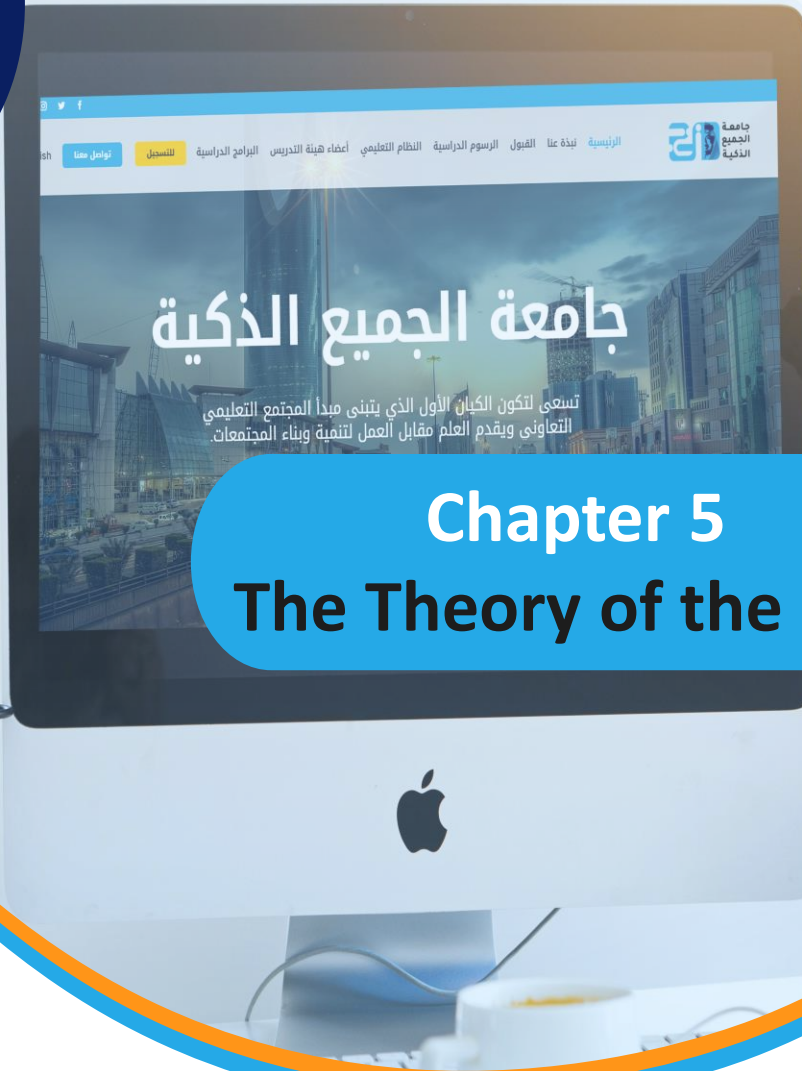


MGM 112

Introduction to Economics

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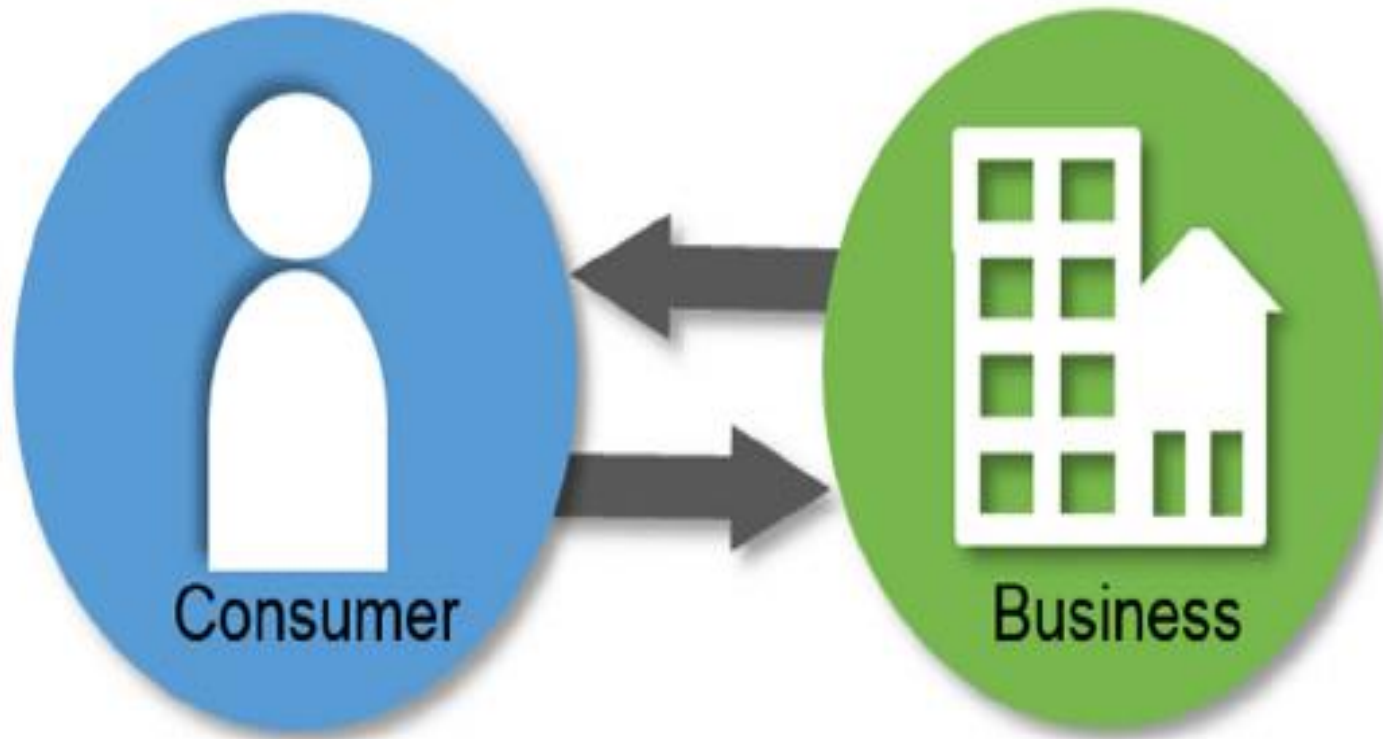


