

# Research Methodology

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Research:- Systematized effort to gain new knowledge.

## Types of Research :-

### 1. Descriptive vs Analytical :-

Descriptive research includes surveys and fact finding enquiry of different kinds. Here researcher has no control over the variables. It is the description of the state of affairs.

In Analytical Research the researcher has to use facts or information already available, and analyze these to make a critical evaluation of the material.

### 2. Applied vs fundamental :-

Applied research finds a solution for an immediate problem facing a society or a industrial business.

fundamental research is concerned with generalization and with the formulation of a theory.

### 3. Quantitative & Qualitative :-

Quantitative research is based on the measurement of quantity or amount.

Qualitative research is concerned with qualitative phenomenon, i.e. related to quality.

### 4. Conceptual vs Empirical :-

Conceptual research is related to some abstract ideas or theory.

empirical research relies on experience or observation alone.

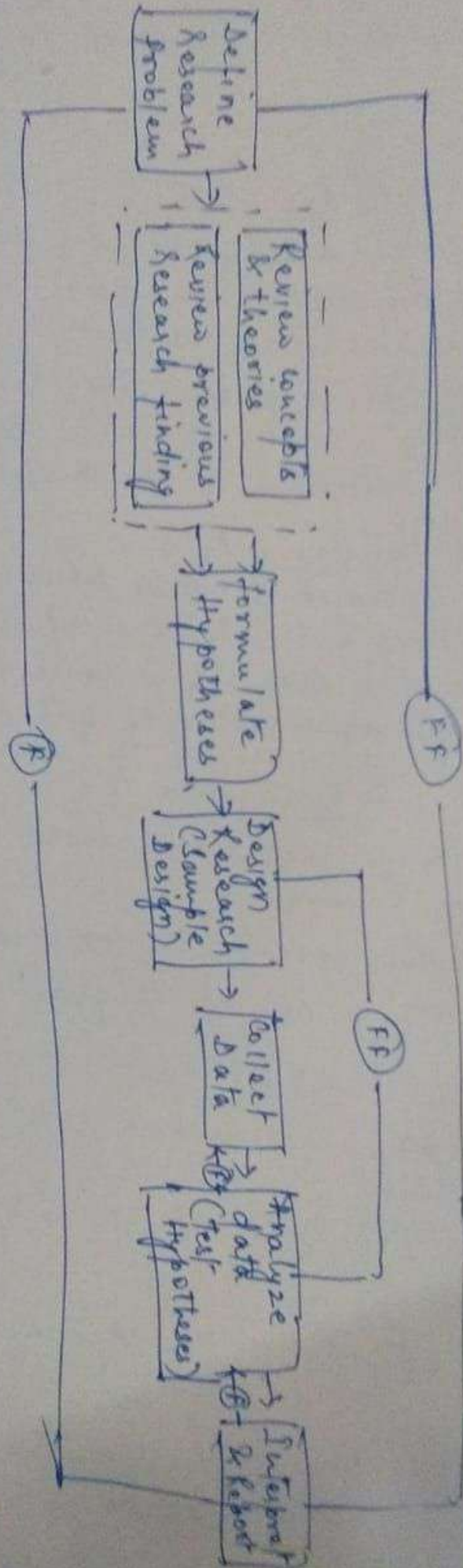
Research Method :- All the research method used by researcher.

Research Methodology :- A way to systematically solve the research problem.



# Research Process :-

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## Sample designs :-

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1. Deliberate Sampling :- Deliberate selection of particular units of the universe for constituting a sample which represents the universe.
2. Simple random sampling :- chance or probability sampling where each and every item is having equal chance of inclusion in the sample.
3. Systematic Sampling :- particular system is adopted for to select sample from the universe. i.e. 15<sup>th</sup> no of sample from universe.
4. Stratified sampling :- when the sample drawn does not constitute homogenous group, then the population is stratified into no of non overlapping subpopulations or strata and sample items are selected from each stratum.
5. cluster or Area Sampling :- Grouping of samples and selecting a cluster or group rather than individual element for inclusion.
6. Multi stage sampling :- first selecting a primary sampling units like states then district and then towns and finally selecting families.
7. Sequential Sampling :- Here the size of the sample is not fixed in advance but is determined according to mathematical decisions on the basis of information received as survey progresses.



## Data Collection Methods :-

1. By observation
2. Through personal interviews
3. Through telephonic interviews
4. By mailing questionnaire
5. Through schedules

## Problems encountered by researchers in India :-

1. Lack of scientific training in the methodology of research
2. Insufficient interaction between university research depts.
3. Lack of confidence in the business units.
4. Overlapping of research studies.
5. No code of conduct for researchers
6. Difficulty of adequate and timely assistance.
7. Library management is insufficient.
8. Difficulty of timely availability of published data.
9. problem of conceptualization

Research Design :- It is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose  
It is the conceptual structure within which research is conducted.

## Different Research Design :-

1. In exploratory research studies :-

The objective is discovery of ideas and insights. It is flexible and versatile and often the front end of total research design. The methods used are Expert surveys, pilot surveys case studies. Qualitative research is done.



