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Кафедра «Инженерная экономика»

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**ЭЛЕКТРОННЫЙ УЧЕБНО-МЕТОДИЧЕСКИЙ КОМПЛЕКС  
ПО ДИСЦИПЛИНЕ  
«ЭКОНОМИКА ПРЕДПРИЯТИЯ» (НА АНГЛИЙСКОМ ЯЗЫКЕ)**

для специальности  
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## Перечень материалов

**Теоретический раздел** содержит конспект лекций по дисциплине и примеры решения задач.

**Практический раздел** задания для практического усвоения пройденных теоретических тем.

**Вспомогательный раздел** состоит из примерного задания на курсовую работу и учебной программы со списком рекомендуемой литературы.

## Пояснительная записка

*Цели ЭУМК:*

- обеспечение открытости и доступности образовательных ресурсов путем размещения ЭУМК в локальной сети университета

- обеспечение учебного процесса по дисциплине комплексом учебно-методических, справочных и других материалов для повышения качества профессиональной подготовки специалистов

*Особенности структурирования и подачи учебного материала:*

конспект лекций по курсу дополнен практическими примерами, что позволяет изучать учебный материал с самопроверкой.

*Рекомендации по организации работы с ЭУМК:*

- необходим IBM PC-совместимый ПК стандартной конфигурации. Для эффективной работы с диском необходимо **230 Мб** оперативной памяти

- для работы необходимо приложение AdobeAcrobat.

# TABLE OF CONTENTS

<b>I. THEORETICAL SECTION</b> .....	5
<b>TOPIC 1. INTRODUCTION TO ECONOMICS</b> .....	5
<b>Part 1: Basics</b> .....	5
<b>Part 2: Costs and Revenues</b> .....	8
<b>Part 3: Comparative Economics</b> .....	9
<b>TOPIC 2. CLASSIFICATION OF FACTORS OF PRODUCTION</b> .....	13
<b>TOPIC 3. CLASSIFICATION OF PRODUCTION MANAGEMENT IN BUSINESS ADMINISTRATION</b> .....	20
<b>TOPIC 4. FIXED ASSETS OF THE ENTERPRISE</b> .....	29
<b>Part 1. What Is a Fixed Asset?</b> .....	29
<b>Part 2. Types of Fixed Assets</b> .....	30
<b>Part 3. Accounting fixed funds cost</b> .....	31
<b>Part 4. Physical and moral depreciation of fixed assets</b> .....	33
<b>Part 5. Depreciation of fixed assets</b> .....	33
<b>Part 6. Methods of charging depreciation from fixed funds</b> .....	35
<b>TOPIC 5. CURRENT ASSETS (WORKING CAPITAL) OF ENTERPRISE</b> .....	38
<b>Part 1. Current assets of enterprise. Composition and classification.</b> .....	38
<b>Part 2. Liquidity and Working Capital</b> .....	40
<b>Part 3. Rationing of working capital</b> .....	44
<b>TOPIC 6. MANPOWER</b> .....	46
<b>Part 1. Manpower of the enterprise: definition, classification, brief description</b> .....	46
<b>Part 2. The manpower structure of the enterprise</b> .....	47
<b>Part 3. Staff turnover</b> .....	49
<b>Part 4. Wages</b> .....	52
<b>TOPIC 7. PRODUCTION PROGRAM AND PRODUCTION CAPACITY OF THE ENTERPRISE</b> 54	
<b>Part 1. The concept and indicators of production program</b> .....	54
<b>Part 2. The concept and calculation of the production capacity of the enterprise</b> .....	55
<b>TOPIC 8. PRODUCTION COSTS: WHAT THEY ARE AND HOW TO CALCULATE THEM</b> .....	60
<b>Part 1. What Are Production Costs?</b> .....	60
<b>Part 2. Five types of production costs</b> .....	61
<b>Part 3. How are production costs calculated?</b> .....	62
<b>Part 4. Production costs vs. manufacturing costs</b> .....	63
<b>Part 5. Best practices to control production costs</b> .....	63
<b>TOPIC 9. PRICING</b> .....	65
<b>Part 1. Fundamentals of pricing</b> .....	65
<b>Part 2. What is pricing?</b> .....	67

Part 3. Pricing Strategy .....	69
Part 4. Methods of setting prices.....	76
<b>TOPIC 10. TAXES.....</b>	<b>80</b>
Part 1. What are taxes?.....	80
Part 2. Types of taxes .....	81
Part 3. Direct and indirect tax.....	84
<b>TOPIC 11. NET INCOME AND PROFIT .....</b>	<b>86</b>
Part 1. Cost of goods sold (COGS).....	86
Part 2. Gross profit .....	87
Part 3. Economic profit (or loss): definition, formula, and example .....	89
Part 4. Income definition: types, examples, and taxes .....	92
Part 5. Net income (NI) definition: uses, and how to calculate it.....	94
<b>TOPIC 12. EFFICIENCY OF PRODUCTION ACTIVITIES OF THE ENTERPRISE.....</b>	<b>95</b>
Part 1. Main categories and concepts of efficiency.....	95
Part 2. Profitability Ratios.....	96
<b>II. PRACTICAL SECTION.....</b>	<b>100</b>
<b>PRACTICAL LESSON NO. 1. COST STRUCTURES.....</b>	<b>100</b>
<b>PRACTICAL LESSON NO. 2. CLASSIFICATION OF FACTORS OF PRODUCTION.....</b>	<b>101</b>
<b>PRACTICAL LESSON NO. 3. PERSONNEL MANAGEMENT.....</b>	<b>102</b>
<b>PRACTICAL LESSON NO. 4. DEPRECIATION OF FIXED ASSETS.....</b>	<b>103</b>
<b>PRACTICAL LESSON NO. 5. RATE OF WORKING ASSETS .....</b>	<b>106</b>
<b>PRACTICAL LESSON NO. 6. MANPOWER.....</b>	<b>112</b>
<b>III. LIST OF COURSE WORK SECTIONS.....</b>	<b>114</b>
<b>IV. ACADEMIC PROGRAMME OF HIGHER EDUCATIONAL ESTABLISHMENT IN ACADEMIC DISCIPLINE FOR SPECIALITY .....</b>	<b>115</b>

# I. THEORETICAL SECTION

## TOPIC 1. INTRODUCTION TO ECONOMICS

### Part 1: Basics

Economics – the study of how individuals and societies make decisions about ways to use scarce resources to fulfill wants and needs.

What does THAT mean?! In this lesson we'll learn it with you.

Economics is divided into macroeconomics and microeconomics.

1) *Macroeconomics* is the big picture: growth, employment, etc. Where Choices made by large groups (like countries)

Macroeconomics is the branch of economics that studies the behavior and performance of an economy as a whole. Its primary focus is the recurrent economic cycles and broad economic growth and development.

It focuses on foreign trade, government fiscal and monetary policy, unemployment rates, the level of inflation, interest rates, the growth of total production output, and business cycles that result in expansions, booms, recessions, and depressions.

Using aggregate indicators, economists use macroeconomic models to help formulate economic policies and strategies.

2) *Microeconomics* is about how individuals make economic decisions.

Microeconomics studies how individual consumers and firms make decisions to allocate resources. Whether a single person, a household, or a business, economists may analyze how these entities respond to changes in price and why they demand what they do at particular price levels.

Microeconomics analyzes how and why goods are valued differently, how individuals make financial decisions, and how they trade, coordinate, and cooperate.

Within the dynamics of supply and demand, the costs of producing goods and services, and how labor is divided and allocated, microeconomics studies how businesses are organized and how individuals approach uncertainty and risk in their decision-making.

There are 5 Economic Questions. Society (we) must figure out:

- ✓ WHAT to produce (make)
- ✓ HOW MUCH to produce (quantity)
- ✓ HOW to Produce it (manufacture)
- ✓ FOR WHOM to Produce (who gets what)
- ✓ WHO gets to make these decisions?

An economist studies the relationship between a society's resources and its production or output, and their opinions help shape economic policies related to interest

rates, tax laws, employment programs, international trade agreements, and corporate strategies.

Economists analyze economic indicators, such as gross domestic product and the consumer price index to identify potential trends or make economic forecasts.

According to the Bureau of Labor Statistics, 36% of all economists in the United States work for a federal or state agency. Economists are also employed as professors, by corporations, or as part of economic think tanks

Let's talk about the resources. How can you explain this word. So what are resources? It's the things used to make other goods. Everything is so simple. BUT, there's a Fundamental Problem: scarcity. It's *unlimited wants and needs but limited resources*. Because ALL resources, goods, and services are limited – WE MUST MAKE CHOICES. We make choices about how we spend our money, time, and energy so we can fulfill our NEEDS and WANTS. What are NEEDS and WANTS?

- ✓ NEEDS – “stuff” we must have to survive, generally: food, shelter, clothing
- ✓ WANTS – “stuff” we would really like to have (Fancy food, shelter, clothing, big screen TVs, jewelry, conveniences. It's also known as LUXURIES)

Look at this slide, you can see a standoff between our NEEDS and WANTS. On the first picture you see a glass of water, and on others fancy food. What do you choose?

TRADE-OFFS

You can't have it all (SCARCITY – remember?) so you have to choose how to spend your money, time, and energy. These decisions involve picking one thing over all the other possibilities – a TRADE-OFF!

Look at this slide, you see 3 pictures. What COULD you have done instead of come to the university today? These are all Trade-Offs!

A special kind of Trade-Off is an OPPORTUNITY COST. It's the Value of the Next Best Choice. (Ex: Sleeping is the opportunity cost of studying for a test). This is really IMPORTANT – when you choose to do ONE thing, its value (how much it is worth) is measured by the value of the NEXT BEST CHOICE. This can be in time, energy, or even MONEY. Look at the slide, if I buy the pizza then I can't afford the movies. Answer the questions: What is the opportunity cost of buying pizza?

Now let's talk about the production. Production is how much stuff an individual, business, country, even the WORLD makes. But what is “STUFF”? STUFF – Goods and Services. Goods – tangible (you can touch it) products we can buy. Services – work that is performed for others.

Now we talk a little about the factors of Production, but we'll look at it in more detail in the next lessons. Look at the slide and answer my question. So, what do we need to make all of this Stuff?

There are 4 factors of production:

- 1) LAND – Natural Resources. F.ex. water, natural gas, oil, trees (all the stuff we find on, in, and under the land)
- 2) LABOR is divided into Physical and Intellectual. Labor is manpower.

3) **CAPITAL** - Tools, Machinery, Factories. The things we use to make things. Human capital is brainpower, ideas, innovation.

4) **ENTREPRENEURSHIP** – Investment. Investing time, natural resources, labor and capital are all risks associated with production.

Look at the slide and say me which factor of production.

There are 3 parts to the Production Process:

- 1) Factors of Production – what we need to make goods and services
- 2) Producer – company that makes goods and/or delivers services
- 3) Consumer – people who buy goods and services (formerly known as “stuff”)

How do you think which Came First?

Good answers, now look at the slide, you see the structure of the production process. As you see factors of production came the first (land, labor, capital, entrepreneurship), then production or manufacturing factory makes goods and/or services. Finally goods and/or services come to the consumer.

Goods are divided into capital goods and consumer goods.

- ✓ Capital Goods: are used to make other goods
- ✓ Consumer Goods are final products that are purchased directly by the consumer

In the production there are such things as specialization, division of Labor, consumption .

Specialization – dividing up production so that Goods are produced efficiently. F.ex. Nike makes shoes, not hamburgers. Hardee’s makes hamburgers, not shoes! That is, each company does its own business.

Division of Labor – different people perform different jobs to achieve greater efficiency (assembly line).

Consumption – how much we buy (Consumer Sovereignty).

If we INCREASE land, labor, capital we INCREASE production. Many entrepreneurs invest profit back into production. If we DECREASE land, labor, capital we DECREASE production. BUT WHY would we ever DECREASE production?

Look at this picture on this slide. It’s the circular flow model.

A Circular flow model of the economy is a graphical representation of the movement of money between three sectors – businesses, households, and the government – and three markets – production factors, products, and the financial market.

The assumptions of the circular flow model are the following:

- 1) The household sector includes the consumers who have disposable income to spend on goods and services, seeking to satisfy their needs and wants.
- 2) The business sector refers to all the firms operating in an economy, such as corporations, partnerships, and proprietorships), which are responsible for using their resources effectively and produce sufficient goods and services.
- 3) The government sector includes all the government agencies on a local, state, and federal level, which are responsible for the legislation and the proper functioning of the market. Often, the government is the largest, if not the only buyer of a product (i.e. military supplies and equipment).

4) The households spend their entire income on goods and services and do not save any money.

5) The goods, services, and productive factors are priced, but the way in which their prices are determined pertains to the market mechanisms and not to circular flow model.

Let's look at an example. According to the picture on the slide, there are two opposing flows between the households and the firms. The goods and services are produced by the firms to be consumed by the households. However, the factors of production, such as labor, land, and capital flow from the households to the firms to be converted into goods and the services that will be consumed by the households. The households spend their entire money income to buy goods and services in the product markets. In this case, consumer spending is converted into business revenue. In addition, there are transactions that take place between the firms, but these are not shown on the slide. Finally, the government creates flows both to the households and the businesses, offering services and receiving funds.

A measure of the production of an entire country in one year is GDP (Gross Domestic Product).

The GDP is considered the broadest measure of a country's economic performance. It calculates the total market value of all finished goods and services produced in a country in a given year. The Bureau of Economic Analysis (BEA) also issues a regular report during the latter part of each month. Many investors, analysts, and traders focus on the advance GDP report and the preliminary report, both issued before the final GDP figures because the GDP is considered a lagging indicator, meaning it can confirm a trend but can't predict a trend.

Reported by the Department of Commerce (DOC) during the middle of each month, the retail sales report is very closely watched and measures the total receipts, or dollar value, of all merchandise sold in stores. Sampling retailers across the country acts as a proxy of consumer spending levels. Consumer spending represents more than two-thirds of GDP, proving useful to gauge the economy's general direction.

Look at the diagram and video, you see the difference between GDP in 2022 and 2023 years and Top 10 world economies by GDP from 1960 to 2020.

## **Part 2: Costs and Revenues**

### *What Is Cost of Revenue?*

The term cost of revenue refers to the total cost of manufacturing and delivering a product or service to consumers. Cost of revenue information is found in a company's income statement. It is designed to represent the direct costs associated with the goods and services the company provides. The service industry often favors using the cost of revenue metric because it is a more comprehensive account of the various costs associated with selling a good or service.

Cost – the total amount of money it takes to produce an item (to pay for ALL Factors of Production).



Revenues – the total amount of peso a company or the government takes in.

Fixed Costs – the amount of money a business MUST pay each month or year (like rent and Capital expenses).

Variable Costs – the amount of money a business pays that changes over time (Labor and Raw Materials).

Total Costs = Fixed + Variable Costs.

Marginal Costs – the additional Cost of the NEXT UNIT produced.

Profit – the difference between Total Costs and Revenues.

Profit=Revenues-Total cost

Cost Structures:

► Total costs:	$TC = FC + VC, TC(0) = FC$
► Variable costs:	$VC = TC - FC$
► Fixed costs:	$FC = AFC * Q, FC = TC - VC$
► Average fixed costs:	$AFC = FC / Q$
► Average costs:	$AC = TC / Q, AC = AFC + AVC$
► Average variable costs:	$AVC = VC / Q$
► Average total costs:	$ATC = TC / Q$
► Marginal cost:	$MC = \Delta TC / \Delta Q$
► Average revenue:	$AR = TR / Q$
► Total revenue:	$TR = AR * Q$

Profit Motive - why you are in business? To make MONEY (principles of Capitalism).

Cost Benefit Analysis – weighing the Marginal Costs vs. the Marginal Benefits of producing an item or making any economic decision. If the Benefit is GREATER than the Cost, then business does it. Immediate or short term satisfaction can lead to missing the long-term benefits. For Example, immediate spending on cheap stuff instead of long-term savings will lead to lower economic prosperity.

### *How Cost of Revenue Works*

Cost of revenue is the total cost incurred to produce and sell a product or service. It includes all the costs associated with the production process, such as raw materials, labor, overhead expenses. It also includes any other direct costs related to the production and delivery of the product or service.

Cost of revenue is important for businesses because it helps them determine their true gross profit margin. Companies should be interested in know how much residual revenue is left over after all costs of making and selling a product have been incurred. This residual profit is used to pay overhead or indirect costs still vital to the operation of the company but not directly tied to making a product.

## **Part 3: Comparative Economics**

Five economic systems illustrate historical practices used to allocate resources to meet the needs of the individual and society.

### **Primitivism**

In primitive agrarian societies, individuals produced necessities from building dwellings, growing crops, and hunting game at the household or tribal level.

### **Feudalism**

A political and economic system of Europe from the 9th to 15th century, feudalism was defined by the lords who held land and leased it to peasants for production, who received a promise of safety and security from the lord.

### **Capitalism**

With the advent of the industrial revolution, capitalism emerged and is defined as a system of production where business owners organize resources including tools, workers, and raw materials to produce goods for market consumption and earn profits. Supply and demand set prices in markets in a way that can serve the best interests of society.

### **Socialism**

Socialism is a form of a cooperative production economy. Economic socialism is a system of production where there is limited or hybrid private ownership of the means of production. Prices, profits, and losses are not the determining factors used to establish who engages in the production, what to produce and how to produce it.

### **Communism**

Communism holds that all economic activity is centralized through the coordination of state-sponsored central planners with common ownership of production and distribution.

### **What Is a Command Economy?**

A command economy is an economy in which production, investment, prices, and incomes are determined centrally by a government. A communist society has a command economy.

### **What Is Behavioral Economics?**

Behavioral economics combines psychology, judgment, decision-making, and economics to understand human behavior.

### **Comparative Economics:**

1) **A traditional economic** system is based on customs, history and time-honored beliefs. A traditional economy is an economic system in which traditions, customs, and beliefs help shape the goods and services the economy produces, as well as the rule and manner of their distribution. Countries that use this type of economic system are often rural and farm-based. Also known as a subsistence economy, a traditional economy is defined by bartering and trading. A little surplus is produced and if any excess goods are made, they are typically given to a ruling authority or landowner.

#### Characteristic of the traditional economies:

- ✓ Economic Questions answered by custom
- ✓ Predominately Agricultural

- ✓ Developing or “3rd World”
- ✓ Trade and barter oriented
- ✓ Low GDP & PCI (per capita income = avg. inc.)
- ✓ Examples of traditional economies: Burundi, Bangladesh, Afghanistan

2) A **command economy** is a key aspect of a political system in which a central governmental authority dictates the levels of production that are permissible and the prices that may be charged for goods and services. Most industries are publicly owned.

The command economy is a component of a communist political system, while a free market system exists in capitalist societies.

Characteristic of the command economies:

- ✓ Economic questions answered by the government
- ✓ Very little economic choice
- ✓ No private ownership
- ✓ Communism
- ✓ Examples of command economies: Old Soviet Union, old Communist China, Cuba, North Korea

3) In economics, a **free market** is an economic system in which the prices of goods and services are determined by supply and demand expressed by sellers and buyers. Such markets, as modeled, operate without the intervention of government or any other external authority. Proponents of the free market as a normative ideal contrast it with a regulated market, in which a government intervenes in supply and demand by means of various methods such as taxes or regulations. In an idealized free market economy, prices for goods and services are set solely by the bids and offers of the participants.

Characteristic of Free Market (Capitalist) Economies:

- ✓ Economic questions answered by producers and consumers
- ✓ Limited government involvement
- ✓ Private property rights
- ✓ Wide variety of choices and products
- ✓ **In the modern world there are no examples with a purely pronounced market economy; in modern states, a mixed economic system most often prevails.**

Capitalism

- ✓ Competition – more businesses means lower prices and higher quality products for consumers to buy.
- ✓ Voluntary Exchange – businesses and consumers **MUST** be free to buy or sell what and when they want.
- ✓ Private Property – Individuals and businesses **MUST** be able to get the benefits of owning their **OWN** property. Government doesn’t control it.
- ✓ Consumer Sovereignty – consumers get to make free choices about what to buy and this helps drive production (Demand drives Supply).
- ✓ Profit Motive – people want to make or save \$\$\$\$\$. Their “Self Interest” motivates Capitalism.

- ✓ Social Safety Net – “Mixed Economy” idea that says the government should NOT allow people to suffer in economic crisis (natural part of Capitalism’s “Business Cycle”), but provide security instead – Social Security, Unemployment Insurance, etc.

4) A mixed economic system is a system that combines aspects of both capitalism and socialism. A mixed economic system protects private property and allows a level of economic freedom in the use of capital, but also allows for governments to interfere in economic activities in order to achieve social aims.

According to neoclassical theory, mixed economies are less efficient than pure free markets, but proponents of government interventions argue that the base conditions required for efficiency in free markets, such as equal information and rational market participants, cannot be achieved in practical application.

Most modern economies feature a synthesis of two or more economic systems, with economies falling at some point along a continuum. The public sector works alongside the private sector, but they may compete for the same limited resources. Mixed economic systems do not block the private sector from profit-seeking, but do regulate business and may nationalize industries that provide a public good.

#### Characteristic of Mixed Economy/Socialism:

- ✓ Government involvement and ownership and control of property, of decision making, and companies.
- ✓ Government control of business
- ✓ Social “safety net” for people
- ✓ Socialism
- ✓ Examples of countries with a mixed economy: Modern China, USA, France, Japan, Germany, Russia

## TOPIC 2. CLASSIFICATION OF FACTORS OF PRODUCTION

Today we'll speak about factors of production in details.

What Are Factors of Production?

Factors of production are the inputs needed for creating a good or service, and the factors of production include land, labor, entrepreneurship, and capital.

Those who control the factors of production often enjoy the greatest wealth in a society. In capitalism, the factors of production are most often controlled by business owners and investors. In socialist systems, the government (or community) often exerts greater control over the factors of production.

Look at this slide. You see the circulation of factors of production.

Factors of production is the productive resources used to produce goods and services.

Factors of production are grouped into four categories:

- ✓ Land (Natural Resources)
- ✓ Labor (Human Resources)
- ✓ Capital
- ✓ Entrepreneurship

Let's study each of them.

The first factory is land. Try to answer the question. What Raw materials are needed to produce your product? First of all is the "gifts of nature" that we use to produce goods and services. All the things we call natural resources. Also it comes from the air, water, or the earth. F/ex. land, minerals, water. Materials are divided into renewable and non-renewable. F.ex.

- ✓ Renewable
  - Water, air growing things
- ✓ Non-Renewable
  - Coal, oil

### **Factor 1: Land (Natural Resources).**

Land has a broad definition as a factor of production and can take on various forms, from agricultural land to commercial real estate to the resources available from a particular piece of land. Natural resources, such as oil and gold, can be extracted and refined for human consumption from the land.

Cultivation of crops on land by farmers increases its value and utility. For a group of early French economists called "the physiocrats," who predated the classical political economists, land was responsible for generating economic value.

While land is an essential component of most ventures, its importance can diminish or increase based on industry. For example, a technology company can easily begin operations with zero investment in land. On the other hand, land is the most significant investment for a real estate venture.

Nature supplies raw materials necessary to make things. These raw materials are called Natural Resources.

Example: Chicken noodle soup contains chicken meat, spices, water, and vegetables, all of which came from the nature, without noodles, but noodles are made from flour, water, eggs - and these are natural resources.

Look at the slide. Figure shows how long the known reserves of nonrenewable energy resources will last at the current growth rates of use.

New reserves are constantly being discovered. Now look at this figure. Answer the question who has the oil.

Next Figure shows how Primary energy supply in China in 2015.

How many years do you think these sources will last in your country?

We need to use work time and work effort that people devote to producing goods and services, people's efforts, labor. Effort can be physical or mental.

Difference between Renewable and Non-Renewable Resources.

Renewable resource	Non-renewable resource
It can be renewed as it is available in infinite quantity	Once completely consumed, it cannot be renewed due to limited stock
Sustainable in nature	Exhaustible in nature
Low cost and environment-friendly	High cost and less environment-friendly
Replenish quickly	Replenish slowly or do not replenish naturally at all

*The 5 Most Important Natural Resources are:*

Air: Clean air is important for all the plants, animals and humans to survive on this planet. So, it is necessary to take measures to reduce air pollution.

Water: 70% of the Earth is covered in water and only 2 % of that is freshwater. Initiative to educate and regulate the use of water should be taken.

Soil: Soil is composed of various particles and nutrients. It helps plants grow.

Iron: It is found as mineral silica and is used to build strong weapons, transportation and buildings

Forests: Forests provide clean air and preserve the ecology of the world. Trees are being cut for housing and construction projects

Ok. The second factor is labor. Try answer these questions.

- What will your employees have to do to create your product?
- What work will need to be done to turn your raw material into your finished product?

**Factor 2: Human Labor.** Human effort used to produce goods and services is called labor. Labor can be physical or mental.

- Example: to the soup, farmers raise the animals and crops, a truck driver drives them to a factory, and workers operate machinery to mix and can it (physical labor)

- Someone has to design the machines, and think of a recipe for the soup (mental labor)

Labor refers to the effort expended by an individual to bring a product or service to the market. Again, it can take on various forms. For example, the construction worker at a hotel site is part of labor, as is the waiter who serves guests or the receptionist who enrolls them into the hotel.

Within the software industry, labor refers to the work done by project managers and developers in building the final product. Even an artist involved in making art, whether it is a painting or a symphony, is considered labor. For the early political economists, labor was the primary driver of economic value. Production workers are paid for their time and effort in wages that depend on their skill and training. Labor by an uneducated and untrained worker is typically paid at low prices. Skilled and trained workers are called “human capital” and are paid higher wages because they bring more than their physical capacity to the task.

For example, an accountant’s job requires the analysis of financial data for a company. Countries that are rich in human capital experience increased productivity and efficiency. The difference in skill levels and terminology also helps companies and entrepreneurs create corresponding disparities in pay scales. This can result in a transformation of factors of production for entire industries. An example of this is the change in production processes in the information technology (IT) industry after jobs were outsourced to countries with lower salaries.

Look at next slide. Figure shows the China labor force and how it has changed since 2000.

The third factor is Capital. Try to answer this question. What equipment and people will you need to create your product?

In economics, capital typically refers to money. However, money is not a factor of production because it is not directly involved in producing a good or service. Instead, it facilitates the processes used in production by enabling entrepreneurs and company owners to purchase capital goods or land or to pay wages. For modern mainstream (neoclassical) economists, capital is the primary driver of value.

It is important to distinguish personal and private capital in factors of production. A personal vehicle used to transport family is not considered a capital good, but a commercial vehicle used expressly for official purposes is. During an economic contraction or when they suffer losses, companies cut back on capital expenditure to ensure profits. However, during periods of economic expansion, they invest in new machinery and equipment to bring new products to market.

An illustration of the above is the difference in markets for robots in China compared to the United States after the 2008 financial crisis. After the crisis, China experienced a multi-year growth cycle, and its manufacturers invested in robots to improve productivity at their facilities and meet growing market demands. As a result, the country became the biggest market for robots. Manufacturers within the United States, which had been in the throes of an economic recession after the financial crisis, cut back on their investments related to production due to tepid demand.

What about Physical capital? What tools, machines and factories will you need to create your product

Financial capital: What funds the firm use to buy physical capital

And Human capital: What knowledge, skills, education and experience will your employees need to have in order to produce your product (for example: a seamstress , a chemist, a computer technician )

And it's goods made by people and used to produce other goods and services. Tools, instruments, machines, buildings, and other constructions that have been produced in the past and that businesses now use to produce goods and services.

### Physical capital

Capital goods represents one of the key factors of corporation function. Generally, capital allows a company to preserve liquidity while growing operations, it refers to physical assets in business and the way a company have reached their physical capital. While referring how companies have obtained their capital it is important to consider both - physical capital and human capital. Biased on economic theory, physical capital represents one of the four primary factors of production, that is also recognized as inputs production function. The others are natural resources (including land), and labour, and entrepreneurship. The word "Physical" is used to distinguish physical capital from human capital and financial capital. "Physical capital" denote to fixed capital, all other sorts of real physical asset that are not included in the production of a product is distinguished from circulating capital.