Chapter 5 The Theory of the Firm



جامعة الجميع الذكية
EVERYONE'S SMART UNIVERSITY

Lecture 5



Syllabus

**I- The Firm
Theory**

**II-
Production
Function**

**III- THE
Costs**

**IV- The
Revenue**

**V- The
Profit**

I- The Firm Theory

I- 1- Context of the Theory of the Firm

I-2- The Production Theory

I-3- The Theory of the Firm

I-4- The Short Run versus the Long Run

I- The Firm Theory

I- 1- Context of the Theory of the Firm

- **Neoclassical Economics** abandoned the production approach of the classicals to reconstruct economics as a mathematical science of behavior and markets expressing the interplay of demand and supply based on theories of marginal utility, marginal productivity, and universal scarcity.
- The most famous of this approach are **Alfred Marshall, William Stanley Jevons, Léon Walras.....**
- This approach is based on **the Production Theory**

I- The Firm Theory

Neoclassical Economics Theory

Assumptions



I- The Firm Theory

I-2- The Production Theory

- **Production theory** forms the foundation for the theory of supply.
- Production is the process by which factor inputs are transformed into output.
- Production involves transformation of inputs such as capital, equipment, labor, and land into output - goods and services. In this production process, the manager is concerned with efficiency in the use of the inputs- technical vs. economical efficiency.

I- The Firm Theory

- The production function can thus answer a variety of questions. It can, for example, measure the **marginal productivity** of a particular factor of production (*i.e.*, the change in output from one additional unit of that factor).
- It can also be used to determine the cheapest combination of productive factors that can be used to produce a given output.

I- The Firm Theory

- The Production Decisions of a Firm

The production decisions of firms are analogous to the purchasing decisions of consumers, and can likewise be understood in three steps:

1. Production Technology
2. Cost Constraints
3. Input Choices

- Factors of production are Inputs into the production process (e.g., labor, capital, and materials)

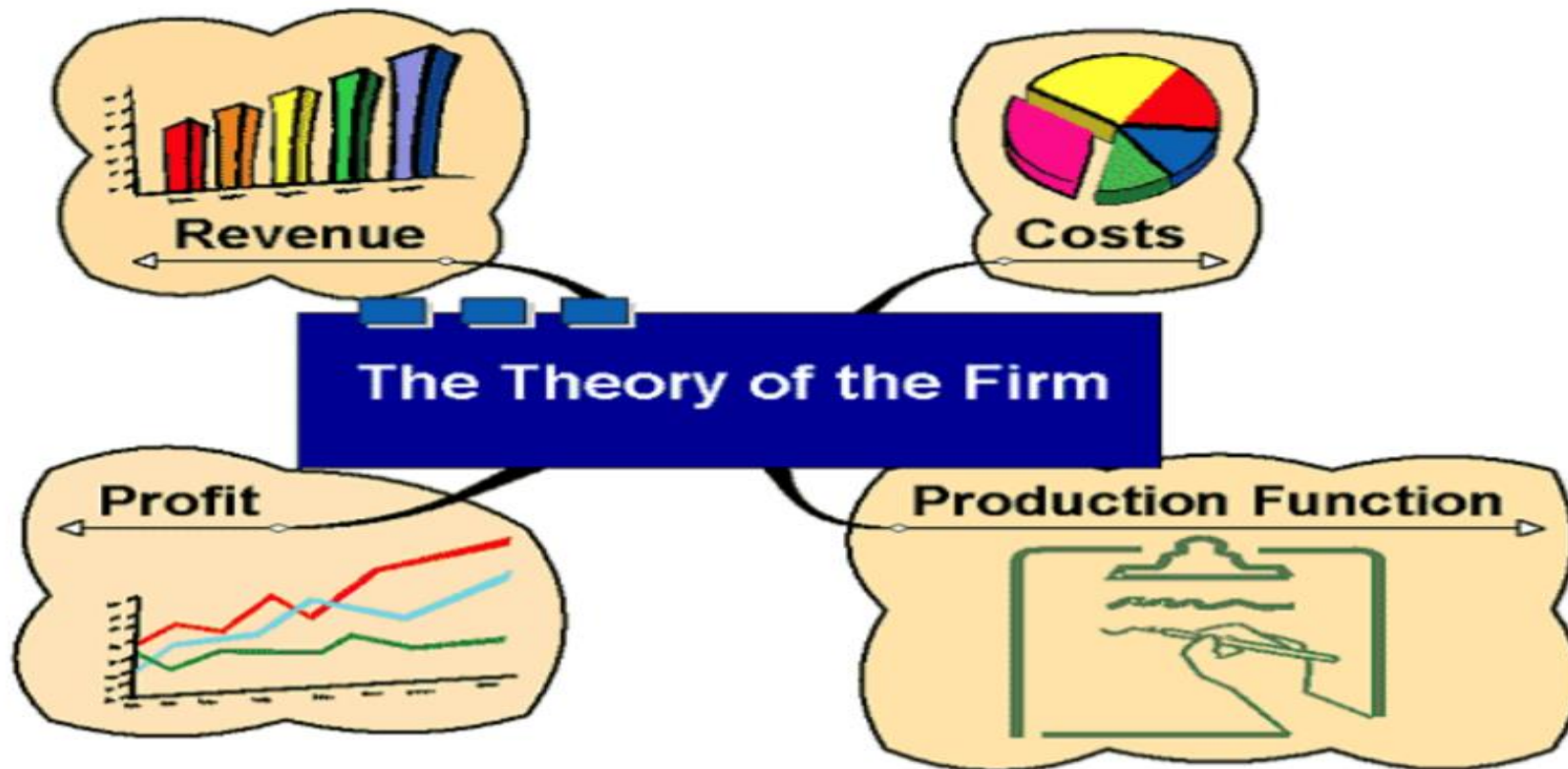
I- The Firm Theory

I-3- The Theory of the Firm

- **The Theory of the Firm** describes how a firm makes costminimizing production decisions and how the firm's resulting cost varies with its output
- Managerial decision making involves four types of production decisions:
 1. Whether to produce or to shut down
 2. How much output to produce
 3. What input combination to use
 4. What type of technology to use