## 2. Descriptive Research design :-

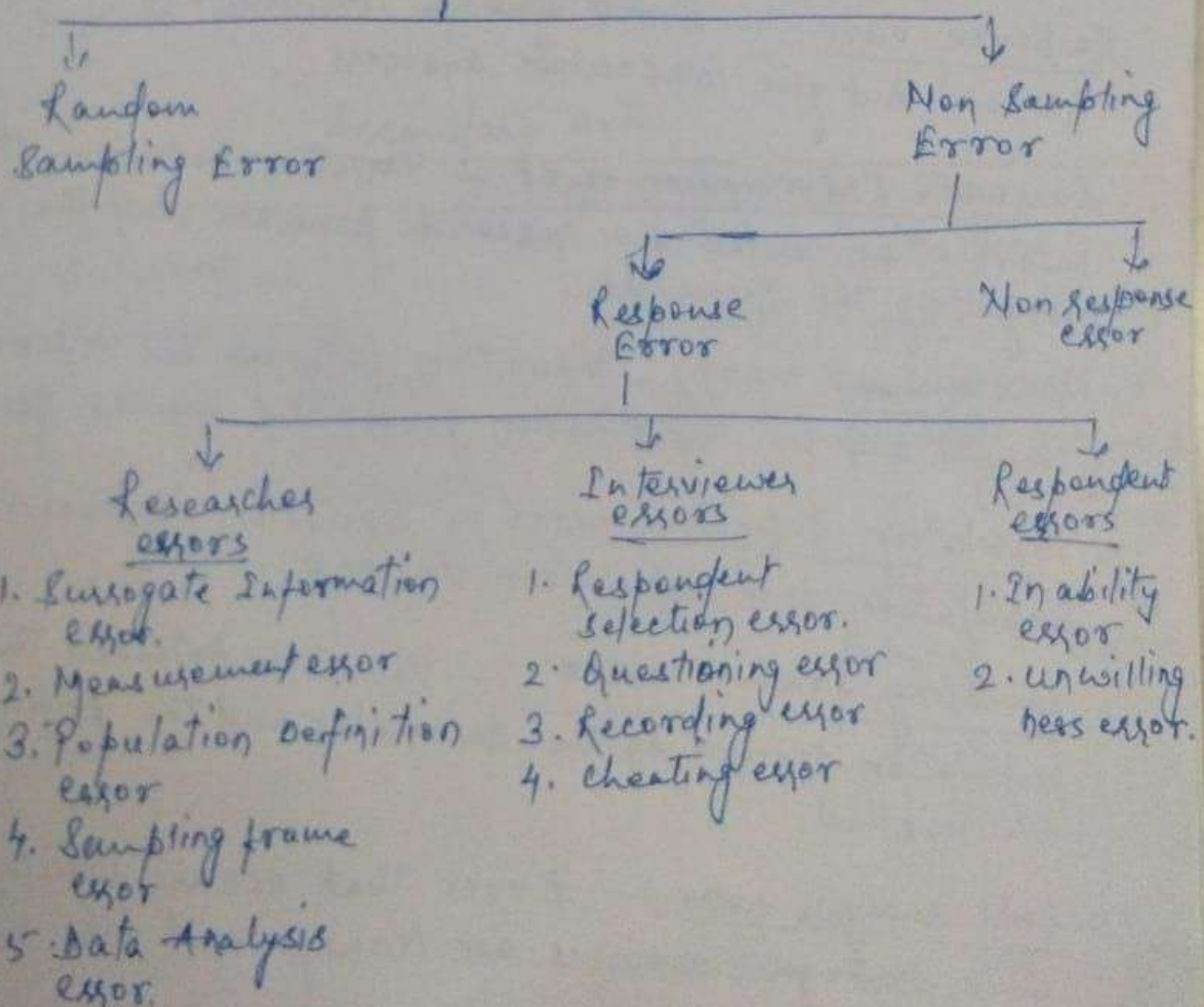
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Describe the market characteristics or functions. It is marked by the prior formulation of specific hypotheses. It has preplanned & structured design. The methods used are surveys, panels, observation & other data.

## 3. Causal Research design :-

Determine cause & effect relationships. Manipulation of one or more independent variables. Measure the effect on dependent variables. There is a control of other mediating variables.

### Sources of Error





Total Error :- Variation between the true mean value in the population and the observed mean value obtained in the research project.

Random Sampling Error :- The error due to the particular sampling selected being an imperfect representation of the population of interest.

Non Sampling Error :- The errors that are attributed to sources other than sampling.

Non response error :- The error occurs when some of the respondents included in the sample do not respond.

