ISBN: 978-93-90847-07-5

1. Sampling Techniques

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1.1 Introduction:

When a researcher conducts research and indulges in data collection for predicting behavior of a population. As it is not possible to collect data on the whole universe a sample which is perceived as the best fit for predicting about the universe is extracted for survey or research data collection and this result is used in predicting about the whole universe.

Sample means the group of individuals who will actually participate in the research for predicting about the universe them represent. To interpret rightly from the sample about the universe the sample should be selected appropriately.

Sampling assists a lot in judging about population. Using sample from the population and doing data collection on it will help us to judge about population in acredible manner. Hence if sample is not selected scientifically than the judgments made about population may be inaccurate. There are many techniques of sampling. But the technique used to select sample depends on the demand of purpose and aim of the research. This chapter tries to present some of those techniques.

To begin with terminologies for various aspects included in sampling are as follows.

1st Population/universe of research: All the parts of the universe are the population who will be studied is the universe of study, e. g Universe of helmet users, out of which a few persons of this category will be researched upon to assess about the universe.

2nd Sample: It is not possible to do research on the whole universe (e.g. Universe, hence a part of the universe will be used, this is the sample.

3rd Sampling: How the sample will be sized up is sampling procedure. Various sampling techniques may be clubbed into two categories:

- Probability Sampling
- Non- Probability Sampling

Difference between Probability Sampling and Non-Probability Sampling Methods:

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We have looked at the different types of sampling methods above and their subtypes.

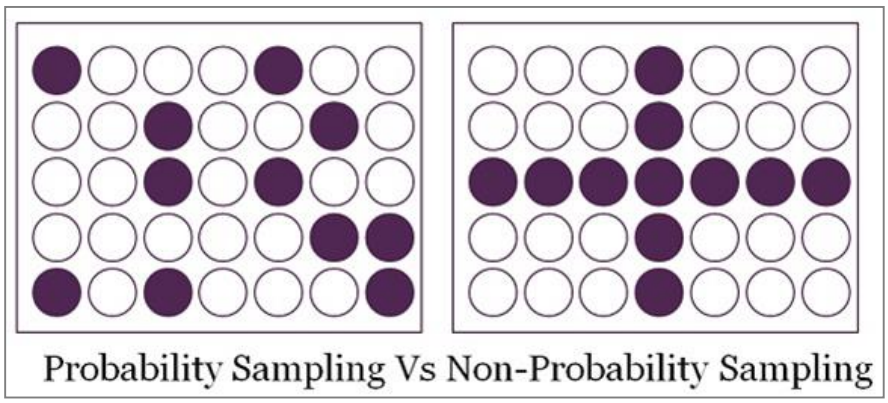
To encapsulate the whole discussion, though, the significant differences between probability sampling methods and non-probability sampling methods are as below:

	Probability Sampling Methods	**Non-Probability Sampling Methods**
Definition	Probability Sampling is a sampling technique in which samples from a larger population are chosen using a method based on the theory of probability.	Non-probability sampling is a sampling technique in which the researcher selects samples based on the researcher's subjective judgment rather than random selection.
Alternatively Known as	Random sampling method.	Non-random sampling method.
Population Selection	The population is selected randomly.	The population is selected arbitrarily.
Nature	The research is conclusive.	The research is exploratory.
Sample	Since there is a method for deciding the sample, the population demographics are conclusively represented.	Since the sampling method is arbitrary, the population demographics representation is almost always skewed.
Time Taken	Takes longer to conduct since the research design defines the selection parameters before the market research study begins.	This type of sampling method is quick since neither the sample or selection criteria of the sample are undefined.
Results	This type of sampling is entirely unbiased and hence the results are unbiased too and conclusive.	This type of sampling is entirely biased and hence the results are biased too, rendering the research speculative.
Hypothesis	In probability sampling, there is an underlying hypothesis before the study begins and the objective of this method is to prove the hypothesis.	In non-probability sampling, the hypothesis is derived after conducting the research study.

An account is given of the various sampling techniques.

1.2 Probability Sampling:

Probability Sampling means that all elements of the universe have equal chance of being considered in the sample. Through randomization. Other term for it is random sampling.

