

# **Business Research Method**

## **Unit 4**

**By**

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# Sampling: Basic Concepts: Defining the Universe,

- Sampling is a process used in statistical analysis in which a **predetermined number of observations are taken from a larger population**. The methodology used to sample from a larger population depends on the type of analysis being performed, but it may include simple random sampling or systematic sampling.
- The universe **consists of all survey elements that qualify for inclusion in the research study**. The precise definition of the universe for a particular study is set by the research question, which specifies who or what is of interest. The universe may be individuals, groups of people, organizations, or even objects.

# Concepts of Statistical Population, Sample,

- **A population is the entire group that you want to draw conclusions about. A sample is the specific group that you will collect data from.** The size of the sample is always less than the total size of the population. In research, a population doesn't always refer to people.

# Characteristics of a good sample.

- (1) Goal-oriented: A sample design should be goal oriented. It is means and should be oriented to the research objectives and fitted to the survey conditions.
- (2) Accurate representative of the universe: A sample should be an accurate representative of the universe from which it is taken. There are different methods for selecting a sample. It will be truly representative only when it represents all types of units or groups in the total population in fair proportions. In brief sample should be selected carefully as improper sampling is a source of error in the survey.
- (3) Proportional: A sample should be proportional. It should be large enough to represent the universe properly. The sample size should be sufficiently large to provide statistical stability or reliability. The sample size should give accuracy required for the purpose of particular study.
- (4) Random selection: A sample should be selected at random. This means that any item in the group has a full and equal chance of being selected and included in the sample. This makes the selected sample truly representative in character.
- (5) Economical: A sample should be economical. The objectives of the survey should be achieved with minimum cost and effort.
- (6) Practical: A sample design should be practical. The sample design should be simple i.e. it should be capable of being understood and followed in the fieldwork.
- (7) Actual information provider: A sample should be designed so as to provide actual information required for the study and also provide an adequate basis for the measurement of its own reliability.

# Sampling Frame (practical approach for determining the sample frame expected),

- Qualities of a Good Sampling Frame
- You can't just use any list you come across! Care must be taken to make sure your sampling frame is adequate for your needs.
- Include all individuals in the target population.
- Exclude all individuals not in the target population.
- Includes accurate information that can be used to contact selected individuals.
- a sampling frame is the source material or device from which a sample is drawn.

# Sampling errors, Non Sampling errors,

- A Sampling error is a statistical error that occurs when an analyst does not select a sample that represents the entire population of data and the results found in the sample do not represent the results that would be obtained from the entire population. Sampling is an analysis performed by selecting a number of observations from a larger population, and the selection can produce both sampling errors and non-sampling errors.
- A non-sampling error is an error that results during data collection, causing the data to differ from the true values. Non-sampling error differs from sampling error. A sampling error is limited to any differences between sample values and universe values that arise because the entire universe was not sampled

# Methods to reduce the errors,

1. Increase the sample size.
2. Divide the population into groups.
3. Know your population.
4. Thoroughly Pretest your Survey Mediums
5. Avoid Rushed or Short Data Collection Periods
6. Send Reminders to Potential Respondents
7. Ensure Confidentiality
8. Use Incentives

# Sample Size constraints, Non Response.

- Effects of Small Sample Size
- In short, when researchers are constrained to a small sample size for economic or logistical reasons, they may have to settle for less conclusive results. Whether or not this is an important issue depends ultimately on the size of the effect they are studying.
- Effect of Large Sample Size
- There is a widespread belief that large samples are ideal for research or statistical analysis. However, this is not always true. Using the above example as a case study, very large samples that exceed the value estimated by sample size calculation present different hurdle.
- One of the most important problems is non-response. It is the phenomenon that the required information is not obtained from the persons selected in the sample.
- **The consequences of non-response**
- One effect of non-response is that it reduces the sample size. This does not lead to wrong conclusions. Due to the smaller sample size, the precision of estimators will be smaller. The margins of error will be larger



# Probability Sample: Simple Random Sample,

- Simple random sampling as the name suggests is a completely random method of selecting the sample. This sampling method is as easy as assigning numbers to the individuals (sample) and then randomly choosing from those numbers through an automated process. Finally, the numbers that are chosen are the members that are included in the sample.

# Systematic Sample,

- Systematic Sampling is when you choose every “nth” individual to be a part of the sample. For example, you can choose every 5th person to be in the sample. Systematic sampling is an extended implementation of the same old probability technique in which each member of the group is selected at regular periods to form a sample.

# Stratified Random Sample,

- Stratified Random sampling involves a method where a larger population can be divided into smaller groups that usually 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.

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# Area Sampling & Cluster Sampling.

- Area sampling is a method of sampling used when no complete frame of reference is available. The total area under investigation is divided into small sub-areas which are sampled at random or according to a restricted process (stratification of sampling). Each of the chosen sub-areas is then fully inspected and enumerated, and may form the basis for further sampling if desired.
- There are two ways to classify cluster sampling. The first way is based on the number of stages followed to obtain the cluster sample and the second way is the representation of the groups in the entire cluster.

# Non Probability Sample:

- Non-probability sampling is a sampling technique in which the researcher selects samples based on the subjective judgment of the researcher rather than random selection.
- In non-probability sampling, not all members of the population have a chance of participating in the study unlike probability sampling, where each member of the population has a known chance of being selected.
- Non-probability sampling is most useful for exploratory studies like pilot survey (a survey that is deployed to a smaller sample compared to pre-determined sample size).

# Judgment Sampling, Convenience Sampling, Quota Sampling

- In judgmental sampling, the samples are selected based purely on researcher's knowledge and credibility. In other words, researchers choose only those who he feels are a right fit (with respect to attributes and representation of a population) to participate in research study
- Convenience sampling is a non-probability sampling technique where samples are selected from the population only because they are conveniently available to researcher. These samples are selected only because they are easy to recruit and researcher did not consider selecting sample that represents the entire population.
- Quota Sampling
- For studying the career goals of 500 employees, technically the sample selected should have proportionate numbers of males and females. Which means there should be 250 males and 250 females. Since, this is unlikely, the groups or strata is selected using quota sampling.

# Snowballing Sampling methods & Consecutive Sampling

- **Snowballing Sampling methods**
- For example, this type of sampling can be used to conduct research involving a particular illness in patients or a rare disease. Researchers can seek help from subjects to refer other subjects suffering from the same ailment to form a subjective sample to carry out the study.
- **Consecutive Sampling**
- This non-probability sampling technique is very similar to convenience sampling, with a slight variation. Here, the researcher picks a single person or a group of sample, conducts research over a period of time, analyzes the results and then moves on to another subject or group of subject if needed.

# Determining size of the sample

- Determining sample size is a very important issue because samples that are too large may waste time, resources and money, while samples that are too small may lead to inaccurate results. In many cases, we can easily determine the minimum sample size needed to estimate a process parameter, such as the population mean.
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- learn how to determine the sample size using a sample calculation formula known as the Andrew Fisher's Formula.
  1. Determine the population size (if known).
  2. Determine the confidence interval.  $\pm 5\%$
  3. Determine the confidence level. 95%
  4. Determine the standard deviation (a standard deviation of 0.5 is a safe choice where the figure is unknown)
  5. Convert the confidence level into a Z-Score.



$$\text{Sample Size} = \frac{(Z\text{-score})^2 \times \text{StdDev} \times (1\text{-StdDev})}{(\text{confidence interval})^2}$$