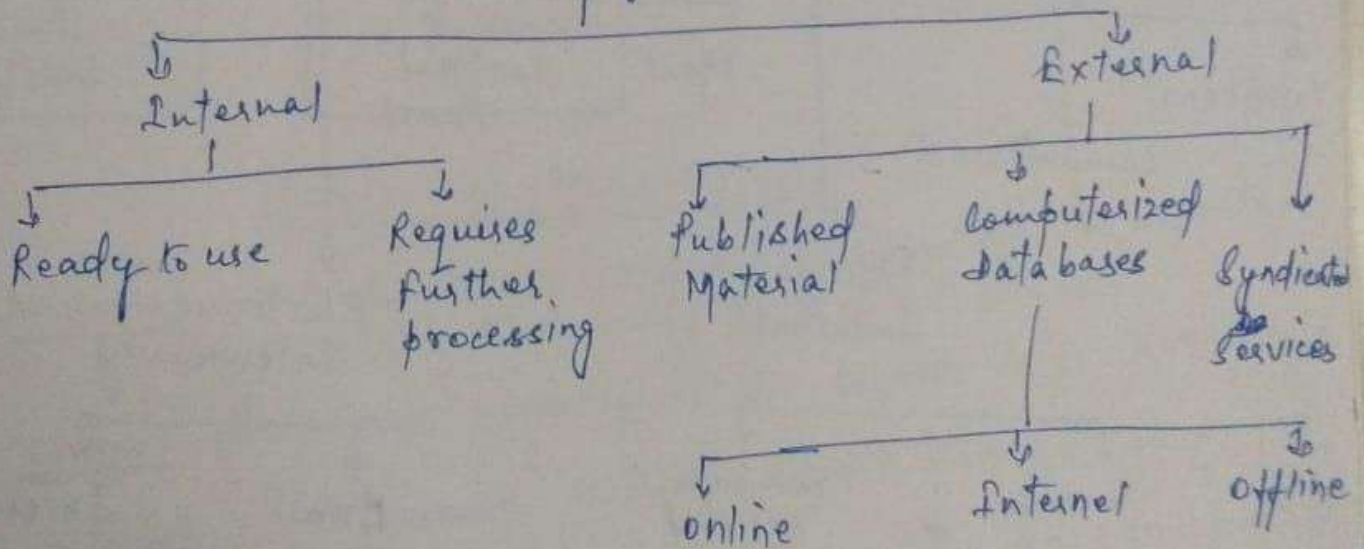
Response error :- Error due to the respondents who respond but give inaccurate answers.

1. Surrogate Information error :- Variation between the information needed for research problem and the information sought by the researcher.
2. Measurement error :- Variation between the information sought and the information generated by the researcher.
3. Population definition error :- Variation between actual population and population defined.
4. Sampling frame error :- Variation between the population defined by the researcher and the population as implied.
5. Data analysis error :- Error that occurs while raw data from questionnaires are transformed into research findings.



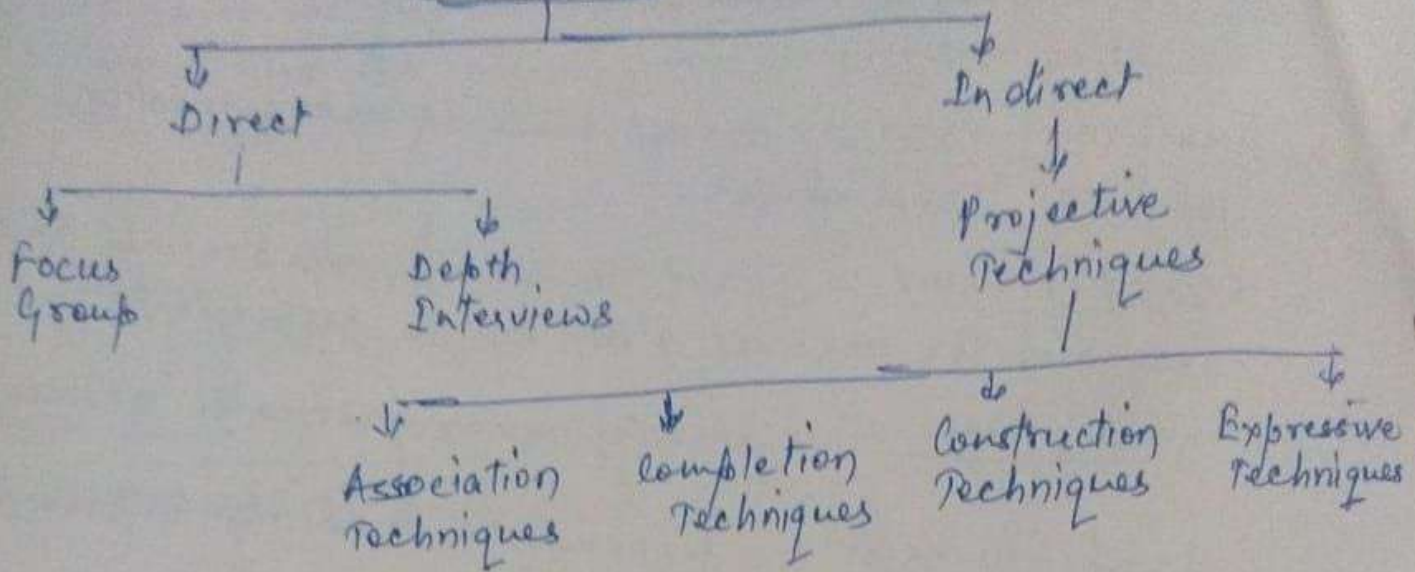
1. Respondent selection error :- it occurs when interviewer select respondents other than those specified by the sampling design.
  2. Questioning error :- Error made is asking questions from the respondents.
  3. Recording error :- Errors in hearing, interpreting, and recording the answers given by the respondents.
  4. Cheating error :- when interviewer fabricates answers.
1. Inability error :- respondent's inability to provide accurate answers.
  2. Unwillingness error :- respondent's unwillingness to provide accurate information.

