relationships

relationship b/w variables standardize data w/o reason

Directional hypothesis indicates the particular direction of the expected relationship between variables. For eg: younger teachers are less motivated than older teachers. Non-directional hypothesis is formulated when there are no clues available about the +ve or -ve relationships between two variables. For eg: there is difference between work attitudes of government and Bank employee.