Introduction

Population	The **population** is the collection of units (people, objects or whatever) that researchers are interested in knowing about. The number of individuals in a population is called **population size**. Population may be finite (we know the numbers exactly) or infinite (no idea about the number).
Sample	A sample is a smaller collection of units selected from the population i.e. a **finite subset of individuals** in a population is called a **sample** and the number of individuals in a sample is called **sample size**.

Introduction (cont)

Parameters	The terms that describe the **characteristics of a population**	
Statistic	the terms describe the **characteristics of sample**	
	Population	**Sample**
Definition	Collection of all items under study	Part or portion of population chosen for study
Character-istics	Parameters	Statistics
	Population size = N	Sample size = n
Symbols	Mean = μ	Mean = $\bar{x}$
	Standard Deviation = σ	Standard Deviation = S
	Correlation Coeff. = ρ	Correlation Coeff. = r
Census	Data are collected for each and every unit (person, household, shop, organi-zation etc.) of the population.	

Introduction (cont)

Sampling	Instead of every unit of the population, only a part of the population is studied and the conclusions are drawn on that basis for the entire population.
Sampling Frame	(Source list) The sampling frame is the list of items in the population (universe) from which sample is to be drawn.

Sampling Process

Define the population

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Specify the sampling frame

↓

Specify sampling unit

↓

Selection of sampling method

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Determination of sample size

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Specify the sampling plan

↓

Select the sample

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Sample Design

Technique or the procedure the researcher would adopt in selecting items for the sample. Sample design is determined before data are collected. It must consider:

- the sampling frame
- technique of selection of sample
- sample size

Sampling Techniques

Sampling Techniques

Random (Probability)	Non random (Non probability)
Simple Random Sampling	Judgement Sampling
Stratified Sampling	Snowball Sampling
Systematic Sampling	Convenience Sampling
Multistage Sampling	Quota Sampling
Cluster Sampling	

Trick

- Random: **Simple Stratified System of Multistage Cluster**
- Non-Random: **John Snow Convinces Queen**

Simple Random Sampling

> Every individual or item from a frame has the same chance of selection as every other individual or item.

> n is used to represent the sample size and N is used to represent the frame size.

> Every item in the frame is numbered from 1 to N. The chance that any particular member of the frame is selected on the first draw is 1/N.

Simple Random Sampling (cont)

> Random sample can be obtained by any of the following methods:

- Lottery Method
- Random number method
- Random number generator (by different software)

Stratified Random Sampling

> used when we have to select samples from a **heterogeneous population** such as male and female, or educated and uneducated, etc

> the population is divided into subgroups or strata and a simple random sample is taken from each such subgroup.

> each stratum is homogeneous internally and heterogeneous with other strata.

> sampling can be either proportionate or disproportionate.

> **Advantages**

- increases a sample's statistical efficiency.
- provides adequate data for analyzing the various subpopulations or strata
- enables different research methods and procedures to be used in different strata.

Systematic Random Sampling

> random selection of the first item and then the selection of a sample item at every kth interval.

> The interval k is fixed by dividing the population by sample size.

> K = Size of population / Size of sample required = N/n

Cluster Sampling

> involves dividing the population into non overlapping areas or clusters.

> in contrast to stratified random sampling where strata are homogeneous, cluster sampling identifies clusters that tend to be internally heterogeneous.

> cluster contains a wide variety of elements, and the cluster is a miniature, or microcosm, of the population. eg. city, homes, colleges, etc.

> Often clusters are naturally occurring groups of the population

> Two of the foremost advantages are convenience and cost.

Multistage Sampling

> further development of the principle of cluster sampling.

> consists of first selecting the clusters and then selecting a specified number of elements from each selected cluster is known as sub sampling or two stage sampling.

> clusters which form the units of sampling at the first stage are called the first stage units (fsu) or primary sampling units (psu)

> the elements within clusters are called second stage units (ssu).

Judgment Sampling

> when elements selected for the sample are chosen by the judgment of the researcher

> professional researchers might believe they can select a more representative sample than the random process will provide

> saving time and money

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Judgment Sampling (cont)

- The sampling error cannot be determined objectively because probabilities are based on nonrandom selection.
- Example: Market selection for the construction of consumer price index

Snowball Sampling

- subjects are selected based on referral from other survey respondents.
- The researcher identifies a person who fits the profile of subjects wanted for the study. The researcher then asks this person for the names and locations of others who also fit the profile of subjects wanted for the study.
- particularly useful when subjects are difficult to locate
- survey subjects can be identified cheaply and efficiently
- main disadvantage is that it is nonrandom

Convenience Sampling

- elements for the sample are selected for the convenience of the researcher
- researcher typically chooses elements that are readily available, nearby or willing to participate.
- For example, a convenience sample of homes for door to door interviews might include houses people are at home, houses with no dogs, houses near the street, first floor apartments and houses with friendly people.
- If a research firm is located in a mall, a convenience sample might be selected by interviewing only shoppers who pass the shop and look friendly.

Quota Sampling

- Certain population subclasses, such as age group, gender or geographical region are used as strata.
- instead of randomly sampling from each stratum, the researcher uses a nonrandom sampling method to gather data from each stratum until the desired quota of samples is filled.
- a quota is based on the proportions of the subclasses in the population.
- an interviewer would begin by asking a few filter questions; if the respondent represents a subclass whose quota has been filled, the interviewer would terminate the interview.

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