### Secondary data

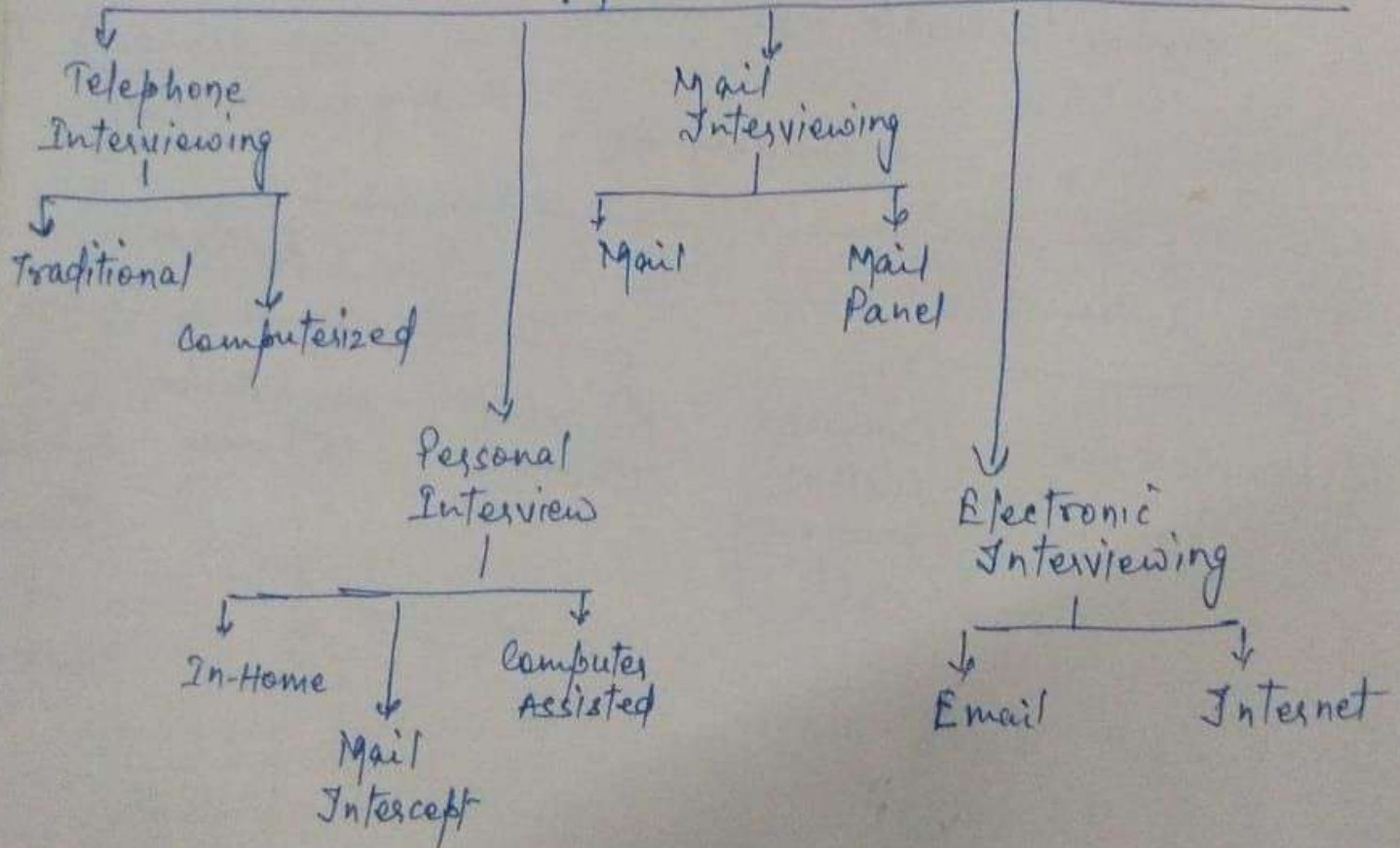


# Qualitative Research Procedures

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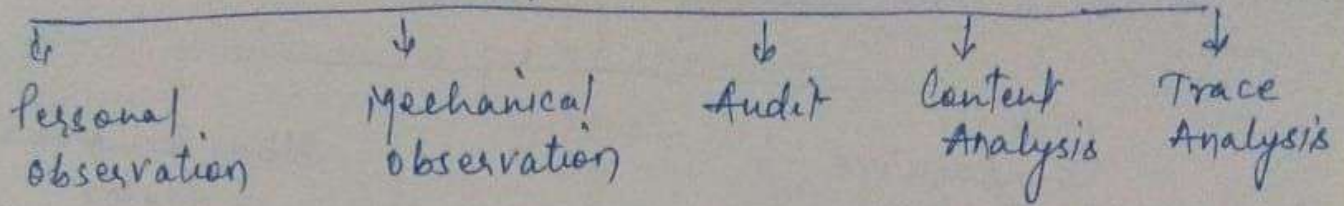
# Survey Method



