

1. Selection of Research Approach

- Research approach - 2 types: **exploratory & conclusive research** for survey based researches.
- Based on requirements of study, the researcher should decide about the type of study to be conducted.

- The modeling research should be used to find the best result through a model which consists of an objective function and a set of constraints.
- The algorithmic research should be used to find the optimal or near optimal solution using either exact algorithm or heuristic, respectively.

2. Design of Sampling Plan

- Sampling plan → mechanism by which the sampling units of study are selected from the sampling frame of the population.
- In turn affects cost & time to conduct the study, & reliability of inferences of the study.
- Should be selected with utmost care.

- Sampling plan – probability sampling plans & non-probability sampling plans.

- probability sampling plans : simple random sampling, systematic sampling, stratified random sampling, cluster sampling, multistage sampling etc.

- Non-probability sampling plans: convenience sampling, judgment sampling, quota sampling, snowball sampling etc.

3. Design of Experiment

- A study involves different response variables, each may be affected by many factors.
- To test the effect of these factors, a suitable experiment to be designed such that the necessary data for testing the significance of the effects of the factors on the response variable are collected & the inferences of the test are highly reliable.

- Two main steps of designing the experiment

- a) Identify the response variable of the study

- b) For each response variable repeat the following steps:

- Identify the factors affecting the response variable.

- Decide on the type of each of the factors (a factor may be either fixed factor or random factor)
- Fix the no. of levels (treatments) of each factor.
- Form the skeleton of the experiment
- Write the model of the experiment & define its components.

4. Design of Questionnaire

- Data – primary or secondary data
- The data which is collected for the first time by direct observation – **primary data.**
- The data which is obtained from existing records, publications etc. – **secondary data**

- Different methods of primary data collection – personal interview, telephone interview, and mail survey.
- The success of survey methods depends on the strength of questionnaire used.
- Questionnaire – set of well-formulated questions to probe & obtain responses from the respondents.

Generalized steps of designing questionnaire:

- i. Identification of research issues & finalization of the set of hypotheses.
- ii. For each issue, formulation of a set of questions & then deciding about the contents & format of each question.
- iii. Arrangement of questions in questionnaire in appropriate sequence.
- iv. Pre-testing questionnaire
- v. Review of questions for improvements.