In economics, capital represents the man-made assets that support economic activities. Physical capital, as a subset, refers to the durable non-financial assets used in the process of producing goods and services. It is also known as real capital, capital stock, or capital assets. Examples of physical capital include machinery, tools, buildings, inventory, and so on.

Physical capital is one of the factors of production in Adam Smith's Classical Economics theory. Together with land and natural resources as well as human capital, the three factors will support the process of production and contribute to the real GDP growth of an economy.

### Financial capital

*Financial capital* generally refers to saved-up financial wealth, especially that used in order to start or maintain a business. A financial concept of capital is adopted by most entities in preparing their financial reports. Under a financial concept of capital, such as *invested money* or *invested purchasing power*, capital is synonymous with the net assets or equity of the entity. Under a physical concept of capital, such as operating capability, capital is regarded as the productive capacity of the entity based on, for example, units of output per day.

**Financial capital maintenance** can be measured in either nominal monetary units or units of constant purchasing power. Accordingly, there are three concepts of capital maintenance in terms of International Financial Reporting Standards (IFRS):

- 1) Physical capital maintenance;
- 2) Financial capital maintenance in nominal monetary units; and
- 3) Financial capital maintenance in units of constant purchasing power.

Financial capital is provided by lenders for a price: interest. Also see time value of money for a more detailed description of how financial capital may be analyzed. Furthermore, financial capital, is any liquid medium or mechanism that represents wealth, or other styles of capital. It is, however, usually purchasing power in the form of money available for the production or purchasing of goods, etcetera.



Capital can also be obtained by producing more than what is immediately required and saving the surplus.

Financial capital can also be in the form of purchasable items such as computers or books that can contribute directly or indirectly to obtaining various other types of capital. Financial capital has been subcategorized by some academics as economic or "productive capital" necessary for operations, signaling capital which signals a company's financial strength to shareholders, and regulatory capital which fulfills capital requirements.

#### And Human capital

Human capital is a concept used by economists to designate personal attributes considered useful in the production process. It encompasses employee knowledge, skills, know-how, good health, and education. Human capital has a substantial impact on individual earnings. Research indicates that human capital investments have high economic returns throughout childhood and young adulthood.

Companies can invest in human capital, for example, through education and training, enabling improved levels of quality and production.

In October 2018, the World Bank published the Human Capital Index (HCI) as a measurement of economic success. The Index ranks countries according to how much is invested in education and health care for young people. The World Bank's 2019 World Development Report on The Changing Nature of Work showcases the Index and explains its importance given the impact of technology on labor markets and the future of work. One of the central innovations of the World Bank Human Capital Index was the inclusion and harmonization of learning data across 164 countries. This introduced a measure of human capital which directly accounts for the knowledge and skills acquired from schooling, rather than using schooling alone, now widely recognized to be an incomplete proxy. The learning outcomes data, methodology, and applications to the human capital literature underlying this effort were published in Nature.

**Factor 3: Capital Resources.** Producing goods and services requires tools and equipment. The buildings, machines, supplies, etc. used to produce are called capital resources, or capital goods.

- Examples: the truck used to drive to the factory, the machines used to can the soup, and the factory building itself

Look at the slide. Figure shows measures of human capital and how they have changed since 1910. You see that nowadays we are more educational than in the past.

And the last one is Entrepreneurship. The human resource that organized and combines labor, land, capital. The quantity and quality of entrepreneurship is hard to describe and measure. But we can easily recognize brilliant entrepreneurs by their enormous financial success. Sam Walton (Wal-Mart), Bill Gates (Microsoft), and Michael Dell (Dell Computers) are examples of outstanding entrepreneurs.

Now we'll study Influences on Entrepreneurs Decision Making.

- 1) Scarcity- Nearly all resources are scarce, meaning there is a limited supply available to meet unlimited wants. The more scarce a resource, the more expensive it

is. Inverse Economic Relationship – when fruit is out of season, supply is more scarce. This causes the price to increase because it is more valuable

2) Opportunity Cost – resources are scarce, the choice to use a resource in one way means not using it in another. Use a field to grow corn means the field cannot be used to grow soy beans

3) Productivity- is a measure of the amount of output produced by a given amount of inputs. It reflects how efficiently resources are being used. This is also referred to as measuring the efficient use of the factors of production.

For example, the productivity of a farmer (labor) increases with the use of a tractor (capital).

Investing in human capital is one way to increase productivity

4) To realize a profit, produce good/service at a cost lower than the market price for the good or service. Profit is the money left over from selling a good or service after the cost of buying productive resources have been paid. And you should have next aims:

- Minimize the use of scarce resource in production
- Maximize the productivity of the factors used in production to keep cost as low as possible.

### **Entrepreneurship:**

The 4<sup>th</sup> Factor. Making the other 3 factors of production into something useful often takes creativity and some risk. Entrepreneurship is the factor of production that ties the others together

Examples: Someone has to decide what to name the soup, where to sell it, and how much to charge

In the end.

What Are the Factors of Production?

The factors of production are an important economic concept outlining the elements needed to produce a good or service for sale. They are commonly broken down into four elements: land, labor, capital, and entrepreneurship. However, commentators sometimes refer to labor and capital as the two primary factors of production. Depending on the specific circumstances, one or more factors of production might be more important than the others.

What Are Examples of the Factors of Production?

Land refers to physical lands, such as the acres used for a farm or the city block on which a building is constructed. Labor refers to all wage-earning activities, such as the work of professionals, retail workers, and so on. Entrepreneurship refers to the initiatives taken by entrepreneurs, who typically begin as the first workers in their firms and then gradually employ other factors of production to grow their businesses. Finally, capital refers to the cash, equipment, and other assets needed to start or grow a business.

Are All Factors of Production Equally Important?

Depending on the context, some factors of production might be more important than others. For example, a software company that relies primarily on the labor of skilled software engineers might see labor as its most valuable factor of production.

Meanwhile, a company that makes its money from building and renting out office space might see land and capital as its most valuable factors. As the demands of a business change over time, the relative importance of the factors of production will also change accordingly.

Look at the slide. You see fastest-growing occupations.

In order to study economic relationships, we need a sensible way to categorize the various things in our economic world. Take a look at this list of things that have value. Which of them would you place in the category of LABOR? Which are LAND? Which are CAPITAL? Are there some that don't fit in any of the three?

Some Things that Have Value:

Food in a Restaurant

the car you drive

Oil in the Ground

Your Mom's old House, which you Rent to Tenants

Fish in the Ocean

Teaching

A Building Site

Food on your table

A \$100 Bill

A House You Live in

A Truck

potassium salt

Ditch Digging

Computer Programming

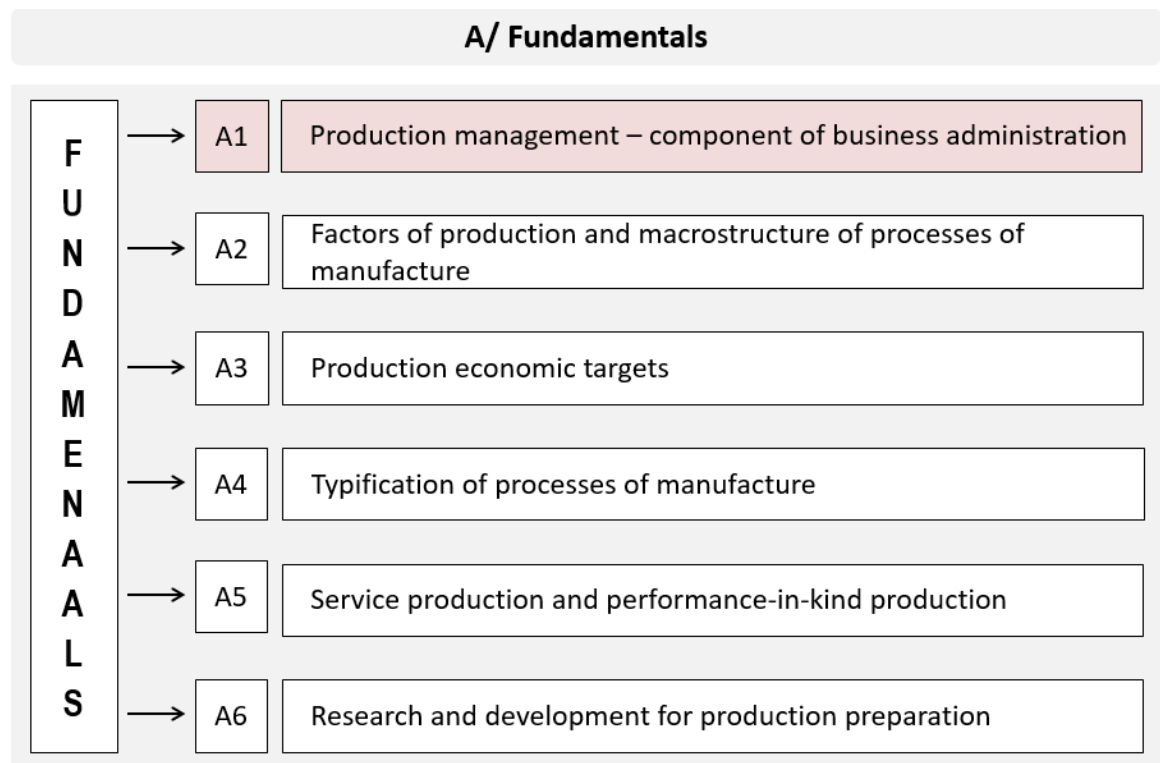
A Certificate for 100 Shares of Microsoft

Playing Music in the Subway

tea cultivation

Did your chart come out like this? Check out your answers.

### TOPIC 3. CLASSIFICATION OF PRODUCTION MANAGEMENT IN BUSINESS ADMINISTRATION



Business administration (BWL) is a sub-discipline of economic science in addition to economics. It is divided into

- > general business administration (ABWL)
- and
- > special business administration (SBWL).

#### **General business administration:**

General business administration deals with the question formulations which originate in all business units.

It has the task of passing on basic knowledge and explaining economic inherent laws as well as interdependencies.

#### **Functions:**

The **internal structure** of general business administration, its division in single disciplines, is **determined by** the operational **functions** (also called main job fields).

Such functions are, for example, the **procurement** of the goods and manpower necessary for the operational activity, the **production** of the products demanded by the users, the provision of capital for **financing** the operational processes, or the **sales** of the produced products to the users.

The following business management individual disciplines are derived from these functions:

- (1) Materials management
- (2) Enterprise economy
- (3) Personnel management
- (4) Production management**
- (5) Financial management
- (6) Industrial marketing/marketing and others

Let's talk about it in more detail

### **(1) Materials management**

Materials management is important as most manufacturing concerns spend more than 60% of the money they take in, on materials. That means materials soak up a substantial portion of the capital invested in the industry.

This emphasizes the requirement for adequate materials management and control because even small savings in materials can reduce the production cost very effectively, thus profit increases.

Materials management is a core function of supply chain management, involving the planning and execution of supply chains to meet the material requirements of a company or organisation. These requirements include controlling and regulating the flow of material while simultaneously assessing variables like demand, price, availability, quality, and delivery schedules.

Material managers determine the amount of material required and held in stock, plan for the replenishment of these stocks, create inventory levels for each type of item (raw material, work in progress or finished goods), and communicate information and requirements to procurement operations and the extended supply chain. Materials management also involves assessing material quality to make sure it meets customer demands in line with a production schedule and at the lowest cost.

Material management systems embrace all of the activities related to materials and are a basic business function that adds value to a finished product. It can also include the procurement of machinery and other equipment needed for production processes as well as spare parts.

Typical roles in Materials Management include inventory analysts, inventory control managers, materials managers, material planners, and expeditors as well as hybrid roles like buyer/planners.

Regardless of role, the main objective of Materials Management is assuring a supply of material with optimised inventory levels and minimum deviation between planned and actual results.

The objectives of material management are sometimes referred to as the 'Five Rs of Materials Management':

- 1) The right material
  - 2) At the right time
  - 3) In the right amount
- And of the quality that is:
- 4) At the right price
  - 5) From the right sources

## **(2) Enterprise economy**

Enterprise economy is a system of knowledge related to the process of developing and making economic decisions in the course of an enterprise's activities.

The enterprise is an independent economic entity, the purpose of which is to satisfy social needs and make a profit. The enterprise is the main link in the market economy. It is the enterprise that is the main producer of goods and services, the main market entity that enters into various economic relations with other entities. Therefore, the economics of an enterprise, as a system of knowledge and methods for managing the economic activity of an enterprise, occupies an important place in the organization of production and distribution of benefits in any economic system.

The economics of an enterprise is closely related to microeconomics and macroeconomics, but is not identical to them. The difference from microeconomics is that microeconomic analysis studies the influence of the market on an individual enterprise and is not really a study of the economy and organization of production at the enterprise level. Microeconomic analysis considers both sides of the market: supply and demand. From the point of view of the economics of the enterprise, demand is considered as a value given from the outside.

Within the framework of economics, enterprises usually consider the following sections of knowledge in the field of economics:

- 1) The production structure of the enterprise, in conjunction with the type of production, the organization of the production cycle;
- 2) Formation of fixed and working capital, use of capital, receipt and distribution of income (profit) of the enterprise;
- 3) Development of a strategy for the economic activity of the enterprise, planning of production and sales of products;
- 4) Formation of production costs, calculation of the cost of production, formation of the pricing policy of the enterprise;
- 5) Financial resources of the enterprise, efficiency of economic activity, risk assessment in entrepreneurship;
- 6) Economics of labor at the enterprise, selection of personnel and their hiring, organization of labor, remuneration system, issues of stimulating the increase in labor productivity;
- 7) Issues of material and technical support of production: supply of raw materials, materials, formation of stocks and their rational use;
- 8) Issues of technical preparation of production and creation of the necessary production infrastructure;
- 9) Innovative activity of the enterprise, product quality, investment policy of the enterprise, environmental issues;
- 10) Foreign economic activity of the enterprise;
- 11) Organization of the enterprise management process as a whole.

## **(3) Personnel management**

**Personnel management** can be defined as obtaining, using and maintaining a satisfied workforce. It is a significant part of management concerned with employees at work and with their relationship within the organization.

In the modern world, there are differences between personnel management and human resource management.

The main difference between Personnel Management and Human Resource Management lies in their scope and orientation. While the scope of personnel management is limited and has an inverted approach, wherein workers are viewed as tool. Here the behavior of the worker can be manipulated as per the core competencies of the organization and are replaced when they are worn-out.

Here are the three types of personnel management that organizations use to develop and maintain staffing procedures:

*1. Strategic personnel management*

Strategic personnel management focuses on an organization's current and future staffing needs. In this approach, an HR manager aligns available resources with an organization's objectives to create plans for hiring and training staff to help employees and the organization accomplish their goals. They typically base their strategies on ongoing business operations and predicted employment needs.

*2. Tactical personnel management*

Tactical personnel management involves developing HR resources and using them to plan staffing processes. Unlike strategic personnel management, tactical personnel management focuses primarily on recruiting and maintaining employees. HR managers may use this approach to:

- ✓ Manage employee schedules based on demand, availability and organizational needs
- ✓ Create long-term employment and recruiting plans to maintain ideal staffing levels
- ✓ Organize staff resources, such as HR tools and job assessments, and make them available to employees and their managers

*3. Operational personnel management*

Operational personnel management focuses on maintaining HR support functions. HR professionals use this approach to help managers implement strategic decisions. For example, after an HR manager hires a new employee, the HR team may complete onboarding, handle employment records and issue resources like office keys and parking passes. These support tasks are elements of operational management, which also includes professional development activities, such as continuing education and career advice.

*What are the objectives of personnel management?*

Personnel management aims to create a working environment that benefits everyone in an organization. Creating an effective program can contribute significantly to the success of an organization and its staff. A strong personnel management approach can empower employees to use their skills and talents to increase their productivity and achieve professional success.

*What are personnel management responsibilities?*

HR professionals who work in personnel management have varying responsibilities depending on the organization's size and goals. They often oversee an organization's administrative tasks, particularly for staffing and employment. Their responsibilities may include:

- ✓ Creating job listings with required experience and competencies
- ✓ Recruiting new employees through several platforms
- ✓ Interviewing and hiring candidates to fill vacant positions
- ✓ Helping new hires complete onboarding paperwork
- ✓ Training or arranging for the training of new employees
- ✓ Creating and maintaining company policies that reflect the organization's mission and vision
- ✓ Developing and supporting an inclusive company culture
- ✓ Organizing and securing employment documents
- ✓ Managing payroll and resolving employee payroll concerns
- ✓ Providing employees with opportunities for continuing education and training
- ✓ Managing employee benefits, absences and time-off requests
- ✓ Handling termination and resignation processes

#### **(4) Production management**

**Production management**, also called **operations management**, planning and control of industrial processes to ensure that they move smoothly at the required level. Techniques of production management are employed in service as well as in manufacturing industries. It is a responsibility similar in level and scope to other specialties such as marketing or human resource and financial management. In manufacturing operations, production management includes responsibility for product and process design, planning and control issues involving capacity and quality, and organization and supervision of the workforce.

Production management is the process of managing the conversion of production inputs (raw materials, human resources, and capital) into production outputs (the goods that a company produces). It is an integral part of overall business management and encompasses overseeing both the planning as well as the execution of the manufacturing process. As such, production management involves managing physical materials and inventories, as well as adherence to design specifications, equipment utilization, performance, and labor in order to implement the company's production strategy.

The role of production management is to harmonize all key aspects related to production. Sometimes also referred to as the 5 Ms of production, these include: 1) men (workforce and labor), 2) machines (equipment), 3) methods (production processes, workstations and routings), 4) materials (raw materials, components and/or sub-assemblies), and 5) money (financing and asset utilization). Effectively and continuously managing production is key in realizing efficiency gains and keeping the production process up to date. A well-designed and executed manufacturing operation translates directly into increased profits, controlled costs, and an improved bottom line.



As production management requires the coordination and supervision of both people, materials, and equipment, managers need to continually make decisions in four key areas:

#### *Production Planning*

Production planning is the stage where the master schedule is produced. It requires managers to decide where production will begin. For example which machines or which facility.

It also requires deciding upon when production will start. Different products run at different speeds and require numerous inputs to complete, so the decision of when is based on the overall product mix.

#### *Production Control*

Production control is the floor level application of design specifications. Here, much like a traffic officer in a busy intersection, managers direct staff and equipment to conduct the steps to complete their part of a finished good. This also involves active management against quality standards as well as close monitoring of production speeds against established measured run times.

#### *Process Improvement*

All production managers are responsible for monitoring and driving continuous improvement. Many companies may use methodologies such as Lean or Six Sigma to formalize the efforts, but even without such methodologies, no process is static and production management requires reliance on honing and approving floor level process activities of equipment and labor.

#### *Equipment Maintenance*

Just as production managers need to monitor and coach staff to perform tasks using efficient steps, so too does the equipment need to be managed to keep it in optimal running condition. Maintenance costs are usually rolled into the fully costed finished goods, especially for manufacturers using a cost-plus system to determine costs and set prices. Because of this, overall equipment effectiveness (OEE) is vital.

#### *Why is Production Management Important?*

Without effective floor-level management of production processes, error and inefficiency would be more common within a factory. There are other reasons that production management is important to business operations:

1) **Reduces Manufacturing Cost** – By maximizing outputs while minimizing inputs, production management lowers the cost required to produce finished products. This can be used to improve profit margin, or it may be passed onto the customer to ensure a competitive advantage.

2) **Improves Competitiveness** – Knowing that the right products are available on time and will be delivered on schedule means that a company is always in the game in any market.

3) **Accomplishes Business Objectives** – Production management helps companies produce finished goods efficiently. Because these finished products are always made with high quality and delivered when needed, businesses can leverage those things to grow the business, secure capital for improvement, and increase customer satisfaction.

4) **Improves Brand Image** – Many manufacturing companies today operate some or all their production on a Direct to Consumer (D2C) basis. As a result, branding and brand image have become important. Sound production management means that customers rely on products and can have confidence in their quality and availability thus improving brand image. Overall, a good brand image is important whether your products are Engineer-to-Order (ETO), Make-to-Order (MTO), or Make-to-Stock (MTS).

5) **Optimizes Use of Resources** – Production management means that labor, equipment, and resources are optimized in the production effort. This can lower waste levels and create an environment for employees that is positive and well balanced. With the emphasis on today's work/life balance and green initiatives to reduce carbon footprints, effective production management that optimizes the use of resources can help deliver on both of those trends.

### **(5) Financial management**

At its core, financial management is the practice of making a business plan and then ensuring all departments stay on track. Solid financial management enables the CFO or VP of finance to provide data that supports creation of a long-range vision, informs decisions on where to invest, and yields insights on how to fund those investments, liquidity, profitability, cash runway and more.

#### *Scope/Elements of Financial Management*

1) **Investment decisions** includes investment in fixed assets (called as capital budgeting). Investment in current assets are also a part of investment decisions called as working capital decisions.

2) **Financial decisions** – They relate to the raising of finance from various resources which will depend upon decision on type of source, period of financing, cost of financing and the returns thereby.

3) **Dividend decision** – The finance manager has to take decision with regards to the net profit distribution. Net profits are generally divided into two:

a) *Dividend for shareholders* – Dividend and the rate of it has to be decided.

b) *Retained profits* – Amount of retained profits has to be finalized which will depend upon expansion and diversification plans of the enterprise.

### **10 Major functions of financial management**

- ✓ Ascertains capital composition
- ✓ Estimates capital requirements
- ✓ Investment of total funds
- ✓ Makes the choice of source of funds
- ✓ Manages of cash flow
- ✓ Disposal of surplus
- ✓ Decisions of acquisitions and mergers
- ✓ Control finances
- ✓ Decisions on capital budgeting
- ✓ Tax planning and protection of assets

## (6) Industrial marketing/marketing and others

**Industrial marketing** (or **business-to-business marketing**) is the marketing of goods and services by one business to another. Industrial goods are those an industry of uses to produce an end product from one or more raw materials. The term, *industrial marketing* has largely been replaced by the term *B2B* marketing (i.e. business to business marketing).

*Why is industrial marketing important?*

The main distinctive feature of industrial marketing is that customers are not individuals but businesses, and it changes the usual way of promoting goods and developing a marketing strategy. Below we explain why a special attitude to marketing in B2B is so important.

Industrial marketing is aimed at increasing sales of wholesale products and goods for industrial purposes. It helps companies that produce raw materials expand their businesses.

Industrial marketing covers two marketing aspects:

**a) The manufacturing business promotion:** creating the image and developing the potential of the company, increasing the investment attractiveness and its boosting in the B2B market.

**b) Product promotion:** strategic development of a product offer, building a marketing strategy, and pushing products forward on the market.

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**Let's summarize.**

**Production management** is a functions theory which deals with business management problems of the function production; that is the way products are created and performances.

Frequently the plant economy and the materials management are also assigned to production management in terms of content.

In this way, it touches on both business management and technical and technological problems.

**Special business administration** can be designed as **function-oriented** as well as **institution-oriented**.

As a **functions theory** it maintains the division of teaching disciplines developed in ABWL and deals more deeply with special problems which exceed knowledge provided in ABWL.

As an **institutions theory** it is concerned with business management problems of the **branches of trade**. Therefore it is also designated as branch of trade theory. Due to the branch of trade orientation, the following SBWL are to be distinguished:

- (1) Industrial firm theory
- (2) Bank operating theory
- (3) Insurance operating theory
- (4) Trade enterprise theory
- (5) Transport operating theory and others

Starting from the function production, two possibilities for the design of special business administration are given:

> Special business administration:

**Production management (function-oriented)**

> Special business administration:

**Industrial firm theory (institution-oriented)**

Passing on the knowledge of business administration requires an examination of its internal structure, the sequential organization of a presentation of its crucial points, as well as the differentiation of compulsory organizations and elective organizations.

## TOPIC 4. FIXED ASSETS OF THE ENTERPRISE

### Part 1. What Is a Fixed Asset?

The term fixed asset refers to a long-term tangible piece of property or equipment that a firm owns and uses in its operations to generate income. The general assumption about fixed assets is that they are expected to last, be consumed, or be converted into cash after at least one year.

As such, companies are able to depreciate the value of these assets to account for natural wear and tear. Fixed assets most commonly appear on the balance sheet as property, plant, and equipment (PP&E).

#### *Areas of Importance of fixed assets*

##### Purchases

- ✓ Determine new assets & their costs
- ✓ Selecting the correct Fixed Asset Account
- ✓ Apply bar-code tags for identification

Perform annual inventory audits

Submit eDisposal forms

Maintain the Fixed Assets accounting records

#### *Fixed Assets Fabrication*

##### Fabricated Equipment

1) Defined as scientific or other complex equipment comprised of two or more individual components that are fabricated/built into a single functional unit. However, fabrication does not apply to components that are simply wired together and can be dismantled to operate separately (for example, IT components such as computers and network equipment).

2) All components in the fabrication must function as a singular unit and be collectively disposed of at the end of the fabricated asset's useful life. Individual components of a fabrication cannot (1) be used independently of the other components or (2) function separately apart from the fabricated unit to which it is attached. Fabricated equipment is capitalized as a single asset when its combined total cost equals or exceeds \$5,000 and has a useful life of two or more years.

The term alludes to the fact that these assets won't be used up or sold within the accounting period. A fixed asset typically has a physical form and is reported on the balance sheet as PP&E. Companies purchase fixed assets for any number of reasons including:

- 1) The production or supply of goods or services
- 2) Rental to third parties
- 3) Use in an organization

A company's balance sheet statement includes its assets, liabilities, and shareholder equity. Assets are divided into current assets and noncurrent assets, the difference of which lies in their useful lives. Current assets are typically liquid, which means they can be converted into cash in less than a year. Noncurrent assets refer to

assets and property owned by a business that are not easily converted to cash and include long-term investments, deferred charges, intangible assets, and fixed assets.

Thus, Fixed funds include means of production which repeatedly participate in the production process, preserve their natural form, and transfer their value to manufactured production by parts according to the degree of their wear and tear. Means of production with the term of service of more than 12 months belong to fixed funds.

Capital investments into radical soil improvement (drying, irrigating and other meliorating work) and investments into rented objects of fixed funds also belong to fixed funds.

Ground areas, objects of wildlife management (water, the bowels of the earth and other natural resources) which are in the organization property are taken into account in the structure of fixed funds of the enterprise.

## **Part 2. Types of Fixed Assets**

***Property and Plant*** – land, improvements to land, easements, buildings, building improvements, infrastructure, and structures

***Moveable Equipment*** –

- ✓ *Used in the course of business operations,*
- ✓ *Expected normal life of two or more years,*
- ✓ *Acquisition costs of \$5,000+*

***(Barcodes applied & inventoried annually)***

Examples: Office equipment/furniture, Data processing equipment, Educational equipment, Motor vehicles- licensed or unlicensed

***Other Tangible or Intangible assets***

- ✓ (In-house designed) Software
  - *Purchased software is not a Fixed Asset*
- ✓ Copyrights

The highest share in the structure of the property complex of the enterprise is occupied with fixed assets.

Fixed capital is manufacturing assets which are used repeatedly or constantly during a long period, but not less than one year, for producing goods and rendering market and non market services. Fixed assets are divided into material and non-material assets (Fig. 1)

Buildings, constructions, machines and equipment, measuring and regulating devices, dwellings, computer facilities and office equipment, vehicles (transport means), tools, industrial and household stock (inventory), draught animals, productive livestock, pedigree cattle, perennial planting and other kinds of material fixed assets belong to fixed assets (fixed funds) of the enterprise.

Computer software, original entertaining products, fiction or art works, scientific industrial technologies, other non-material fixed assets, which are objects of intellectual property, the use of which is limited by the owner's rights established for them, belong to non-material fixed assets.

Material and non-material fixed assets are shown in the balance of the enterprise.

