SAMPLING

(By Dr. N. N. Mahto) Visthapit College Balidih, Bokaro

Defn:- Sampling is defined as the process of selecting certain members or a subset of the population to make statistical inferences from them and to estimate characteristics of the whole population. Sampling is widely used by researchers in market research so that they do not need to research the entire population to collect actionable insights. It is also a time-convenient and a cost-effective method and hence forms the basis of any research design.

For example, if a drug manufacturer would like to research the adverse side effects of a drug on the population of the country, it is close to impossible to be able to conduct a research study that involves everyone. In this case, the researcher decides a sample of people from each demographic and then conducts the research on them which gives them an indicative feedback on the behavior of the drug on the population.

Merits:

1. Economical:
It is economical, because we have not to collect all data. Instead of getting data from 5000 farmers, we get it from 50-100 only.

:2. Less Time Consuming:

As no of units is only a fraction of the total universe, time consumed is also a fraction of total time. Number of units is considerably small, hence the time.

3. Reliable:
If sample is taken judiciously, the results are very reliable and accurate.

4. Organisational Convenience:
As samples are taken and the number of units is smaller, the better (Trained) enumerators can be employed by the organisation.

5. More Scientific:
According to Prof R.A. Fisher, “The sample technique has four important advantages over census technique of data collection. They are Speed, Economy, Adaptability and Scientific approach.”

It is based on certain laws such as:

(a) Law of Statistical Regularity

(b) Law of Inertia of Large numbers

(c) Law of Persistence

(d) Law of Validity.

6. Detailed Enquiry:
A detailed study can be undertaken in case of the units included in the sample. Size of sample can be taken according to time and money available with the investigator.

7. Indispensable Method:
If universe is bigger, there remains no option but to proceed for this method. It is specially used for infinite, hypothetical and perishable universes.

Demerits:
1. Absence of Being Representative:
Methods, such as purposive sampling may not provide a sample, that is representative.

2. Wrong Conclusion:
If the sample is not representative, the results will not be correct. These will lead to the wrong conclusions.

3. Small Universe:
Sometimes universe is so small that proper samples cannot be taken not of it. Number of units are so less.

4. Specialised Knowledge:
It is a scientific method. Therefore, to get a good and representative sample, one should have special knowledge to get good sample and to perform proper analysis so that reliable result may be achieved.

:**5. Inherent defects:** The results which are achieved though the analysis of sampling data may not be accurate as this method have inherent defects. There is not even a single method of sampling which has no demerit.

6. Sampling Error:

This method of sampling has many errors.:

7. Personal Bias:

As in many cases the investigator, chooses samples, such as convenience method, chances of personal bias creep in.

Types of Sampling: Sampling Methods

Any market research study requires two essential types of sampling. They are:

1. **Probability Sampling:** Probability samplings a sampling method that selects random members of a population by setting a few selection criteria. These selection parameters allow every member to have the equal opportunities to be a part of various samples.
2. **Non-probability Sampling:** Non probability sampling method is reliant on a researcher's ability to select members at random. This sampling method is not a fixed or pre-defined selection process which makes it difficult for all elements of a population to have equal opportunities to be included in a sample.

In this blog, we discuss the various probability and non-probability sampling methods that can be implemented in any market research study.

Types of Sampling: Probability Sampling Methods

Probability Sampling is a sampling technique in which sample from a larger population are chosen using a method based on the theory of probability. This sampling method considers every member of the population and forms samples on the basis of a fixed process. For example, in a population of 1000 members, each of these members will have 1/1000 chances of being selected to be a part of a sample. It gets rid of bias in the population and gives a fair chance to all members to be included in the sample.

There are 4 types of probability sampling technique:

- **Simple Random Sampling:** One of the best probability sampling techniques that helps in saving time and resources, is the Simple Random Sampling method. It is a trustworthy method of obtaining information where every single member of a population is chosen randomly, merely by chance and each individual has the exact same probability of being chosen to be a part of a sample.
  For example, in an organization of 500 employees, if the HR team decides on conducting team building activities, it is highly likely that they would prefer picking

chits out of a bowl. In this case, each of the 500 employees has an equal opportunity of being selected.

- **Cluster Sampling:** Cluster sampling is a method where the researchers divide the entire population into sections or clusters that represent a population. Clusters are identified and included in a sample on the basis of defining demographicparameters such as age, location, sex etc. which makes it extremely easy for a survey creator to derive effective inference from the feedback.
  For example, if the government of the United States wishes to evaluate the number of immigrants living in the Mainland US, they can divide it into clusters on the basis of 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 provides insightful immigration data.

- **Systematic Sampling:** Using systematic sampling method, members of a sample are chosen at regular intervals of a population. It requires selection of a starting point for the sample and sample size that can be repeated at regular intervals. This type of sampling method has a predefined interval and hence this sampling technique is the least time-consuming.
  For example, a researcher intends to collect a systematic sample of 500 people in a population of 5000. Each element of the population will be numbered from 1-5000 and every 10th individual will be chosen to be a part of the sample (Total population/ Sample Size = 5000/500 = 10).