I- The Firm Theory

The Theory of the Firm



The Short Run versus the Long Run

I-4- The Short Run versus the Long Run

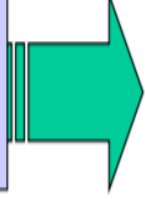
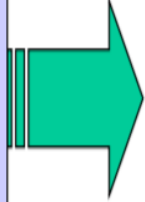
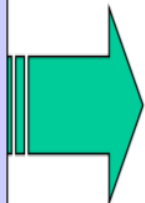
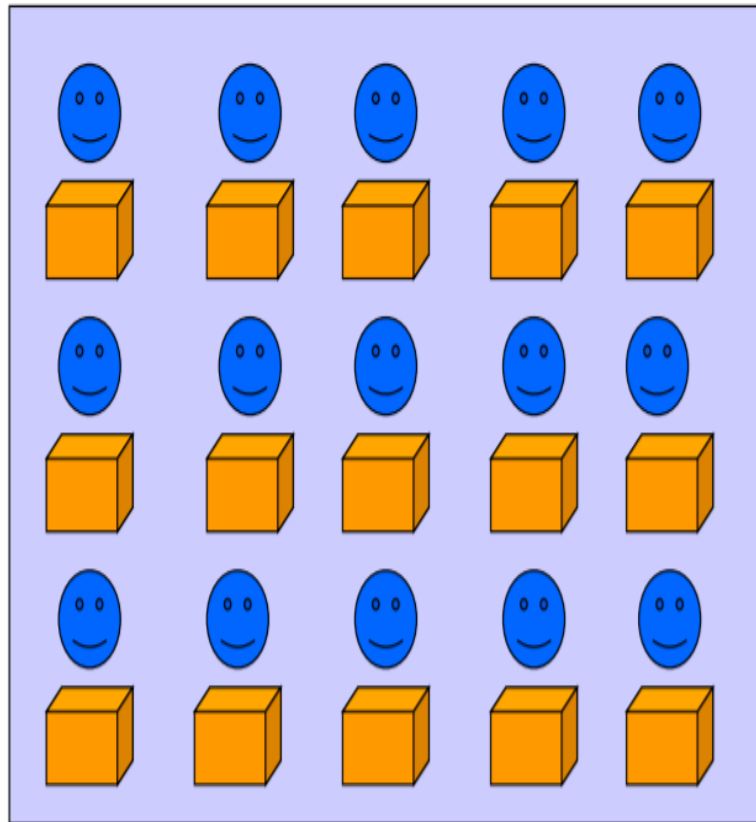
I-4-1- The short run

Short run is a period of time in which quantities of one or more production factors cannot be changed.

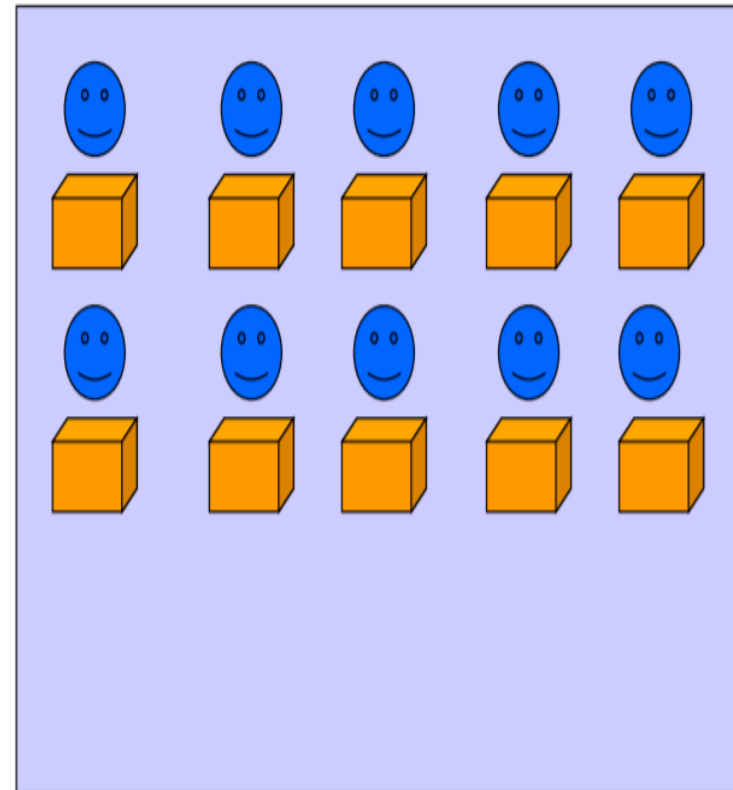
- Fixed input Production factor that cannot be varied.
- In the short run some inputs are fixed and some variable

- In the short run at least one factor fixed in supply but all other factors capable of being changed.
- It reflects ways in which firms respond to changes in output (demand).
- It Can increase or decrease output using more or less of some factors but some likely to be easier to change than others

The Short Run versus the Long Run



In times of rising sales (demand) firms can increase labour and capital but only up to a certain level – they will be limited by the amount of space. In this example, land is the **fixed factor** which cannot be altered in the short run.



If demand slows down, the firm can reduce its variable factors – in this example, it reduces its labour and capital but again, land is the factor which stays fixed.

