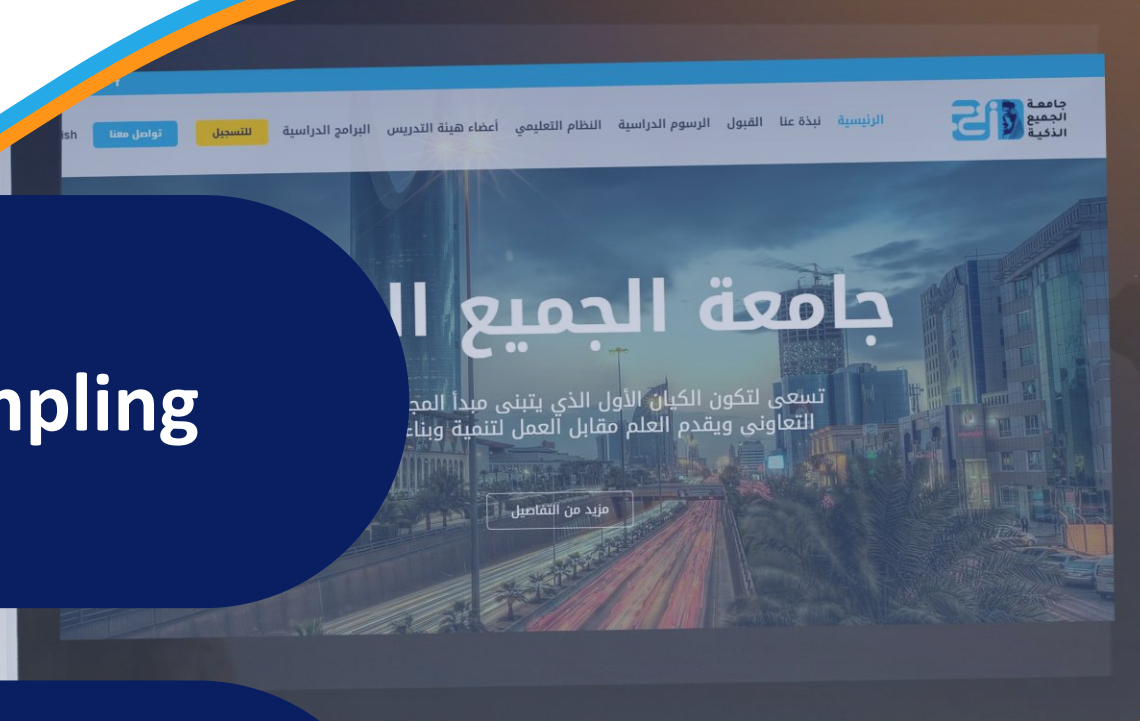




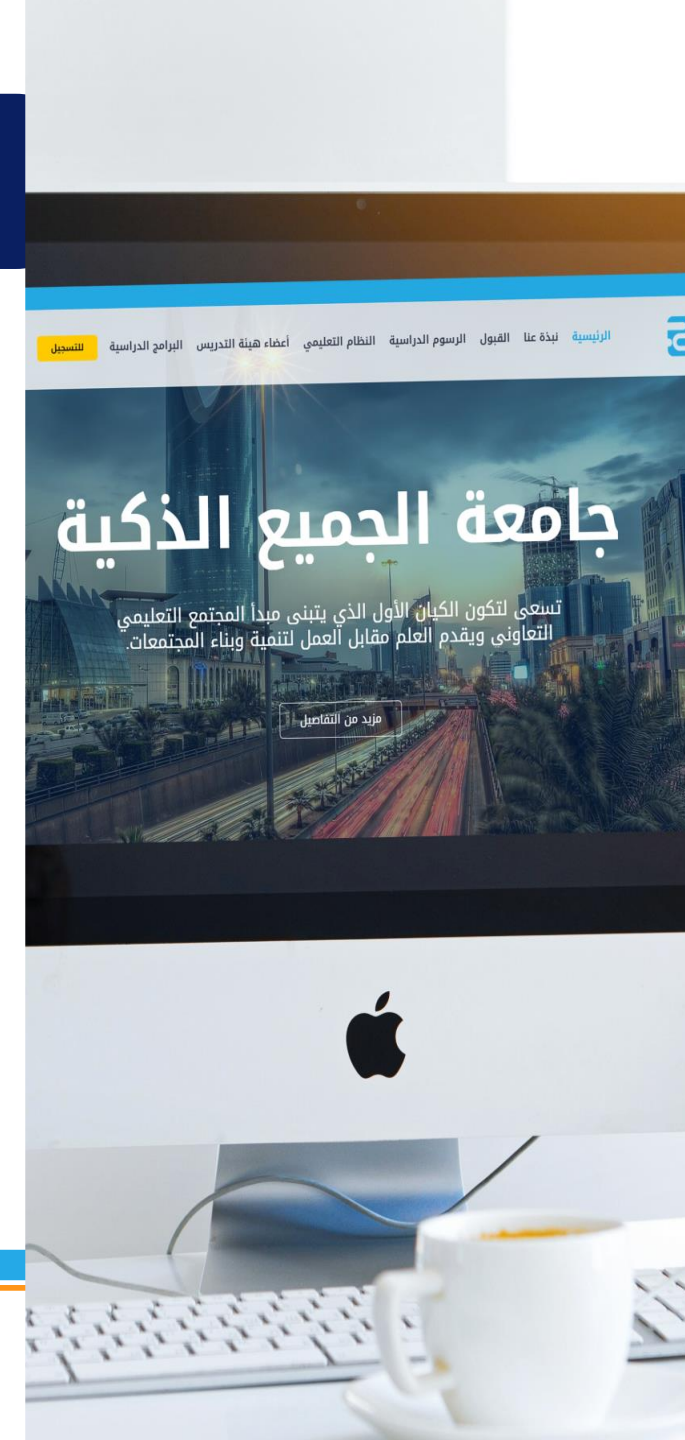
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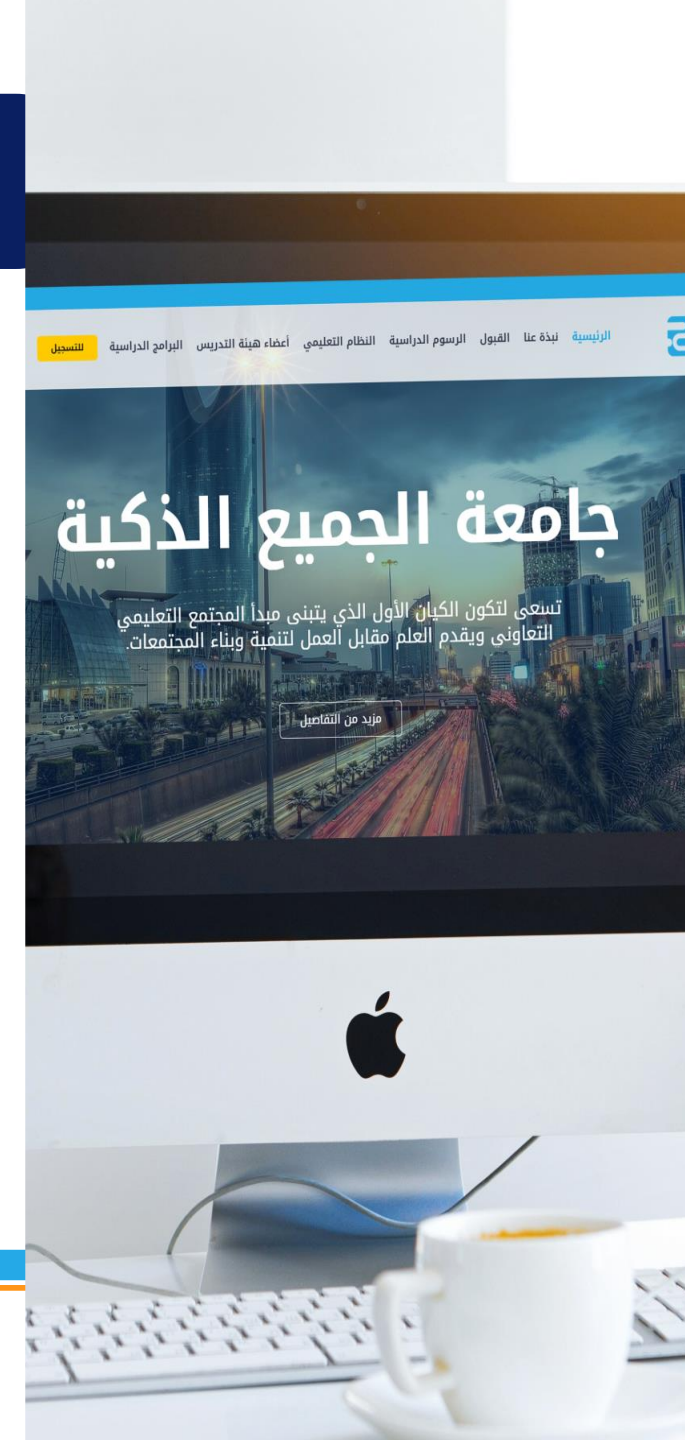
# Research Population & Sampling

Final Project  
Prepared by Walid Soliman  
Lecture 6

1. An Introduction
2. The concept of population and research sample
3. Reasons for using the sampling method
4. Sample types
  - 1) Random sample (probability)
    - Simple random sample
    - Systematic sample
    - Stratified random sample
    - Cluster random sampling