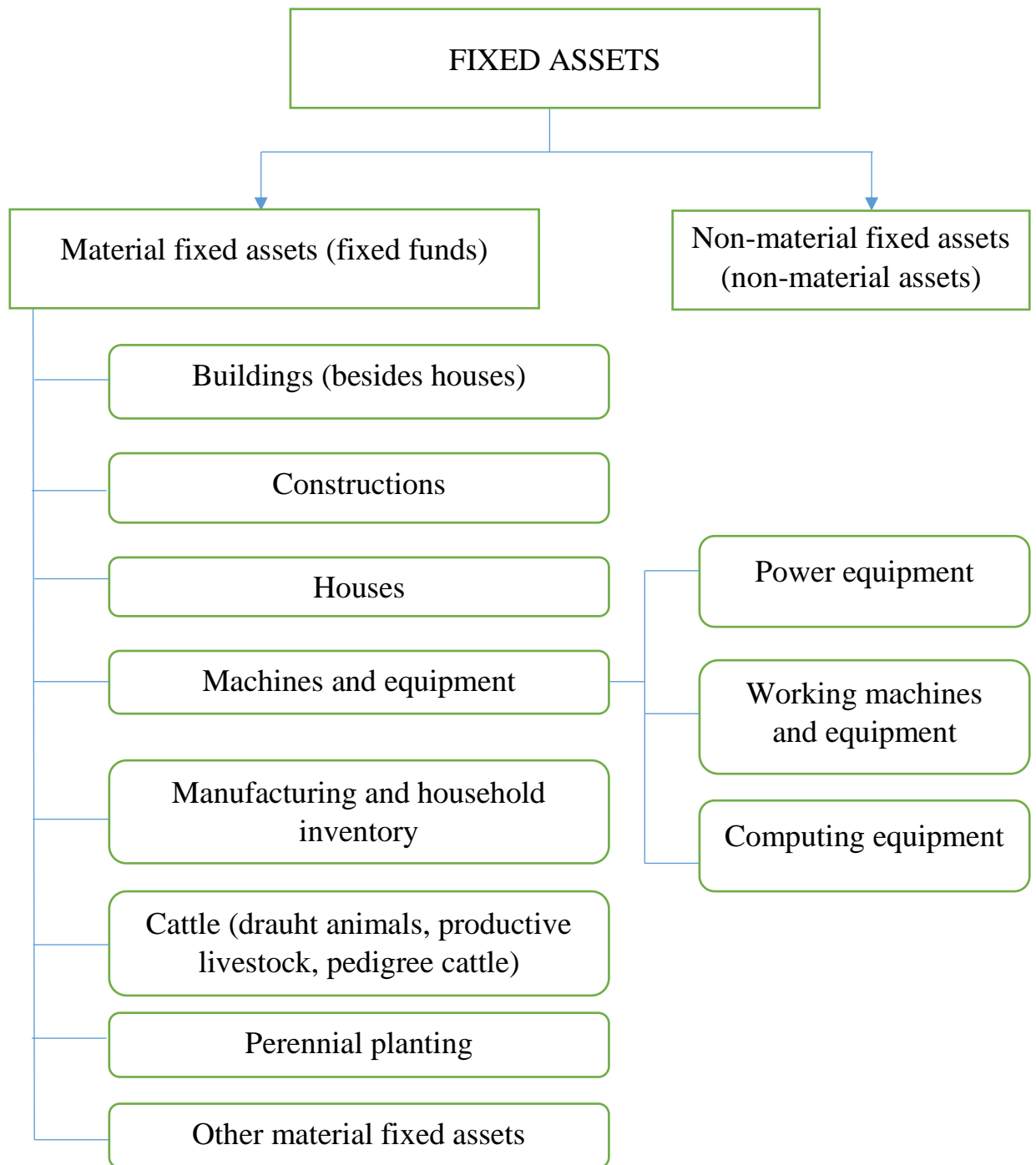


Figure 1. Fixed assets of the enterprise

### **Patr 3. Accounting fixed funds cost**

Fixed funds transfer their cost to a ready product gradually during a long time, covering several production and technological cycles. Therefore accounting of fixed funds and their reflection in the balance are organized so that it was simultaneously

possible to show preservation by them of their initial form and their gradual loss of cost.

It is necessary to distinguish acquisition cost, depreciated cost (residual value), adjusted historical cost of fixed funds.

The acquisition cost reflects actual expenses for the purchase (creation) of fixed funds. The acquisition cost does not change. The exception makes radical reconstruction or partial liquidation.

For a separate object the acquisition cost is defined according to the formula:

$$C_a = C_{equip} + C_{inst} + E_{transport} + E_{other}, \quad (4.1)$$

where  $C_a$  – acquisition cost;

$C_{equip}$  – cost of the acquired equipment;

$C_{inst}$  – cost of the installation work;

$E_{transport}$  – expenses for transportation;

$E_{other}$  – other expenses.

Since within one year the physical volume of fixed funds changes (the enterprise, for example, can purchase some units of new equipment and write off a part of working equipment), the acquisition cost of fixed funds at the end of the year will differ from the acquisition cost at the beginning of the year. The acquisition cost at the end of the year is calculated as follows:

$$C_a^{e.y} = C_a^{b.y} + C_+ + C_-, \quad (4.2)$$

where  $C_a^{e.y}$  – acquisition cost at the end of the year;

$C_a^{b.y}$  – acquisition cost at the beginning of the year;

$C_+$  – cost of fixed funds commissioned during the year;

$C_-$  – cost of fixed funds withdrawn during the year.

Let us give an example of calculating the cost of fixed assets shown in Fig. 2.



Figure 2. Microscope with Laser



<i>Requisition Line Items</i>	<i>Cost</i>
Frame	8,396.97
Eyepiece	207.00
Stage	5,905.50
Observation Tube	1,408.95
Transmitted Light Detector	5,609.76
Spectral Detection	6,302.50
Fiber Port	537.54
<b>Optional Software</b>	<b>4,499.00</b>
<i>Shipping/Handling</i>	<i>100.00</i>
<i>Installation</i>	<i>800.00</i>
<b>Extended Warranty</b>	<b>2,000.00</b>
<b>TOTAL ASSET COST</b>	\$34,194.22
<b>REQUISITION TOTAL</b>	\$40,693.22

#### **Part 4. Physical and moral depreciation of fixed assets**

After a certain period of time from the moment of the purchase or creation the fixed funds lose a part of their value. In economics such phenomenon is called wear and tear.

Wear and tear is the gradual loss of the consuming cost of fixed funds . It is necessary to distinguish moral and physical wear and tear.

Physical wear and tear is the loss of the consuming cost of fixed funds as a result of the deterioration of details, the influence of natural factors and aggressive environments.

The obsolescence is the loss of cost because of decreasing the cost of reproduction of analogous objects of fixed funds which is caused by the perfection of technology and organization of production. There are two kinds of the obsolescence:

- ✓ the obsolescence of the first kind means decreasing fixed funds cost because analogous fixed funds are made with smaller expenses and become cheaper;
- ✓ the obsolescence of the second kind means that as a result of scientific and technical progress there appears more modern and more productive equipment.

The essence of the obsolescence consists in the fact that means of labor lose their cost before the end of the term of their physical service.

The obsolescence is favorable to the society as a whole because it leads to the reduction of production costs, but not favorable to those people who invest their capital into fixed funds with the purpose of receiving profit from renting them.

#### **Part 5. Depreciation of fixed assets**

The depreciation of fixed funds reflected in book keeping is accumulated during the whole term of their service in the form of depreciation charges on accounts for accounting the depreciation.

Depreciation is a systematic process of transferring the cost of means of labor in the process of their wear and tear onto a product which is made with their help. Depreciation is monetary expression of the physical wear and tear and obsolescence of fixed funds. The sum of the depreciation charged during fixed funds functioning should be equal to their acquisition (adjusted historical) cost.

Objects for charging depreciation are the objects of fixed funds which exist in the organization according to the property right, economic and operative management.

Depreciation is not charged from the following kinds of fixed funds:

- from objects of fixed funds received according to the contract of donation and free of charge in the process of privatization;
- from available housing (except for objects used for receiving profit);
- from objects of fixed funds consuming properties of which eventually do not change (soil areas and objects of wildlife management).

The norm of depreciation is the annual percent of the compensation of fixed funds cost established by the state.

The norm of depreciation for complete restoration is calculated according to the expression:

$$N_d = \frac{C_a - L + D}{C_a \cdot T_u}, \quad (4.3)$$

where  $N_d$  – annual norm of depreciation for complete restoration;

$C_a$  – acquisition cost of fixed funds;

$L$  – liquidating cost of the fixed industrial funds;

$D$  – the cost of dismantling fixed funds which are being liquidated and other expenses connected to the liquidation;

$T_u$  – term of paying usage.

Norms of depreciation charges are differentiated into groups and kinds of fixed funds. They depend also on conditions under which fixed funds are maintained.

Thus, for buildings they vary from 0.4 up to 11 %, for power and working machines and the equipment approximately from 3 up to 50 %, for heat-exchange devices in manufacturing plastics with the non-aggressive environment – 6.7 %, for the same devices used in manufacturing plastics with aggressive environment – 10%.

The norm of depreciation is connected to the term of paying usage of an object of fixed funds. It is possible to consider that the term of paying usage is the inverse value to the norm of depreciation:

$$N_d = \frac{1}{T_u} \cdot 100\%, \quad (4.4)$$

Charging depreciation from the cost of commissioned fixed funds begins from the first date of the month which follows the month of their commissioning. Charging depreciation from the cost of withdrawn fixed funds stops from the first date of the month which follows the month of their withdrawal.

## Part 6. Methods of charging depreciation from fixed funds

Charging depreciation can be carried out only by those ways which are allowed to be used. Among the methods of charging depreciation there are the following ones:

- the linear method;
- the method of diminishing residue;
- the double declining balance;
- the method of writing off the cost according to the sum of numbers of years of the term of paying usage.

The application of one of the ways for the group of homogeneous objects of fixed funds is carried out during the whole term of its paying usage.

The **linear method** belongs to the most widespread ones. It is used approximately by 70 % of all enterprises. The popularity of the linear method is caused by the simplicity of its application. Its essence consists in the fact that the equal part of the cost of the given kind of fixed funds is depreciated every year.

The annual sum of depreciation charges is calculated as follows:

$$D = \frac{C_a \cdot N_d}{100\%}, \quad (4.5)$$

where  $D$  – the annual sum of depreciation charges (in percentages);

$C_a$  – acquisition cost;

$N_d$  – norm of depreciation charges.

For example, the enterprise has bought a laptop. Its cost is \$ 2,000, the term of service life is 5 years. Thus, annually we will write off for the depreciation  $2,000/5 = \$400$ :

Year	Residual value at the beginning of the year, \$	The sum of annual depreciation, \$	Residual value at the end of year, \$
1	2,000	400	1,600
2	1,600	400	1,200
3	1,200	400	800
4	800	400	400
5	400	400	0

It is necessary to note the following. If the residual value of an object is equal to zero it does not mean that the price of the computer became equal to zero. This computer can have real value, to be in working condition and to serve much longer than one year. Zero residual value of the given computer means only that the enterprise completely compensated expenses for its purchase.

The linear method is expedient to use for those kinds of fixed funds where the time, but not the obsolescence is the major factor which limits the term of service life.

When using **the method of diminishing residue the annual sum of depreciation** charges is defined proceeding from the residual value of an object of fixed funds at the beginning of the year under review and the norm of depreciation estimated on the basis of term of paying usage of this object:

$$D = \frac{V_r \cdot N_d}{100\%} \cdot k_a, \quad (4.6)$$

where  $V_r$  – residual value (depreciated cost) of an object;

$k$  – coefficient of acceleration;

$N_d$  – norm of amortization for the given object.

*The residual value of fixed assets is equal to the original cost minus the amount of depreciation for the current year.*

Disadvantages of this method:

- ✓ in the first years, the cost of production increases;
- ✓ the method does not guarantee a complete write-off of the value of the object and therefore the entire depreciated amount is written off in the last year.

When using **the method of writing off the cost according to the sum of numbers of years** of the term of paying usage the annual sum of depreciation is defined proceeding from the acquisition cost of an object of fixed funds and the annual ratio, where in the numerator there is the number of years remaining till the end of the term of service life of an object, and in the denominator there is the sum of numbers of years of service life of an object:

$$D = C_a \cdot \frac{N_{years}}{T \cdot (T+1)}, \quad (4.7)$$

where  $C_a$  – acquisition cost;

$N_{\text{years}}$  – the number of years which remain till the end of the term of paying usage;

$T$  – term of paying usage.

For example, the equipment at the cost of \$ 100,000 was commissioned. The term of paying usage is 5 years. The sum of numbers of the usage term is 15 (1+2+3+4+5). The calculation is presented in the table:

Year	Residual value at the beginning of the year, \$	Norm of depreciation, %	The sum of annual depreciation, \$	Residual value at the end of year \$
1	100,000	$100,000 \times 5/15 = 33,333$	33,333	66,667
2	66,667	$100,000 \times 4/15 = 26,667$	26,667	40,000
3	40,000	$100,000 \times 3/15 = 20,000$	20,000	20,000
4	20,000	$100,000 \times 2/15 = 13,333$	13,333	6,667
5	6,667	$100,000 \times 1/15 = 6,667$	6,667	0

This method is equivalent to the method of diminishing residue, but it enables to write off the whole cost of an object without the residue.

During the year under review depreciation charges from objects of fixed funds are charged monthly irrespective of the used method of charging at the rate of 1/12 of the annual sum.

**A productive method** of calculating depreciation of an object of fixed assets or intangible assets consists in depreciating the organization based on the depreciable cost of the object and the ratio of natural indicators of the volume of products (works, services) produced (performed) in the current period to the resource of the object.

Example. An object with a depreciable cost of \$ 10 million was purchased. The volume of products (works) predicted during the life of the facility is 25 thousand pieces. Issued for the reporting month 500 pieces.

1. Depreciation per unit of production:

$$D_{\text{unit}} = \frac{C_a}{P} = \frac{10,000,000}{25,000} = 4,000 \text{ \$/unit}$$

2. Depreciation charges for the reporting month:

$$D_{\text{month}} = D_{\text{unit}} \cdot N_p = 4,000 \cdot 500 = 2 \text{ million \$}$$

*Depreciation rates for trucks, cars and buses are set based on the actual mileage taken into account in thousands of kilometers.*

## TOPIC 5. CURRENT ASSETS (WORKING CAPITAL) OF ENTERPRISE

### Part 1. Current assets of enterprise. Composition and classification.

Each business must have a certain quantity of monetary resources except of capital assets such as current assets (working capital) for the purchase of essential tools, support material, fuel, pay for all types of energy consumption, other services such as wage.

On the role in production and circulation process current assets are divided into:

- ✓ Circulating assets
- ✓ Operating assets

Stock (Circulating assets)– such part of resources of enterprise, that takes part in one production cycle, fully changes its material and real form by transformation from essential tools to finished commodity and fully transposes cost at produced items.

Operating assets - a part of current assets, that advanced by enterprise for service of circulation process. This part of capital assets not directly takes part in production process, but services circulation of resources of enterprise.

A structure of current assets relates (in terms of shares, %) that add up between component parts of current assets of enterprise or its individual elements.

Table 5.1 – Composition of current assets

Breakdown	Current assets							
Function	Production revolving funds (production sphere)				Circulation funds (circulation sphere)			
Role in production and circulation	Resources in stocks		Resources in production		Finished commodity (FC)		Cash assets (CA) and accounts receivable	
Consolidated elements	Industrial stocks	Low value items	Work-in-process	Prepaid expenses	FC in warehouses	Shipped goods	CA	Accounts receivable
Degree of planning	Rationed					Not rationed		

**1) Manufacturing inventory (MI)** – such part of current assets, that invested into material assets. They have not entered into the production process yet and they are in the warehouse of the enterprise (raw materials and basic materials, auxiliary materials, purchased semi-finished products, components and fuels).

**2) Low value items** – means of labor with a service life of less than 1 year and the cost of a predetermined value (tools, equipment, special tools, special equipment, work clothes);

**3) Work-in-progress** – the totality of labor objects at various stages of the production process, partially finished products, expressed in value form. WIP differs from MI in that these material assets are already in the production cycle.

**4) Prepaid expenses** – non-material part of stock (circulating assets): costs of preparing and mastering new product's production, new technology, design, experimental and other work, performed in the current year, but related to products which production and sale is yet to happen.

**Finished goods** – consists of FG currently placed at the enterprise's warehouse and dispatched goods.

Dispatched goods – finished goods that are already in the circulation sphere, but haven't been paid for yet. Comes under two headings: - payment due day is yet to come; - overdue payment.

**Monetary resources** – on moneyed corporations accounts, invested in securities; in enterprise's fund and estimates (postal transfers, shortages, budget overruns).

**Accounts receivable** – represents money owed to the firm by distributors on overdue payment, revenue services on taxes overpayment, and debtors on claims and disputed debts.

Working capital as an economic phenomenon is defined as a source of maintaining continuity in the production, when operating assets and stock (Circulating assets) go through both production and circulation spheres.

The ability of working capital to be transformed into cash is called working capital liquidity. Time expenditure on selling and receiving cash and obtainable sale price are taken into account.

Constantly transforming, working capital continuously cycles, which epitomizes the process of production in constant renewal.

1st stage – monetary or preparative. An Enterprise makes investments in raw materials, fuels, etc. At this stage monetary resources are converted into manufacturing inventory (**MR-MI**) and transferred from the sphere of circulation to the sphere of production.

2nd stage – MI is brought into production, which results in it being transferred into finished goods (**MI-production-FG**).

3rd stage – An enterprise encashes finished goods. (**FG – MR - ΔMR**). At this stage capital is transferred from the sphere of production to the sphere of circulation, configuring itself as finished goods at the warehouse, then dispatched goods, funds accounted with the consumer, accounts receivable and MR at enterprise's bank account. With MR received from the sale, objects of labor, MI are acquired again. So there is a working capital cycle.

Working capital of the enterprise is simultaneously disposed in each of the three stages of the cycle, which ensures a continuous production process.

The time that the complete circuit of working capital takes is a **turnover period (inventory turnover ratio)**, and turnover's number – **rate of turnover or working capital turnover ratio**.

$$ITR = COGS/AI, \quad (5.1)$$

$$R_{turnover} = TP / AI, \quad (5.2)$$

where COGS – volume of sales or cost of goods sold;

AI – average standard of working capital, t.m. average inventory;

TP – turnover plan.

Working Capital turnover acceleration can be achieved through manufacturing inventory reduction, overstock and surplus inventories liquidation, production cycle time reduction, finished goods sales acceleration.

#### What Can Inventory Turnover Tell You?

Inventory turnover measures how often a company replaces inventory relative to its cost of sales. Generally, the higher the ratio, the better.

A low inventory turnover ratio might be a sign of weak sales or excessive inventory, also known as overstocking. It could indicate a problem with a retail chain's merchandising strategy, or inadequate marketing.

A high inventory turnover ratio, on the other hand, suggests strong sales. Alternatively, it could be the result of insufficient inventory. As problems go, ensuring a company has sufficient inventory to support strong sales is a better one to have than needing to scale down inventory because business is lagging.

The speed with which a company can turn over inventory is a critical measure of business performance.

Retailers that turn inventory into sales faster tend to outperform comparable competitors. The longer an inventory item remains in stock, the higher its holding cost, and the lower the likelihood that customers will return to shop.

The fast fashion business is an example. Competitors including H&M and Zara typically limit runs and replace depleted inventory quickly with new items. Slow-selling items equate to higher holding costs. There is also the opportunity cost of low inventory turnover; an item that takes a long time to sell delays the stocking of new merchandise that might prove more popular.

A decline in the inventory turnover ratio may signal diminished demand, leading businesses to reduce output.

#### Inventory Turnover and Dead Stock

Inventory turnover is an especially important piece of data for maximizing efficiency in the sale of perishable and other time-sensitive goods. Examples include groceries, fashion, autos, and periodicals.

An overabundance of cashmere sweaters, for instance, may lead to unsold inventory and lost profits, especially as seasons change and retailers restock accordingly. Such unsold stock is known as obsolete inventory, or dead stock.

#### Example of an Inventory Turnover Calculation *Walmart Inc. (WMT)*

For fiscal year 2022, Walmart Inc. reported cost of sales of \$429 billion and year-end inventory of \$56.5 billion, up from \$44.9 billion a year earlier.

Walmart's inventory turnover ratio for the year was:

$\$429 \text{ billion} \div [(\$56.5 \text{ billion} + \$44.9 \text{ billion})/2]$ , or about 8.5

Its days inventory equaled:

$(365 \div 8.5)$ , or about 42 days

This showed that Walmart turned over its inventory every 42 days on average during the year.

## Part 2. Liquidity and Working Capital



Consider all of the assets you own. Some things you own such as your nicest shirt or food in your refrigerator might be able to sold quickly. Others such as a rare collectible coin or custom painting of your family may be a bit more difficult. The relative ease in which things can be bought or sold is referred to as liquidity.

Financial liquidity impacts individuals, companies, and financial markets. As each group attempts to buy and sell things, it's crucial to understand what financial liquidity is, how to measure it, and why it is important.

#### Understanding Financial Liquidity

Assets like stocks and bonds are very liquid since they can be converted to cash within days. However, large assets such as property, plant, and equipment are not as easily converted to cash. For example, your checking account is liquid, but if you owned land and needed to sell it, it may take weeks or months to liquidate it, making it less liquid.

Before investing in any asset, it's important to keep in mind the asset's liquidity levels since it could be difficult or take time to convert back into cash. Of course, other than selling an asset, cash can be obtained by borrowing against an asset. For example, banks lend money to companies, taking the companies' assets as collateral to protect the bank from default. The company receives cash but must pay back the original loan amount plus interest to the bank.

*Liquidity* – ability to convert assets into cash or to obtain cash to meet short-term obligations.

#### Short-term – conventionally viewed as a period up to one year.

- ✓ Financial liquidity refers to how easily assets can be converted into cash.
- ✓ Cash, public stock, inventory, and some receivables are considered more liquid as a company or individual can expect to convert these to cash in the short-term.
- ✓ Long-term fixed assets or private securities are harder to sell, making them illiquid.
- ✓ A company can gauge its liquidity by calculating its current ratio, quick ratio, or operating cash flow ratio.
- ✓ Liquidity is important as it indicates whether there will be the short-term inability to satisfy debts or make agreements whole.

#### What Is Working Capital?

Working capital, also known as net working capital (NWC), is the difference between a company's current assets—such as cash, accounts receivable/customers' unpaid bills, and inventories of raw materials and finished goods – and its current liabilities, such as accounts payable and debts. It's a commonly used measurement to gauge the short-term health of an organization.

- ✓ Working capital, also called net working capital, represents the difference between a company's current assets and current liabilities.
- ✓ Working capital is a measure of a company's liquidity and short-term financial health.
- ✓ A company has negative working capital if its ratio of current assets to liabilities is less than one (or if it has more current liabilities than current assets).

- ✓ Positive working capital indicates that a company can fund its current operations and invest in future activities and growth.
- ✓ High working capital isn't always a good thing. It might indicate that the business has too much inventory, not investing its excess cash, or not capitalizing on low-expense debt opportunities.

**Current Assets** - Cash and other assets reasonably expected to be (1) realized in cash, or (2) sold or consumed, during the longer of one-year or the operating cycle.

**Current liabilities** - Obligations to be satisfied within a relatively short period, usually a year.

**Working Capital** - Excess of current assets over current liabilities

Widely used measure of short-term liquidity

Constraint for technical default in many debt agreements

**Current Ratio** – Ratio of Current Assets to Current Liabilities

Relevant measure of current liability coverage, buffer against losses, reserve of liquid funds.

Limitations – A static measure

Limitations of Working Capital

Working capital can be very insightful to determine a company's short-term health. However, there are some downsides to the calculation that make the metric sometimes misleading.

First, working capital is always changing. If a company is fully operating, it's likely that several – if not most – current asset and current liability accounts will change. Therefore, by the time financial information is accumulated, it's likely that the working capital position of the company has already changed.

Working capital fails to consider the specific types of underlying accounts. For example, imagine a company whose current assets are 100% in accounts receivable. Though the company may have positive working capital, its financial health depends on whether its customers will pay and whether the business can come up with short-term cash.

On a similar note, assets can quickly become devalued. Accounts receivable balances may lose value if a top customer files for bankruptcy. Inventory is at-risk of obsolescence or theft. Physical cash is also at risk of theft. Therefore, a company's working capital may change simply based on forces outside of its control.

Last, working capital assumes all debt obligations are known. In mergers or very fast-paced companies, agreements can be missed or invoices can be processed incorrectly. Working capital relies heavily on correct accounting practices, especially surrounding internal control and safeguarding of assets.

Example of Working Capital

At the end of 2021, Microsoft (MSFT) reported \$174.2 billion of current assets. This included cash, cash equivalents, short-term investments, accounts receivable, inventory, and other current assets.<sup>1</sup>

The company also reported \$77.5 billion of current liabilities comprised of accounts payable, current portions of long-term debts, accrued compensation, short-term income taxes, short-term unearned revenue, and other current liabilities.

Therefore, at the end of 2021, Microsoft's working capital metric was \$96.7 billion. If Microsoft were to liquidate all short-term assets and extinguish all short-term debts, it would have almost \$100 billion of cash remaining on hand.

Another way to review this example is by comparing working capital to current assets or current liabilities. For example, Microsoft's working capital of \$96.7 billion is greater than its current liabilities. Therefore, the company would be able to pay every single current debt twice and still have money left over.

### *Why Is Working Capital Important?*

Working capital is important because it is necessary for businesses to remain solvent. In theory, a business could become bankrupt even if it is profitable. After all, a business cannot rely on paper profits to pay its bills—those bills need to be paid in cash readily in hand. Say a company has accumulated \$1 million in cash due to its previous years' retained earnings. If the company were to invest all \$1 million at once, it could find itself with insufficient current

### Financial Liquidity By Asset Class

*Cash* is the most liquid asset, and companies may also hold very short-term investments that are considered cash equivalents that are also extremely liquid. Companies often have other short-term receivables that may convert to cash quickly. Unsold inventory on hand is often converted to money during the normal course of operations. Companies may also have obligations due from customers they've issued a credit to.

Some investments are easily converted to cash like public stocks and bonds. Since stocks and bonds have public exchanges with continual pricing, they're often referred to as liquid assets.

Other investment assets that take longer to convert to cash might include preferred or restricted shares, which usually have covenants dictating how and when they can be sold. In addition, specific types of investments may not have robust markets or a large group of interested investors to acquire the investment. Consider private shares of stock that cannot easily be exchanged by logging into your online brokerage account.

Coins, stamps, art and other collectibles are less liquid than cash if the investor wants full value for the items. For example, if an investor was to sell to another collector, they might get full value if they wait for the right buyer. However, because of the specialized market for collectibles, it might take time to match the right buyer to the right seller.

Land, real estate, or buildings are considered among the least liquid assets because it could take weeks or months to sell them. Fixed assets often entail a lengthy sale process inclusive of legal documents and reporting requirements. Compared to public stock that can often be sold in an instant, these types of assets simply take longer and are illiquid.

### **Part 3. Rationing of working capital**

Working capital can be permanent (need-based) and temporary. Permanent working capital is the minimum level of financial resources that is continuously required by a firm to carry out its production activities and efficient usage of the enterprise's potential. If this standard is set too low, the enterprise will not be able to provide the production with necessary materials, pay suppliers and employees in due time. Working capital standards being overestimated may result in production and sales disruptions. Excess of the standard leads to overstocking, freezing of funds, which results in losses.

Assessment aims the enterprise's WC rationalization. There is no constant WC value. It depends on the scale of operations, goods production lead time, material assets' elements reserves figure. In the process of assessment, ratios and standards are established. Ratios – value corresponding to the stock volume of each WC element. It may be measured in stocking days and means the length of the period provided by this type of material assets. Standards – expressed in monetary terms and based on this type of material assets' stock ratios and daily average consumption. Calculation of manufacturing inventory. Depending on the functions performed, there are three types of inventories: Current; Insurance; Technological (preparative). All of them are assessed in natural form, but measured in monetary terms.