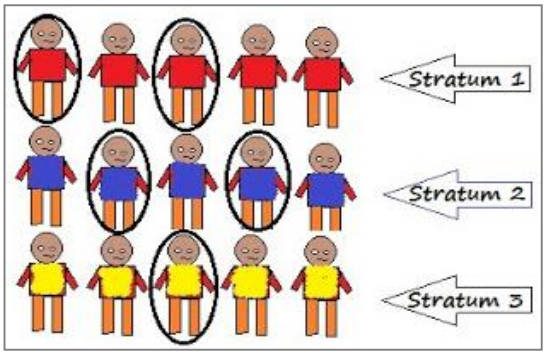


There are following main types of probability sample.

- Simple random sampling.
- Systematic sampling.
- Stratified sampling.
- Cluster sampling.
- Multi-stage sampling
- Area sampling

a. **Simple Random Sampling**: Every element has an equal chance of getting selected to be the part sample. It is used when we are unaware about the population details. E.g. If helmet users of a city are one lakh people we may do survey on $1/20^{th}$ part of the population may be the sample size.

b. **Stratified Sampling**: This technique creates strata's of the population based on similarities and. Difference. And then every unit of the strata has a chance of being selected on the random bases the researcher should have awareness about similarities and differences to create stratas. For example in the case of helmet users we can categorize on the basis of male and female two wheeler drivers from various geographical zones of the city and when this data is stratified we may randomly select persons for data collection.



c. **Systematic Sampling:** Systematic sampling method is used by researchers to select sample unit members from the universe at regular interval. A starting point is highlighted from which the sample size will be considered and also it depicts the sample size for a given population.. This type of sampling method defines the sample size to be considered, for e.g. 20% of one lakh helmet users is calculated and selected and the period from which the sample should be considered, from which zone make sample selection easy. Another example is a researcher intends to collect a systematic sample of 500 people in a population of 5000. He/she numbers each element of the population from 1-5000 and will choose every 10th individual to be a part of the sample (Total population/ Sample Size = 5000/500 = 10).
d. **Cluster Sampling:** In this method the whole universe is divided into sections called clusters which altogether represent the whole universe. Clusters are identified on the basis of demographic variables like age, sex, location, etc. This makes it easy to select sample from multiple demographic sections and the finding which is ultimately observed may be based on fair distribution. No segment is excluded. For example, if the United States government wishes to evaluate the number of immigrants living in the Mainland US, they can divide it into clusters based on states such as California, Texas, Florida, Massachusetts, Colorado, Hawaii, etc. This way of conducting a survey will be more effective as the results will be organized into states and provide insightful immigration data.
e. **Multi Stage Sampling:** This type of sampling occurs when the next stage is determined on the basis of findings from the first stage. Findings from first stage determine how we will do research in the next stage. It may utilize the combination of various methods of probability sampling which are appropriate for that stage. Normally in multi-stage sampling design is applicable in a big inquires of geographical area, for the entire country. Multistage sampling has to with the combination of the various methods of probability sampling in most effective and efficient approach.
f. **Area Sampling:** Is a design sampling that deals with geographical subdivision of environment that represents clusters of unit's which are part of the universe, for example if SEZ of India are studied than that will be based on terrestrial location.

1.3 Non-Probability Sampling:

In **non-probability sampling**, the sample is selected based on the basis of purpose. Sample units are included based on what one wants to study. All universe cannot be represented in non-probability sample, only those who serve your purpose are included in it.

Non-probability sampling is used for the following:

a. Exploratory research: Researchers use this sampling technique widely when conducting them are in the initial state of their research .and usually do qualitative research, pilot studies, or exploratory research.

b. Making hypotheses: When review is over, modal sampling method may be used for generation various knowledge about their research which may help in selecting the variables to be studied and how dependent and independent variables will be related, hence predictions are made. Economic and time considerations: For preliminary data collection and pilot study one does not want to waste money and time. For surveys and questionnaires strata's have not to be rigidly considered hence they prefer non-probability sampling procedure.

The diverse method of different sampling considering the non-random designs are:

A. Quota sampling,
B. Accidental sampling,
C. Judgmental sampling or Purposive sampling,
D. Expert sampling,
E. Snowball sampling,
F. Modal instant sampling

From the listed the researcher has to deliberately select items to be sample. This type of sampling is costly in application.

