# DEPARTMENT OF COMMERCE AND FINANCIAL STUDIES
# BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620024
# MBA (Financial Management)

- **Course Code: FMCC10/21**
- **Course Name : Business Research Methods**
- **Unit – II / Topic : Sampling Methods**
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# Scheme of Presentation

- Sampling Concepts
- Sample Vs Census
- Sampling Vs Non – Sampling Error
- Sampling Design
- Probability Sampling Design
- Non - Probability Sampling Design
- Determination of Sample Size

# Sampling Concept

- Sampling means selecting the group that you will actually collect data from in your research.
- 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.

# Need for Sampling

1. Sampling can save time and money. A sample study is usually less expensive than a census study and produces results at a relatively faster speed.
2. Sampling may enable more accurate measurements for a sample study is generally conducted by trained and experienced investigators.
3. Sampling remains the only way when the population contains infinitely many members.
4. Sampling remains the only choice when a test involves the destruction of the item under study.
5. Sampling usually enables to estimate the sampling errors and, thus, assists in obtaining information concerning some characteristics of the population

# Sampling Fundamentals

## 1. Universe/Population

- ‘Universe’refers to the total of the items or units in any field of inquiry,
- The term ‘population’ refers to the total of items about which information is desired.
- all units in any field of inquiry constitute the universe and all elementary units (on the basis of one characteristic or more) constitute population.
- The population or universe can be finite or infinite
- The population is said to be finite if it consists of a fixed number of elements so that it is possible to enumerate it in its totality
- The symbol ‘N’ is generally used to indicate how many elements (or items) are there in the case of a finite population.
- An infinite population is a population in which it is theoretically impossible to observe all the elements.

# 2. Sampling frame

- The elementary units or the group or cluster of such units may form the basis of sampling process in which case they are called as sampling units.
- A list containing all such sampling units is known as sampling frame. Thus sampling frame consists of a list of items from which the sample is to be drawn.
- If the population is finite and the time frame is in the present or past, then it is possibe for the frame to be identical with the population.
- Whatever the frame may be, it should be a good representative of the population

# 3. Sampling design

- A sample design is a definite plan for obtaining a sample from the sampling frame.
- It refers to the technique or the procedure the researcher would adopt in selecting some sampling units from which inferences about the population is drawn.
- Sampling design is determined before any data are collected. Various sampling designs have already been explained earlier in the book.

# 4. Statisitc(s) and parameter(s)

- A statistic is a characteristic of a sample, whereas a parameter is a characteristic of a population.
- Thus, when we work out certain measures such as mean, median, mode, or the like ones from samples, then they are called statistic(s) for they describe the characteristics of a sample.
- But when such measures describe the characteristics of a population, they are known as parameter(s).
- For instance, the population means (μ) is a parameter, whereas the sample mean ( X ) is a statistic.
- To obtain the estimate of a parameter from a statistic constitutes the prime objective of sampling analysis

# 5. Sampling Error

- Sample surveys do imply the study of a small portion of the population and as such there would naturally be a certain amount of inaccuracy in the information collected.
- This inaccuracy may be termed as sampling error or error variance.
- Sampling errors are those errors which arise on account of sampling and they generally happen to be random variations (in case of random sampling) in the sample estimates around the true population values.

# 6. Confidence level and significance level

- The confidence level or reliability is the expected percentage of times that the actual value will fall within the stated precision limits.
- Thus, if we take a confidence level of 95%, then we mean that there are 95 chances in 100 (or .95 in 1) that the sample results represent the true condition of the population within a specified precision range against 5 chances in 100 (or .05 in 1) that it does not.
- confidence level indicates the likelihood that the answer will fall within that range, and the significance level indicates the likelihood that the answer will fall outside that range.
- We can always remember that if the confidence level is 95%, then the significance level will be (100 – 95) i.e., 5%; if the confidence level is 99%, the significance level is (100 – 99) i.e., 1%, and so on

# 7. Sampling Distribution

- We are often concerned with sampling distribution in sampling analysis.
- If we take a certain number of samples and for each sample compute various statistical measures such as mean, standard deviation, etc., then we can find that each sample may give its own value for the statistic under consideration
- The significance of sampling distribution follows from the fact that the mean of a sampling distribution is the same as the mean of the universe.
- Thus, the mean of the sampling distribution can be taken as the mean of the universe