Current (carryover) inventory shall cover the enterprise's needs of resources between regular supplies. Varies from minimum up to maximum. It reaches a maximum at supply moment, and then declines to the minimum by the time of the next supply.

Insurance (guarantee) inventory created in case of unexpected deviations from target dates or size of the supply lot, and violations of the planned materials consumption.

Technological inventory created on the period when materials are being prepared for the production, which includes time for analysis and laboratory tests. It is included in general ratio calculations when it is not an integral part of the production process.

#### **What Is Capital Rationing?**

Capital rationing is the process through which companies decide how to allocate their capital among different projects, given that their resources are not limitless. The main goal is to maximize the return on their investment.

- ✓ Capital rationing is a process that companies use to decide which investment opportunities make the most sense for them to pursue.
- ✓ The typical goal of capital rationing is to direct a company's limited capital resources to the projects that are likely to be the most profitable.
- ✓ Hard capital rationing refers to restraints put on a company by outside entities, such as banks or other lenders.
- ✓ Soft capital rationing results from a company's own policies relating to how it wants to use its capital.

## Two Types of Capital Rationing

There are two primary types of capital rationing, referred to as hard and soft:

**1) Hard capital rationing** occurs based on external factors. For example, the company may be finding it difficult to raise additional capital, either through equity or debt. Or, its lenders may impose rules on how it can use its capital. These situations will limit the company's ability to invest in future projects and may even mean that it must reduce spending on current ones.

**2) Soft capital rationing**, also known as internal rationing, is based on the internal policies of the company. A fiscally conservative company, for example, may require a particularly high projected return on its capital before it will get involved in a project – in effect, self-imposing capital rationing.

An example of determining the standard for stocks in production (work in progress):

Determine the standard of working capital in work in progress with the following data: annual output 72000 pieces, duration of the production cycle 2days, cost of manufacturing a unit of production \$ 10, material costs \$ 6.

1. Let's determine the coefficient of increase in costs:

$$k_{i.c.} = \frac{6 + 10}{2 \cdot 10} = 0.8$$

2. Determine the standard of working capital in work in progress:

$$S_{wc} = \frac{72,000}{365} \cdot 2 \cdot 10 \cdot 0.8 = \$ 3,156.16$$

This means that the company must have \$10 to produce 72,000 parts per year.

\* 365 –number of days in a year.

## TOPIC 6. MANPOWER

### Part 1. Manpower of the enterprise: definition, classification, brief description

The labor resources or manpower of an enterprise are the main resource of each enterprise, the results of the production activity of an enterprise largely depend on the quality of selection and utilization efficiency of which. At the level of an individual enterprise, instead of the term "labor, resources," the terms "personnel" and "personnel" are often used.

Under the **manpower** of the enterprise, it is commonly understood the main (staff) composition of employees of the enterprise. Depending on the functions they perform, the personnel of the enterprise are divided into the following categories: main and auxiliary workers; leaders; specialists; employees. These workers form (at manufacturing enterprises) industrial production personnel (IPP).

Each category of workers in its composition includes a number of professions, which in turn are represented by groups of specialties. Inside the specialty of workers can be divided by skill level.

**A profession** is a set of special theoretical knowledge and practical skills necessary to perform a certain type of work in any industry.

**A specialty** is a type of activity within a given profession that has specific features and requires special knowledge and skills from employees.

**Qualification** is a set of knowledge and practical skills that allow you to perform work of a certain complexity.

By skill level, workers can be divided into: unskilled, low-skilled, skilled and highly skilled. The qualification of workers is determined by the ranks.

Managers are distributed among management structures and management units. According to the management structures, managers are divided into linear and functional, according to the management links - into higher, middle and lower levels.

**Specialists** are workers engaged in engineering, economic and economic work: engineers, economists, accountants, legal advisers, etc.

**Employees** are employees who prepare and execute documentation, accounting and control, and business services: clerks, cashiers, timekeepers, accountants, etc.

The ratio of the listed categories of workers in their total number, expressed as a percentage, is called **the structure of personnel**. The personnel structure can also be determined by age, sex, level of education, work experience, qualifications and other characteristics.

In the practice of accounting and planning personnel distinguish recruiting, list and average composition.

**The qualifying structure** is the minimum required number of employees who have to come to work every day to complete the task on time.

**The list of staff** - all permanent and temporary workers listed on the company, both performing at the moment of work, and being on regular holidays, business trips, performing state duties, who did not appear for work due to illness or for any other reasons. The list number of employees can be set on a specific date.

**The average composition** is determined by summing up the list of employees for all calendar days of the period, including weekends and holidays, and dividing the amount received by the full calendar number of days in the period.

## **Part 2. The manpower structure of the enterprise**

It is known that the main factors of production in an enterprise are: means of labor, objects of labor and personnel.

The main role belongs to the personnel potential in the enterprise. It is the cadres who play the first violin in the production process, it depends on them how effectively the means of production are used in the enterprise and how successfully the enterprise as a whole works. Therefore, each company should develop and implement personnel policy.

Personnel policy should be aimed at achieving the following goals:

- ✓ creating a healthy and efficient team;
- ✓ raising the level of skills of employees;
- ✓ creating a workforce that is optimal in terms of sex and age structure, as well as in terms of qualifications;
- ✓ creation of a highly professional management team able to flexibly respond to changing circumstances, feel and implement everything new and advanced and able to look far ahead.

Personnel policy at the enterprise includes:

- ✓ selection and promotion of personnel;
- ✓ personnel training and their continuous training;
- ✓ hiring workers in part-time employment;
- ✓ placement of workers in accordance with the existing production system;
- ✓ stimulation of labor;
- ✓ improving the organization of labor;
- ✓ creation of favorable working conditions for employees of the enterprise, etc.

It should be noted that personnel management is an integral part of the management of the enterprise as a whole.

The process of enterprise management can be divided into the following components: management of equipment, economics, personnel.

If the first two components of the management process for a specialist are not particularly difficult, then the most difficult is personnel management. This is due to the fact that each member of the workforce has its potential work opportunities, its own

character traits, in its plan it is unique. Therefore, managers at various levels are required to know the psychology of each employee subordinate to them and, on this basis, act on him so that his potential abilities at work are fully revealed and realized.

For the analysis, planning, accounting and personnel management, all employees of the enterprise are classified according to a number of signs. Depending on the participation in the production process, the entire personnel of the enterprise is divided into two categories: industrial production personnel (IPP) and non-industrial.

**To industrial production personnel** are employees who are directly related to the production and maintenance.

**Non-industrial personnel** include employees who are not directly related to production and maintenance. These are mainly workers of the housing and communal services, children's and medical-sanitary institutions belonging to the enterprise.

In turn, industrial production personnel, depending on the functions they perform, are classified into the following categories: workers; leaders; specialists; employees.

**Workers** are employees of an enterprise who are directly involved in the creation of wealth or the provision of industrial and transportation services. Workers, in turn, are subdivided into main ones in auxiliary ones. The main ones are workers who are directly related to the production of products, to the subsidiary ones – production services. This division is purely conditional, and in practice it is sometimes difficult to distinguish between them.

**The specialists** at the enterprise include: accountants, economists, technicians, mechanics, psychologists, sociologists, artists, commodity scientists, technologists, etc.

**Employees** in the company include: supply agents, typists, secretary-typists, cashiers, clerks, timekeepers, freight forwarders, etc.

In addition to the generally accepted classification of PPP by category, there are classifications within each category. For example, managers in production, depending on the teams they lead, can be divided into linear and functional. Linear managers include the heads of the teams of production departments, enterprises, associations, industries, and their deputies; to functional – heads, heads of functional services groups (departments, departments), and their deputies.

According to the level occupied in the general system of management of the national economy, all managers are subdivided into: managers of the lower level, middle and upper level.

Masters, senior craftsmen, foremen, heads of small workshops, as well as heads of divisions within functional departments and services are usually referred to as **lower-level managers**.

**The middle managers** are the directors of enterprises, general directors of various associations and their deputies, heads of large workshops.

**Top executives** usually include general directors of large associations, heads of functional departments of ministries, departments and their deputies.



By science and practice it has long been established that the efficiency of the enterprise's work at 70-80% depends on its head. It is the manager who selects the team for himself and determines the personnel policy at the enterprise. Much depends on how he does it. If the company does not have a long-term plan for the development of the enterprise, if there is no strategy for the long and short term, then all this is not in the head of the manager either. In this case, consider that the enterprise has a bad future. Therefore, at every enterprise, the main pivot in personnel policy should be the selection and placement of managers at various levels in the first place.

The efficiency of the use of labor in an enterprise to a certain extent depends on the structure of the enterprise's personnel - the composition of personnel by category and their share in the total number.

The structure of the IPP is influenced by the following factors:

- ✓ the level of mechanization and automation of production;
- ✓ type of production (single, small batch, large batch, mass);
- ✓ size of the enterprise;
- ✓ organizational and legal form of management;
- ✓ complexity and knowledge-intensiveness of products;
- ✓ industry sector of the enterprise, etc.

Personnel policy at the enterprise should be aimed at the optimal combination of categories of IPP.

The process of personnel management requires that at each enterprise the structure of RFP is determined and analyzed by sex and age composition, as well as by level of qualification. This is necessary in order to prepare the replacement of personnel in a timely manner, as well as to achieve the structure of personnel most acceptable to the enterprise by sex and age composition, by skill level.

### **Part 3. Staff turnover**

It is unlikely that anyone will argue that the staff turnover negatively affects the work of the enterprise, does not allow the team to form, and therefore the corporate spirit, which invariably entails a decrease in production indicators and work efficiency.

What are the causes of staff turnover, how to deal with it, and is it always necessary to do this?

To begin with, we define the term staff turnover:

**Staff turnover** is the movement of labor caused by employee dissatisfaction with the workplace or organization dissatisfaction with a specific employee.

Fluidity can be:

- Intra-organizational – associated with labor movements within the organization;
- External – between organizations, industries and sectors of the economy.

Distinguish between natural and excessive employee turnover. How to understand the natural or excessive staff turnover in your enterprise?

**Staff turnover rate** – the ratio of the number of laid-off employees of an enterprise who retired during a given period for reasons of turnover (of their own accord, absenteeism, violation of safety, unauthorized care, etc., not caused by production or national need) to the average payroll number same period.

Natural turnover (3-5% per year) contributes to the timely renewal of the team and does not require special measures from management and personnel service.

Excessive turnover causes significant economic losses, and also creates organizational, human, technological, and psychological difficulties.

Excessive staff turnover, according to Western psychological research, adversely affects the morale of the remaining employees, their work motivation and commitment to the organization. With the departure of employees, the existing connections in the workforce are falling apart, and turnover can become avalanche-like. In recent years, Russian enterprises often have cases of “care by departments” when established working groups, due to the same motivation and established contacts, prefer to transfer to another organization as a whole.

In this way:

- staff turnover affects the productivity of not only those workers who intend to leave, but also those who continue to work, that is, on the life of the entire organization;
- turnover prevents from creating an efficiently working team, negatively influences the corporate culture of the organization.

Despite the urgency of this problem in many organizations, “staff retention programs” are still rare.

The fluidity of staff does not arise from scratch, she always says to the competent manager that something in his “business kingdom” is amiss. What are the causes of staff turnover in an enterprise, why do people leave, why do they leave as if unexpectedly or massively?

The main and main reasons for staff care are as follows:

- ✓ uncompetitive payment rates;
- ✓ unfair pay structure;
- ✓ unstable earnings;
- ✓ long or inconvenient opening hours;
- ✓ poor working conditions;
- ✓ despotic or unpleasant leadership;
- ✓ problems with travel to the place of work;
- ✓ lack of opportunities for promotion, training or advanced training, development of experience, career growth;
- ✓ work in which there is no special need;
- ✓ inefficient procedure for the selection and evaluation of candidates;
- ✓ inadequate recruitment measures (lack of control over adaptation);

- ✓ the changing image of the organization;
- ✓ work with staff on the principle of "juicer" (rigid structure);
- ✓ precedents abrupt dismissals and abrupt recruitment of personnel in the organization (hence the instability of the company).

Personnel of the enterprise are not a constant: some employees are dismissed, others are hired. In this regard, the employee turnover index (CT) is determined:

$$CT = \left( \frac{N_{l-off}}{ANE} \right) * 100, \quad (6.1)$$

where  $N_{l-off}$  – the number of retired or laid-off workers for a certain period, pers .;  
 ANE – the average number of employees for the same period, pers.

Typically, turnover indices are calculated per year, although sometimes quarterly turnover indices are also calculated, allowing for seasonal variations to be taken into account.

For the management of the company, it is important to know the reasons for the dismissal of employees. Personnel stability is the key to successful work of the enterprise. Voluntary layoffs in addition to financial losses exacerbate the organization's poor reputation.

For a comparative analysis of personnel, indicators such as the turnover ratio for reception, the turnover ratio for retirement, the replacement rate for the number of employees and others are used.

The turnover rate for admission is calculated as the ratio of the number of employees hired for a given period ( $P_e$ ) to the average number of employees (ANE) for the same period:

$$R_{t(a)} = \frac{P_e}{ANE}, \quad (6.2)$$

The turnover ratio for retirement is calculated as the ratio of the number of retired workers for a given period ( $P_r$ ) to the average number of employees (ANE) for the same period:

$$R_{t(r)} = \frac{P_r}{ANE}, \quad (6.3)$$

The replenishment rate of the number of employees is calculated as the ratio of the number of employees hired for a given period ( $P_e$ ) to the number of retired employees for the same period of ( $P_r$ ):

$$R_{rep} = \frac{P_e}{P_r}, \quad (6.4)$$

## Part 4. Wages

Wages are the remuneration of employees for work and its final results. The enterprise is obliged to pay employees wages not lower than the minimum level established by the state. There are tariff and non-tariff forms of wages. Tariff forms of wages are determined in accordance with the tariff system of the country. The tariff forms of wages include piecework and hourly wages. In addition to tariff forms, there are tariff-free forms, when wages are not tied to tariff coefficients, but are determined based on the share of the employee's labor participation in the overall result.

With a simple time wage, the worker's earnings are determined by the tariff rate of the category assigned to him and the amount of time actually worked. Salary is calculated according to the formula:

$$W_{st} = r_h \cdot N_h, \quad (6.5)$$

where  $r_h$  – hourly rate of a worker of the corresponding category;

$N_h$  – number of hours worked per month.

In accordance with the time-bonus payment, the worker, in addition to the basic pay, in accordance with the time worked and the tariff rates, receives a bonus for providing certain quantitative and qualitative indicators.

*Example. Calculate the wages of the worker according to the time-based wage system for the month. The worker has the 4th tariff category, the tariff coefficient of which is 1.36. The first class hourly rate, taking into account the increasing coefficient, is set at the enterprise in the amount of \$7, 168 hours worked per month.*

$$W_{st} = 7 \cdot 1.36 \cdot 168 = 168 = 1,599.36 \$$$

Under a simple piecework system, the worker's earnings directly depend on his output. Wages are calculated in accordance with the quantity of products produced at constant piece rates, which increases the interest of workers in increasing individual labor productivity. Earnings are calculated according to the formula:

$$W_{sp} = p_u \cdot N_p, \quad (6.5)$$

where  $p_u$  – unit price;

$N_p$  – the number of actually manufactured products, pcs.

The piece-bonus system provides for the payment to the worker, in addition to piecework wages calculated at rates, of bonuses for achieving established individual or collective (quantitative or qualitative) indicators.

*Example. Determine the employee's monthly salary according to the piecework wage system. The standard time for the manufacture of the part is 40 minutes. The work is charged according to the 5th category, the tariff coefficient of which is 1.51. The hourly tariff rate of the first category, taking into account the multiplying factor, is set at the enterprise in the amount of \$ 7. The worker produced 300 parts per month.*

$$W_{sp} = 7 \cdot 1.51 \cdot \frac{40}{60} \cdot 300 = 2,114 \$$$

For specialists, employees and managers, a system of official salaries is used. Official salary – the absolute amount of wages, established in accordance with the position held. The work of managers is evaluated according to the results of the work of the entire team, according to the degree of fulfillment of the functions assigned to them, the level of labor organization achieved. And the work of specialists and employees - based on the volume, completeness, quality and timeliness of the performance of official duties. Bonuses are accrued for the main results of economic activity.

The main indicator of the use of labor is its **productivity**. Measurement of labor productivity is carried out by comparing the results of labor in the form of the volume of output with labor costs. Labor productivity is the most important economic indicator, which serves to determine the effectiveness of labor activity of both an individual employee and an enterprise team.

**Labor productivity** is defined as the ratio of output, expressed in monetary units, to the number of employees, the cost of working time or the wage fund.

Growth in labor productivity is measured by the change in economic output per labor hour over a defined period. Labor productivity should not be confused with employee productivity, which is a measure of an individual worker's output.

For example, suppose the real GDP of an economy is \$10 trillion and the aggregate hours of labor in the country is 300 billion. The labor productivity would be \$10 trillion divided by 300 billion, equaling about \$33 per labor hour. If the real GDP of the same economy grows to \$20 trillion the next year and its labor hours increase to 350 billion, the economy's growth in labor productivity would be 72 percent.

The growth number is derived by dividing the new real GDP of \$57 by the previous real GDP of \$33. Growth in this labor productivity number can sometimes be interpreted as improved standards of living in the country, assuming it keeps pace with labor's share of total income.

## TOPIC 7. PRODUCTION PROGRAM AND PRODUCTION CAPACITY OF THE ENTERPRISE

### Part 1. The concept and indicators of production program

Production Program means any program based on a feasibility report contemplating the achievement of commercial production. Production Program means all approved work plans and budgets for production operations on the property.

The production program is a system of planned targets for the production of products of the established nomenclature, assortment and quality, designed to meet various needs. When developing a production program, enterprises use natural, conditionally natural, labor and cost methods of measurement. They allow you to plan, record and control the cost, sales volumes, nomenclature, assortment, labor intensity of products.

Natural meters (pieces, tons, meters, etc.) characterize the production specialization of the enterprise and its market share. Based on the unit of production, technological norms for the consumption of raw materials, energy, working hours are established, and the cost of the product (service) is also calculated. Labor meters (hours and minutes of working time) are used in intra-production planning to assess the labor intensity of a unit of output and the production program. Labor intensity is the most common indicator.

Cost meters of the production program are used simultaneously with natural and labor. They reflect the volume of products (services) produced. The unit of measurement is the national currency. To characterize exports, the currency of other countries, for example, the US dollar, the euro, can be used.

In monetary terms, such indicators as sales volume (sold products), commercial and gross output, net and conditionally net output, normative net output, gross and intra-production turnover, standard processing cost are calculated.

**The volume of sales** or sold products is a general indicator of the production program of the enterprise.

**Gross output** characterizes the entire volume of work performed by the enterprise for a certain period of time (month, quarter, year). The composition of gross output includes both finished and unfinished products, the so-called work in progress.

**Marketable (commercial) output** is the value of finished products obtained as a result of the enterprise's production activities, completed works and services intended for sale to the outside.

$$GO = MO + \Delta WinP, \quad (7.1)$$

where MO – marketable (commercial) output;

WinP – leftover work in progress.

*Example. The commercial output of the enterprise for the year amounted to \$ 1,000,000. The balance of work in progress at the end of the period amounted to \$ 300,000, at the beginning of \$ 100,000.*

$$GO = 1,000,000 + (300,000 - 100,000) = 1,200,000 \$$$

Gross output represents, roughly speaking, the total value of sales by producing enterprises (their turnover) in an accounting period (e.g. a quarter or a year), before subtracting the value of intermediate goods used up in production

Sales volume is the value of goods and services produced and sold by the enterprise for a certain period of time.

$$MO = SV(SP) + \Delta FP, \quad (7.2)$$

where  $SV(SP)$  – sales volume or sold products;

FP – finished products.

Gross turnover is the sum of the cost of production of all departments of the enterprise.

## **Part 2. The concept and calculation of the production capacity of the enterprise**

**Production capacity** is the output a business process can produce in a given time with finite resources under expected and normal conditions. Production Capacity is like the maximum potential of a business to produce finished goods with available budget and raw materials or inputs. It can be calculated over a period of time like a week, days, or months even.

*Product Capacity is usually referred to in units of finished goods produced by it. e.g. 5000 chairs in a month or 50000 clips in a week etc.*

**Production capacity** depends on a number of factors. The most important of them are as follows:

- ✓ quantity and productivity of equipment;
- ✓ high-quality equipment, the level of physical and moral wear and tear;
- ✓ the degree of progressiveness of machinery and production technology;
- ✓ quality of raw materials, timeliness of their deliveries;
- ✓ level of specialization of the enterprise;
- ✓ level of organization of production and labor.

In the natural measurement of production capacity, output is determined for each item.

The **total production** capacity of the enterprise producing various product names is measured at cost. The production capacity of the enterprise is determined by the capacity of the leading production units, workshops, sections, units.

Production Capacity is very important while designing a business process. It determines how much production a business anticipates to be sold for next few years or months. According to that, one buys raw materials, equipment and other inputs so that the production capacity meets the demand.

If a business invests too much into production capacity and the demand in the market is less then a lot of produced inventory can go waste. If the business doesn't use

the planned capacity, then the business is losing the money it invested in building the capacity. There are lot of factors which determine the production capacity. It is how you manage your raw materials, employees, time and storage in a efficient way to equalize demand. Decisions in such cases takes time and depends upon a lot of factors such as:

1. Raw materials which would be used to produce the finished goods
2. Labor which will be working to support the machinery and make the products
3. Warehouse for Storing the intermediate or finished goods to make sure that the inventory is well maintained.
4. Equipment and Machinery including their maintenance and downtime
5. Scheduling e.g. 8 hours a day or 24 hrs a day
6. Business Conditions
7. Delivery Timeliness
8. Required Output

The average annual production capacity is defined as:

(Production capacity at the beginning of the year) + (Average annual capacity of the equipment introduced during the year) – (Average annual capacity of the equipment removed during the year).

This enables companies to calculate the production capacity.

Production capacity is defined as:

(Machine-hours capacity x 60minutes) x (Efficiency factor (labor performance)) / (Individual product's standard allowed minute (SAM))

Thus the production capacity of a single workplace, unit, group of equipment (for example, a separate machine), if several different products are assigned to them, is determined by the representative product or by the standard set of products according to the following formula:

$$PC = \frac{F_a \cdot n \cdot l_p}{\sum L_i}, \quad (7.3)$$

where  $F_a$  – is the annual real fund of the operating time of a unit of equipment under the adopted regime;

$n$  – is the number of pieces of equipment, pcs .;

$l_p$  – labor performance.

$\sum L_i$  – labor intensity of a standard set of products processed at a given workplace, hour.

The level of use of production capacity depends on the load and the actual shift of equipment, i.e. the higher the utilization rate of equipment over time, the higher the level of utilization of production capacity. Therefore, simultaneously with the calculation of the production capacity of certain groups of equipment and jobs, their load is calculated (load factor):



$$L_f = \frac{\sum_{i=1}^n N_i \cdot t_i}{60 \cdot F_a \cdot n \cdot l_p}, \quad (7.4)$$

where  $N_i$  – is the number of items processed on a separate group of equipment, pcs;

$t_i$  – SAM;

$N_i$  - the number of products of the  $i$ -th name, pcs;

$n$  – the number of units of equipment of one group, pcs.

Increasing the level of use of existing production capacities allows obtaining more products without attracting additional capital investments, and, consequently, reducing the need to create new capacities. Better use of production capacities helps to reduce the cost of products, increase profits as a result of an increase in output, reduce capital intensity of products and increase production profitability.

#### *Finding the capacity utilization rate*

Once both production capacity and actual output are measured, calculating another important manufacturing KPI – the capacity utilization rate is possible. This KPI shows how much of a company’s installed production capacity is being utilized, or in other words, what percentage of maximum capacity the manufacturing process is operating at.

The capacity utilization rate is calculated by dividing the actual capacity by the production capacity and multiplying the result by 100 to obtain a percentage.

$$\text{Capacity utilization} = (\text{Actual output level} / \text{Production capacity}) \times 100\%$$

The capacity utilization rate is great for assessing the production plant’s operational efficiency and the costs and pricing of products. Generally, a capacity utilization rate of around 85% is considered optimal – a higher rate can lead to diminished returns due to accelerated workstation depreciation or the inability to respond to sudden demand surges. Generally, the higher the capacity utilization rate, the lower the cost per unit, and the greater the profit margin.

#### *Example of Production Capacity*

1. Assuming a factory produces beverages in 500 ml bottles. Now there are two types of machines in the factory. The first set of machines make glass bottles and another set of machines make the drinks and fills in the bottle.

Both these machines need to work in synchronization. If there is not enough glass bottles, beverage will go waste and vice versa.

Let us assume machines can run for 15 hours a day.

The first machine can make 10 bottles a minute. In 15 hours it can make  $15 \times 60 \times 10$  bottles which 9000 but the second machine can make only 1000 ml beverage in 1 minute so in 15 hours it can make  $1000 \text{ml} \times 15 \times 60$  which is 900000 ml of beverage.

Now for a 500 ml bottle with 900000 ml, the business can fill 1800 bottles only which can defined as the production capacity but now business has to decide either to reduce the bottles making capacity or increase the beverage making capacity.

Also the market demand needs to be judged to make sure how to finetune the production capacity.

2. Suppose a factory has 8 sewing lines and each line has 25 machines. Total 200 machines and the working shift is 10 hours per day. The total factory capacity per day is 2,000 hours (200 machines \* 10 hours). If the factory is producing only one style (Shirt) of Standard Allowed Minute (SAM) 25 minutes and used all 200 machines daily production capacity at 50%

$$\begin{aligned}
 &= (2000*60/25)*50\% \text{ Pieces} \\
 &= (2000*60*50) / (25*100) \text{ Pieces} \\
 &= (6000000/2500) \text{ Pieces} \\
 &= 2400 \text{ Pieces}
 \end{aligned}$$

Table-7.1: Production capacity calculation template

Numer of total machines	Shift hours	Product SAM	Average line efficiency, %	Production capacity
200	10	25	50	2,400

*Production capacity planning considerations*

To get a more realistic idea of available capacities that consider more constraints and externalities, and especially if a company produces a mix of goods, a more comprehensive approach to production capacity planning is needed.

Practically speaking, the more constraints it is possible to account for, the more accurate the production capacity metric will be, which will allow for more precise production planning and scheduling. Examples of constraints include changeover and downtimes, worker leave and holidays, space and transportation, and any other bottlenecks that affect output.

To get a realistic overview of capacity, manufacturing needs to be broken down into the sequence of operations, workstation availability, setup times, material availability, supplier lead times, as well as any other details that may affect the schedule. Bearing in mind, that a typical plant needs to simultaneously handle multiple instances of these production processes for a number of different products.

What’s more, it’s also important to factor in the rate of efficiency of the manufacturing line. One way to do it is by measuring the Overall Equipment Effectiveness (OEE) KPI, which factors in the rate of defects, performance losses, etc., however, there are many other methods available.

Now that you understand production capacity and how it works, let’s look at some effective strategies to improve productivity and increase output.

- ✓ **Invest in accurate production planning and scheduling:** This is crucial for getting a handle on lead times and ensuring that your production process runs smoothly.
- ✓ **Use data to improve decision-making:** Data can help you understand which areas of your operation are most efficient and where there is room for improvement.

- ✓ **Implement lean manufacturing principles:** Lean manufacturing is designed to minimize waste and maximize efficiency.
- ✓ **Streamline your production process:** Simplifying your production process can help you increase output and reduce costs.
- ✓ **Invest in technology:** Technology can automate various tasks in your manufacturing operation, freeing employees to focus on more important tasks.
- ✓ **Add more work shifts:** A manufacturing business typically operates one shift per day. However, adding additional shifts can help you increase production capacity without investing in machines or hiring more employees.
- ✓ **Outsource production:** There will be times when your operation is at capacity and you cannot produce more products. In these cases, outsourcing production can be a viable option. Doing so will help you meet customer demand without investing in more machinery or personnel.
- ✓ **Adopt lean manufacturing practices:** Lean manufacturing is designed to minimize waste and maximize efficiency. This can help you improve productivity and increase output.