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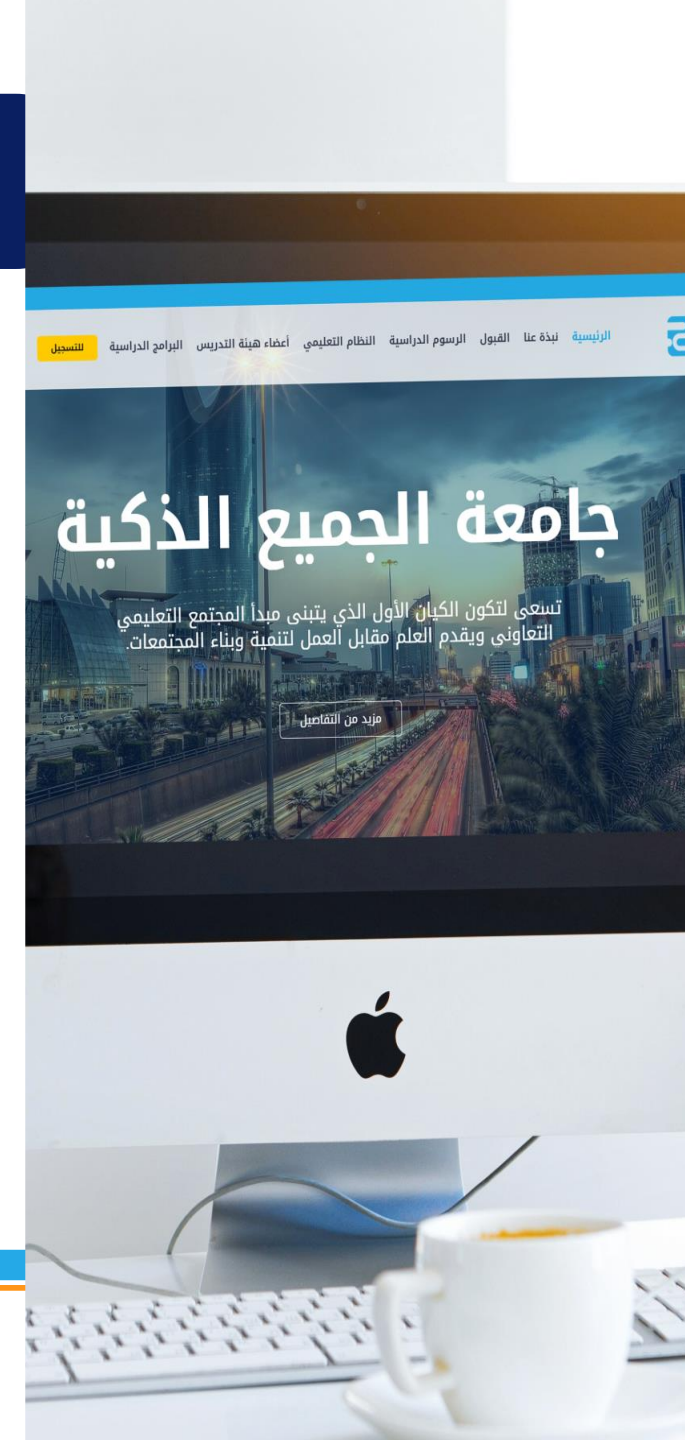