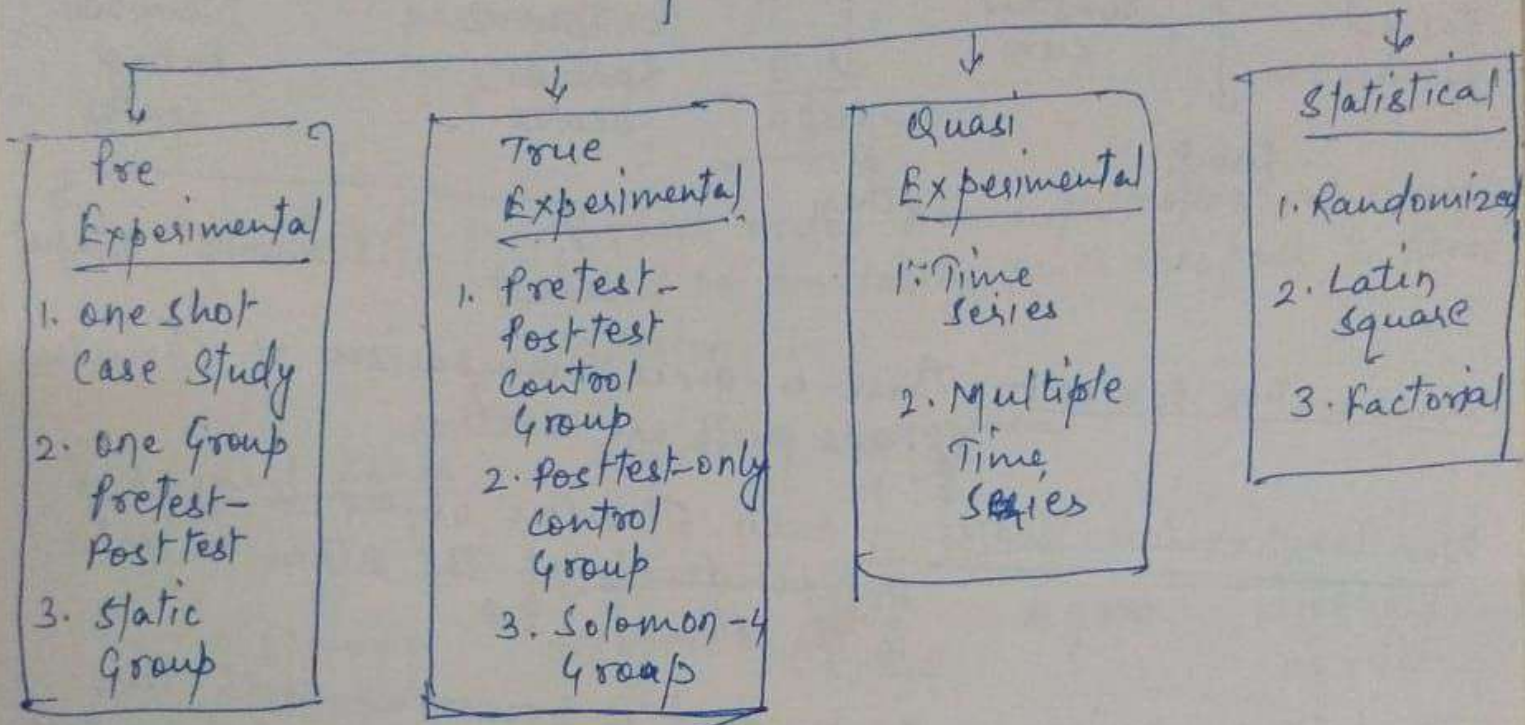


## Observation Method

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## Experimental Design



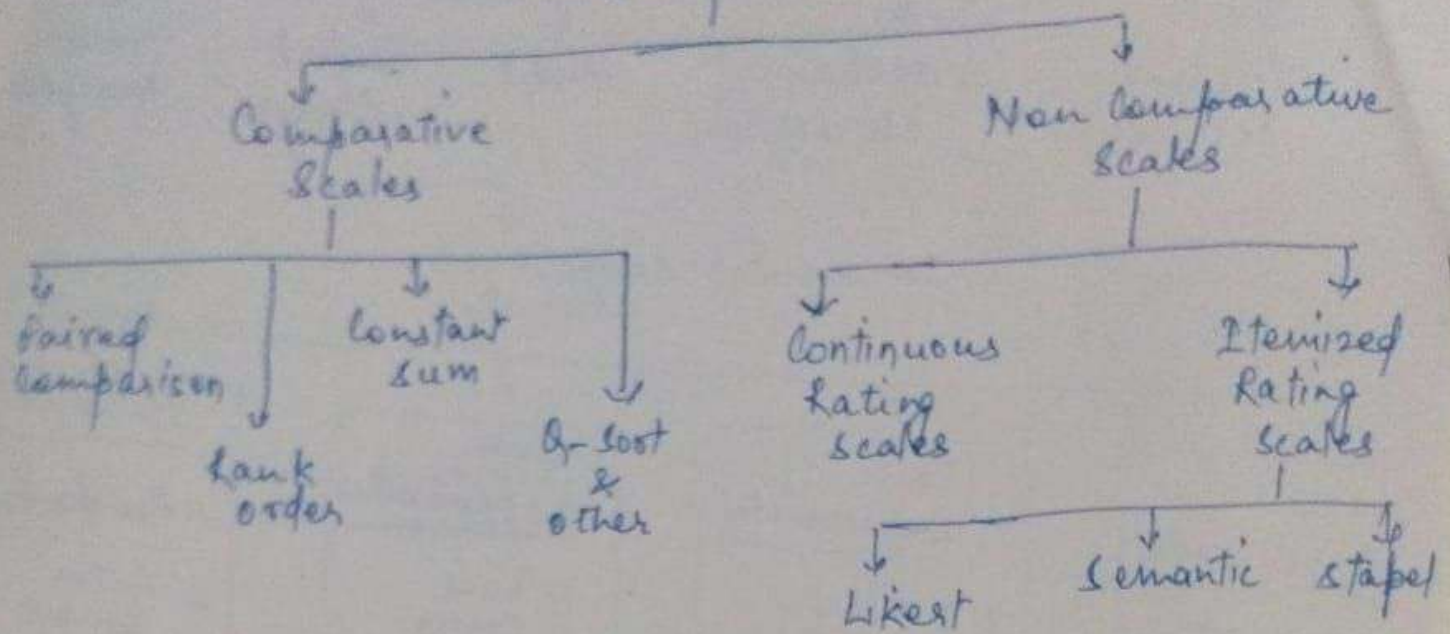
## Scales of Measurement

1. Nominal :- Numbers assigned to identify the objects.  
e.g. Numbering of football players.
2. ordinal :- Rank ordering of the objects e.g. percentile.
3. Interval :- Difference between objects can be compared.
4. Ratio :- Ratios of scale values can be computed.