Knowing the production capacity makes a world of difference for any manufacturer. By understanding what it is and how to calculate it, he can set the company up for success.

## **TOPIC 8. PRODUCTION COSTS: WHAT THEY ARE AND HOW TO CALCULATE THEM**

### **Part 1. What Are Production Costs?**

Production costs refer to all of the direct and indirect costs businesses face from manufacturing a product or providing a service. Production costs can include a variety of expenses, such as labor, raw materials, consumable manufacturing supplies, and general overhead.

- ✓ Production costs refer to the costs a company incurs from manufacturing a product or providing a service that generates revenue for the company.
- ✓ Production costs can include a variety of expenses, such as labor, raw materials, consumable manufacturing supplies, and general overhead.
- ✓ Total product costs can be determined by adding together the total direct materials and labor costs as well as the total manufacturing overhead costs.

Cost of production reflects all the costs that a business pays that are associated with manufacturing a product or providing a service. These costs include both direct and indirect business costs; direct costs are connected to the product, while indirect costs involve the maintenance and running of the company.

For an expense to be listed as a production cost, it has to be incurred while producing the product or service for sale. A manufacturer, for example, may include raw materials, machinery, labor, and rent in its production costs. On the other hand, a software company may list software licenses, third-party applications, web or application hosting, and labor.

These expenses naturally impact a business' pricing structure, cash flow, and resulting profit or loss. All else remaining the same, an increase in production cost means a decrease in the amount of cash you have on hand.

Decreased production costs, however, don't automatically lead to more profit in the long run. Cutting on expenses like labor or raw materials may also result in lower-quality products and services.

The ability to balance production costs with the projected revenue generated by those products and services is a key to success for any business.

Taxes levied by the government or royalties owed by natural resource-extraction companies are also treated as production costs. Once a product is finished, the company records the product's value as an asset in its financial statements until the product is sold. Recording a finished product as an asset serves to fulfill the company's reporting requirements and inform shareholders.

Total product costs can be determined by adding together the total direct materials and labor costs as well as the total manufacturing overhead costs. Data like the cost of production per unit can help a business set an appropriate sales price for the finished item.

To arrive at the cost of production per unit, production costs are divided by the number of units manufactured in the period covered by those costs. To break even, the sales price must cover the cost per unit. Prices that are greater than the cost per unit result in profits, whereas prices that are less than the cost per unit result in losses.

## **Part 2. Five types of production costs**

While the exact expenses depend on the business and industry, there are five main types of production costs:

### **1. Fixed costs**

Fixed costs (also referred to as overhead or indirect costs) remain the same, regardless of how many products or services a business produces.

They are not dependent on production volume but are usually recurring and time-based. Examples of fixed costs are monthly salaries or rent.

### **2. Variable costs**

Variable costs are expenses that change in direct proportion to any changes in production. They increase when production volume rises and decrease when production volume falls. Examples of variable costs are raw materials, packaging, or shipping costs.

### **3. Total cost**

Total cost is the sum of both fixed and variable costs accrued during production. In other words, it's the total cost of production and changes according to production volume.

### **4. Average cost**

Average cost is the total cost of production divided by the total unit of output.

The average cost (or unit cost) is how much it costs a business to produce a single unit and helps determine its selling price.

### **5. Marginal cost**

Marginal cost is the incremental increase in total cost when one additional unit is produced.

As fixed costs aren't changed by production volume, marginal costs mostly have to do with variable costs.

Calculating marginal costs helps a business determine its optimal level of production. When the marginal cost to produce one additional unit is lower than the average cost-per-unit, the business has reached economies of scale and an increased potential to maximize profit margins.

For an expense to qualify as a production cost it must be directly connected to generating revenue for the company. Manufacturers carry production costs related to the raw materials and labor needed to create their products. Service industries carry production costs related to the labor required to implement and deliver their service. Royalties owed by natural resource-extraction companies also are treated as production costs, as are taxes levied by the government.

### **Part 3. How are production costs calculated?**

Production incurs both direct costs and indirect costs. Direct costs for manufacturing an automobile, for example, would be materials like plastic and metal, as well as workers' salaries. Indirect costs would include overhead such as rent and utility expenses. Total product costs can be determined by adding together the total direct materials and labor costs as well as the total manufacturing overhead costs. To determine the product cost per unit of product, divide this sum by the number of units manufactured in the period covered by those costs.

Production costs are calculated by adding together all the fixed costs and variable costs incurred while producing a product or service.

The formula for calculating total production costs is:

$$\mathbf{Fixed\ costs + Variable\ costs = Production\ cost}$$

Take, for example, a furniture manufacturer that makes patio sets. Its fixed costs include warehouse rent, equipment and asset depreciation, labor, utilities, and insurance, amounting to \$75,000 a month. Its variable costs for production that same month include raw materials, packaging, freight, and credit card processing fees, totaling \$100,000.

Its total production cost for the month is  $\$75,000 + \$100,000 = \$175,000$ .

The formula to calculate the average cost per unit is:

$$\mathbf{(\text{Fixed costs} + \text{Variable costs}) / \text{Total number of units produced} = \text{Production cost per unit}}$$

If our furniture manufacturer made 350 patio sets that month, its production cost per unit is  $\$175,000 / 350 = \$500$ .

**Note:** You can also calculate for average fixed costs or average variable fixed costs separately using the formulas below:

$$\mathbf{\text{Fixed costs} / \text{Total number of units produced} = \text{Average fixed cost}}$$

$$\mathbf{\text{Variable costs} / \text{Total number of units produced} = \text{Average variable cost}}$$

The formula for marginal cost is:

$$\mathbf{\text{Change in total cost} / \text{Change in quantity} = \text{Marginal cost}}$$

In the months before summer, the manufacturer sees a growth in demand for patio sets and increases production to 500 units a month. It hires two new employees and purchases more raw materials.

Its marginal cost per additional unit is:

$$(\$200,000 - 175,000) / (500 - 300) = \$125.$$

## **Part 4. Production costs vs. manufacturing costs**

It's easy to confuse production costs with manufacturing costs; both have to do with producing a product for sale.

The two calculations give businesses a clear picture of all their costs and help set the optimal price to ensure long-term profitability. But while production costs cover all the expenses of operating a business during production, manufacturing costs factor in only costs related to the product.

Manufacturing costs don't account for the standard fixed costs described in the previous sections. Instead, they look at the following three types of expenses:

**Direct material costs:** The expense for all the raw materials and other inventory types that directly go into the final product. Examples of direct material costs are fabric for apparel or aluminum and rubber for bicycles.

**Direct labor costs:** The salaries paid to anyone directly involved in making the product or service for sale. It's important to note that direct laborers are only those who actively work on the product, such as the engineer who designs a car, or a bottler of packaged beverages. Department managers or employees dedicated to repairing products are not included in direct labor costs.

**Manufacturing overhead costs:** All other indirect costs incurred during production are considered as part of overhead. In comparison, direct material and direct labor costs are tied to specific product units, overhead accounts for the manufacturing process as a whole.

Examples of manufacturing overhead costs are warehouse rent, utilities, equipment depreciation, and maintenance and repairs. It also includes the salaries of management or maintenance staff, but not salaries for any administrative, sales, or other business functions.

**Note:** Direct and variable costs sound similar, as they're expenses accrued during production. However, direct costs can also include fixed costs, such as labor and rent, while variable costs can also include indirect costs, like credit card fees and shipping.

## **Part 5. Best practices to control production costs**

An ongoing goal of every business is to reduce production costs without sacrificing the quality of their product or service.

There are several ways to do this, most of which require looking at previous numbers and assessing each step of the production process.

### *1. Keep track of production numbers*

Applying the production cost formulas will give a clear breakdown of what's being spent to get the product or service ready for customers.

It's best to calculate production costs at regular intervals (i.e., per quarter, per month, per season) so you can detect any changes in total expense and analyze its effect on business sales and profit.

### *2. Reduce cost of materials and supplies*

Raw materials and parts make up a significant percentage of production costs. And more often than not, suppliers are willing to negotiate favorable terms to retain a good client.

Ask about any available discounts in exchange for longer contracts, larger orders, or cash payments. It's also good to get quotes from other suppliers or consider testing alternative materials that don't compromise on quality.

### *3. Streamline the production process*

Review the steps and resources used to manufacture your product, talk to your production team, and look for opportunities to streamline the process. Check for tasks that seem overly time-consuming or unnecessary, and develop ways to improve or update workflows.

If needed, conduct ABC tests, measure improvement metrics such as production output or saved resources, and reassess any changes regularly.

### *4. Eliminate any unnecessary costs*

Are there any expenses you can cut that wouldn't make a big difference to the final product or service? For instance, many businesses spend heavily on packaging, which leads to heavier packages, higher shipping rates, and waste.

Other areas that can offer potential savings include consolidating deliveries, optimizing the quantity of on-hand inventory, and scheduling routine equipment maintenance to prevent malfunctions and downtime.

### *5. Leverage automation and software tools*

When it comes to repetitive tasks common to most business production, automation goes a long way in reducing labor and increasing efficiency.

Common areas of automation within production include processing orders, tracking shipments, managing resources, scheduling payroll, and the like. Business management software can also organize all production data on one platform and simplify data tracking throughout the business.

Production costs are at the core of every business, impacting its selection of suppliers and the type of products and prices it offers to customers.

Calculating production costs also informs strategic decision-making, revealing potential areas of improvement, whether a production change can achieve economies of scale and the best way to maximize profit.



## TOPIC 9. PRICING

### Part 1. Fundamentals of pricing

A product selling price is how much a customer pays for a product/service. Prices vary depending on how much customers are prepared to pay, the amount of money the seller is prepared to accept, and how competitive the price is when compared to other businesses.

The primary function of price should be considered measuring. Thanks to the price, it is possible to measure, determine the value of the goods, i.e. the amount of money that the buyer will give, and the seller will receive for the goods.

Prices are formed under the influence of two groups of factors - internal and external, which ultimately determine the ratio of supply and demand in the commodity market (Figure 9.1).

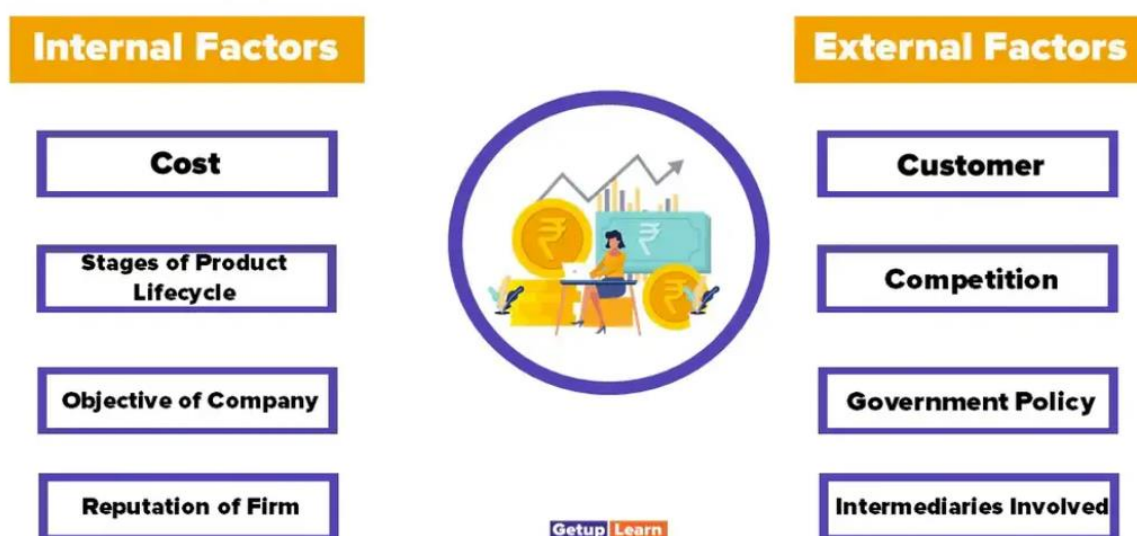


Fig. 9.1 – Internal and external pricing factors

Internal factors, i.e. factors of the microeconomic level, depend on the activities of the enterprise itself.

External or macroeconomic factors do not depend on the activities of the enterprise and take into account changes in general economic proportions, conditions in the country and abroad.

Following are the internal factors affecting pricing decisions:

1. Cost
2. Stages of Product Lifecycle
3. Objective of Company
4. Reputation of Firm
5. Advertising Expenditure
6. Credit Policy of Company

### Cost

Cost means all kinds of expenditures incurred by the company to manufacture products. There are various variables as well as the fixed costs incurred by the company to manufacture the product. Before fixing a price for any commodity it is necessary for the company to cover its variable as well as a fixed cost.

### Stages of Product Lifecycle

Every product has to pass on through various stages of the product lifecycle. The price of the product is also influenced by the stage at which the product is in.

At the introduction of the Product Company generally charge a lower price, during growth company charges a higher price whereas decline stage of the product Lifecycle Company again charges a lower price for its product.

### Objective of Company

The pricing policy of the company is also depending upon the objective of the company. If the company's objective is to capture market share then it will charge a lower price and if the objective of the company is to earn more ROI then it will charge a higher price for its products.

### Reputation of Firm

The goodwill of the company also affects its pricing policy of the company. If the company carries a good reputation in the market then it will help the company to higher prices for its products. Eg. Amul company charges a high price for its dairy products as it carries a good reputation in the market.

### Advertising Expenditure

Advertising and promotional expenditure incurred by the company also affect the pricing policy. If the expenditure of the company on these activities is more than the price charged by the company for products; will be higher and vice-versa.

### Credit Policy of Company

Every company gives a credit period to wholesalers or retailers for making repayment of the price charged by the company. If the company has a policy of giving more credit periods then the price charged by the company will be higher. If the credit period is given less credit period then the price charged will be lower.

Following are the external factors affecting pricing decisions:

1. Customer
2. Competition
3. Government Policy
4. Intermediaries Involved

### Customer

Customer tests and preferences change over a period of time. Therefore the company needs to take into consideration various customer factors before determining the price for its products. Customer factors such as purchasing capacity, income level, etc. need to be considered.

### Competition

The study of the pricing policy of the competitors is very important before setting prices for products. If competition is tough in the market then the company should restore lower pricing for its products to get competitive advantages in the market. If

there is a monopoly or less completion then the company charges a higher price for its product.

#### Government Policy

Government rules and regulations are very important before finalizing the price of the product. For a certain category of goods and services government may announce a predetermined price and all companies dealing in such kind of goods and services has to follow the norms of the government.

#### Intermediaries Involved

To travel goods from a company to a consumer many intermediaries are involved. The larger the number of intermediaries in the supply chain higher will be the price of the product and if the number of intermediaries is less then the price of the product will be less.

## **Part 2. What is pricing?**

**Pricing** is the process whereby a business sets the price at which it will sell its products and services, and may be part of the business's marketing plan. In setting prices, the business will take into account the price at which it could acquire the goods, the manufacturing cost, the marketplace, competition, market condition, brand, and quality of product.

Pricing is a fundamental aspect of product management and is one of the four Ps of the marketing mix, the other three aspects being product, promotion, and place. Price is the only revenue generating element amongst the four Ps, the rest being cost centers. However, the other Ps of marketing will contribute to decreasing price elasticity and so enable price increases to drive greater revenue and profits.

Pricing can be a manual or automatic process of applying prices to purchase and sales orders, based on factors such as: a fixed amount, quantity break, promotion or sales campaign, specific vendor quote, price prevailing on entry, shipment or invoice date, combination of multiple orders or lines, and many others. [An automated pricing](#) system requires more setup and maintenance but may prevent pricing errors. The needs of the consumer can be converted into demand only if the consumer has the willingness and capacity to buy the product. Thus, pricing is the most important concept in the field of marketing, it is used as a tactical decision in response to changing competitive, market and organizational situations.

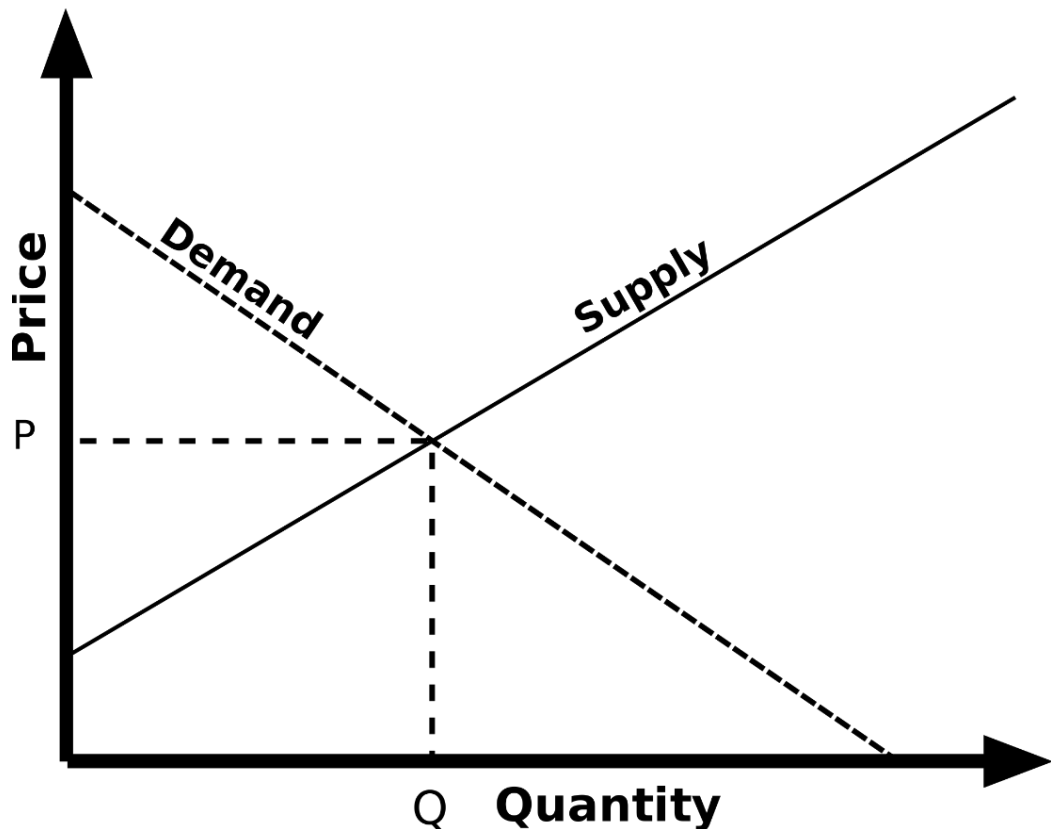


Fig. 9.2 – Price dependence on supply and demand

The objectives of pricing should consider:

- ✓ the financial goals of the company (i.e. profitability)
- ✓ the fit with marketplace realities (will customers buy at that price?)
- ✓ the extent to which the price supports a product's market positioning and be consistent with the other variables in the marketing mix
- ✓ the consistency of prices across categories and products (consistency indicates reliability and supports customer confidence and customer satisfaction)
- ✓ to meet or prevent competition

Price is influenced by the type of distribution channel used, the type of promotions used, and the quality of the product. Where manufacturing is expensive, distribution is exclusive, and the product is supported by extensive advertising and promotional campaigns, then prices are likely to be higher. Price can act as a substitute for product quality, effective promotions, or an energetic selling effort by distributors in certain markets.

From the marketer's point of view, an **efficient price** is a price that is very close to the maximum that customers are prepared to pay. In economic terms, it is a price that shifts most of the consumer economic surplus to the producer. A good pricing strategy would be the one that could balance between the price floor (the price below which the organization ends up in losses) and the price ceiling (the price by which the organization experiences a no-demand situation).

### Part 3. Pricing Strategy

The price you set for your product or service, no matter what it is, can make or break your company's financial goals. Of course, you won't find the right price in a day. You need a well-thought-out pricing strategy if you want customers to buy your products but don't want to give up a significant profit margin.

You will need to determine exactly how much your profit margin should be. Some companies make millions by charging just a few dollars, while others may do well by charging a lot more than they should. In the end, people will only buy products or services whose prices match how much they think they are worth.

With the right pricing strategy, you'll be able to consider everything that affects a customer's buying decision.

A pricing strategy is a way to determine the best price for the product or service using an analytical model.

It is how a business owner decides how much to charge for a product or service. Most of the time, you'll need to do some math, do market research, or talk to customers before implementing a good plan.

But if you make a plan that considers market conditions and other things that affect how people act, you'll be able to beat your competitors in your industry.

Marketers develop an overall pricing strategy that is consistent with the organization's mission and values. This pricing strategy typically becomes part of the company's overall long-term strategic plan. The strategy is designed to provide broad guidance for price-setters and ensures that the pricing strategy is consistent with other elements of the marketing plan. While the actual price of goods or services may vary in response to different conditions, the broad approach to pricing (i.e., the pricing strategy) remains a constant for the planning outlook period which is typically 3–5 years, but in some industries may be a longer period of 7–10 years. The pricing strategy established the overall, long-term goals of the pricing function, without specifying an actual price-point.

Broadly, there are six approaches to pricing strategy mentioned in the marketing literature:

**Operations-oriented pricing:** where the objective is to optimize productive capacity, to achieve operational efficiencies or to match supply and demand through varying prices. In some cases, prices might be set to de-market.

**Revenue-oriented pricing:** (also known as *profit-oriented pricing* or *cost-based pricing*) - where the marketer seeks to maximize the profits (i.e., the surplus income over costs) or simply to cover costs and break even. For example, dynamic pricing (also known as yield management) is a form of revenue oriented pricing.

**Customer-oriented pricing:** where the objective is to maximize the number of customers; encourage cross-selling opportunities or to recognize different levels in the customer's ability to pay.

**Value-based pricing:** (also known as *image-based pricing*) occurs where the company uses prices to signal market value or associates price with the desired value position in the mind of the buyer. The aim of value-based pricing is to reinforce the

overall positioning strategy e.g. premium pricing posture to pursue or maintain a luxury image.

**Relationship-oriented pricing:** where the marketer sets prices in order to build or maintain relationships with existing or potential customers.

**Socially-oriented pricing:** Where the objective is to encourage or discourage specific social attitudes and behaviours. e.g. high tariffs on tobacco to discourage smoking.

**Optional pricing:** Where the objective is to allow consumer to have an option on their purchase. e.g. buying a car optional to have CD player.

Different pricing strategies can help the business grow, make more sales, and make as much money as possible. Here are some common types of pricing strategies to think about as part of the overall marketing plan:

### *1) Skimming pricing*

A price skimming strategy is used by businesses that charge the most for new products and then slowly lower the price over time. In this pricing strategy, prices go down as products end their useful life and become less important. Price skimming is usually done by businesses that sell high-tech or unusual items.

Reducing the price also allows businesses to align with any competitor products which appear over this time.

Effective marketing is crucial to a successful price skimming strategy, as customers must feel the product is of high quality and demand to justify the higher price.

*Example: An electronics company releases a new gaming device. The company advertises the product for months before its release and boasts its new features. The product is originally released at \$699 which the brand's loyal customers are happy to pay.*

*After a few months, the company reduces the price to \$549 to attract price-sensitive customers and to compete with the latest similar products.*

#### **Pros:**

- ✓ Generate maximum profit from initial product sales.
- ✓ Create a strong brand image by conveying quality and value of the product.
- ✓ Differentiate product by setting pricing higher than other products on the market.

#### **Cons:**

- ✓ Isolate market initially through high pricing that drives away the price-sensitive markets.
- ✓ Lose sales to competition if pricing is not lowered at the correct time or to an appropriate amount.
- ✓ Decrease profit as market demand diminishes and product price is lowered.

### *2) Penetration pricing*

When a business enters a new market, it's hard to get market share immediately, but penetration pricing can help. The penetration pricing strategy is to set prices much lower than competitors' prices to get initial sales. These low prices can bring in new customers and steal sales from competitors.

This plan is meant to get sales going but will only help grow quickly. At first, firm will probably lose money in exchange for more sales and a better name. When it raise pricing to match the market, expect some customers to leave as they hunt for the cheapest choice.

*Example. A new cafe in town sells 30% cheaper coffee than other cafes. They also focus on good customer service and have a loyalty program that gives away every tenth coffee for free. When client demand rises, the cafe gradually raises the coffee price. This gives customers a chance to establish a taste for the coffee and other items while enjoying exceptional service.*

**Pros:** t's much easier to get into a low market than an average price, and you can get new customers quickly.

**Cons:** It won't work in the long run, so it should only be used for short-term pricing.

### 3) *Competitive pricing*

The competitive pricing strategy has set the price of the products or services at the current market rate. CEO can price the products above or below the market rate as long as it's competitive. All other products establish the pricing in the market, which helps stay competitive if the industry is crowded.

With the rise of online shopping, it's now easy to compare prices before making a purchase, which 96% of people do. This gives a chance to win over customers by charging a little less than the average price on the market.

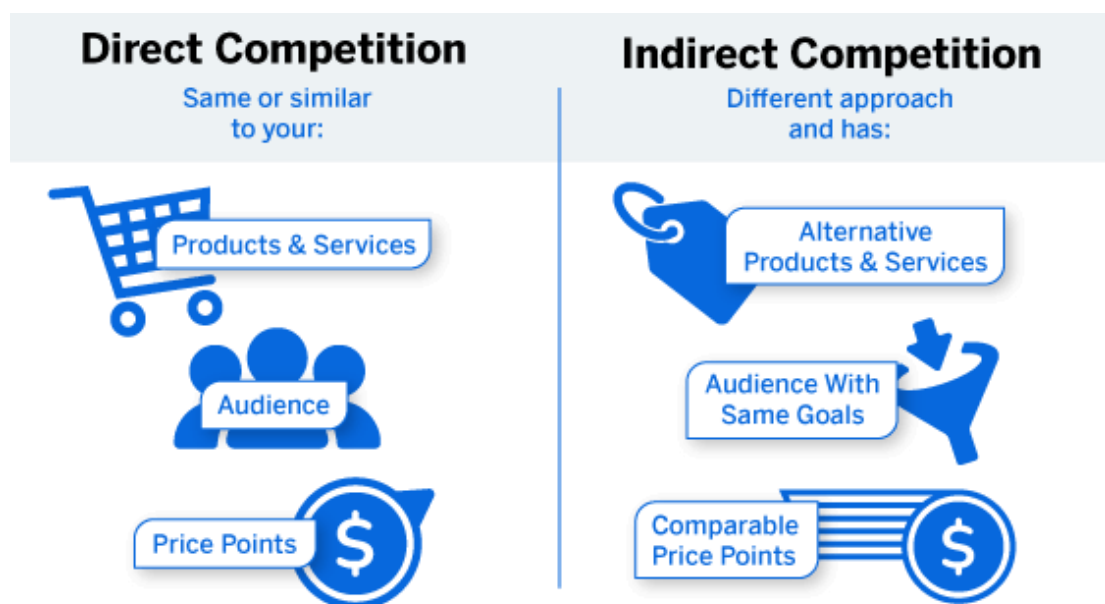


Fig. 9.3 – Types of competitive pricing

*Example. A landscaper compares pricing with local competitors. To attract price-sensitive consumers, it prices its most popular service, lawn maintenance, below the market average.*

**Pros:** You can maintain market share in a competitive market by offering slightly lower prices.

**Cons:** You need to keep a close eye on average market prices to keep a competitive edge with customers who care about prices.

#### ***4) Premium pricing (also Prestige Pricing)***

Premium pricing is when prices are set higher than the rest of the market to create a sense of value, quality, or luxury. If the company has a good reputation and a loyal customer base, she can often charge a higher price for high-quality, branded products.

This pricing strategy works especially well if a target audience is made up of early adopters who like to be the first to try new things. Companies that sell luxury, high-tech, or exclusive products, especially in the fashion or tech industries, often use a premium pricing strategy.

Once a company cements itself as ‘luxury’ through initial marketing expenses, premium-priced products can drive high profit margins in the long-term and establish a reliable and reputable brand image.