### 2) Non-random samples

- Convenience sample
- Intended sample
- Quota sample
- Snowball sample

### 5. Sample selection steps

### 6. Specify the sample size

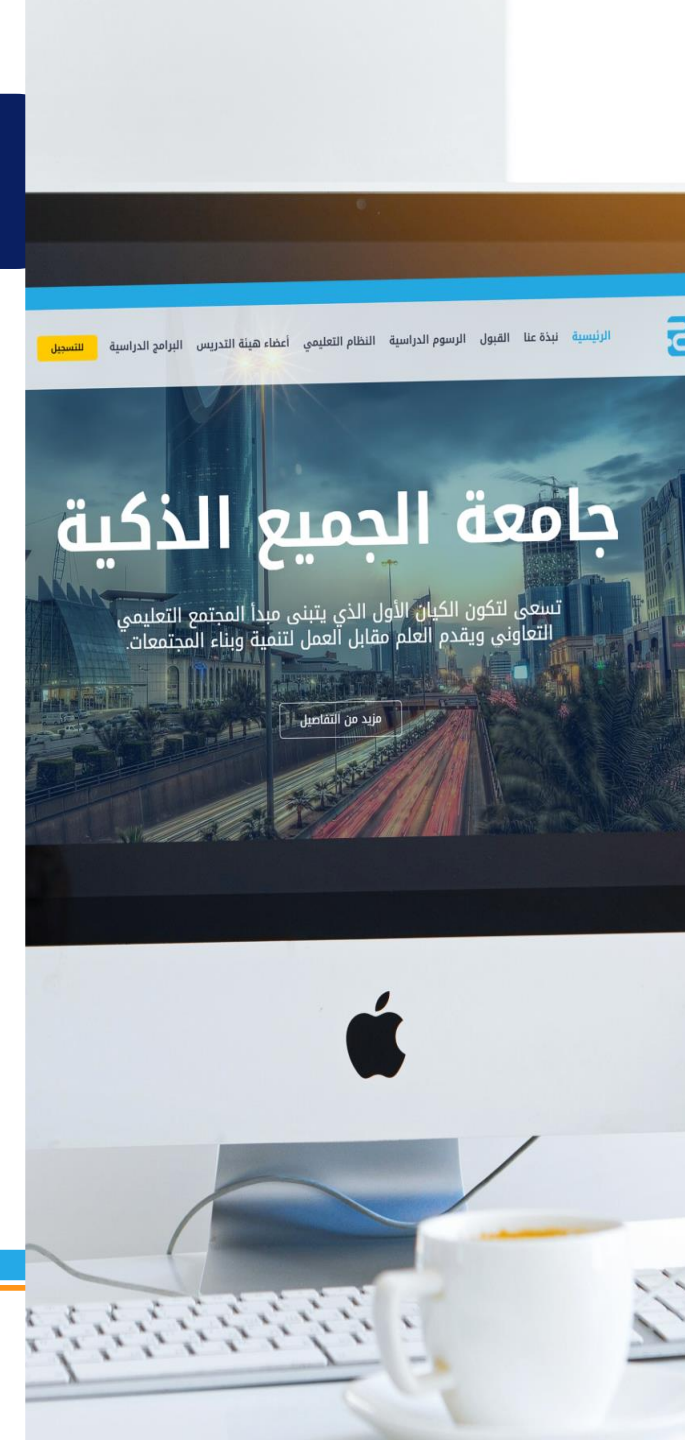


**By the end of this chapter you will be able to understand the following knowledge:**

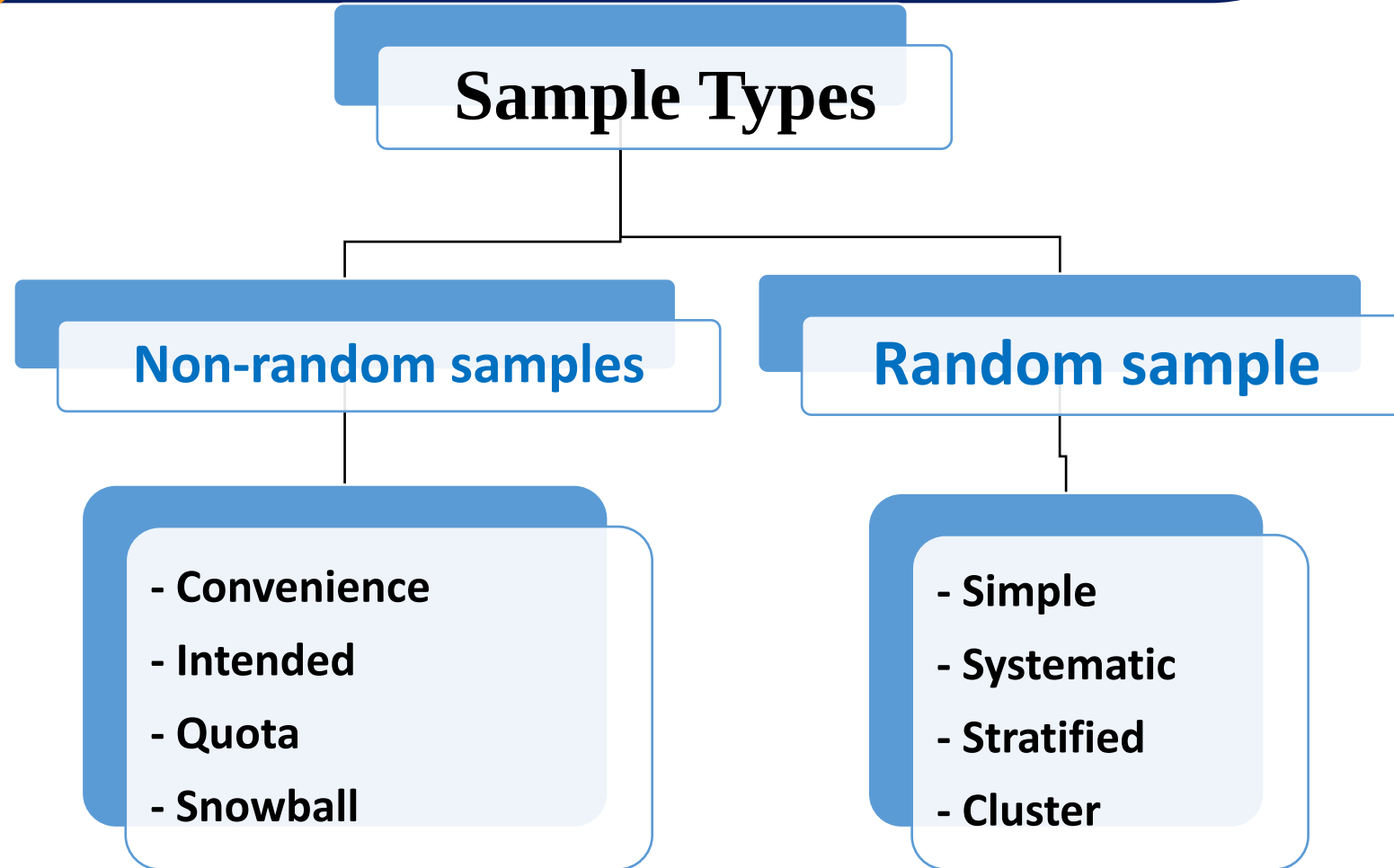
- Identify the concept of both the population and the study sample.
- Recognize the need to use the sampling method.
- Identify the types of random and non-random samples.
- Learn how to determine the sample size.

**By the end of this chapter you will possess the following Skills:**

- The ability to define the framework of the study population.
- The ability to distinguish and compare different types of samples.
- The ability to choose the appropriate sample according to the nature and objectives of the research and the study population.
- The ability to estimate the appropriate size of the study sample.

