

# 2. Sampling Methods [IT2110]

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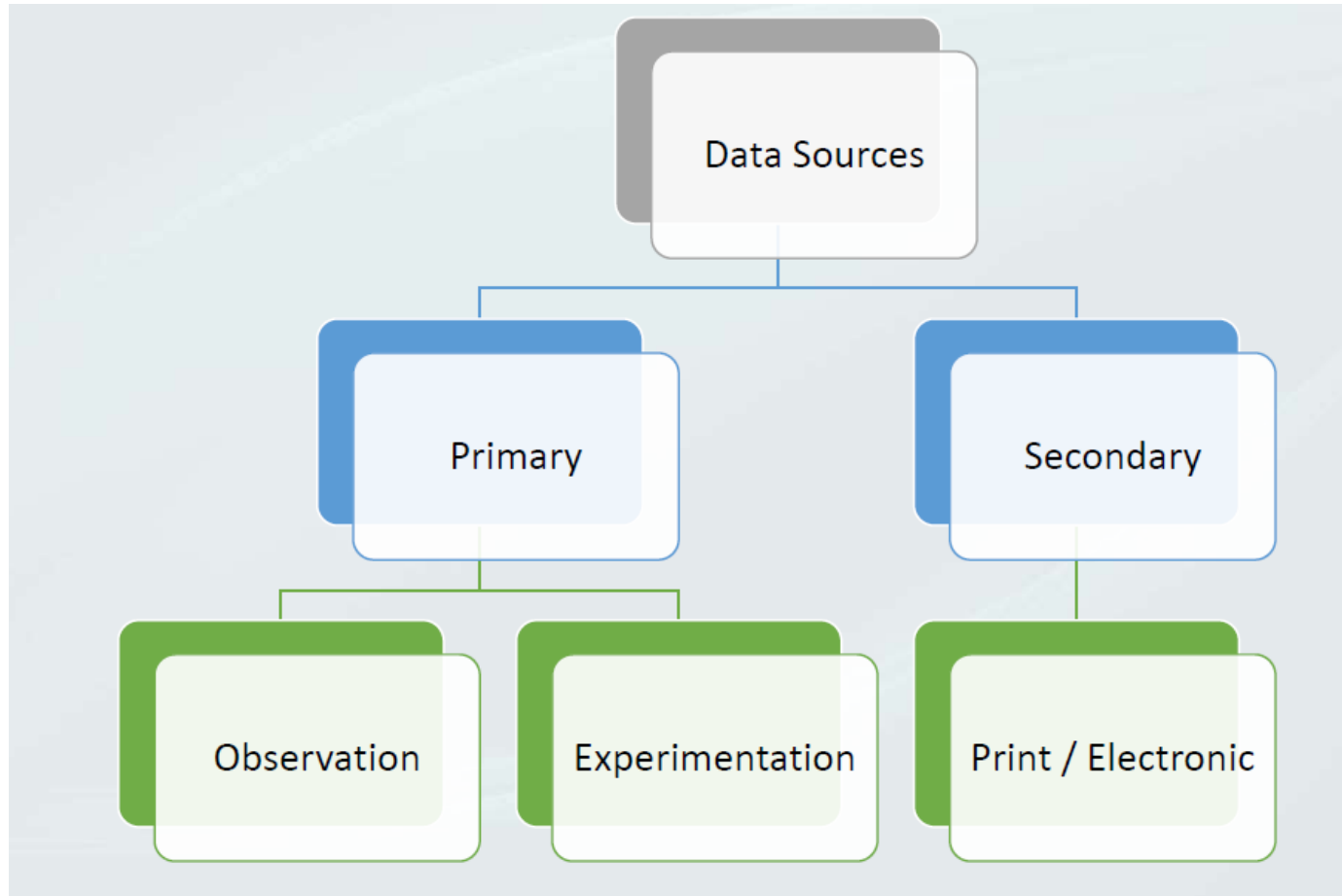


1.

# Introduction to Sampling

# Data Sources

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# Introduction to Sampling

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- Data should be collected before describing.
- If a sampling survey is done, should plan how to select the sample.
- **Two types of sampling:**
  - Probability sampling.
  - Non-probability sampling.
- Why should a proper sample be selected?