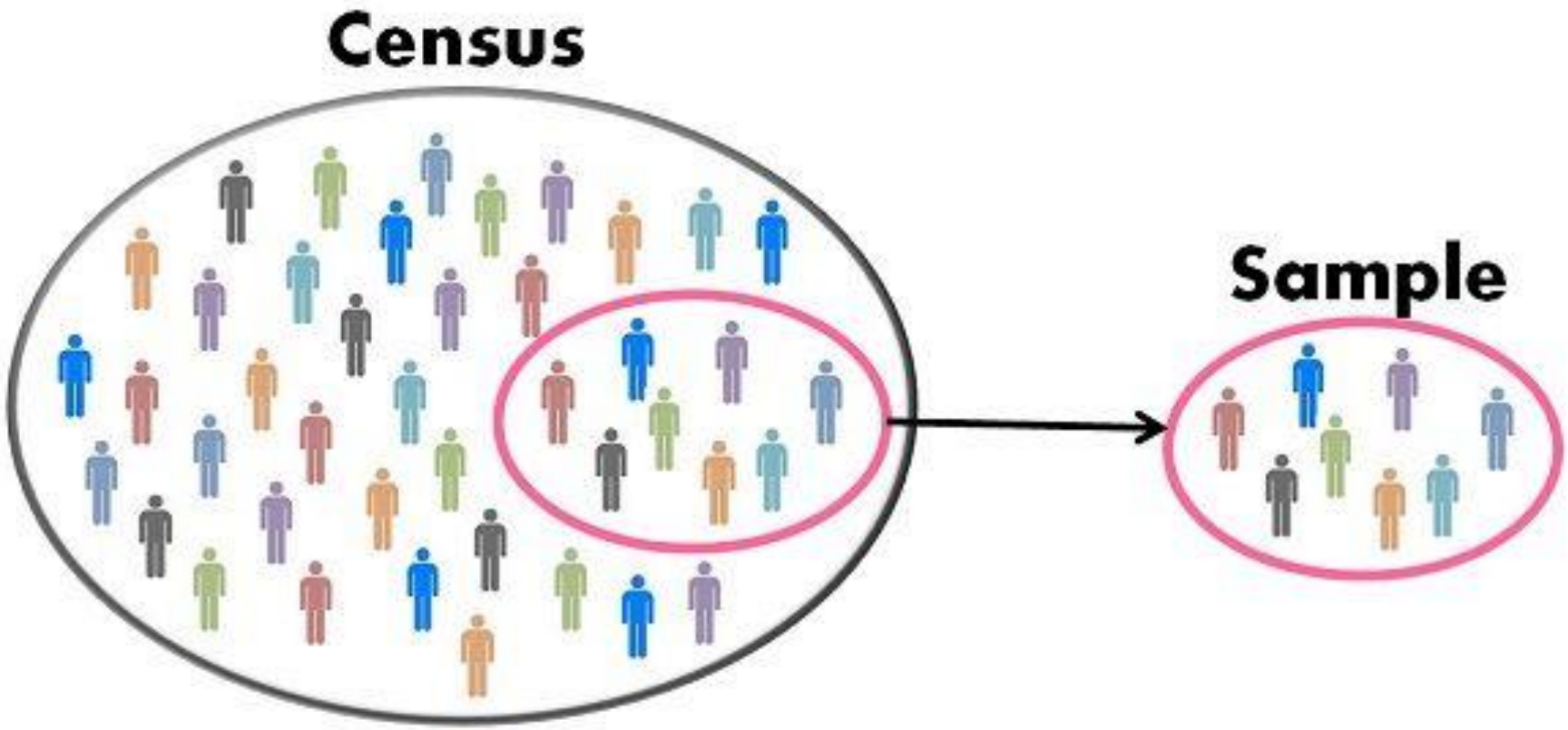
# Central Limit Theorem

- The central limit theorem states that “the distribution of means of random samples taken from a population having mean μ and finite variance $\sigma^2$ approaches the normal distribution with mean μ and variance $\sigma^2$ /n as n goes to infinity.”
- This theorem is by far the most important theorem in statistical inference. It assures that the sampling distribution of the mean approaches normal distribtion as the sample size increases.

# Census

- A statistical investigation in which the data are collected for each and every element/unit of the population is termed as census method.
- It is also known as 'complete enumeration' or '100% enumeration' or 'complete survey'.