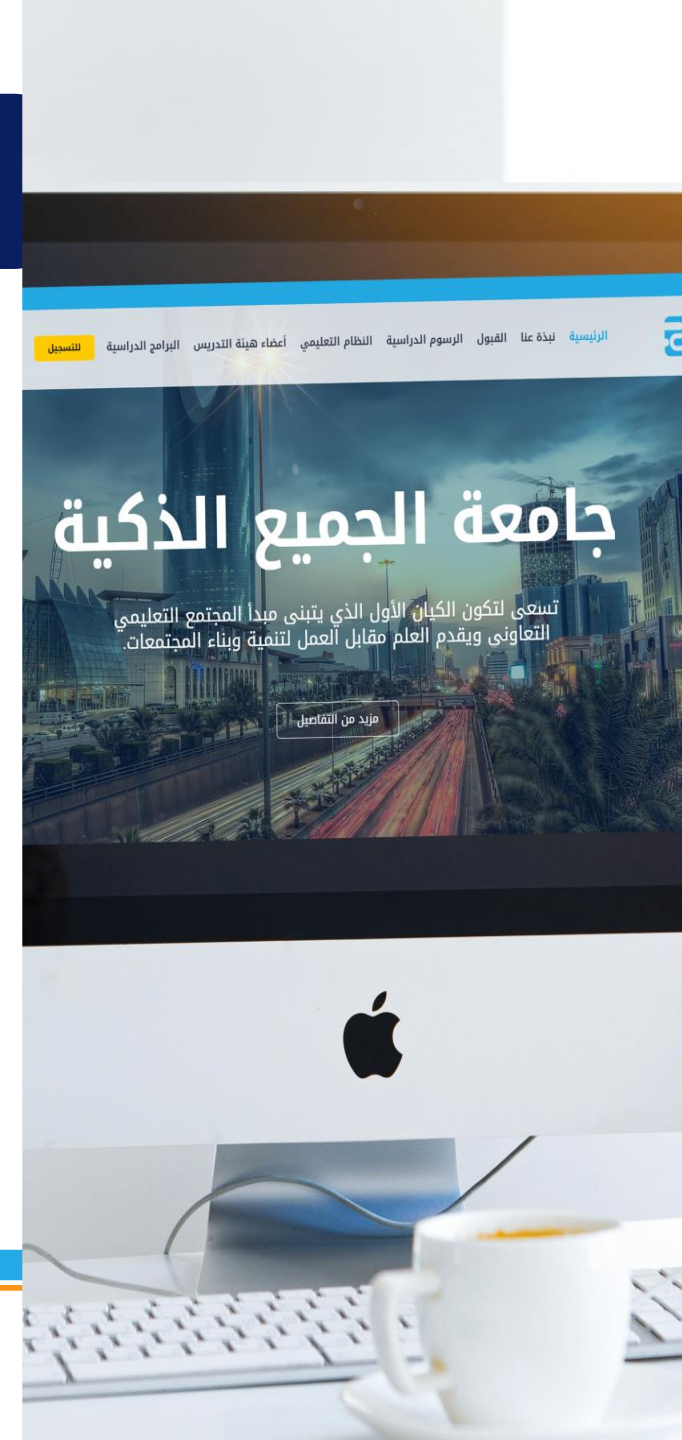


# Sample Types



## 2. Non-Random Samples

- **Non-probability sampling uses non-random criteria like the availability, geographical proximity, or expert knowledge of the individuals you want to research to answer a research question.**
- Non-probability sampling is used when the population parameters are either unknown or not possible to individually identify. For example, visitors to a website that doesn't require users to create an account could form part of a non-probability sample.



## 2. 1. Convenience sampling

**Convenience sampling** is primarily determined by convenience to the researcher.

This can include factors like:

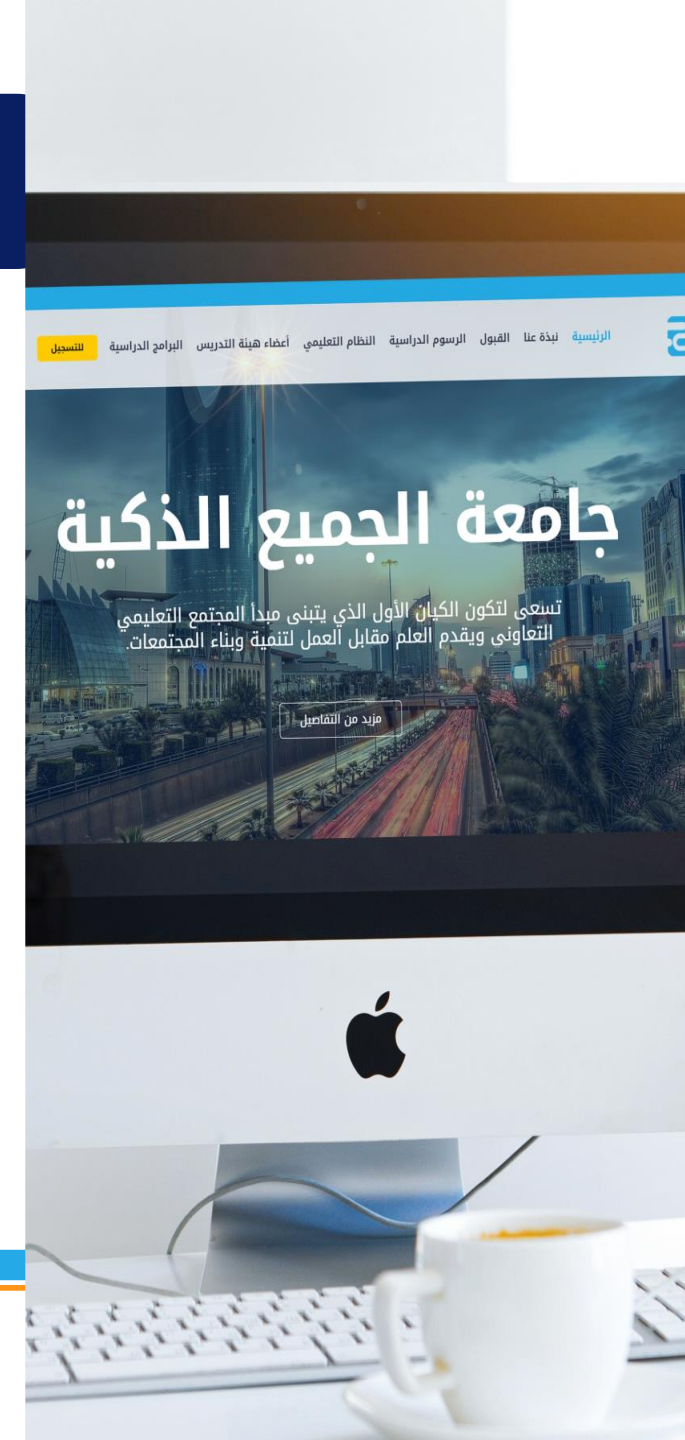
- Ease of access
- Geographical proximity
- Existing contact within the population of interest