The Short Run versus the Long Run

I-4-2- The long run

It is defined as the period of time taken to vary all factors of production

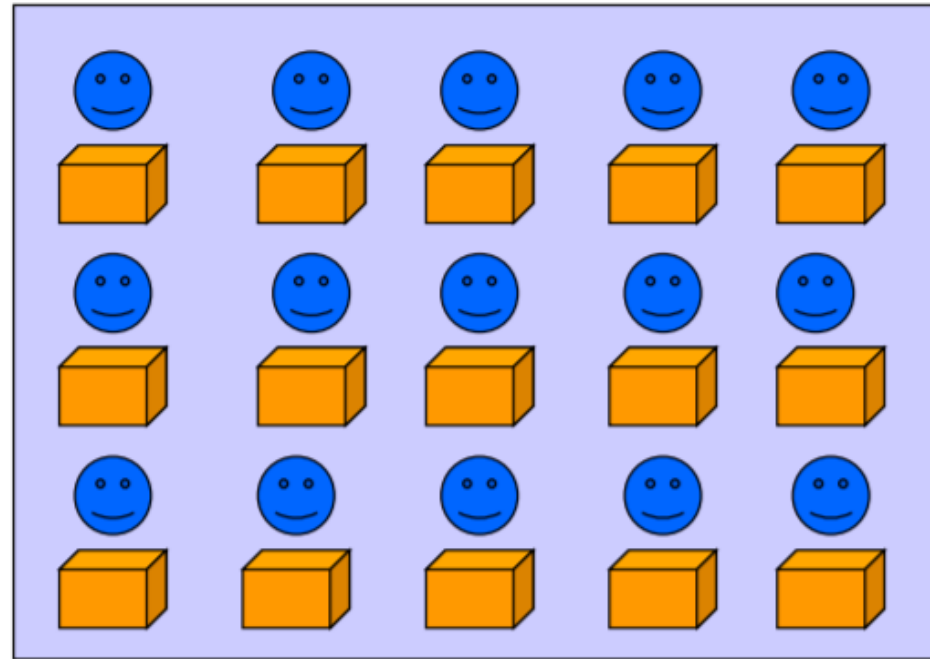
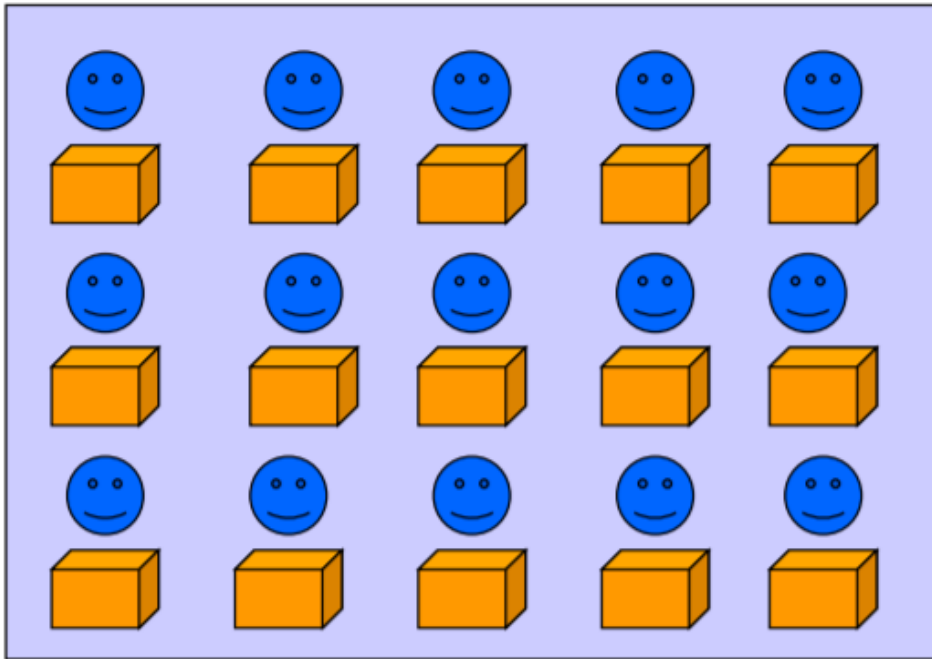
- By doing this, the firm is able to increase its total capacity
- not just short term capacity
- Associated with a change in the scale of production
- The period of time varies according to the firm and the industry
- In electricity supply, the time taken to build new capacity could be many years; for a market stall holder, the 'long run' could be as little as a few weeks or months!

The Short Run versus the Long Run

In the long run all inputs become variable

- The long run is the period in which a firm can adjust all inputs to changed conditions in the long run we can talk about returns to scale (compare latter with economies of scale, which is a cost related concept).

The Short Run versus the Long Run



In the long run, the firm can change all its factors of production thus increasing its total capacity. In this example it has doubled its capacity.

The Short Run versus the Long Run



- **Short-Run Changes in Production Factor Productivity**
How much does the quantity of Q change, when the quantity of L is increased?
- **Long-Run Changes in Production Returns to Scale**
How much does the quantity of Q change, when the quantity of both L and K is increased?

II- Production Function

II-1- Definition

II-2- Determinants

II-3- The Production formula

II-4- The Production Table

II- 5- The Efficiency

II- Production Function

II-1- Definition

Production function, in Economics, is an equation that expresses the relationship between the quantities of productive factors (such as labour and capital) used and the amount of product obtained.

- It states the amount of product that can be obtained from every combination of factors, assuming that the most efficient available methods of production are used.
- It states the relationship between inputs and outputs

II- Production Function

- **The Producers Theory** is concerned with the behavior of firms in hiring and combining productive inputs to supply commodities at appropriate prices.
- Two sets of issues are involved in this process:
 - one is the technical constraints, which limit the range of feasible productive processes,
 - while the other is the institutional context such as the characteristics of the market where commodities and inputs are purchased and sold.

II- Production Function

II-2- Determinants

- The determinants of the Production Function are **the Inputs**.
- These inputs are classified as Land, Labour and Capital.