- **Stratified Random Sampling:** Stratified Random sampling is a method where the population can be divided into smaller groups, that don't overlap but represent the entire population together. While sampling, these groups can be organized and then draw a sample from each group separately.
  For example, a researcher looking to analyze the characteristics of people belonging to different annual income divisions, will create strata (groups) according to annual family income such as – Less than RS20,000, RS21,000 – RS30,000, RS31,000 to RS40,000, RS41,000 to RS50,000 etc. and people belonging to different income groups can be observed to draw conclusions of which income strata have which characteristics. Marketers can analyze which income groups to target and which ones to eliminate in order to create a roadmap that would definitely bear fruitful results.

Use of the Probability Sampling Method

There are multiple uses of the probability sampling method. They are:

- **Reduce Sample Bias:** Using the probability sampling method, the bias in the sample derived from a population is negligible to non-existent. The selection of the sample largely depicts the understanding and the inference of the researcher. Probability

sampling leads to higher quality data collection as the population is appropriately represented by the sample.

- **Diverse Population:** When the population is large and diverse, it is important to have adequate representation so that the data is not skewed towards one demographic. For example, if Square would like to understand the people that could their point-of-sale devices, a survey conducted from a sample of people across US from different industries and socio-economic backgrounds, helps.
- **Create an Accurate Sample:** Probability sampling helps the researchers plan and create an accurate sample. This helps to obtain well-defined data.

Types of Sampling: Non-probability Sampling Methods

The non-probability method is a sampling method that involves a collection of feedback on the basis of a researcher or statistician's sample selection capabilities and not on a fixed selection process. In most situations, output of a survey conducted with a non-probable sample leads to skewed results, which may not totally represent the desired target population. But, there are situations such as the preliminary stages of research or where there are cost constraints for conducting research, where non-probability sampling will be much more effective than the other type.

There are 4 types of non-probability sampling which will explain the purpose of this sampling method in a better manner:

- **Convenience sampling:** This method is dependent on the ease of access to subjects such as surveying customers at a mall or passers-by on a busy street. It is usually termed as convenience sampling, as it's carried out on the basis of how easy is it for a researcher to get in touch with the subjects. Researchers have nearly no authority over selecting elements of the sample and it's purely done on the basis of proximity and not representativeness. This non-probability sampling method is used when there are time and cost limitations in collecting feedback. In situations where there are resource limitations such as the initial stages of research, convenience sampling is used.
  For example, startups and NGOs usually conduct convenience sampling at a mall to distribute leaflets of upcoming events or promotion of a cause – they do that by standing at the entrance of the mall and giving out pamphlets randomly.

- **Judgmental or Purposive Sampling:** In judgemental or purposive sampling, the sample is formed by the discretion of the judge purely considering the purpose of study along with the understanding of target audience. Also known as deliberate sampling, the participants are selected solely on the basis of research requirements and elements who do not suffice the purpose are kept out of the sample. For instance, when researchers want to understand the thought process of people who are interested in studying for their master's degree. The selection criteria will be: "Are you interested in studying for Masters in …?" and those who respond with a "No" will be excluded from the sample.
- **Snowball sampling:** Snowball sampling is a sampling method that is used in studies which need to be carried out to understand subjects which are difficult to trace. For

example, it will be extremely challenging to survey shelterless people or illegal immigrants. In such cases, using the snowball theory, researchers can track a few of that particular category to interview and results will be derived on that basis. This sampling method is implemented in situations where the topic is highly sensitive and not openly discussed such as conducting surveys to gather information about HIV Aids. Not many victims will readily respond to the questions but researchers can contact people they might know or volunteers associated with the cause to get in touch with the victims and collect information.

- **Quota sampling:** In Quota sampling, selection of members in this sampling technique happens on basis of a pre-set standard. In this case, as a sample is formed on basis of specific attributes, the created sample will have the same attributes that are found in the total population. It is an extremely quick method of collecting samples.

Use of the Non-Probability Sampling Method

There are multiple uses of the non-probability sampling method. They are:

- **Create a hypothesis:** The non-probability sampling method is used to create a hypothesis when limited to no prior information is available. This method helps with immediate return of data and helps to build a base for any further research.
- **Exploratory research:** This sampling technique is widely used when researchers aim at conducting qualitative research, pilot studies or exploratory research.
- **Budget and time constraints:** The non-probability method when there are budget and time constraints and some preliminary data has to be collected. Since the survey design is not rigid, it is easier to pick respondents at random and have them take the survey or questionnaire.

Difference between Probability Sampling and Non-Probability Sampling Methods

We have looked at the different types of sampling methods above and their subtypes. To encapsulate the whole discussion though, the major 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 sample from a larger population are chosen using a method based on the theory of	Non-probability sampling is a sampling technique in which the researcher selects samples based on the subjective judgment of the researcher

	probability.	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.
Market Research	The research is conclusive in nature.	The research is exploratory in nature.
Sample	Since there is method to deciding the sample, the population demographics is conclusively represented.	Since the sampling method is arbitrary, the population demographics representation is almost always skewed.
Time Taken	Take a longer time 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 is 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.

.