Convenience samples are sometimes called “accidental samples,” because participants can be selected for the sample simply because they happen to be nearby when the researcher is conducting the data collection.

(Nikolopoulou, 2022)

## 2. 1. Convenience sampling

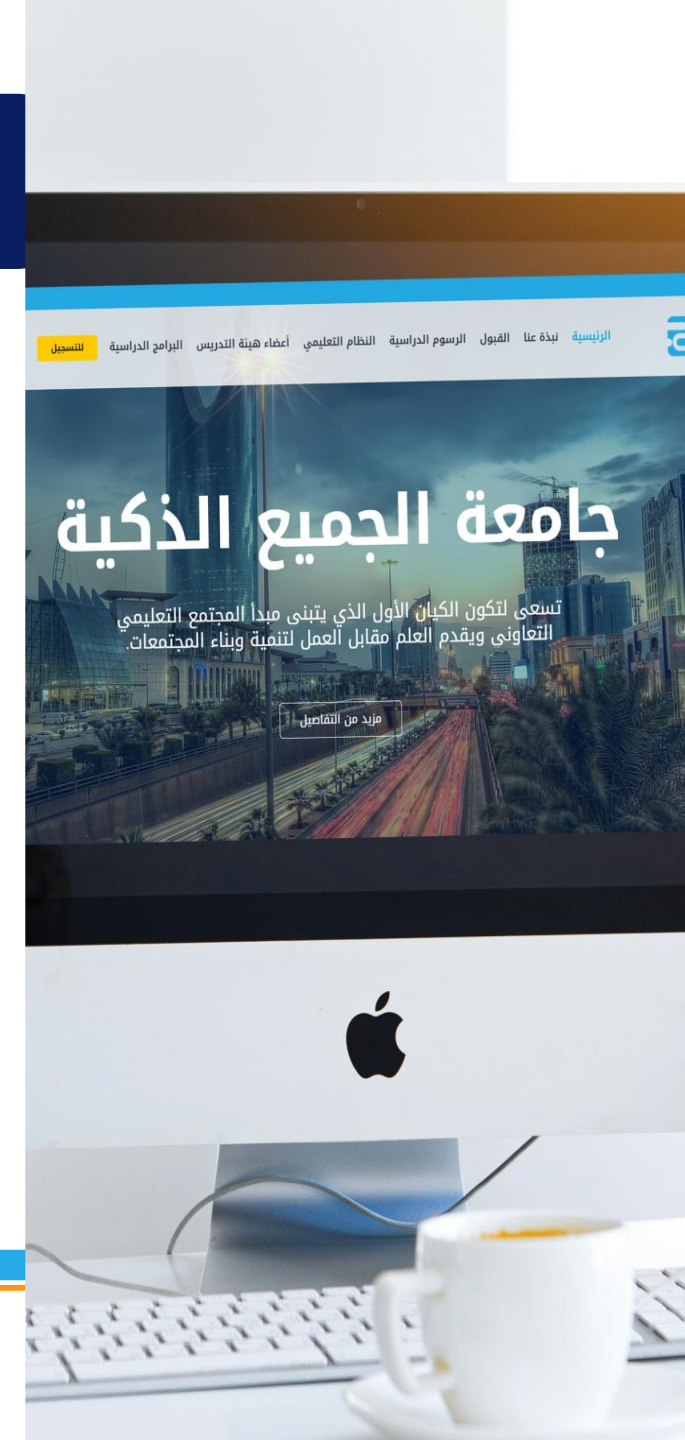
**Example:** you are investigating the association between daily weather and daily shopping patterns. To collect insight into people's shopping patterns, you decide to stand outside a major shopping mall in your area for a week, stopping people as they exit and asking them if they are willing to answer a few questions about their purchases



## 2. 2. Intended sampling

It is also called the **target sample** because the researcher chooses this type of sample to achieve **his purpose** so that he estimates his need for information, and he chooses the study sample freely, meaning that this type of sample is not representative of anyone.