1.3.1 Types of Non-Probability Random Sampling:

A. Quota Sampling:

In research, very often it is not feasible to cover the whole universe to be studied because of lack of time, budgetary constraints and social hassles hence researchers selection of sample is at the convenience of researcher. Whatever criteria one wants to study on that bases one selects sample which suits those criteria. He will fix the sample size, persons in the sample will be holding characteristics which he plans to study, and as the number of persons he has planned to include is reached, he will do the analysis on that sample on which data is collected. , his tallying will be at his convenience guided by some evidence of characteristic, such as sex, race, based on population of interest. The sample selection is by the convenient door of the researcher.

Quota sampling is of two types; first is proportionate quota sampling which represent the characteristics of major population by just collecting data from a fraction of the universe which is statistically right for proving about the Universe under study. Example if we are interested in studying population of females getting education we may visit urban vs rural schools to survey education level of girls in both settings. They are equal proportion of the total Quota which are convenient to assess. An equal proportion of school going girls from rural setting schools and some urban setting schools, i.e., 200 from urban and 200 from rural. When the data is collected on this sample we will stop and predict about the universe on the basis of 400 females surveyed from nearby urban and rural settings,

The major setback of Quota sampling is that one uses one criteria for deciding quota, for e.g. education level of girls was the deciding factor, no other factors were considered as significant. The non-proportional quota sampling is a technique which is not interested in matching proportion of sample with quota. It is meaningful if it just gives finding for a small cluster of the quota.

B. Accidental Sampling:

This sampling method is like quota sampling. But often is based on subjective data. It is analysis of reading material, most popular among market analysts and newspaper analysts. They by chance come across matter which they may use for their survey purpose. It has the same advantages and disadvantages as quota sampling.

C. Judgmental or Purposive Sampling:

The sampling design is based on the requirement and purpose of the researcher, he assesses the type of sample that will fit his requirement. The researcher highlights his intention through doing research on the type of sample which will provide him the data which will serve his purpose and respondents are ready to serve him.

D. Expert Sampling:

The researcher discusses with experts in the area in which he is doing research, takes their view and on that basis does data collection on the sample which he feels is appropriate according to experts' opinion. Here seeks for the consent of those that are expert or known expert in the area of study and begin the process of collecting his information directly from individual or group of respondent. It also involves sample collection based on one's specialized knowledge and experience as a researcher and does sample accumulation who according to researcher are suitable. It can also be used to check the credibility of the other sampling techniques used.

E. Snowball Sampling:

The sample design is based on one's network. The researcher many know two or three persons from the organization, on their reference he may add others from the sample organization in his sample. This selection is based completely on communication, it is like a chain, one person linking the researcher with others whom he knows. It is useful when the researcher know little about a group or organization to study. The disadvantage is that the choice of the whole sample balances on the intermittent communicator. He may know persons of a specific type, but he may be biased in this type of selection, as the connecting persons may exclude those who are unknown to him which my deprive the researcher of fair sample.

F, Modal Instant Sampling:

In this type of sampling researcher may use the sample with most frequent representation of the characteristic which is desired to be studied. Persons selected in the sample a have had the experience to be researched upon very frequently, like the typical voter in the public opinion poll, or news readers who highlight an event in the most emphatic way. It can also be a group of persons with the most vivid view about any significant incident like flood calamity reporters or Kedarnath event reporters. There are problems with these types of sampling. may be the persons we select may not match on other demographic variables like age, gender, seniority, religion, etc, this may bring diversity in their narration which may give skewed findings, making it difficult to generalize.

G. Heterogeneity Sampling:

This sampling is sampling by diversity. In it persons with variety of information are tapped. That is their view about the research topic from various angles. This is just the contradictor sampling method as compared to modal instant sampling. All possible views are categorized and then frequency of various views may be assessed. More the ideas coming up about a research topic better it is.

That reveals the variation in perception, beliefs and knowledge about the research. This sampling may suit in the beginning of research when we assess the various views held NY people and then look for common elements which can be further studied.

1.4 Conclusion:

In conclusion the probability random sampling is more preferable because the researcher generate his data for the use of entire population by using probabilistic method to control biased during the sampling, based on evidence generated by the agencies of statistical official that the non-probability techniques is based on purpose that lead to assumption which resulting to risk. Basing on assumption means one will generate inappropriate generalization of the population.[1-20]