# Scaling Techniques

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Comparative scales:- There is direct comparison of stimulus objects with one another.

Non Comparative Scales:- Each stimulus object is scaled independently of the other objects in the stimulus set.

1. Paired comparison:- Respondent is presented with two objects at a time and asked to select one object according to some criteria.

2. Rank order:- Respondents are presented with several objects simultaneously and asked to rank them.

	<u>Rank</u>
Coca cola	1
IBM	2
Microsoft	3
GE	4
Nokia	5



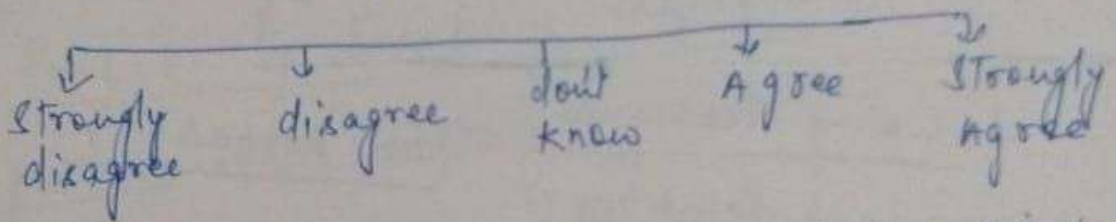
3. Constant Sum :- Respondents are required to allocate a constant sum of units among a set of stimulus.

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	<u>Response</u>
Mild	10
Fragrance	9
Texture	4
Price	8
packaging	7
Moisturizing	5
	<u>43</u>

4. Q-sort :- A rank order procedure to sort objects based on similarity with respect to some criterion.

1. Likert scale :- degree of agreement



2. Semantic Differential :- Seven point scale with bipolar levels



Seas is

Powerful	-	-	-	-	*	-	Weak
Unreliable	-	-	-	-	-	*	Reliable
Modern	-	-	*	-	-	-	old fashioned
Cold	-	*	-	-	-	-	Warm
Careful	*	-	-	-	-	-	Careless



3. Stapel Scale :- A scale for measuring attitudes that consists of a single adjective in the middle of an even-numbered range of values, from -5 to +5 without (0). (17)

e.g. Seass

+5	+5
+4	+4
+3	+3
+2	+2 (X)
+1	+1
High Quality	Poor service
-1	-1
-2	-2
-3 (X)	-3
-4	-4
-5	-5

### Sampling Techniques

### Non probability

1. Convenience Sampling :-

A	B	C	D	E
1	6	11	16	22
2	7	12	17	22
3	8	13	18	23
4	9	14	19	24
5	10	15	20	25

2. Judgemental Sampling :-

A	B	C	D	E
1	6	11	16	21
2	7	12	17	22
3	8	13	18	23
4	9	14	19	24
5	10	15	20	25

Researcher has taken groups B, C, & E to be convenient. In that group one or two elements are selected.



### 3. Quota Sampling :-

A	B	C	D	E
1	6	11	16	21
2	7	12	17	22
3	8	13	18	23
4	9	14	19	24
5	10	15	20	25

Quota of one element from each group is selected. (13)

### 4. Snowball Sampling

A	B	C	D	E
1	6	11	16	21
2	7	12	17	22
3	8	13	18	23
4	9	14	19	24
5	10	15	20	25

Elements 2 & 9 are randomly selected from A & B groups.  
Element 2 refers 12 & 13.  
& Element 9 refers 18.