# Reasons for Drawing a Sample



- Less time consuming than a census
- Less costly to administer than a census
- Less cumbersome and more practical to administer than a census of the targeted population

2.

# Non-Probability Sampling

# Non-Probability Sampling

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- Uses a subjective (i.e., non-random) method.
- Does not require a sampling/survey frame.
- Fast, easy and inexpensive.
- Sample might not be representative of the population.
- Chance of each element being selected (i.e., probability), cannot be calculated.
- Can be applied to studies that are used as:
  - an idea generating tool.
  - a preliminary step.
  - a follow-up step.

# Non-Probability Sampling

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## ■ Convenience Sampling

- Obtain a sample of convenient elements.
- Often, respondents are selected because they happen to be in the right place at the right time.

Eg: Interviewing People on the street

## ■ Judgment Sampling

- Based on previous ideas about the population.
- Subject to the researcher's biases.
- Can be more biased than haphazard sampling.



# Non-Probability Sampling (cont'd.)



## ■ Quota Sampling

- One of the most common forms of non-probability sampling.
- Sampling is done until a specific number of units (quotas) for various subpopulations has been selected.
- Market researchers often use quota sampling (particularly for telephone surveys).

# 3.

## Probability Sampling

# Probability Sampling

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- Based on the principle of randomization or chance.
- More complex, time consuming and usually more costly.
- More reliable.
- Requires a sampling/survey frame.
- Can use computers or other methods to select elements randomly (e.g.: random number tables).

# Sampling Frame



- The list of elements from which a sample may be drawn.
- Also known as: ***working population***.
- Examples: Telephone directory, List of voters

# Probability Sampling (cont'd.)



- Commonly used probability sampling methods:
  - Simple Random Sampling (SRS).
  - Systematic Sampling (SYS).
  - Probability-Proportional-to-Size (PPS) Sampling.
  - Cluster Sampling.
  - Stratified Sampling (STR).
  - Multi-Stage Sampling.
  - Multi-Phase Sampling.
  - Replicated Sampling.

# Simple Random Sampling (SRS)

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- Starting point for all probability sampling designs.
- Each unit in the sample has the same inclusion probability (  $n$  – Sample Size,  $N$  – Population Size).
- Sampling may be done with or without replacement (SRSWR or SRSWOR).
- Generally, SRSWOR yields more precise results and is operationally more convenient.

# SRS (cont'd.)

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- Advantages of SRS
  - Simplest sampling technique.
  - Requires no additional (auxiliary) information on the frame in order to draw the sample.
  - Needs no technical development.
- Disadvantages of SRS
  - Makes no use of auxiliary information even if such information exists on the survey frame.
  - Can be expensive.
  - It is possible to draw a 'bad' SRS sample.

# Systematic Sampling (SYS)

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- Units are selected from the population at regular intervals.
- A sampling interval ( $k = N/n$ ) and a random start are required.
- Every *kth* individual thereafter.
- **Advantages**
  - Can result in a sample that is better dispersed than SRS.
  - Simpler than SRS.
- **Disadvantages**
  - Can result in a 'bad' sample if the sampling interval matches some periodicity in the population.



# Stratified Sampling



- Divide population into two or more subgroups (called strata) according to some common characteristic.
- A simple random sample is selected from each subgroup, with sample sizes proportional to strata sizes.

# Cluster Sampling



- Population is divided into several “clusters,” each representative of the population.
- A simple random sample of clusters is selected.
- All items in the selected clusters can be used, or items can be chosen from a cluster using another probability sampling technique.

# Multistage Sampling

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- With multistage sampling, we select a sample by using combinations of different sampling methods.
- **Example:-** In Stage 1, we might use cluster sampling to choose clusters from a population. Then, in Stage 2, we might use simple random sampling to select a subset of elements from each chosen cluster for the final sample.

# PROBLEM



An auto analyst is conducting a satisfaction survey, sampling from a list of 10,000 new car buyers. The list includes 2,500 Ford buyers, 2,500 GM buyers, 2,500 Honda buyers, and 2,500 Toyota buyers. The analyst selects a sample of 400 car buyers, by randomly sampling 100 buyers of each brand.

What type of sampling method have used in this scenario?

# Thank You

## Questions?