Generally, premium pricing strategies determine that a business never discounts its products to ensure its perception is not ‘cheapened’ within the market.

*Example 1: A food manufacturer releases a new chocolate bar which is made of 100% organic cocoa beans and ingredients, sourced from an exclusive location and priced at double its competitors’ prices.*

*Through effective marketing and packaging, customers perceive the chocolate as a delicacy and are willing to pay the extra amount.*

*Example 2: A restaurant gains trust in its market through word-of-mouth or online reviews, which charges 50% more than its competitors for the same services.*

#### **Pros:**

- ✓ Increase long-term profit margins through higher pricing.
- ✓ Establish a renowned, sought-after brand with a loyal customer base.
- ✓ Differentiate from competitors through unique marketing and pricing strategy.

#### **Cons:**

- ✓ Alienate the price-sensitive market due to higher pricing.
- ✓ Lose profits initially due to the high cost required to market premium products.
- ✓ Experience lower sales volumes as higher price appeals mostly to top tier of the market only.

#### ***5) Psychological pricing***

Psychological pricing strategies play on how people think by making small changes to a product’s price, placement, or packaging. Offer a buy-two-get-one deal or set the price at \$49.99 instead of \$50. Well, it’s cheaper than \$50. Some stores have one-day sales or sales that only last for a certain amount of time to get customers in quickly.



Almost any business can use this method, but stores and restaurants use it the most because it makes people think they are getting a deal.

*Example: A restaurant sets the price of a set meal at \$14.95 to get people to buy it for what they think is lower than \$15.*

**Pros:** By making small changes to your sales methods, you can sell more products without losing money.

**Cons:** Some customers may see it as a trick, which could hurt your reputation or cause you to lose sales.

## **6) Freemium pricing**

Freemium pricing gives customers a free version of a primary product or service, then encourages them to pay for a premium version with more features or options. Customers can see what the product or service can do for them and learn more about your business.

It is a common strategy for software companies and organizations with memberships.

Freemium pricing splits product/service users into two categories – free and paid service. Free users have their access limited to certain product features, and paid users have full unrestricted access.

This strategy works off the premise that free users will see the value in purchasing the full product from the quality of the free service. The ‘no strings attached’ nature of the free service makes word-of-mouth advertising common for freemium pricing and sign-up rates can increase quite rapidly.

*Example: Consider an online photo editing tool using a freemium model. The free option offers access to core tools which are valuable enough on their own but can work even better in conjunction with the full toolset, available with the premium option.*

*A graphic design firm employee signs up for the free service and eventually purchases the premium option, recommending it to colleagues. The colleagues further recommend the product to their peers and so on.*

### **Pros:**

- ✓ Display product value in a practically and effectively.
- ✓ Encourage free advertising through word-of-mouth recommendations.
- ✓ Build brand loyalty and increase retention rates by easing users into the product.

### **Cons:**

- ✓ Lose profit from free service customers who are content with its features.
- ✓ Lessen customers’ perception of product value by having a free version on offer.
- ✓ Increase sales cycle from customers using free service before adopting premium.

## **7) Dynamic Pricing**

Dynamic pricing works off market demands and allows companies to set flexible prices for their products/services. Businesses determine customers’ willingness to pay

in certain circumstances and adjust their prices accordingly. Dynamic pricing works in two ways:

1. *Raising prices:* Increased demand for a product/service (e.g. peak season) causes a business to raise its prices as a larger number of customers are willing to pay more. In some instances, such as air travel, most customers already expect to pay different rates during different times of the year and accept that busier flights will incur higher costs.

2. *Lowering prices:* Reduced demand for a product/service (e.g. off-season) causes a business to lower its prices, maximising revenue during the lull. The cheaper prices drive loyalty from existing customers and can help to attract new ones.

*Example: A hotel anticipates a large event that will draw crowds of people from out of town by raising its prices considerably, knowing that many will pay the higher rate. Conversely, the hotel lowers its prices during colder months to attract more customers (including the price-sensitive to compensate for the reduced business during this time.*

**Pros:**

- ✓ Enable flexibility with prices that reflect periodic market demand.
- ✓ Maximise profit margins through increase in price.
- ✓ Sell more services/products during slow sales periods.

**Cons:**

- ✓ Frustrate and confuse customers due to increased prices and lack of consistency.
- ✓ Lose out to competition offering lower pricing during times when price is increased.
- ✓ Suffer loss to profit when prices are lowered during slow sales periods.

### **8) High-Low pricing**

High-Low pricing involves setting a high (reference) price for a product/service then lowering it during a sale/promotional period before once again increasing the price. The reference price serves to reflect the product's value and reputation before it's discounted.

This strategy works by pushing a sense of urgency onto customers to purchase the product during the sales period. The general increase in traffic during these periods results in high sales as customers often also buy full-priced products when in-store.

High-Low pricing works best in instances where customers are not sure of what a product's pricing should be in ordinary circumstances, and with customers who directly relate promotional sales with low prices.

*Example: A shoe store releases a new pair of sneakers for \$110. A month later, the store holds a 30% off sale, reducing the sneakers to \$77. Acknowledging the reference price from previous advertisements, customers rush to take advantage of the 'bargain'. Customers perceive the sneakers as being of high quality and value because of the reference price. Following the sale, the store prices the sneakers at \$100.*

**Pros:**

- ✓ Establish value by showing the product's worth through higher pricing.
- ✓ Drive store traffic and product demand through promotional efforts.

- ✓ Generate higher sales volumes by reaching broader markets during sales.

**Cons:**

- ✓ Discourage customers who may perceive discounted product as lacking quality/value.
- ✓ Decrease profit during promotional periods.
- ✓ Lose sales during the reference pricing period for customers who wait for promotional sales.

### ***9) Tailored pricing***

Unlike fixed pricing, where customers pay a pre-determined amount for a product/service, tailored pricing determines that prices are set on a case-by-case basis. Businesses that offer custom offerings, with varying time, cost, and scale, will often use this strategy.

Tailored pricing works best in instances where the sales cycle is in-depth and lengthy as salespeople can better understand each clients' needs, budget, and potential for upselling. It also means that customers are more likely to need assistance with their purchase, unlocking opportunities to provide the best/highest value product/service bundle.

*Example: Consider a SaaS company who provide a CRM platform for businesses of varying sizes. As the company offers a broad range of software solutions and subscription tiers, which many businesses would need to use in combination, the sales process is too complicated to do without assistance.*

*Customers can request a quote and work alongside a salesperson to identify which products they need, the breadth of service required, and their budget. The salesperson generates a quote based on these factors (and others) to offer the customer the best pricing for the service provided.*

**Pros:**

- ✓ Better understand customer needs and align product/service with them.
- ✓ Maximise profit from each sale through scrutinised pricing.
- ✓ Improve customer retention through increased sales touchpoints.

**Cons:**

- ✓ Discourage customers who are looking for an upfront cost.
- ✓ Lose visibility over profit margins/revenue due to fluctuating price points.
- ✓ Delay sales through lengthy nurturing period and quote determination.

### ***10) Fixed pricing***

Fixed pricing works off a set model that offers the same price to customers regardless of time, cost, and other determining factors. Due to its restrictive nature, fixed pricing is commonly used by businesses who offer rigid products/services with little to no variation across their customer portfolio.

Businesses must allocate ample time to devise appropriate rates for fixed pricing to ensure they're covering all involved costs and resources required for the full scope of service. It's also important that the products/services on offer have been available for long enough to gain an accurate understanding of the time and expenses involved before implementing fixed pricing.

*Example: A graphic design firm offers fixed pricing on its services, with prices depending on service, e.g. infographic, website, flyer, etc. Some projects may take longer than others, requiring more resources and greater expenses.*

*The firm must determine a single price for each project type that considers the highest and lowest estimated time and cost for each and establish a price that can cover and compensate for both scenarios.*

**Pros:**

- ✓ Encourage customers with transparency and confidence in pricing.
- ✓ Predict profit margins/revenue through early knowledge of price points.
- ✓ Shorten sales cycle through straightforward transaction for customers.

**Cons:**

- ✓ Misjudge service timing/costs and lose profit.
- ✓ Discourage customers who are asking for custom services.
- ✓ Lose control over unexpected additional costs.

### ***11) Loss leader pricing***

Loss leader pricing gets people into your store to buy a very cheap product. While they're there, they might buy other full-price items they didn't plan to, which should more than makeup for the loss of the original product.

*Example: On Sundays, a grocery store sells bread for a very low price, which draws people who may do all their weekly shopping.*

**Pros:** This pricing strategy attracts customers who might not otherwise go to your store and exposes them to your entire line of products.

**Cons:** Some customers will only buy the product that costs you money, which could be many of them. It means you need to keep an eye on your profit and stock levels.

## **Part 4. Methods of setting prices**

Determining the price of a product is not an easy task. The price of the company should be set in such a way as it is able to recover the cost of the company in the long run. Price should be determined in such a way that it not only attracts the customer to buy the product but also generates a reasonable return to the company on their investment.

In order to earn more profit in the short run company may charge a higher price for its products but if the customer feels the price charged by the company is higher than any other alternative available in the market then customer may not prefer to buy the product and company will find it difficult to generate revenue on their products.

There is various method of pricing which help the company to recover its cost and get some profit margin for its products. Before selecting any method of pricing company has to take into consideration various factors that affect pricing.

We can classify the types of pricing methods:

1. Cost Oriented Pricing
2. Market Oriented Method of Pricing

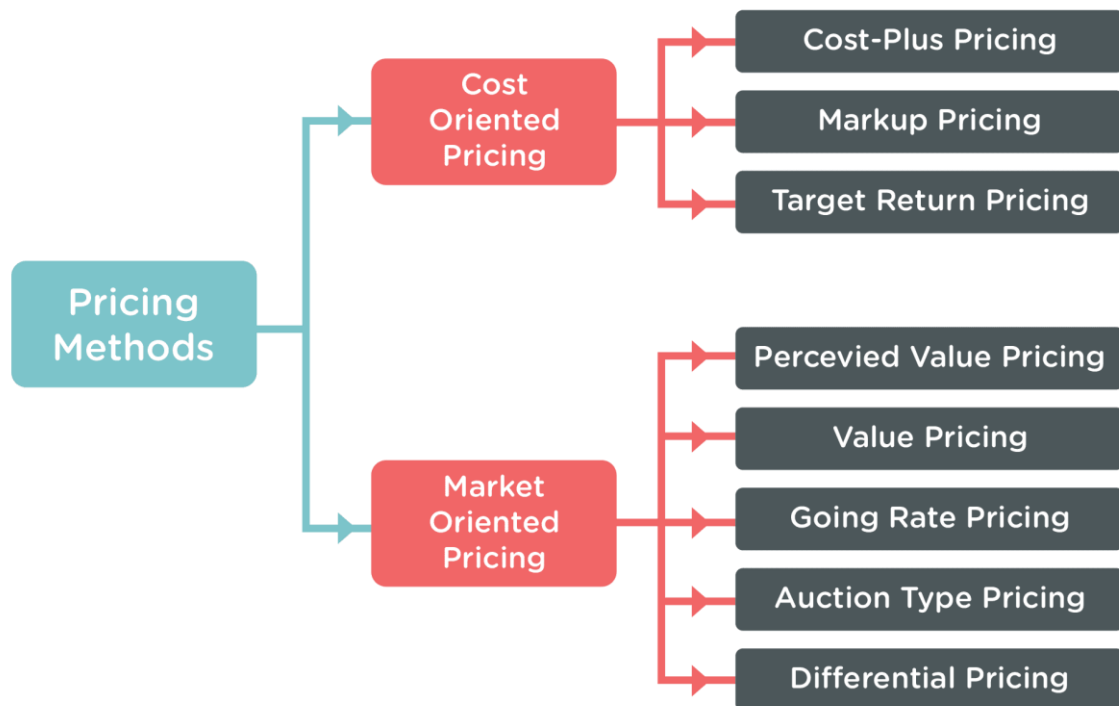


Fig. 9.4 – The types of pricing methods

Recovery of cost is the prime motto of every company as no company wants to make a loss. Following are types of cost-oriented pricing methods:

1. Cost Plus Pricing
2. Mark Up Pricing
3. Break Even Pricing
4. Target Return Pricing
5. Early Cash Recovery Pricing

#### Cost plus pricing

This is the easiest method to determine the price of the product. Under this method, the company finalized its full cost i.e. total cost, and then adds a specific percentage to the total cost to determine the selling price for its products.

This difference between the selling price and the total cost is the profit of the company. For Example: if the total cost of the company's product is \$ 1,000 and the company decided to get a 10% profit on the total cost then the selling price of the company will be \$ 1,100 (1000+ 100).

#### Mark up Pricing

This method is somewhat similar to cost plus pricing only difference is that in cost plus pricing specific percentage is charged on the total cost of the company but in markup pricing, the specific percentage is charged on the selling price of the company.

In this method, the company is aware of the cost and expected profit margin, and by using the company calculates the selling price of this product. For example; if the total cost of the company is \$ 900 and the expected profit the company wants to earn

on its selling price is 10% then the selling price of the company will be \$ 1,000 =  $(900 \times 100) / (100 - 10)$ .

#### Target Return Pricing

Under this method of pricing, the company decided to sell price in order to achieve a particular level of **return on their investment (ROI)**. The target selling price is determined by using the following formula:

$$\text{Target sales price per unit} = \frac{\text{total cost} + (\text{expected \% of ROI})}{\text{total sales in units}}$$

*For Example:*

The total investment of the company is \$ 100,000

Expected return on investment 20%

The total cost of the company is \$ 50,000

Expected sales in units 5,000

$[50,000 + (20\% \text{ on } 100,000)] / 5,000$

Target sales price per unit = \$ 14 per unit.

#### Break Even Pricing

*Break-even pricing is a no profit no loss pricing method. Break-even pricing is the price at which the selling price is equal to the total cost of the company. In this method, the company determines the volume of sales required to recover both variables as well as the fixed cost of the company.*

*For example: if the variable cost per unit is \$ 20 and Selling price per unit is \$ 30 and the fixed cost incurred by the company is \$ 400,000 then in order to cover both variables, as well as the fixed cost company, should sell at least 40,000 units in order to break even. If the company is not able to sell 40,000 units then it has to increase the selling price in order to break even.*

#### Early Cash Recovery Pricing

*The company uses this pricing method when the product life cycle is very short and the company has to recover its investment at the earliest. This pricing method is followed when a company introduces some innovative product in the market and they think that competitors will also introduce a similar kind of product at a lower price and the company may have to exit from the market.*

*The company tries to recover its cost in the short run by maximizing its profit of the company. This pricing policy is generally followed in the case of fashion brands and technology-related products.*

Following are the market-oriented method of pricing:

1. Perceived Value Pricing
2. Going Rate Pricing
3. Seal-Bid Pricing

### Perceived Value Pricing

The customer has some perceived value at which he would like to buy the product. Every company should take into consideration the perceived value of customers before setting prices for its products. The company conducts a primary market survey to know customers perceived value.

Customer choice about the product is influenced by various factors such as after-sale service provided by company staff, advertising, etc. If the customer perceived a lower value then the company will charge a lower price for its product and vice versa.

### Going Rate Pricing

In this pricing method price charges by major competitors will be taken as standards for setting prices for their own products. Companies determine the price for their product on the basis of market price of similar commodities in the market This method of pricing is further subdivided into three categories:

- 1) Competitors Parity Method
- 2) Premium Pricing
- 3) Discount Pricing

#### *Competitors Parity Method*

Under this method, the company charges the same price as charged by the competitor in the market. If the competitor increases the price company will also increase the price and if the competitor decreases the price then the company will also decrease the price for its products irrespective of its demand in the market or cost structure the company.

#### *Premium Pricing*

In this pricing, method company charges some additional price for its products for having additional features than that of competitors. A company that provides some additional features in its products than competitors is only in the position to charge premium prices for its products.

#### *Discount Pricing*

This method of pricing is exactly the opposite of premium pricing. In discount, pricing companies charge a lower price for their products due to the lack of additional features as provided by their competitors.

### Seal-Bid Pricing

In order to win the bid, the company submits a tender with as lowest price possible. This pricing policy is adopted in case of big contracts or orders where big companies or government departments invite tenders from various companies to give the assignment.

In this method of pricing buyer expectation is lower pricing tender and the seller wants to full fill buyer expectation by giving tender or quotation at a lower rate taking into consideration the expected pricing policy of the competitor.

## TOPIC 10. TAXES

### Part 1. What are taxes?

Taxes are mandatory contributions levied on individuals or corporations by a government entity – whether local, regional, or national. Tax revenues finance government activities, including public works and services such as roads and schools, or programs such as Social Security and Medicare.

In economics, taxes fall on whoever pays the burden of the tax, whether this is the entity being taxed, such as a business, or the end consumers of the business's goods. From an accounting perspective, there are various taxes to consider, including payroll taxes, federal and state income taxes, and sales taxes.

- ✓ Taxes are mandatory contributions collected by governments.
- ✓ There are many forms of taxes and most are applied as a percentage of a monetary exchange (for example, when income is earned or a sales transaction is completed).
- ✓ Other forms of taxes, such as property taxes, are applied based on the assessed value of a held asset.
- ✓ Understanding what triggers a tax situation can enable taxpayers to manage their finances to minimize the impact of taxes.

To help fund public works and services – and to build and maintain the infrastructure used in a country – a government usually taxes its individual and corporate residents. The tax collected is used for the betterment of the economy and all who are living in it.

Tax revenues are used for public services and the operation of the government, as well as for Social Security and Medicare.

A tax requires a percentage of the taxpayer's earnings or money to be taken and remitted to the government. Payment of taxes at rates levied by the government is compulsory, and tax evasion – the deliberate failure to pay one's full tax liabilities – is punishable by law. (On the other hand, tax avoidance – actions taken to lessen your tax liability and maximize after-tax income – is perfectly legal.)

Most governments use an agency or department to collect taxes. The State Administration of Taxation is responsible for collecting taxes in China. It is an administrative body, but can support the prevention of tax crimes, incl. tax evasion and tax fraud by exchanging relevant information with the Ministry of Public Security.

Taxation is divided into national tax and local tax. Local taxes are further divided into: resource tax, personal income tax, individual incidental income tax, land value-added tax, urban maintenance and construction tax, vehicle and vessel use tax, property tax, slaughter tax, urban land use tax, fixed asset investment direction adjustment tax, enterprise income tax, stamp duty, etc.

Taxes are mainly used for national defense and military construction, national civil servants' salary payment, road traffic and urban infrastructure construction, scientific research, medical and health epidemic prevention, culture and education, disaster relief, environmental protection and other fields.



The functions and roles of taxation are the concrete manifestation of the essence of taxation functions. Generally speaking, taxation has several important basic functions as follows:

#### *Organizing finance*

Taxation is a form of distribution in which the government participates in social distribution by virtue of state coercive power and concentrates part of the surplus products (whether in monetary form or in physical form). The organization of state revenue is the most basic function of taxation.

#### *Regulating the economy*

The participation of the government in social distribution by means of state coercive power necessarily changes the share of social groups and their members in the distribution of national income, reducing their disposable income, but this reduction is not equal, and this gain or loss of interest will affect the economic activity capacity and behavior of taxpayers, which in turn has an impact on the social and economic structure. The government uses this influence to purposefully guide the socio-economic activities and thus rationalize the socio-economic structure.

#### *Monitoring the economy*

In the process of collecting and obtaining revenues, the state must build on the basis of intensive daily tax administration, specifically grasp the sources of taxes, understand the situation, find out problems, supervise taxpayers paying taxes in accordance with the law, and fight against violations of tax laws and regulations, thus supervising the direction of social and economic activities and maintaining the order of social life.

The role of taxation is the effect of the tax function under certain economic conditions. The role of taxation is to reflect the fair tax burden and promote equal competition; to regulate the total economic volume and maintain economic stability; to reflect the industrial policy and promote structural adjustment; to reasonably adjust the distribution and promote common prosperity; to safeguard the rights and interests of the country and promote the opening up to the outside world, etc.

## **Part 2. Types of taxes**

There are several very common types of taxes in all world:

1. Income tax – A percentage of generated income that is relinquished to the state.
2. Payroll tax – A percentage withheld from an employee's pay by an employer, who pays it to the government on the employee's behalf to fund Medicare and Social Security programs
3. Corporate tax – A percentage of corporate profits taken as tax by the government to fund state programs
4. Sales tax – Taxes levied on certain goods and services; varies by jurisdiction
5. Property tax – Based on the value of land and property assets
6. Tariff – Taxes on imported goods; imposed with the aim of strengthening domestic businesses

Tax systems vary widely among nations, and it is important for individuals and corporations to carefully study a new locale's tax laws before earning income or doing business there.

China is one of the biggest markets in the world and is attracting more and more global investors to move into the China market. In order to run the business in a most cost efficient way, it is necessary for the foreign investors to understand all the potential relevant tax costs that would be incurred in China before making an investment decision. In addition, different type of investment activities will trigger different types of taxes.

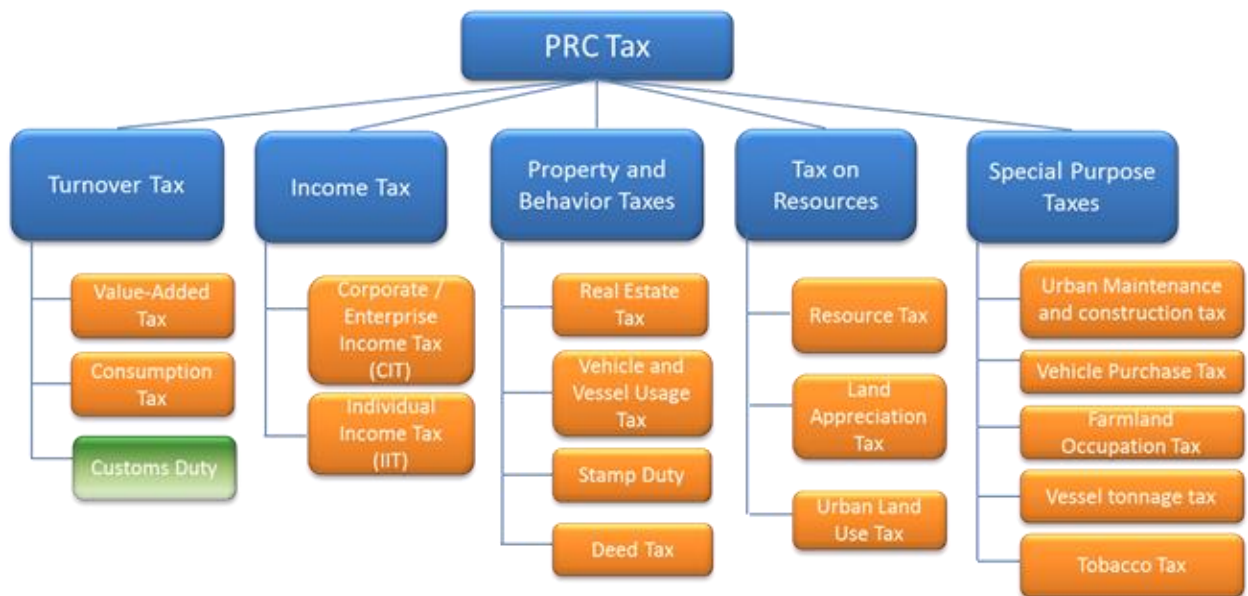


Fig. 10.1 – Types of taxes in China

Under the current tax system in China, there are 26 types of taxes, which, according to their nature and function, can be divided into the following 8 categories:

**1. Turnover taxes.** This includes three kinds of taxes, namely, Value-Added Tax, Consumption Tax and Business Tax. The levy of these taxes are normally based on the volume of turnover or sales of the taxpayers in the manufacturing, circulation or service sectors.

A **value-added tax (VAT)**, known in some countries as a **goods and services tax (GST)**, is a type of tax that is assessed incrementally. It is levied on the price of a product or service at each stage of production, distribution, or sale to the end consumer. If the ultimate consumer is a business that collects and pays to the government VAT on its products or services, it can reclaim the tax paid. It is similar to, and is often compared with, a sales tax. VAT is an indirect tax because the person who ultimately bears the burden of the tax is not necessarily the same person as the one who pays the tax to the tax authorities.

VAT was implemented in China in 1984 and is administered by the State Administration of Taxation. In 2007, the revenue from VAT was 15.47 billion yuan (\$2.2 billion) which made up 33.9 percent of China's total tax revenue for the year. The

standard rate of VAT in China is 13%. There is a reduced rate of 9% that applies to products such as books and types of oils, and 6% for services except for PPE lease.

**2. Income taxes.** This includes Enterprise Income Tax (effective prior to 2008, applicable to such domestic enterprises as state-owned enterprises, collectively owned enterprises, private enterprises, joint operation enterprises and joint equity enterprises) and Individual Income Tax. These taxes are levied on the basis of the profits gained by producers or dealers, or the income earned by individuals. Please note that the new Enterprise Income Tax Law of the People's Republic of China has replaced the above two enterprise taxes as of 1 January 2008.

The enterprise income tax shall be levied at the rate of 25%. 15% tax rate is a concession rate for high-tech companies.

**3. Resource taxes.** This consists of Resource Tax and Urban and Township Land Use Tax. These taxes are applicable to the exploiters engaged in natural resource exploitation or to the users of urban and township land. These taxes reflect the chargeable use of state-owned natural resources, and aim to adjust the different profits derived by taxpayers who have access to different availability of natural resources.

**4. Taxes for special purposes.** These taxes are City Maintenance and Construction Tax, Farmland Occupation Tax, Fixed Asset Investment Orientation Regulation Tax, Land Appreciation Tax, and Vehicle Acquisition Tax. These taxes are levied on specific items for special regulative purposes.

**5. Property taxes.** This encompasses House Property Tax, Urban Real Estate Tax, and Inheritance Tax (not yet levied). China is preparing to roll out a new property tax. Two of China's largest cities, Chongqing and Shanghai have trialed property taxes between 0.4% and 1.2% since 2011, mainly targeting second homes, luxury properties, and purchases by non-residents. The new tax is expected to cover a much wider range of properties.

Property tax in China refers to a tax imposed on the ownership or use of real estate properties. It is a form of taxation that individuals or entities are required to pay based on the assessed value of their properties. The tax is typically calculated as a percentage of the property's value. China does not have a comprehensive nationwide property tax. However, it's worth noting that China has been exploring the implementation of a property tax for many years, and there have been discussions and pilot programs in certain regions.

The idea behind a property tax in China is to curb speculation in the real estate market, promote more efficient land use, and address wealth inequality. The tax would typically be levied on the value of residential and commercial properties, either based on their market value or assessed value.

**6. Behavioural taxes.** This includes Vehicle and Vessel Usage Tax, Vehicle and Vessel Usage License Plate Tax, Stamp Tax, Deed Tax, Securities Exchange Tax (not yet levied), Slaughter Tax and Banquet Tax. These taxes are levied on specified behaviour.

**7. Agricultural taxes.** Taxes belonging to this category are Agriculture Tax (including Agricultural Specialty Tax) and Animal Husbandry Tax which are levied on the enterprises, units and/or individuals receiving income from agriculture and animal husbandry activities.

**8 Customs duties.** Customs duties are imposed on the goods and articles imported into and exported out of the territory of the People's Republic of China, including Excise Tax.

An **excise**, or **excise tax**, is any duty on manufactured goods that is normally levied at the moment of manufacture for internal consumption rather than at sale. Excises are often associated with customs duties, which are levied on pre-existing goods when they cross a designated border in a specific direction; customs are levied on goods that become taxable items at the *border*, while excise is levied on goods that came into existence *inland*.

An excise is considered an indirect tax, meaning that the producer or seller who pays the levy to the government is expected to try to recover their loss by raising the price paid by the eventual buyer of the goods. Excises are typically imposed in addition to an indirect tax such as a sales tax or value-added tax (VAT). Typically, an excise is distinguished from a sales tax or VAT in three ways:

- 1) an excise is typically a per unit tax, costing a specific amount for a volume or unit of the item purchased, whereas a sales tax or value-added tax is an *ad valorem* tax and proportional to the price of the goods,
- 2) an excise typically applies to a narrow range of products, and
- 3) an excise is typically heavier, accounting for a higher fraction of the retail price of the targeted products.