## Probability Sampling Technique

### 1. Simple Random Sampling

A	B	C	D	E
1	6	11	16	21
2	7	12	17	22
3	8	13	18	23
4	9	14	19	24
5	10	15	20	25

### 2. Systematic Sampling

A	B	C	D	E
1	6	11	16	21
2	7	12	17	22
3	8	13	18	23
4	9	14	19	24
5	10	15	20	25



### 3. Stratified sampling

A	B	C	D	E
1	6	11	16	21
2	7	12	17	22
3	8	13	18	23
4	9	14	19	24
5	10	15	20	25

from each stratum random selection of one element is done

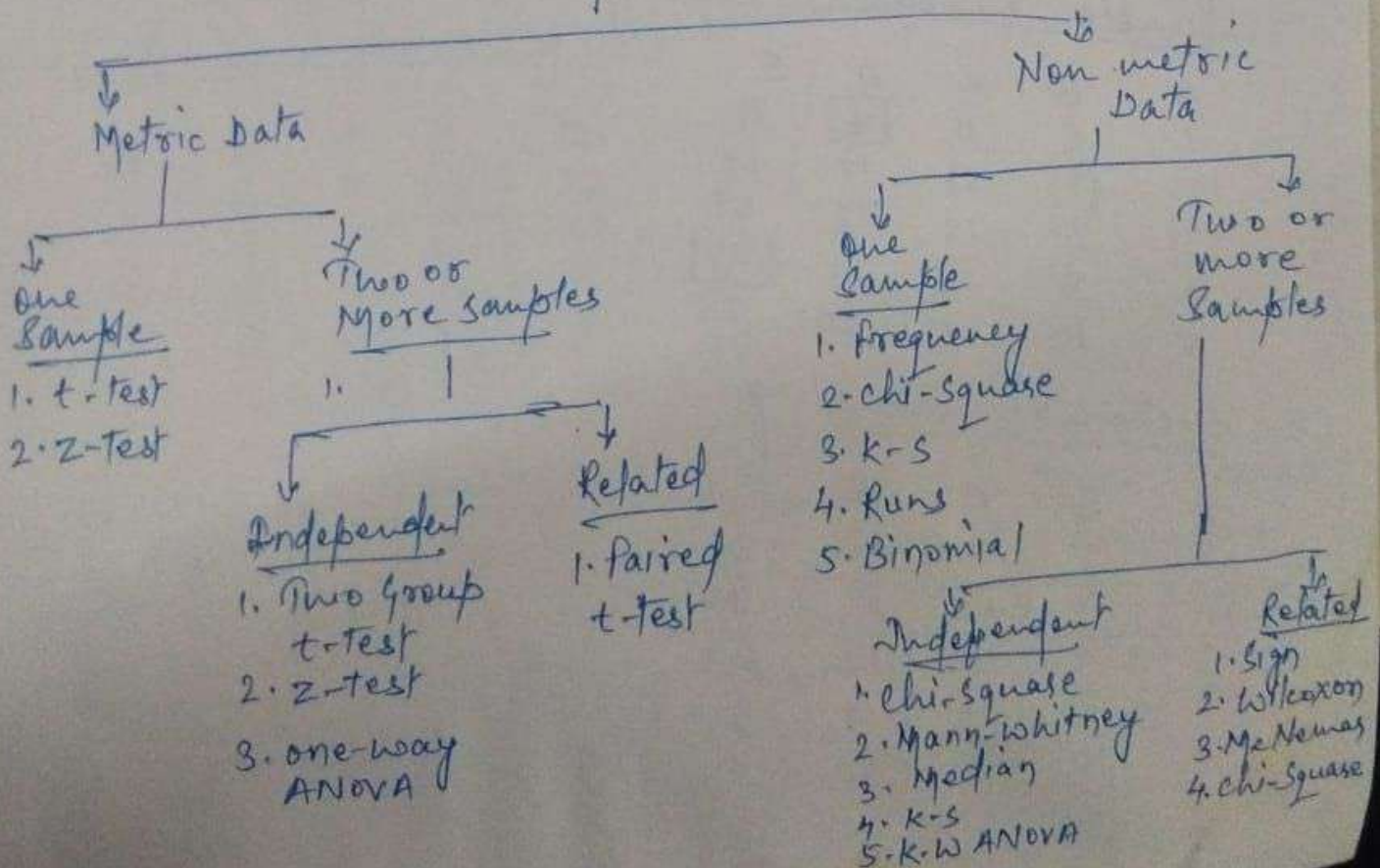
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### 4. Cluster Sampling (Two-stage)

A	B	C	D	E
1	6	11	16	21
2	7	12	17	22
3	8	13	18	23
4	9	14	19	24
5	10	15	20	25

Randomly select 3 clusters B, D, & E. from each cluster select one or two element.

### Univariate Technique





Hypothesis :- proposition or set of proposition set forth as an explanation for the occurrence of some group phenomenon either asserted merely as a provisional conjecture to guide some investigation or accepted.

1. Null Hypothesis :- If we are to compare method A with method B about its superiority & we assume that both methods are equally good then assumption is called as Null Hypothesis ( $H_0$ ).

2. Alternate Hypothesis :- If Method A is superior or the method B is inferior. Then it is called alternate Hypothesis ( $H_a$ ).

Level of Significance :- The significance level of 5% implies that  $H_0$  will be rejected when the sampling result has a less than 0.05 probability of occurrence if  $H_0$  is true.