➤ Land

- all natural resources of the earth
 - * Price paid to acquire land = **Rent**

II- Production Function

➤ Labour

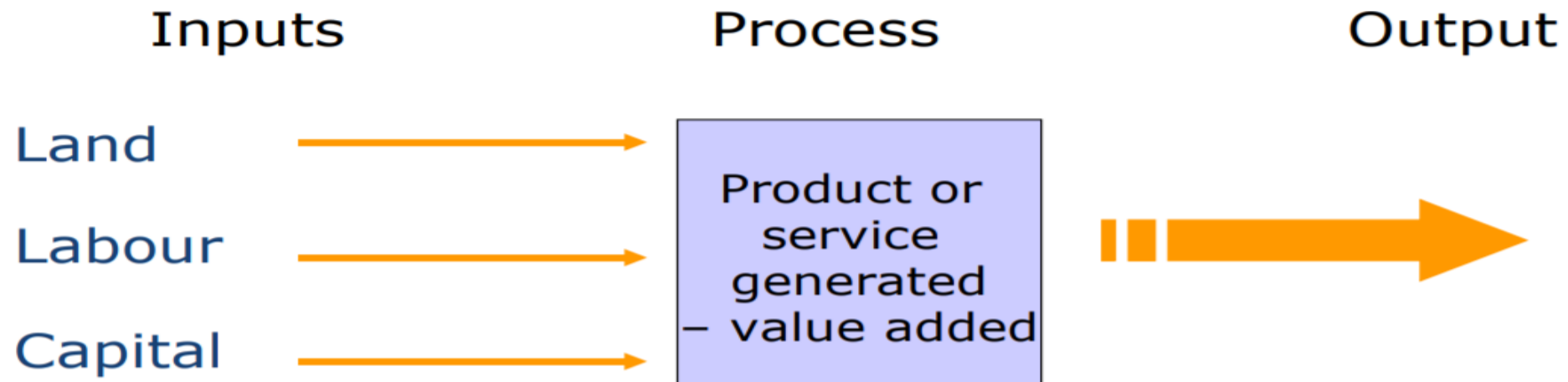
- all physical and mental human effort involved in production
 - * Price paid to labour = **Wages**

➤ Capital

- buildings, machinery and equipment not used for its own sake but for the contribution it makes to production
 - * Price paid for capital = **Interest**

II- Production Function

Production Function



II- Production Function

II-3- The Production formula

Mathematical representation of the linear Production Function

$$Q = f(X_1, X_2, \dots, X_k)$$

where

* Q = output

* $X_1, \dots, X_k$ = inputs

- If we will take 3 inputs (capital, land and labour), the output (Q) will be dependent upon the amount of capital (K), Land (L) and Labour (La) used $Q = f(K, L, La)$

II- Production Function

- For our current analysis, we will reduce **the input**:

➤ capital (K)

➤ labour (L)

$$Q = f(L, K)$$

II- Production Function

II-4- The Production Table

- The production function can also be a **table** showing the maximum amount of output that can be produced from any specified set of inputs, given the existing technology
- Same Q can be produced with different combinations of inputs.

II- Production Function

II- 5- The Efficiency

- All of these outputs are assumed to be technically efficient
But which one is economically efficient?
 - **Economic Efficiency**: occurs when the cost of producing a given output is as low as possible
 - **Technological efficiency**: occurs when it is not possible to increase output without increasing inputs
- The objective of efficiency will provide us with some basic rules about the manner in which firms should utilize inputs to produce goods and services.

II- Production Function

- **To maximize the output attainable with a given level of cost.**
You will see that basic production theory is simply an application of constrained optimization:
 the firm attempts either to minimize the cost of producing a given level of output or to maximize the output attainable with a given level of cost.
- Both optimization problems lead to same rule for the allocation of inputs and choice of technology

III- THE Costs

III- THE Costs

- In buying factor inputs, the firm will incur costs.
- Costs are classified as:
 - **Fixed costs (FC)**: costs that are not related directly to production such as rent, rates, insurance costs, admin costs.
They can change but not in relation to output
 - **Variable Costs (VC)**: costs directly related to variations in output. Raw materials primarily

III- THE Costs

- The Total Cost: the sum of all costs incurred in production

$$TC = FC + VC$$

- Average Cost: the cost per unit of output

$$AC = TC / \text{Output}$$

- Marginal Cost: the cost of one more or one fewer units of production

$$MC = TC_n - TC_{n-1} \text{ units}$$

III- THE COSTS

- **Short run:** Diminishing marginal returns results from adding successive quantities of variable factors to a fixed factor.



Short-Run Changes in Production Factor Productivity

How much does the quantity of Q change, when the quantity of L is increased?

- **Long run:** Increases in capacity can lead to increasing, decreasing or constant returns to scale.



Long-Run Changes in Production Returns to Scale

How much does the quantity of Q change, when the quantity of both L and K is increased?

IV- The Revenue

IV- The Revenue

- **Revenue** is the income a firm retains from selling its products once it has paid indirect tax, such as VAT.
- Revenue provides the income which a firm needs to enable it to cover its costs of production, and from which it can derive a profit.
- Profit can be distributed to the owners, or shareholders, or retained in the business to purchase new capital assets or upgrade the firm's technology.
- Revenue is measured in three ways:

IV- The Revenue

- **Total revenue:**

the total amount received from selling a given output

$$TR = \sum (P_x \times Q_x)$$

- **Average Revenue:**

the average amount received from selling each unit

$$AR = TR / Q$$

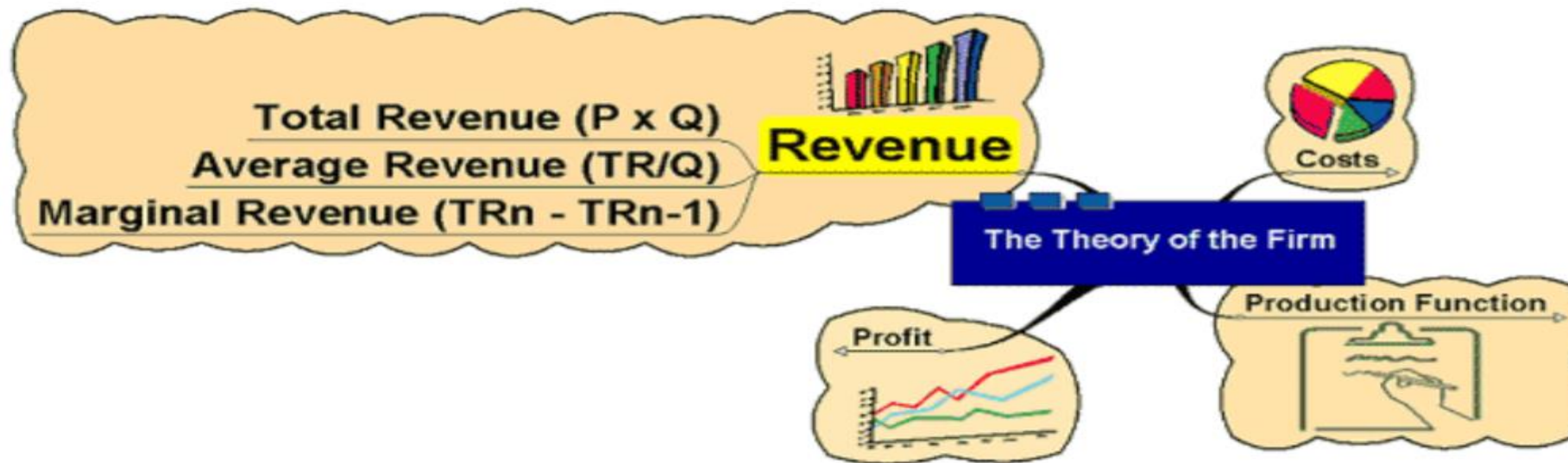
- **Marginal revenue:**

the amount received from selling one extra unit of output

$$MR = TR_n - TR_{n-1} \text{ units}$$

IV- The Revenue

Revenue



V- The Profit

V- The Profit

- **Profit** describes the financial benefit realized when revenue generated from a business activity exceeds the expenses, costs, and taxes involved in sustaining the activity in question.
- Any profits earned funnel back to business owners, who choose to either pocket the cash or reinvest it back into the business.
- Profit is calculated as total revenue less total expenses.

V- The Profit

$$\text{Profit} = \text{TR} - \text{TC}$$

- The reward for enterprise
- Profits help in the process of directing resources to alternative uses in free markets
- Relating price to costs helps a firm to assess profitability in production

- **Normal Profit:**

The minimum amount required to keep a firm in its current line of production

- **Abnormal or Supernormal profit:**

profit made over and above normal profit

- Abnormal profit may exist in situations where firms have market power
- Abnormal profits may indicate the existence of welfare losses
- Could be taxed away without altering resource allocation

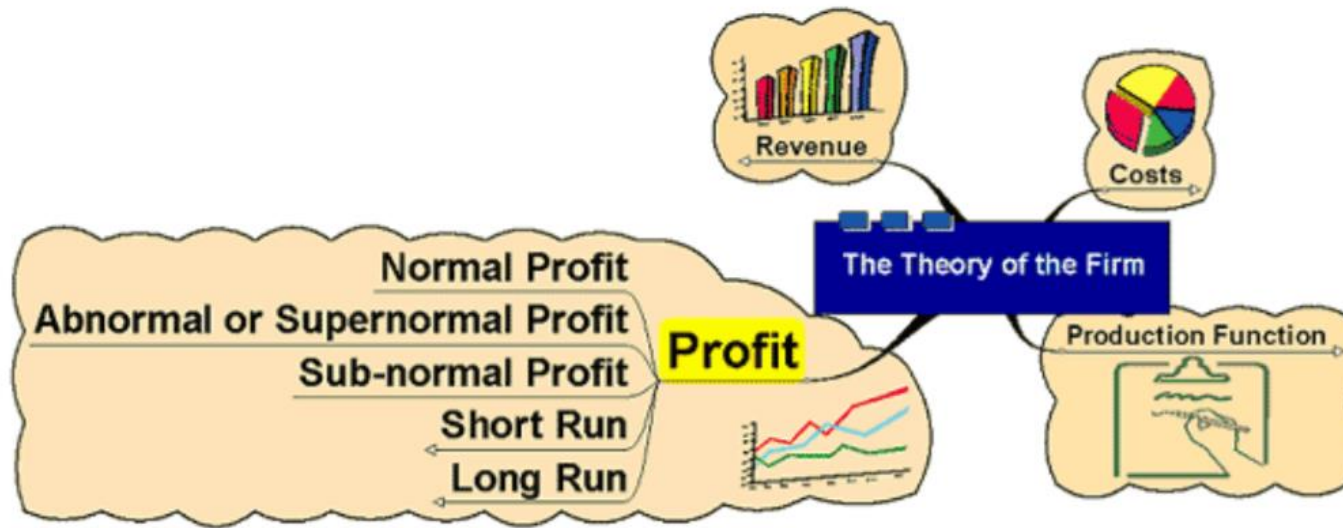
- **Sub-normal Profit:**

profit below normal profit

- Firms may not exit the market even if sub-normal profits made if they are able to cover variable costs
- Cost of exit may be high
- Sub-normal profit may be temporary (or perceived as such!)