Typical examples of excise duties are taxes on gasoline and other fuels and taxes on tobacco and alcohol (sometimes referred to as sin tax).

### **Part 3. Direct and indirect tax**

A direct tax is a tax that a person or organization pays directly to the entity that imposed it. Examples include income tax, real property tax, personal property tax, and taxes on assets, all of which are paid by an individual taxpayer directly to the government.

- ✓ A direct tax is paid by an individual or organization to the entity that levied the tax.
- ✓ Direct taxes include income taxes, property taxes, and taxes on assets.
- ✓ There are also indirect taxes, such as sales taxes, wherein a tax is levied on the seller but paid by the buyer.

An indirect tax is collected by one entity in the supply chain, such as a manufacturer or retailer, and paid to the government; however, the tax is passed onto the consumer by the manufacturer or retailer as part of the purchase price of a good or service. The consumer is ultimately paying the tax by paying more for the product.

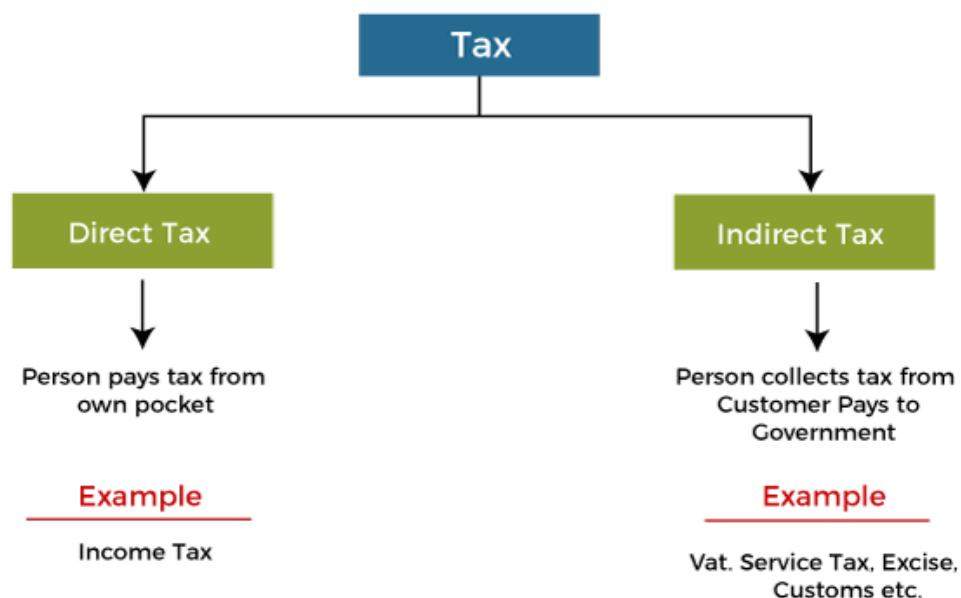


Fig 10.2 – Direct and indirect tax

Let's delve into the differences between indirect and direct taxes. The table mentioned below covers all the differentiating points between direct and indirect taxes.

Table 1 – The differentiating points between direct and indirect taxes

Context	Direct Tax	Indirect Tax
Meaning	Paid directly to the government	Paid to the government via intermediary
Levied on	Profits and income	Goods and services
Taxpayer	Individuals and businesses	End-consumers of products, goods and services.
Tax Rate	Directly depends on income and profits	Same for everyone
Tax Burden	Progressive	Rate of tax is flat so tax burden is regressive
Transfer of liability	Not transferable	Can be transferable
Tax Collection	Complex	Quite convenient
Types	Income Tax	Goods and Services Tax (GST) (VAT)
Evasion	Possible	Not possible

## TOPIC 11. NET INCOME AND PROFIT

### Part 1. Cost of goods sold (COGS)

Cost of goods sold (COGS) refers to the direct costs of producing the goods sold by a company. This amount includes the cost of the materials and labor directly used to create the good. It excludes indirect expenses, such as distribution costs and sales force costs.

- ✓ Cost of goods sold is also referred to as "cost of sales."
- ✓ Cost of goods sold (COGS) includes all of the costs and expenses directly related to the production of goods.
- ✓ COGS excludes indirect costs such as overhead and sales and marketing.
- ✓ COGS is deducted from revenues (sales) in order to calculate gross profit and gross margin. Higher COGS results in lower margins.
- ✓ The value of COGS will change depending on the accounting standards used in the calculation.
- ✓ COGS differs from operating expenses (OPEX) in that OPEX includes expenditures that are not directly tied to the production of goods or services.

COGS is an important metric on financial statements as it is subtracted from a company's revenues to determine its gross profit. Gross profit is a profitability measure that evaluates how efficient a company is in managing its labor and supplies in the production process.

Because COGS is a cost of doing business, it is recorded as a business expense on income statements. Knowing the cost of goods sold helps analysts, investors, and managers estimate a company's bottom line. If COGS increases, net income will decrease. While this movement is beneficial for income tax purposes, the business will have less profit for its shareholders. Businesses thus try to keep their COGS low so that net profits will be higher.

Cost of goods sold (COGS) is the cost of acquiring or manufacturing the products that a company sells during a period, so the only costs included in the measure are those that are directly tied to the production of the products, including the cost of labor, materials, and manufacturing overhead.

For example, COGS for an automaker would include the material costs for the parts that go into making the car plus the labor costs used to put the car together. The cost of sending the cars to dealerships and the cost of the labor used to sell the car would be excluded.

Furthermore, costs incurred on the cars that were not sold during the year will not be included when calculating COGS, whether the costs are direct or indirect. In other words, COGS includes the direct cost of producing goods or services that were purchased by customers during the year. As a rule of thumb, if you want to know if an expense falls under COGS, ask: "Would this expense have been an expense even if no sales were generated?"

Formula and calculation of cost of goods sold (COGS):

$$\text{COGS} = \text{Beginning Inventory} + \text{P} - \text{Ending Inventory}$$

where P – purchases during the period.

Inventory that is sold appears in the income statement under the COGS account. The beginning inventory for the year is the inventory left over from the previous year – that is, the merchandise that was not sold in the previous year.

Any additional productions or purchases made by a manufacturing or retail company are added to the beginning inventory. At the end of the year, the products that were not sold are subtracted from the sum of beginning inventory and additional purchases. The final number derived from the calculation is the cost of goods sold for the year.

The balance sheet has an account called the current assets account. Under this account is an item called inventory. The balance sheet only captures a company's financial health at the end of an accounting period. This means that the inventory value recorded under current assets is the ending inventory.

## **Part 2. Gross profit**

Gross profit is the profit a company makes after deducting the costs associated with making and selling its products, or the costs associated with providing its services. Gross profit will appear on a company's income statement and can be calculated by subtracting the cost of goods sold (COGS) from revenue (sales). These figures can be found on a company's income statement. Gross profit may also be referred to as sales profit or gross income.

- ✓ Gross profit, also called gross income, is calculated by subtracting the cost of goods sold from revenue.
- ✓ Generally, gross profit only includes variable costs and does not account for fixed costs.
- ✓ Gross profit assesses a company's efficiency at using its labor and supplies in producing goods or services.
- ✓ Gross profit, which only reflects the cost of goods sold, is different than net profit which factors in all company-wide expenses.
- ✓ A derivative of gross profit is gross margin, a margin that indicates what percent of revenue a company earns can be applied towards company operating costs.

$$\text{GROSS PROFIT} = \text{NET SALES} - \text{COGS}$$

where: Net sales = Equivalent to revenue, or the total amount of money generated from sales for the period. It can also be called net sales because it can include discounts and deductions from returned merchandise. Revenue is typically called the top line because it sits on top of the income statement. Costs are subtracted from revenue to calculate net income or the bottom line. CoGS = Cost of goods sold. The direct

costs associated with producing goods. Includes both direct labor costs, and any costs of materials used in producing or manufacturing a company's products.

Gross profit assesses a company's efficiency at using its labor and supplies in producing goods or services. The metric mostly looks at variable costs – that is, costs that fluctuate with the level of output, such as:

- ✓ Materials
- ✓ Direct labor, assuming it is hourly or otherwise dependent on output levels
- ✓ Commissions for sales staff
- ✓ Credit card fees on customer purchases
- ✓ Equipment, perhaps including usage-based depreciation
- ✓ Utilities for the production site
- ✓ Shipping.

As generally defined, gross profit does not include fixed costs (that is, costs that must be paid regardless of the level of output). Fixed costs include rent, advertising, insurance, salaries for employees not directly involved in the production, and office supplies.

However, it should be noted that a portion of the fixed cost is assigned to each unit of production under absorption costing, which is required for external reporting under the generally accepted accounting principles (GAAP).

For example, if a factory produces 10,000 widgets in a given period, and the company pays \$30,000 in rent for the building, a cost of \$3 would be attributed to each widget under absorption costing.

Gross profit shouldn't be confused with operating profit. Operating profit is calculated by subtracting operating expenses from gross profit.

Gross profit can be used to calculate another metric, the gross profit margin. This metric is useful for comparing a company's production efficiency over time. Simply comparing gross profits from year to year or quarter to quarter can be misleading, since gross profits can rise while gross margins fall – a worrying trend that could land a company in hot water.

Although the terms are similar (and sometimes used interchangeably), gross profit is not the same as gross profit margin. Gross profit is expressed as a currency value, gross profit margin as a percentage. The formula for gross profit margin is as follows:

$$\text{Gross Profit Margin} = \frac{\text{Revenue} - \text{CoGS}}{\text{Revenue}}$$

Here is an example of how to calculate gross profit and the gross profit margin, using Company ABC's income statement.



Table 11.1 – Company ABC's income statement

<b>Revenues</b>	<i>(in USD millions)</i>
Automotive	141,546
Financial services	10,253
Other	1
Total revenues	151,800
<b>Costs and expenses</b>	
Automotive cost of sales	126,584
Selling, administrative, and other expenses	12,196
Financial Services interest, operating, and other expenses	8,904
Total costs and expenses	147,684

To calculate the gross profit, we first add up the cost of goods sold (COGS), which sums up to \$126,584. We do not include selling, administrative and other expenses since these are mostly fixed costs. We then subtract the cost of goods sold from revenues to obtain a gross profit of  $\$151,800 - \$126,584 = \$25,216$  million.

To obtain the gross profit margin, we divide the gross profit by total revenues for a margin of  $\$25,216 / \$151,800 = 16.61\%$ . This compares favorably to an automotive industry average of around 14%, suggesting that Ford operates more efficiently than its peers.

### **Part 3. Economic profit (or loss): definition, formula, and example**

An economic profit is the difference between the revenue received from sales and the explicit costs of producing its goods and services, as well as any opportunity costs.

Opportunity costs are a type of implicit cost determined by management and will vary based on different scenarios and perspectives.

- ✓ Economic profit is the financial amount that remains after subtracting both explicit costs and opportunity costs from revenue.
- ✓ Opportunity costs are the profits that a business misses out on when choosing to pursue one business venture over another.
- ✓ Economic profit is used for internal analysis and is not required for transparent disclosure.
- ✓ Accounting profit is straightforward and precise: revenue minus explicit costs.
- ✓ While theoretical, economic profit computations can help a company size up and choose between potential business ventures.

Economic profit is often analyzed in conjunction with accounting profit. Accounting profit is the profit that a company shows on its income statement. It is also known as "net income."

Accounting profit measures actual money inflows versus money outflows and is part of the required financial reporting and transparency of a company.

Economic profit, on the other hand, is not recorded on a company's financial statements, nor is it required to be disclosed to regulators, investors, or financial institutions.

Economic profit can be used in a "what if" analysis. Companies and individuals may choose to consider economic profit when they are faced with choices involving production levels or other business alternatives. Economic profit can provide a proxy for foregone profit considerations.

The calculation for economic profit can vary by entity and scenario. In general, it can be captured as follows:

$$\textit{Economic profit} = \textit{revenues} - \textit{explicit costs} - \textit{opportunity costs}$$

If you excluded the opportunity costs from this equation, you'd get simply the accounting profit. However, when you subtract the opportunity costs as well, the economic profit results. It can serve as a comparison to other options that could have been undertaken by a company, for better or worse.

Companies state their explicit costs on the income statement. The accounting profit on the bottom line of the income statement is the net income after subtracting for direct, indirect, and capital costs.

The cost of goods sold is the most basic explicit cost used in analyzing per-unit costs. Thus, in the equation above, a company could also break down its opportunity costs by units to arrive at a per-unit economic profit.

Individuals starting their own business might use economic profit as a proxy for their first year of business (since they have given up some prior opportunity). With large entities, business managers can potentially look more intricately at gross, operating, and net profit versus economic profit at different phases of the business operations.

Accounting profit, or net income, is determined by subtracting all costs from revenue for a particular accounting period. Economic profit is determined by going a step further and subtracting opportunity costs, as well. The former represents an actual figure that's included on financial statements. The latter can be used by company management to determine how effective its business decisions were. It can also be used before actions are taken to decide on the best business strategy to put to work.

Here's a quick reference chart that summarizes the differences between economic profit and accounting profit.

Table 11.2 – The differences between economic profit and accounting profit

<b>Economic Profit</b>	<b>Accounting Profit</b>
A theoretical financial figure based on assumptions	Actual profit (net income) is determined
Isn't part of financial statements or reported	Calculated according to GAAP (Generally Accepted Accounting Principles) and reported to IRS (The Internal Revenue Service)
Used for internal analysis	Used by investors to analyze a potential investment

<b>Economic Profit</b>	<b>Accounting Profit</b>
Illuminates for management the wisdom of various business options	Provides insight into how well management is running company
Can reveal how efficiently a company uses its resources	Is used to calculate investors' earnings per share

*Advantages and disadvantages of economic profit:*

*Advantages*

1. Economic profit figures can be helpful for business decision-making. By studying the effect on net income of subtracting not just explicit costs but the estimated costs of giving up potential business opportunities, companies can size up the wisdom of business ventures from high to low before launching one or more.

2. Economic profit can also be reviewed after the fact. Lessons can be learned about the choices that were made.

3. Economic profit can show management how efficiently the company has been using its resources.

*Disadvantages*

1. The economic profit figure is theoretical because opportunity costs are based on assumptions. Since the opportunity wasn't taken, a company doesn't know the exact amount of revenue that might have been made.

2. The calculation of economic profit over the short-term can lead to inappropriate conclusions about the business option chosen. That's because short-term losses can be inevitable before expected long-term profitability. It's smarter to analyze economic profits over long-term time periods.

*Examples of Economic Profit*

An individual starts a business and incurs startup costs of \$100,000. During the first year of operation, the business earns revenue of \$120,000. This results in an accounting profit of \$20,000. However, if the individual had stayed at her previous job, she would have made \$45,000. In this example, the individual's economic profit is equal to:

$$\$120,000 - \$100,000 - \$45,000 = (\$25,000)$$

This calculation only considers the first year of business. If after the first year, costs decrease to \$10,000 then the economic profit outlook would improve for future years. If economic profit comes out to zero, the company is said to be in a state of "normal profit."

In using economic profit in comparison to gross profit, a company may look at different types of scenarios. In this case, gross profit is the focus, and a company would subtract the opportunity cost per unit:

*Economic profit = revenue per unit - COGS per unit - unit opportunity cost*

If a company generates \$10 per unit from selling t-shirts with a \$5 cost per unit, then its gross profit per unit for t-shirts is \$5. However, if it could have produced shorts with revenue of \$10 and costs of \$2 then there would be an opportunity cost of \$8 as well:

$$\$10 - \$5 - \$8 = (\$3)$$

All things being equal, the company could have earned \$3 more per unit if they had produced shorts instead of t-shirts. Thus, the -\$3 per unit is considered an economic loss.

Companies can use this type of analysis to decide on production levels. More complex scenario analysis of profits may also factor in indirect costs or other types of implicit costs, depending on the expenditures involved in doing business as well as different phases of a business cycle.

#### **Part 4. Income definition: types, examples, and taxes**

Income refers to the money that a person or entity receives in exchange for their labor or products. Income may have different definitions depending on the context – for example, taxation, financial accounting, or economic analysis.

For most people, income means their total earnings in the form of wages and salaries, the return on their investments, pension distributions, and other receipts. For businesses, income means the revenues from selling services, products, and any interest and dividends received with respect to their cash accounts and reserves related to the business.

Economists have different definitions and ways of measuring income. Whether their studies involve earnings, savings, consumption, production, public finance, capital investment, or other related topics and subtopics, their concept of income will correspond to the purpose of their research. While the measure of income on a macro level is critical to societal and policy studies, individuals are more focused on their personal and business income.

- ✓ The term “income” generally refers to the amount of money, property, and other transfers of value received over a set period of time in exchange for services or products.
- ✓ There is no single, standard definition: income is defined according to the context in which the concept is used.
- ✓ Taxable income is the result of determining the annual total or gross income of an individual or entity and reducing that amount by the exclusions, exemptions, and deductions allowed under the tax law.
- ✓ Financial regulators, businesses, and investors focus on businesses’ annual financial statements, which are prepared in accordance with generally accepted accounting principles (GAAP).

There are different terms for income, depending on the quantity being measured. Gross income means the total value of one's salary or payments, without accounting for any cash outflows. Net income refers to the income left over after subtracting taxes or fees. For individual earners, discretionary income is the amount they have available after paying for necessary expenses.

For the purposes of taxation, income refers to the types of revenues that are eligible for income tax. These definitions may vary by jurisdiction—salaries and sales are typically considered part of one's taxable income, but inheritances and gifts usually are not.

### *Taxable Income*

For income tax purposes, the tax code attempts to define income to reflect taxpayers' actual economic position. The general tax framework applies to taxpayers' personal revenue (other than tax-exempt income) from all sources and offsets such revenue with deductions for expenses and losses to determine taxable income.

In addition, public policies may offer favorable taxation for people at certain income levels or for favored economic activities. Such policies include tax exemptions for government bonds, tax-favored treatment for retirement savings, tax credits for people below a certain income level, and promoting energy efficiency through special tax credits.

### *Types of Income in China*

#### Income tax

Chinese companies pay income tax on their worldwide income, foreign companies - on income from sources in China. The standard income tax rate is 25%. There are preferential tax rates for companies from certain industries (particularly high-tech), regions/zones and small businesses. Profits from the disposal of assets are taxed at the normal tax rates. Dividends received by a Chinese company from another Chinese company are tax-free, except for dividends from publicly traded companies with a holding period of less than 12 months.

If a Chinese company alone or jointly with other Chinese tax residents controls a foreign company from a low-tax jurisdiction (tax rate is less than half of China's, i.e. less than 12.5%), then its retained earnings may be included in the Chinese company's taxable income. Control arises if a company owns at least 10% of the voting shares of a foreign company, and in total, Chinese residents own, directly or indirectly, more than 50% of such shares. Control may also arise in other cases.

#### Withholding Tax

When paying income from sources in China, including dividends, interest, royalties, withholding tax is withheld at a rate of 10%. Tax rates are reduced in accordance with the provisions of double tax treaties

***The company has a net profit remaining at its disposal after paying all taxes on income and profits.***

## Part 5. Net income (NI) definition: uses, and how to calculate it

Net income (NI), also called net earnings, is calculated as sales minus cost of goods sold, selling, general and administrative expenses, operating expenses, depreciation, interest, taxes, and other expenses. It is a useful number for investors to assess how much revenue exceeds the expenses of an organization. This number appears on a company's income statement and is also an indicator of a company's profitability.

- ✓ Net income (NI) is calculated as revenues minus expenses, interest, and taxes.
- ✓ Earnings per share are calculated using NI.
- ✓ Investors should review the numbers used to calculate NI because expenses can be hidden in accounting methods, or revenues can be inflated.
- ✓ NI also represents an individual's total earnings or pre-tax earnings after factoring deductions and taxes in gross income.

Net income also refers to an individual's income after taking taxes and deductions into account.

Businesses use net income to calculate their earnings per share. Business analysts often refer to net income as the bottom line since it is at the bottom of the income statement.

To calculate net income for a business, start with a company's total revenue. From this figure, subtract the business's expenses and operating costs to calculate the business's earnings before tax. Deduct tax from this amount to find the NI.

Net income and profit are both business terms that refer to the excess of income over expenses. However, there is a fine difference: Net income is the difference between a company's total revenues and all expenses, including overhead and operational costs, taxes, depreciation and amortization of assets, and any other expenses. Profit refers to the revenue that remains after some expenses.

*Example. During the year, the company sold 15,000 units of products. The price of a unit of production is 20 monetary units. The cost of the annual volume amounted to 230,000 monetary units. Determine the results of the financial efficiency of the enterprise for the year (profit and net income). The income tax rate is 25%.*

1) Determine the cost of goods sold:

$$\text{CoGS} = 15,000 \cdot 20 = 300,000 \text{ monetary units}$$

2) Determine taxable income (its gross profit):

$$\text{Profit} = 300,000 - 230,000 = 70,000 \text{ monetary units}$$

3) Determine income tax payments:

$$\text{Income tax} = \frac{70,000 \cdot 25\%}{100\%} = 17,500 \text{ monetary units}$$

4) Let's determine the net income:

$$\text{Net income} = 70,000 - 17,500 = 52,500 \text{ monetary units}$$

## **TOPIC 12. EFFICIENCY OF PRODUCTION ACTIVITIES OF THE ENTERPRISE**

### **Part 1. Main categories and concepts of efficiency**

Economic efficiency is when all goods and factors of production in an economy are distributed or allocated to their most valuable uses and waste is eliminated or minimized. A system is considered economically efficient if the factors of production are used at a level at or near their capacity.

In contrast, a system is considered economically inefficient if available factors are not used to their capacity. Wasted resources and deadweight losses may cause economic inefficiencies.

- ✓ Economic efficiency refers to how effectively a society's scarce resources are used to produce goods.
- ✓ Economists have several ways of measuring economic efficiency, based on the allocation of inputs, costs, or the allocation of final consumer goods.
- ✓ Productive efficiency is a situation where firms seek the best combination of inputs to lower their costs of production.
- ✓ Allocative efficiency means that economic resources are distributed in a way that produces the highest consumer satisfaction relative to the cost of inputs.
- ✓ Pareto efficiency refers to a situation where it is impossible to improve one person's situation without harming another person's situation.

Pareto efficiency, or Pareto optimality, is an economic state where resources cannot be reallocated to make one individual better off without making at least one individual worse off. Pareto efficiency implies that resources are allocated in the most economically efficient manner, but does not imply equality or fairness. An economy is said to be in a Pareto optimum state when no economic changes can make one individual better off without making at least one other individual worse off.

Economic efficiency implies an economic state in which every resource is optimally allocated to serve each individual or entity in the best way while minimizing waste and inefficiency. When an economy is economically efficient, any changes made to assist one entity would harm another. In terms of production, goods are produced at their lowest possible cost, as are the variable inputs of production.

Some terms that encompass phases of economic efficiency include allocative efficiency, productive efficiency, distributive efficiency, and Pareto efficiency. A state of economic efficiency is essentially theoretical; a limit that can be approached but never reached. Instead, economists look at the amount of loss, referred to as waste, between pure efficiency and reality to see how efficiently an economy functions.

Productive firms seek to maximize their profits by bringing in the most revenue while minimizing costs. To do this, they choose a combination of inputs that minimizes their costs while producing as much output as possible. By doing so, they operate efficiently; when all firms in the economy do so, it is known as productive efficiency.

Consumers, likewise, seek to maximize their well-being by consuming combinations of final consumer goods that produce the highest total satisfaction of

their wants and needs at the lowest cost to them. The resulting consumer demand guides productive (through the laws of supply and demand) firms to produce the right quantities of consumer goods in the economy that will provide the highest consumer satisfaction relative to the costs of inputs. When economic resources are allocated across different firms and industries (each following the principle of productive efficiency) in a way that produces the right quantities of final consumer goods, this is called allocative efficiency.

Finally, because each individual values goods differently and according to the law of diminishing marginal utility, the distribution of final consumer goods in an economy is efficient or inefficient. Distributive efficiency is when the consumer goods in an economy are distributed so that each unit is consumed by the individual who values that unit most highly compared to all other individuals. Note that this type of efficiency assumes that the amount of value that individuals place on economic goods can be quantified and compared across individuals.

## **Part 2. Profitability Ratios**

**Profitability ratios** are a class of financial metrics that are used to assess a business's ability to generate earnings relative to its revenue, operating costs, balance sheet assets, or shareholders' equity over time, using data from a specific point in time. They are among the most popular metrics used in financial analysis.

Profitability ratios can be a window into the financial performance and health of a business. Ratios are best used as comparison tools rather than as metrics in isolation.

Profitability ratios can be used along with efficiency ratios, which consider how well a company uses its assets internally to generate income (as opposed to after-cost profits).

- ✓ Profitability ratios assess a company's ability to earn profits from its sales or operations, balance sheet assets, or shareholders' equity.
- ✓ They indicate how efficiently a company generates profit and value for shareholders.
- ✓ Profitability ratios include margin ratios and return ratios.
- ✓ Higher ratios are often more favorable than lower ratios, indicating success at converting revenue to profit.
- ✓ These ratios are used to assess a company's current performance compared to its past performance, the performance of other companies in its industry, or the industry average.

Profitability ratios can shed light on how well a company's management is operating a business. Investors can use them, along with other research, to determine whether or not a company might be a good investment.

Broadly speaking, higher profitability ratios can point to strengths and advantages that a company has, such as the ability to charge more (or less) for products and to maintain lower costs.

A company's profitability ratios are most useful when compared to those of similar companies, the company's own performance history, or average ratios for the



company's industry. Normally, a higher value relative to previous value indicates that the company is doing well.

Profitability ratios generally fall into two categories – margin ratios and return ratios.

Margin ratios give insight, from several different angles, into a company's ability to turn sales into a profit. Return ratios offer several different ways to examine how well a company generates a return for its shareholders using the money they've invested.

Some common examples of the two types of profitability ratios are:

- ✓ Gross margin
- ✓ Operating margin
- ✓ Pretax margin
- ✓ Net profit margin
- ✓ Cash flow margin
- ✓ Return on assets (ROA)
- ✓ Return on equity (ROE)
- ✓ Return on invested capital (ROIC)

### ***Margin Ratios***

Different profit margins are used to measure a company's profitability at various cost levels of inquiry. These profit margins include gross margin, operating margin, pretax margin, and net profit margin. The margins between profit and costs expand when costs are low and shrink as layers of additional costs (e.g., cost of goods sold (COGS), operating expenses, and taxes) are taken into consideration.

### ***Return Ratios***

Return ratios provide information that can be used to evaluate how well a company generates returns and creates wealth for its shareholders. These profitability ratios compare investments in assets or equity to net income. Those measurements can indicate a company's capability to manage these investments.

### ***Margin Ratios***

#### ***1) Gross Margin***

Gross profit margin, also known as gross margin, is one of the most widely used profitability ratios. Gross profit is the difference between sales revenue and the costs related to the products sold, the aforementioned COGS. Gross margin compares gross profit to revenue.

A company with a high gross margin compared to its peers likely has the ability to charge a premium for its products. It may indicate the company has an important competitive advantage. On the other hand, a pattern of declining gross margins may point to increased competition.

Some industries experience seasonality in their operations. For example, retailers typically experience significantly higher revenues and earnings during the year-end holiday season. Thus, it would be most informative and useful to compare a

retailer's fourth-quarter profit margin with its (or its peers') fourth-quarter profit margin from the previous year.

### *2) Operating Margin*

Operating margin is the percentage of sales left after accounting for COGS as well as normal operating expenses (e.g., sales and marketing, general expenses, administrative expenses). It compares operating profit to revenue.

Operating margin can indicate how efficiently a company manages its operations. That can provide insight into how well those in management keep costs down and maximize profitability.

A company with a higher operating margin than its peers can be considered to have more ability to handle its fixed costs and interest on obligations. It most likely can charge less than its competitors. And it's better positioned to weather the effects of a slowing economy.