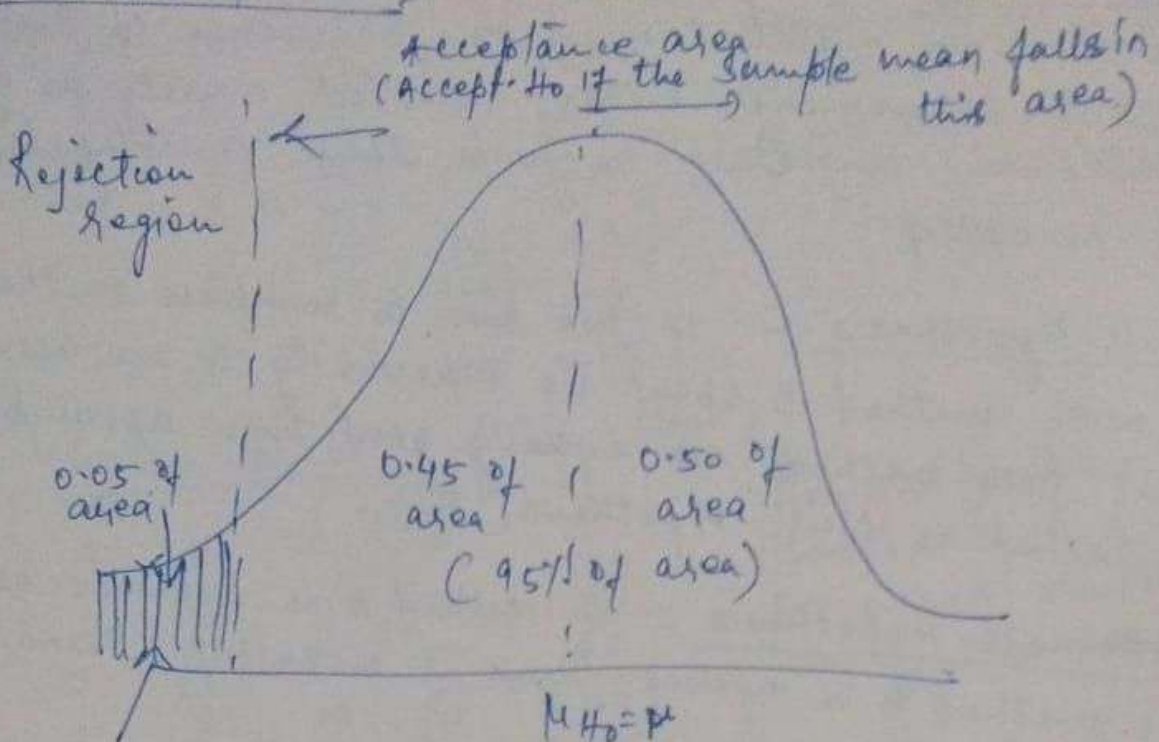
5% level of significance means that researcher is willing to take as much as 5% risk of rejecting null hypothesis when  $H_0$  is true.

Type I & Type II error :-

		Decision	
		Accept $H_0$	Reject $H_0$
$H_0$ true	Correct Decision		Type I error ( $\alpha$ error)
	Type II error ( $\beta$ error)		Correct Decision

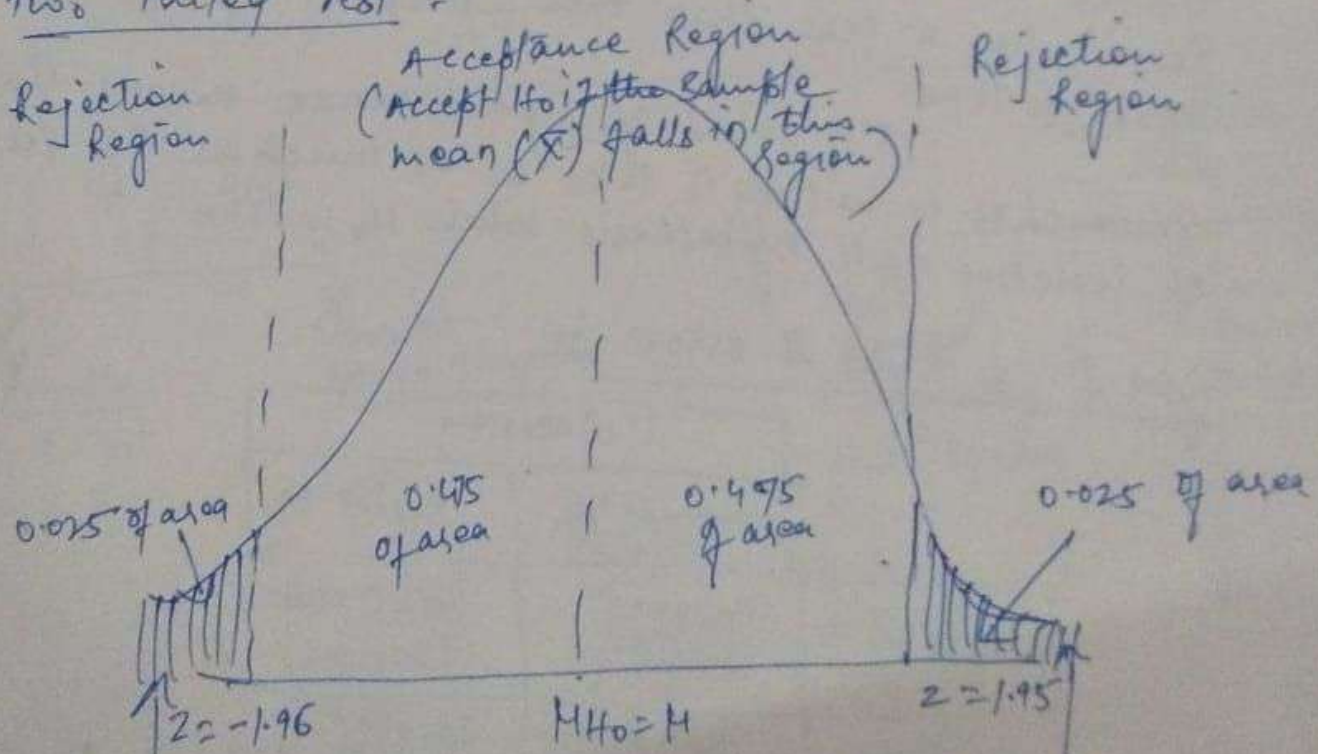


one tailed test



Reject  $H_0$  if the sample mean ( $\bar{x}$ ) falls in this ~~area~~ region

two tailed test



Reject  $H_0$  if sample mean  $\bar{x}$  falls in either of these two regions