V- The Profit

Profit



Review

Summary

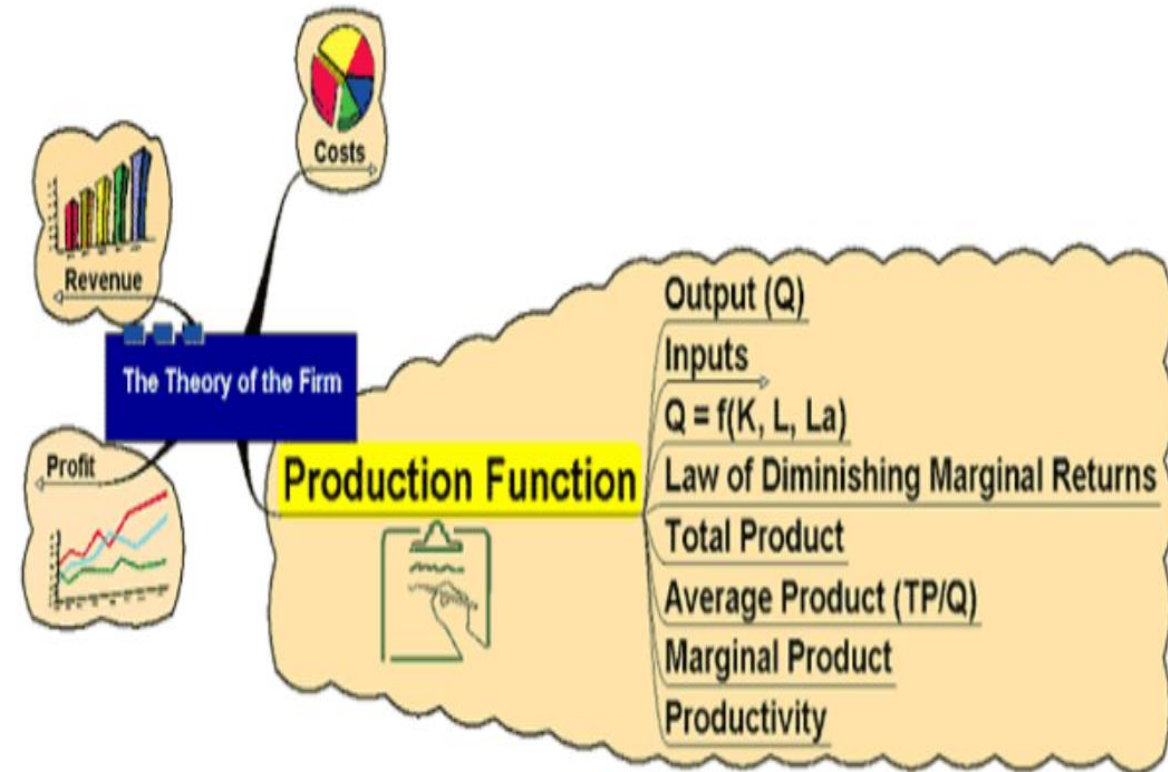


Production Function

Factor Costs:

- **Labour** → wages/salaries
- **Land** → rent
- **Capital** → interest

Production Function



Production Function

Short run period

- the time frame in which at least one of the inputs (factors of production) is fixed but the other inputs are varied. The example of short-run is building, equipment, tools, and others.

Long-run period

- the time frame in which all inputs are variable.

Fixed input

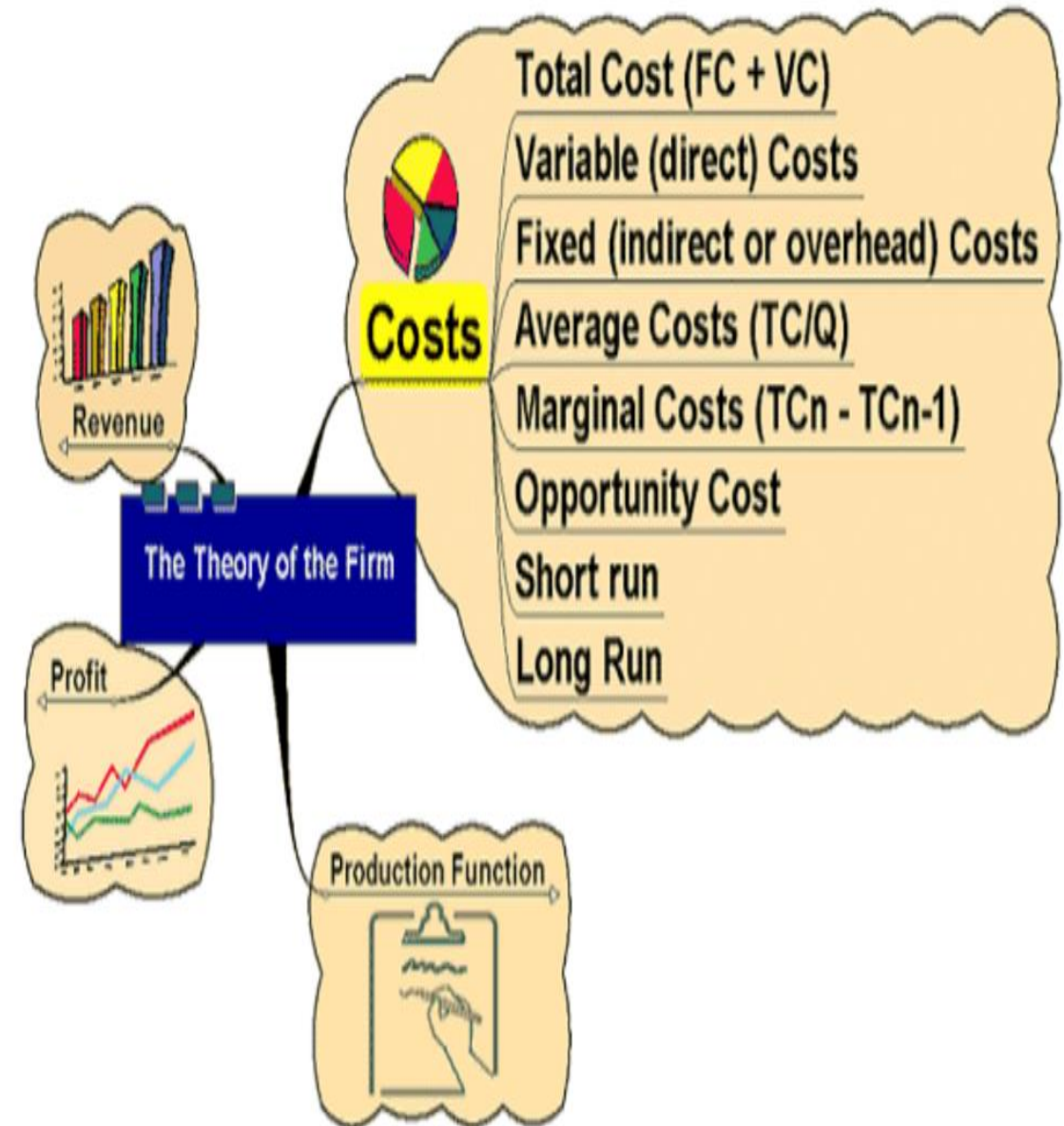
- an input in which the quantity does not change according to output. For example, machinery, land, building, tools, equipment, etc.

Variable input

- an input in which the quantity changes according to output. For example, raw materials, transportation, communication, etc.