- The selection is made according to certain criteria.
- Availability of certain characteristics in the sample units.
- Choose units intentionally.



## 2.3. Quota sampling

- ☐ Select a predetermined number or proportion of units, called a quota. Your quota should comprise subgroups with specific characteristics (e.g., individuals, cases, or organizations) and should be selected in a non-random manner.
- ☐ Your subgroups, called **strata**, should be mutually exclusive. Your estimation can be based on previous studies or on other existing data, if there are any

## 2.2. Quota sampling

- ❑ This helps you determine how many units should be chosen from each subgroup.
- ❑ In the data collection phase, you continue to recruit units until you reach your quota.

### Tip

- ❖ Your respondents should be recruited non-randomly, with the end goal being that the proportions in each subgroup coincide with the estimated proportions in the population.

## 2.2. Quota sampling

**1. Proportional quota sampling** is used when the size of the population is known. This allows you to determine the quota of units you need to include in your sample to represent your population.

Example: in a certain company there are 1,000 employees. They are split into 2 groups: 600 people who drive to work, and 400 who take the train.

You decide to draw a sample of 100 employees. You would need to survey 60 drivers and 40 train riders for your sample to reflect the proportion seen in the company.

(Nikolopoulou, 2022)

## 2.2. Quota sampling

### 2. Non-proportional

- Used when the size of the population is unknown. Here, it's up to you to determine the quota of units that you are going to include in your sample in advance.

Example: you are seeking opinions about the design choices on a website, but do not know how many people use it. You may decide to draw a sample of 100 people, including a quota of 50 people under 40 and a quota of 50 people over 40.

- This way, you get the perspective of both age groups.

(Nikolopoulou, 2022)

## 2.2. Quota sampling

Note that quota sampling may sound similar to stratified sampling, a probability sampling method where you divide your population into subgroups that share a common characteristic.

- ❖ The key difference here is that in stratified sampling, you take a random sample from each subgroup, while in quota sampling, the sample selection is non-random, usually via convenience sampling. In other words, who is included in the sample is left up to the subjective judgment of the researcher.

(Nikolopoulou, 2022)

## 2.2. Quota sampling

**Example:** You are seeking to interview 20 homeowners and 20 tenants between the ages of 45 and 60 living in a certain suburb.

- ✓ You stand at a convenient location, such as a mall, and randomly select people to talk to who appear to satisfy the age criterion. You must first determine whether they do indeed fit the criteria of belonging to the predetermined age range and owning or renting a property.
- ✓ Sampling continues until quotas for various subgroups have been selected. If contacted units are unwilling to participate or do not meet one of the conditions (e.g., they are over 60 or they do not live in the suburb), they are simply replaced by those who do.

## 2.4. Snow Ball Sampling

- Is used when the population you want to research is hard to reach, or there is no existing database or other sampling frames to help you find them. Research about socially marginalized groups such as drug addicts, homeless people, or sex workers often uses snowball sampling.
- To conduct a snowball sample, you start by finding one person who is willing to participate in your research. You then ask them to introduce you to others.
- Alternatively, your research may involve finding people who use a certain product or have experience in the area you are interested in. In these cases, you can also use networks of people to gain access to your population of interest.

(Nikolopoulou, 2022)

## 2.4. Snow Ball Sampling

### Example:

- ✓ You are studying homeless people living in your city. You start by attending a housing advocacy meeting and striking up a conversation with a homeless woman.
- ✓ You explain the purpose of your research and she agrees to participate. She invites you to a parking lot serving as temporary housing and offers to introduce you around.
- ✓ In this way, the process of snowball sampling begins. Where you met someone who could then put you in touch with others in the group.

There are a few methods you can use to draw a non-probability sample, such as:

1. Social media
2. River sampling
3. Street research

## Advantages of Non-probability sampling

1. Does not require a sampling frame, so your subjects are often readily available. This can make non-probability sampling easier to carry out.
2. Allows you to target particular groups within your population. In certain types of research, it is vital that certain units be included in your sample. For example, many kinds of medical research rely on people with specific health issues.
3. Although it is not possible to make statistical inferences from the sample to the population, non-probability sampling methods can provide researchers with the data to make other types of generalizations from the sample being studied.

## Disadvantages of Non-probability sampling

1. Non-probability sample are extremely unlikely to be representative of the population studied.  
This undermines the generalizability of your results.
2. Non-probability samples are at risk of several kinds of research bias:
  - As some units in the population have no chance of being included in the sample, undercoverage bias is likely.
  - Furthermore, since the selection of units included in the sample is often based on ease of access, sampling bias is common as well.

## 5. Sample Selection steps

**The sample selection process consists of several steps:**

1. The researcher identifies the study population accurately.
2. He prepares a complete and accurate list of the units of this population which is called (a framework) through the records.
3. He takes the unit of his representative from the list he prepared.
4. He obtains a sufficient sample to represent the study population with the characteristics that he wants to study.