# Sample Vs Census



| BASIS FOR COMPARISON | CENSUS | SAMPLING |
|---|---|---|
| Meaning | A systematic method that collects and records the data about the members of the population is called Census. | Sampling refers to a portion of the population selected to represent the entire group, in all its characteristics. |
| Enumeration | Complete | Partial |
| Study of | Each and every unit of the population. | Only a handful of units of the population. |
| Time required | It is a time consuming process. | It is a fast process. |
| Cost | Expensive method | Economical method |
| Results | Reliable and accurate | Less reliable and accurate, due to the margin of error in the data collected. |
| Error | Not present. | Depends on the size of the population |

# Non Sampling Errors

- Non-sampling error refers to all sources of error that are unrelated to sampling.
- Non-sampling errors are present in all types of surveys, including censuses and administrative data.
- Non-sampling errors include non-response errors, coverage errors, interview errors, and processing errors.
- A coverage error would occur, for example, if a person were counted twice in a survey, or their answers were duplicated on the survey

# Sampling Vs Non-Sampling Errors

| BASIS FOR COMPARISON | SAMPLING ERROR | NON-SAMPLING ERROR |
|---|---|---|
| Meaning | Sampling error is a type of error, occurs due to the sample selected does not perfectly represents the population of interest. | An error occurs due to sources other than sampling, while conducting survey activities is known as non sampling error. |
| Cause | Deviation between sample mean and population mean | Deficiency and analysis of data |
| Type | Random | Random or Non-random |
| Occurs | Only when sample is selected. | Both in sample and census. |
| Sample size | Possibility of error reduced with the increase in sample size. | It has nothing to do with the sample size. |

# Sampling Design

- A sample design is a definite plan for obtaining a sample from a given population.
- It refers to the technique or the procedure the researcher would adopt in selecting items for the sample.
- Sample design also leads to a procedure to tell the number of items to be included in the sample i.e., the size of the sample.

# Steps in Sampling Design

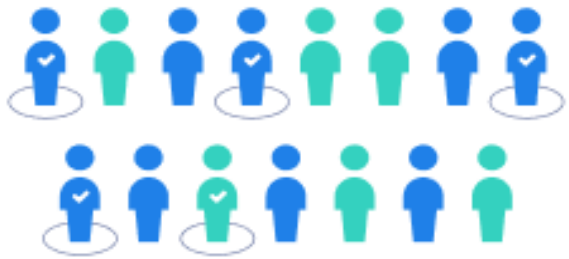
## 1. Type of universe

- The first step in developing any sample design is to clearly define the set of objects, technically called the Universe, to be studied.
- The universe can be finite or infinite.

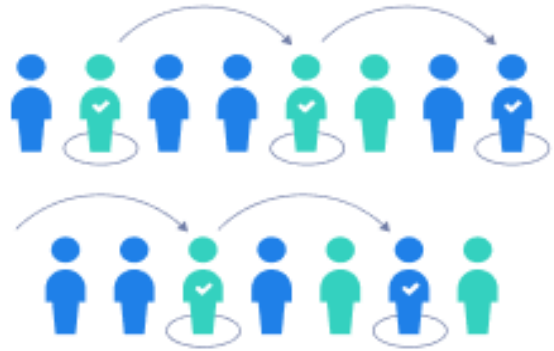
# Probability sampling Design

- Probability sampling means that every member of the population has a chance of being selected. It is mainly used in quantitative research.
- If you want to produce results that are representative of the whole population, probability sampling techniques are the most valid choice.
- There are four main types of a probability samples.
    1. Simple Random Sample
    2. Systematic Sample
    3. Stratified Sample
    4. Cluster Sample

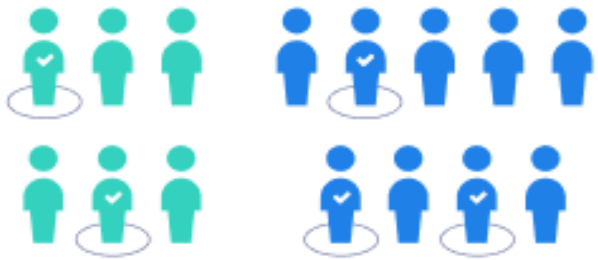
## Simple random sample



## Systematic sample



## Stratified sample



## Cluster sample