The Costs

- **Total Cost** is the sum of all costs (fixed, variable and semi-fixed)
 - **Fixed Costs** do NOT depend on quantity produced: Rent, Rates, Insurance, etc.
 - **Variable Costs** vary directly with the amount produced – raw materials •

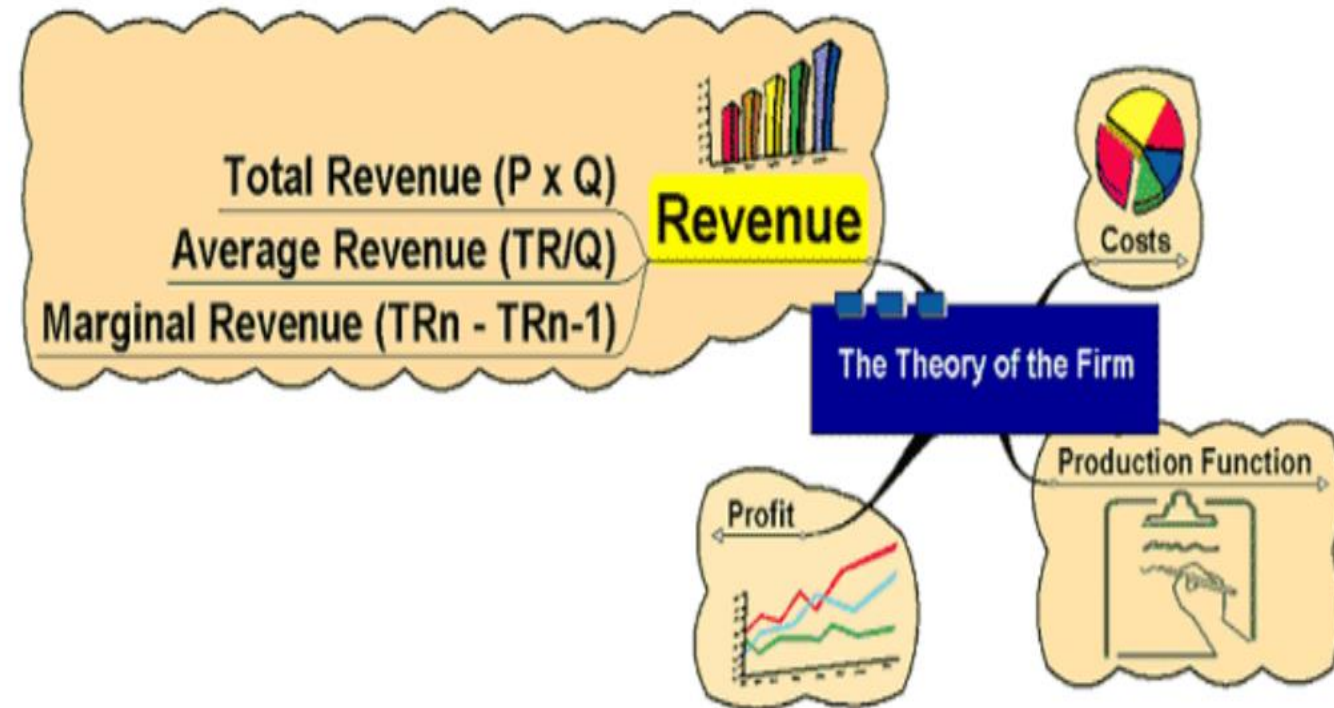


Revenue:

amount received from the sale of goods or services

$$TR = P \times Q$$

Revenue

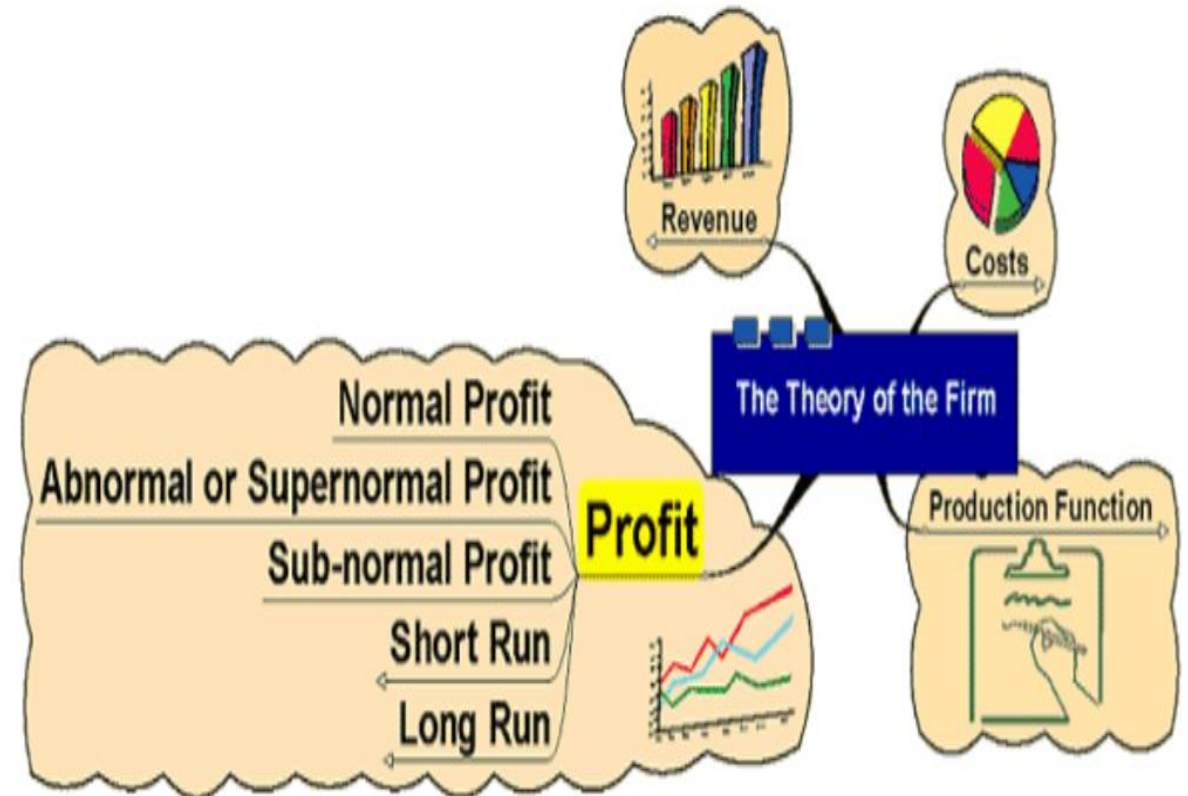


Profit:

Difference between Revenue and Cost

$$\Pi = TR - TC$$

Profit



THANK YOU

AND

GOOD BYE