### Factors affecting sample size:

1. The degree of accuracy and confidence in the results that the researcher seeks to achieve:

Accuracy: the larger the sample size, the more accurate the results.

Confidence: means how close the sample results are to the actual results.

2. The degree of generalization that the researcher seeks from the results of his research: The greater the researcher's need and desire for the results of his research to be broadly generalizable to the original study population, the more he must increase the size of the selected sample.

## 6. Sample Size

3. **Homogeneity or heterogeneity:** whenever the characteristics of the population are homogeneous, the required sample size is relatively small, and there is a need to increase the sample size when there are significant and numerous fundamental differences between observations of the study population.
4. **The size of the population:** The more observations of the study population increase, the larger the required sample size and vice versa, noting that the proportion of the sample to the study Population decreases as the size of the population increases.

### 5. Research Methodology

- Survey research needs a larger number of samples compared to experimental studies which may need a smaller number.

Also, the method used for data collection may impose on the researcher a certain size of the study sample, for example, **observation or interview** requires a relatively small sample size.

# 6. Sample Size

Determining the sample size according to the size of the population at a confidence level of 95%

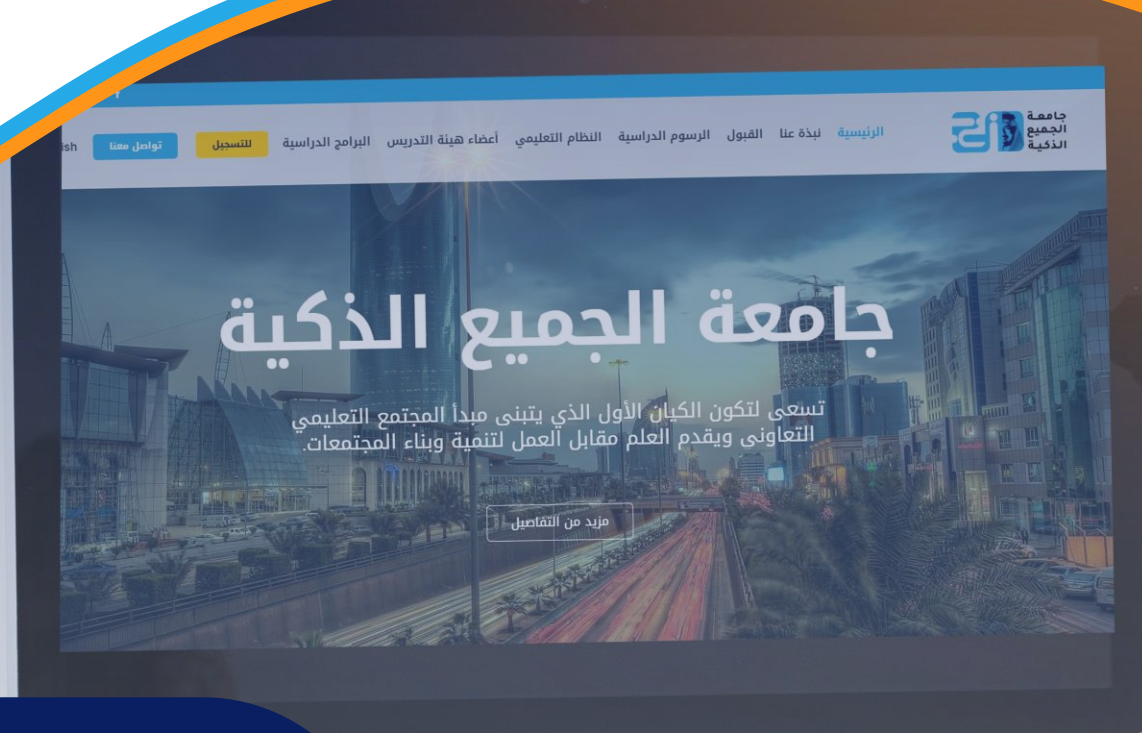
| Sample Size        |                    | Study Population |
|--------------------|--------------------|------------------|
| Margin of error %3 | Margin of error %5 |                  |
| 48                 | 44                 | 50               |
| 91                 | 79                 | 100              |
| 132                | 108                | 150              |
| 168                | 132                | 200              |
| 203                | 151                | 250              |
| 234                | 168                | 300              |
| 291                | 196                | 400              |
| 340                | 217                | 500              |
| 440                | 254                | 750              |
| 516                | 278                | 1000             |
| 696                | 322                | 2000             |
| 879                | 357                | 5000             |
| 964                | 370                | 10.000           |
| 1056               | 383                | 100.000          |
| 1066               | 384                | 1.000.000        |
| 1067               | 384                | 10.000.000       |

## 6. Sample Size

- ❑ Some considerations in determining sample size ( Sekaran and Bougie, 2010)
  1. The sample size ranges from 30 to 500 Units, which is considered appropriate for most research.
  2. When the study population is divided into strata, the partial sample size from each stratum must be no less than 30 individuals
  3. In the case of experimental research that requires a high level of control, a sample size that ranges between 10 to 20 individuals may be appropriate for this type of research.



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*Thank You  
Walid Soliman*