### *3) Pretax Margin*

The pretax margin shows a company's profitability after accounting for all expenses including non-operating expenses (e.g., interest payments and inventory write-offs), except taxes.

As with other margin ratios, pretax margin compares revenue to costs. It can signal management's ability to run a business efficiently and effectively by boosting sales as it lowers costs.

A company with a high pretax profit margin compared to its peers can be considered a financially healthy company with the ability to price its products and/or services most appropriately.

### *4) Net Profit Margin*

The net profit margin, or net margin, reflects a company's ability to generate earnings after all expenses and taxes are accounted for. It's obtained by dividing net income into total revenue.

Net profit margin is seen as a bellwether of the overall financial well-being of a business. It can indicate whether company management is generating enough profit from its sales and keeping all costs under control.

Its drawback as a peer comparison tool is that, because it accounts for all expenses, it may reflect one-time expenses or an asset sale that would increase profits for just that period. Other companies won't have the same one-off transactions. That's why it's a good idea to look at other ratios, such as gross margin and operating margin, along with net profit margin.

### *5) Cash Flow Margin*

The cash flow margin measures how well a company converts sales revenue to cash. It reflects the relationship between cash flows from operating activities and sales.

Cash flow margin is a significant ratio for companies because cash is used to buy assets and pay expenses. That makes the management of cash flow very important. A greater cash flow margin indicates a greater amount of cash that can be used to pay, for example, shareholder dividends, vendors, and debt payments, or to purchase capital assets.

A company with negative cash flow is losing money despite the fact that it's producing revenue from sales. That can mean that it might need to borrow funds to keep operating.

A limited period of negative cash flow can result from cash being used to invest in, e.g., a major project to support the growth of the company. One could expect that that would have a beneficial effect on cash flow and cash flow margin in the long run.

### ***Return Ratios***

#### ***1) Return on Assets (ROA)***

Profitability is assessed relative to costs and expenses. It's analyzed in comparison to assets to see how effective a company is at deploying assets to generate sales and profits. The use of the term "return" in the ROA measure customarily refers to net profit or net income – the value of earnings from sales after all costs, expenses, and taxes. ROA is net income divided by total assets.

The more assets that a company has amassed, the greater the sales and potential profits the company may generate. As economies of scale help lower costs and improve margins, returns may grow at a faster rate than assets, ultimately increasing ROA.

#### ***2) Return on Equity (ROE)***

ROE is a key ratio for shareholders as it measures a company's ability to earn a return on its equity investments. ROE, calculated as net income divided by shareholders' equity, may increase without additional equity investments. The ratio can rise due to higher net income being generated from a larger asset base funded with debt.

A high ROE can be a sign to investors that a company may be an attractive investment. It can indicate that a company has the ability to generate cash and not have to rely on debt.

#### ***3) Return on Invested Capital (ROIC)***

This return ratio reflects how well a company puts its capital from all sources (including bondholders and shareholders) to work to generate a return for those investors. It's considered a more advanced metric than ROE because it involves more than just shareholder equity.

ROIC compares after-tax operating profit to total invested capital (again, from debt and equity). It's used internally to assess appropriate use of capital. ROIC is also used by investors for valuation purposes. ROIC that exceeds the company's weighted average cost of capital (WACC) can indicate value creation and a company that can trade at a premium.

The profitability ratios often considered most important for a business are gross margin, operating margin, and net profit margin.

They're significant because they can indicate the ability to make regular profits (after accounting for costs), and how well a company manages investments for a return for shareholders. They can reflect management's ability to achieve these two goals, as well as the company's overall financial well-being.

## II. PRACTICAL SECTION

### PRACTICAL LESSON NO. 1. COST STRUCTURES

**Fill in the following Chart Pancakes Fixed Cost Variable Cost Total Cost Marginal Cost Average...**

Question: Fill in the following Chart

Pancakes	Fixed Cost	Variable Cost	Total Cost	Marginal Cost	Average Variable	Average Fixed	Average Total
1	_____	_____	_____	_____	_____	_____	250
2	_____	_____	_____	100	_____	_____	_____
3	_____	_____	_____	_____	100	_____	_____
4	200	_____	700	_____	_____	_____	_____
5	_____	750	_____	_____	_____	_____	_____
6	_____	_____	_____	300	_____	_____	_____
7	_____	_____	_____	_____	200	_____	_____
8	_____	1800	_____	_____	_____	_____	_____

#### Types of Costs

Economists differentiate costs for firms in the short run. This means there are some costs in which firms are unable to change, such as rent, management and insurance. Other costs change as production increases, these are variable costs. The rate at which variable costs change is known as the marginal cost of production.

#### Answer and Explanation:





Here is the solution to this problem:

In the short run, fixed costs will not change. Total costs are fixed plus variable costs. Any average cost is the cost divided by the quantity. Average fixed costs plus average variable costs must equal average total cost. Marginal costs are found by calculating the change in total cost, divided by the change in quantity, which in this case is just 1.

To begin with, fixed costs won't change, so they are always 200. Average fixed cost is just 200 divided by the quantity. For the first pancake, average total cost is given as 250. Average fixed cost is 200 since its  $FC/Q$ . That means the average variable cost and variable cost must both be 50. Since the marginal cost of the second unit is 100, the increase in variable costs must be 100, so its 150. Average variable cost for producing 7 units is given as 200, so 200 multiplied by 7 is 1400. The rest of the problem is solved by inserting the known information into the table and the previously used formulas.

**PRACTICAL LESSON NO. 2.**  
**CLASSIFICATION OF FACTORS OF PRODUCTION**

Take a look at this list of things that have value. Which of them would you place in the category of LABOR? Which are LAND? Which are CAPITAL? Are there some that don't fit in any of the three (ex. CLAIMS ON WEALTH or WEALTH FOR CONSUMPTION)?

Food in a Restaurant	 <b>LABOR</b>
The car you drive	
Oil in the Ground	
Your Mom's old House, which you Rent to Tenants	 <b>LAND</b>
Fish in the Ocean	
Teaching	 <b>CAPITAL</b>
A Building Site	
Food on your table	
A \$100 Bill	 <b>WEALTH FOR CONSUMPTION</b>
A House You Live in	
A Truck	 <b>CLAIMS ON WEALTH</b>
Potassium salt	
Ditch Digging	
Computer Programming	
A Certificate for 100 Shares of Microsoft	

## PRACTICAL LESSON NO. 3. PERSONNEL MANAGEMENT

*Complete the comparison table with the missing descriptions.*

BASIS FOR COMPARISON	PERSONNEL MANAGEMENT	HUMAN RESOURCE MANAGEMENT
Meaning	The aspect of management that is concerned with the work force and their relationship with the entity is known as Personnel Management.	The branch of management that focuses on the most effective use of the manpower of an entity, to achieve the organizational goals is known as Human Resource Management.
Approach		Modern
Treatment of manpower		
Type of function		
Basis of Pay		
Management Role	Transactional	
Communication		
Labor Management		Individual Contracts
Initiatives		
Management Actions	Procedure	
Decision Making		
Job Design	Division of Labor	
Focus	Primarily on mundane activities like employee hiring, remunerating, training, and harmony.	Treat manpower of the organization as valued assets, to be valued, used and preserved.

- Traditional
- Machines or Tools
- Groups/Teams
- Asset
- Job Evaluation
- Performance Evaluation
- Routine function
- Strategic function
- Transformational
- Integrated
- Piecemeal
- Indirect
- Direct
- Business needs
- Collective Bargaining Contracts
- Slow
- Fast

## PRACTICAL LESSON NO. 4. DEPRECIATION OF FIXED ASSETS

### FIXED ASSETS AND THE DEPRECIATION

According to table 1 "Initial data" the student finds information about the cost of fixed assets and the rate of depreciation in accordance with the given option. Calculates depreciation charges using three methods: the straight-line method, the sum of years, and the diminishing balance method.

Table 4.1 – Initial data

No. option	Shock absorber price, million \$.	Useful life, years	No. option	Shock absorber price, million \$.	Useful life, years
1	125,0	10	34	150,0	7
2	130,0	8	35	155,0	11
3	135,0	7	36	160,0	8
4	140,0	5	37	165,0	14
5	145,0	9	38	170,0	12
6	150,0	6	39	175,0	10
7	155,0	12	40	180,0	9
8	160,0	10	41	190,0	7
9	165,0	8	42	195,0	11
10	170,0	7	43	200,0	8
11	175,0	5	44	205,0	14
12	180,0	9	45	210,0	12
13	185,0	6	46	215,0	10
14	190,0	12	47	220,0	9
15	195,0	10	48	225,0	7
16	200,0	8	49	230,0	11
17	205,0	7	50	235,0	8
18	210,0	5	51	245,0	12
19	215,0	9	52	250,0	10

No. option	Shock absorber price, million \$.	Useful life, years	No. option	Shock absorber price, million \$.	Useful life, years
20	220,0	6	53	255,0	9
21	225,0	10	54	260,0	7
22	230,0	8	55	265,0	11
23	235,0	7	56	270,0	8
24	240,0	5	57	275,0	14
25	245,0	9	58	280,0	12
26	250,0	6	59	285,0	10
27	255,0	12	60	290,0	9
28	260,0	10	61	300,0	10
29	265,0	8	62	370,0	15
30	270,0	7	63	310,0	12
31	135,0	12	64	330,0	13
32	140,0	10	65	340,0	14
33	145,0	9	66	360,0	11

The results of the calculations should be summarized in tables, the form of which is presented below.

**\* You use only the number of lines equal to the asset's useful life**

Table 4.2 – Calculation of annual depreciation charges by linear method

Year	Annual depreciation charges, mln. \$	Sum accumulated depreciation, million \$	Residual value at the beginning of the year, million \$	Residual value at the end of the year, million \$
1				
2				
3				
...				
N				



Table 4.3 – Calculation of annual depreciation charges by the sum of the numbers of years

Year	Norm of depreciation, %	Number of years of operation remaining	Annual depreciation charges, mln. \$	Sum accumulated depreciation, million \$	Residual value at the end of the year, million \$
1					
2					
3					
...					
N					

Table 4.4 – Calculation of annual depreciation charges by the method reducing balance

Year	Norm of depreciation, %	Annual depreciation charges, mln. \$	Sum accumulated depreciation, million \$	Residual value at the beginning of the year, million \$	Residual value at the end of the year, million \$
1					
2					
3					
...					
N					

Table 4.5 – Comparative values of annual depreciation deductions

Year	Depreciation methods		
	Linear	The sum of the numbers of years	Declining balance
1			
2			
3			
...			
N			

## **PRACTICAL LESSON NO. 5. RATE OF WORKING ASSETS**

### **Objective:**

Students must learn to determine the annual need for materials, master the methodology for calculating the standard of working capital of an enterprise and study methods for analyzing the use of working capital.

### **Work order**

The description is given in table 5.1. Details are presented in Table 5.2.

The student must determine from the initial data of tables 5.1, 5.2, 5.3 in accordance with the preference number:

- I) Determine the need for basic materials for the annual production volume:
  - a) in natural expression;
  - b) in value terms.

It is necessary to make calculations of the following individual elements when determining the general standard of working capital, using the original ones:

1. Production stocks, including:
  - 1.1. Basic materials;
  - 1.2. Auxiliary materials;
  - 1.3. Fuel.
2. Low-value and wearing items.
3. Work in progress.
4. Finished products in the warehouse of the enterprise.

II) Calculate the standards for the following elements of the company's working capital for the planned year: basic materials; auxiliary materials; fuel; low-value and fast-wearing items; work in progress; finished products in the warehouse of the enterprise.

III) Calculate planned indicators for the use of material resources and working capital: the turnover ratio and the duration of one turnover. Draw conclusions about the use of materials and working capital.

IV) Determine the structure of working capital as a percentage. Suggest methods for reducing the amount of working capital.

The results of the calculations should be presented in the table.

Table 5.1 – Initial data. Production information

Variant number	Product composition, (part numbers)	Product release plan, pieces per year, $R_y$	Product prime cost, \$, C	Wholesale price of the product, \$, $P_w$	Duration of the production cycle, days, $D_{pc}$	Stock rate of finished products, days, $N_{fg}$
1, 31	1,9,17	1100	820	950	25	3
2, 32	2,10,18	1200	740	870	35	3
3, 33	3,11,19	1300	660	790	40	4
4, 34	4,12,20	1400	930	1300	30	4
5, 35	5,13,21	1500	1220	1350	44	3
6, 36	6,14,22	1600	1240	1380	26	3
7, 37	7,15,23	1700	860	1000	36	4
8, 38	8,16,24	1800	1280	1420	41	4
9, 39	9,17,25	1900	1405	1650	31	3
10, 40	6,15,24	2000	1315	1460	43	4
11, 41	5,14,23	1950	425	495	27	5
12, 42	4,13,22	1850	735	885	37	3
13, 43	3,12,21	1750	1140	1300	42	4
14, 44	2,11,20	1650	850	995	28	5
15, 45	1,10,19	1550	490	555	38	3
16, 46	8,15,25	1450	1470	1835	40	3
17, 47	7,14,24	1350	1500	1655	24	4
18, 48	6,13,23	1250	990	1270	33	4
19, 49	5,12,22	1150	705	860	47	5
20, 50	4,11,21	1400	815	970	23	5
21, 51	3,10,20	1600	825	1025	37	3
22, 52	2,9,19	1700	735	1040	45	4
23, 53	1,2,3	1800	245	350	24	5
24, 54	4,5,6	1900	550	685	38	4
25, 55	7,8,9	2000	570	690	42	3
26, 56	10,11,12	2100	1215	1460	43	4
27, 57	5,14,23	1950	1825	1995	27	5
28, 58	13,14,15	1850	1135	1585	40	3
29, 59	3,12,21	1750	1140	1380	41	4
30, 60	16,17,18	1650	1150	1495	28	5

Table 5.2 – Initial data. Part Details

No. details	Material (brand)	Workpiece weight, kg, $w_w$	Finished part weight, kg, $w_{fp}$	Interval between two successive deliveries, days, $T_d$	Deviation time from delivery dates, days, $\Delta T_d$	Material price, \$/kg, $P_m$
1	2	3	4	5	6	7
1	Steel45,round 20	2,0	1,6	42	3	9,5
2	Steel35,round 16	3,0	2,5	44	4	9,0
3	Steel40,round 50	3,5	2,9	46	5	17,5
4	Steel30,round 80	3,9	3,1	48	6	17,0
5	Steel20,round 25	4,0	3,2	47	5	19,0
6	65G, sheet4	7,6	6,6	46	4	15,5
7	Steel 45, sheet 10	10,6	9,0	43	3	17,0
8	Steel 35, sheet 20	8,7	6,9	41	2	16,0
9	Steel40H,round 100	5,5	4,1	40	8	16,5
10	BrassL-62	2,9	1,9	39	7	86,0
11	BrassLS-59	3,1	2,3	38	6	76,0
12	BrassL-62	4,9	4,0	37	5	86,0
13	BrassL-62	5,7	4,1	36	4	86,0
14	BrassLS-59	7,9	5,1	37	3	76,0
15	Bronze, casting	3,1	2,1	35	4	105,0
16	Bronze, casting	3,8	2,4	36	5	105,0
17	Bronze, casting	3,9	2,9	34	6	105,0
18	Cast iron	4,8	3,1	33	7	27,0
19	Cast iron	7,0	5,1	38	8	27,0
20	Aluminum A-1	3,8	2,4	39	2	101,0
21	Aluminum A-1	4,5	3,1	40	3	101,0
22	Ductile iron	5,4	3,9	42	5	22,0
23	Ductile iron	6,3	4,2	45	6	22,0
24	Zinc alloy	7,8	5,6	48	7	69,0
25	Zinc alloy	8,1	5,9	41	8	69,0

Table 5.3 – Initial data. Annual consumption and stock rates of auxiliary materials, fuel and low-value wearing items, thousand \$

Variant number	Auxiliary materials		Fuel		Low-value and consumable items	
	Consumption Cyear	Material stock rate, days, $R_{ms}$	Consumption Cyear	Fuel stock rate, days, $R_{fs}$	Consumption Cyear	Stock rate, days, $R_{ms}$
1, 31	125	50	900	80	250	70
2, 32	146	60	950	75	175	65
3, 33	168	70	870	70	155	60
4, 34	172	45	710	65	215	55
5, 35	184	55	750	60	179	50
6, 36	196	65	730	55	168	45
7, 37	210	75	690	50	74	40
8, 38	220	50	630	45	175	35
9, 39	244	55	650	40	199	30
10, 40	256	60	610	35	85	25
11, 41	239	65	590	30	217	85
12, 42	218	70	570	60	89	80
13, 43	193	45	550	50	145	75
14, 44	173	50	530	70	134	70
15, 45	167	55	510	65	121	65
16, 46	151	60	490	60	115	60
17, 47	142	65	470	55	93	55
18, 48	137	70	450	50	105	50
19, 49	127	45	430	45	111	45
20, 50	118	50	410	40	128	40
21, 51	198	55	390	35	133	35
22, 52	172	60	370	30	177	30
23, 53	175	65	360	25	155	60
24, 54	177	60	350	30	217	50
25, 55	171	70	340	40	99	55
26, 56	184	50	750	60	179	50
27, 57	196	65	730	55	168	45
28, 58	211	70	690	50	74	40
29, 59	215	65	630	45	175	35
30, 60	224	55	650	40	199	30

Initial data and calculations are obtained in result tables 5.4 – 5.9.

Table 5.4 – Initial data. Product manufacturing

Indicators	Item number		
Production plan per year, pieces			
Material name			
The prime cost of the product, \$			
Duration of the production cycle, days			
Stock rate of finished products, days			
Workpiece weight, kg			
Finished part weight, kg			
Interval between two successive deliveries, days			
Time of deviation from delivery dates, days			
Material price, \$/kg			

Table 5.5 – Initial data. Auxiliary materials, fuel and low-value and wearing items

Variant number	Auxiliary materials		Fuel		Low-value and consumable items	
	Consumption/year	Material stock rate, days, $R_{ms}$	Consumption/year	Fuel stock rate, days, $R_{fs}$	Consumption/year	Stock rate, days, $R_{ms}$

Table 5.6 – Calculation of the standard of working capital required to create stocks of basic materials

Material (brand)	Daily output, pieces	Daily material consumption, kg	Maximum current stock, kg	Safety stock, kg	Total stock, kg	Working capital ratio, \$

\* Maximum current stock:  $S_{max} = ADC \cdot T_d$

Safety stock:  $S_{saf} = ADC \cdot \Delta T$

Total stock:  $S_{total} = S_{max} + S_{saf} = ADC \cdot (T_d + \Delta T)$

Average stock:  $S_{av} = ADC \cdot (T_d/2 + \Delta T)$

Table 5.7 – The standard of working capital required for the formation of work in progress

Item number	Daily output, pieces	Duration of the production cycle, days	The prime cost of the product, \$	Cost increase factor	Working capital ratio, \$

Table 5.8 – The standard of working capital required for the formation of stocks of finished products

Item number	Daily output, pieces	Duration of the production cycle, days	The prime cost of the product, \$	Working capital ratio, \$

Table 5.9 – Composition of normalized working capital

Name of element of working capital	Working capital ratio, \$	Working capital structure, %
1. Basic materials		
2. Auxiliary materials		
3. Fuel		
4. Low-value consumables		
5. Work in progress		
6. Finished products		
<b>Total:</b>		<b>100</b>

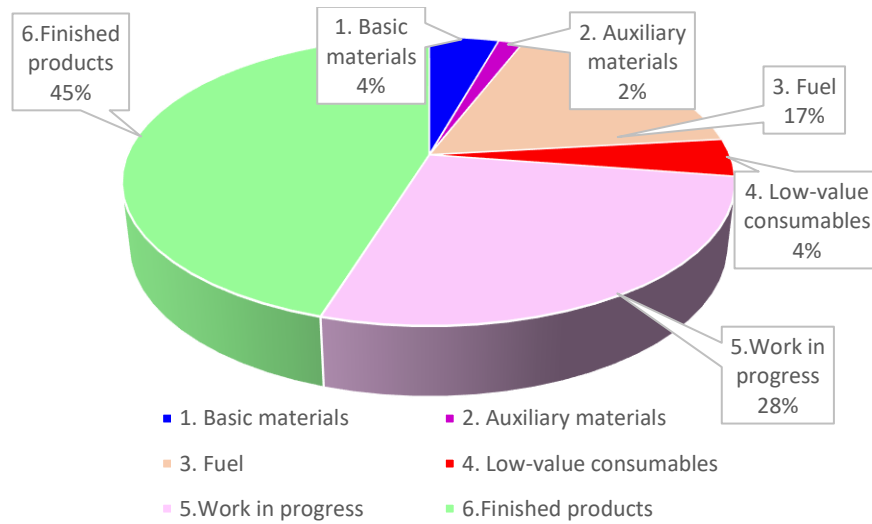


Fig.5.1 – An example of the structure of an enterprise's working capital

## **PRACTICAL LESSON NO. 6. MANPOWER**

### **Task 1. Calculating the coefficient of turnover**

In January, 2019, 10 employees worked in the massage salon: an administrator, a cleaning woman and 8 craftsmen. In February, two masters quit; three new ones took their place. In April came another master. In May, it was decided to hire a junior administrator, and in June, due to the expansion of activities, they hired another cleaner. In September, one master asked for a calculation, since he moved to another city. Thus, for the year 3 people were fired, 5 were recruited.

It is required to calculate the annual turnover rate of this salon.

Decision:

First, we determine the average number of employees:

C1 (January) - 10 people;

C2 (February) -  $10 - 2 + 3 = 11$  people;

C3 (March) - 11 people;

C4 (April) - 12 people;

C5 (May) - 13 people;

C6 (June) - 14 people;

C7 (August) - 14 people;

C8 (September) - 13 people;

C9 – C12 (October-December) - 13 people.

### **Task 2.**

The average number of employees of the enterprise for the year amounted to 600 people.

During a year:

37 people were voluntarily dismissed;

5 people were fired for violation of labor discipline;

11 people retired;

enrolled in educational institutions and 13 people were called up to the Armed Forces;

transferred to other positions and to other departments of the enterprise 30 people

Determine the turnover rate.

### **Task 3.**

The average number of employees of the enterprise for the year was 1 000 people. Under the employment contract this year, 200 people were enrolled in the company. Calculate the turnover ratio for the reception.

### **Task 4.**



The payroll at the beginning of the reporting period was 6,714 people.

Retired during the reporting period - a total of 388 people.

Including for the reasons:

transfer to other companies - expiration of the contract – 67 people

transition to study, military service, retirement and other reasons provided by law – 82 people

of their own accord – 196 people

layoffs – 30 people

dismissal for absenteeism and other violations of labor discipline – 13 people.

It is required to determine the turnover rate.

### III. LIST OF COURSE WORK SECTIONS

Introduction\_\_\_\_\_

1. Justification of the goals and objectives of the work
2. Calculation of the amount of equipment
3. Calculation of the number of employees
4. Calculation of the size of the production area
5. Calculation of investments in fixed capital
6. Calculation of current costs for the volume of output
7. Calculation of the need for working capital
8. Determination of the results of the financial activity of the enterprise
9. Determining the financial efficiency of the project
10. Economic efficiency indicators

Conclusion

*List of graphic material (with an exact indication of the required drawings and schedules)*

1. The structure of the cost of production and working capital
2. Break even point chart

**IV. ACADEMIC PROGRAMME OF HIGHER EDUCATIONAL  
ESTABLISHMENT IN ACADEMIC DISCIPLINE FOR SPECIALITY**

**Belarusian National Technical University**

**APPROVED BY**

VICE-RECTOR for academic affairs  
of the Belarusian National Technical  
University

\_\_\_\_\_ Yu.A. Nikolaychik

\_\_\_\_\_  
Registration № \_\_\_\_\_

**ENTERPRISE ECONOMY / ЭКОНОМИКА ПРЕДПРИЯТИЯ**

**Academic programme of higher educational establishment  
in academic discipline for speciality**

**6-05-0713-04 «Automation of technological processes and production» /  
«Автоматизация технологических процессов и производств»**

**profiling «Automation of technological processes and production in the energy  
sector» / «Автоматизация технологических процессов и производств в  
энергетике», «Automation of technological processes and production in  
instrument making and radio electronics» / «Автоматизация технологических  
процессов и производств в приборостроении и радиоэлектронике»;**

**6-05-0713-05 «Robotic systems» / «Робототехнические системы»**

Minsk 2024

The academic programme is based on educational standards

OSVO 6-05-0713-04-2023, OSVO 6-05-0713-05-2023 and syllabus for the speciality 6-05-0713-04 «Automation of technological processes and production» profiling «Automation of technological processes and production in the energy sector», «Automation of technological processes and production in instrument making and radio electronics»; 6-05-0713-05 «Robotic systems»

**COMPILED BY:**

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I.V. Nasonova, associate Professor of the Department of Management, Belarusian State University of Informatics and Radioelectronics, Candidate of Economic Sciences.

**RECOMMENDED FOR APPROVAL BY:**

Department of Engineering Economics of the Belarusian National Technical University

(minutes № 4 dated 14.11.2023)

Head of the department \_\_\_\_\_ T.A. Sakhnovich  
signature

Methodical commission of the Faculty of Information Technologies and Robotics of the Belarusian National Technical University

(minutes №\_\_ dated \_\_\_\_\_ 20\_\_)

Chairman of the methodical \_\_\_\_\_  
commission

Scientific library of BNTU \_\_\_\_\_ T.N. Biryukova

Scientific and Methodical Council of the Belarusian national technical university  
(minutes №\_\_ units № 1 dated \_\_\_\_\_ 20\_\_)

## EXPLANATORY NOTE

The academic programme for the academic discipline «Enterprise Economics» was designed for speciality 6-05-0713-04 «Automation of technological processes and production» profiling «Automation of technological processes and production in the energy sector», «Automation of technological processes and production in instrument making and radio electronics»; 6-05-0713-05 «Robotic systems».

The goal of studying the academic discipline “Enterprise Economics” is the formation of theoretical knowledge, practical skills and abilities that form analytical thinking in future specialists to solve strategic and current problems that ensure the effective functioning and development of production and economic activity of enterprises (organizations).

The main objectives of the discipline “Enterprise Economics” are:

- formation in students of an idea (concept) about the features of the development of the national economy of the Republic of Belarus;
- formation of an idea (concept) about the role and place of enterprises (organizations) of various forms of ownership in the development of the National Economy of the Republic of Belarus;
- formation of knowledge about the subject of the discipline, methods of conducting economic analysis, assessment and control over the production and economic activity of an enterprise (organization);
- formation of knowledge of modern methods of substantiating economic decisions and the ability to apply them in the implementation of strategic and current tasks of increasing the efficiency of production and economic activity of an enterprise (organization).

Studying the discipline «Enterprise economy» is based on the knowledge gained from studying such disciplines as «Economic theory» and «Sociology». The knowledge and skills acquired by students while studying this discipline are necessary for mastering subsequent special disciplines, such as «Systems Analysis and Operations Research», «Automated information systems», as well as for coursework and graduation projects.

As a result of studying the academic discipline, the student must:

**know:**

- national strategy for sustainable socio-economic development of the Republic of Belarus;
- the essence of the main economic categories and concepts, methods of implementing the economic laws of enterprise development;
- features of the creation, operation and closure of enterprises of various forms of ownership;
- fundamentals of enterprise management and methods of economic substantiation of management decisions;
- methods for assessing the availability, movement and efficiency of using the main economic resources of an enterprise;
- methods for calculating depreciation of fixed assets;
- sources and factors for reducing the cost of products (works, services) and its impact on the competitiveness of the enterprise;

- ways to increase profits and profitability;
- scientific foundations and ways to increase production efficiency, save all types of resources;

**be able to:**

- use legal regulatory materials regulating the production and economic activity of the enterprise;
- formulate and solve economic problems;
- calculate and analyze the economic indicators of the production and economic activity of the enterprise;
- carry out technical and economic calculations and economically justify decisions made within the framework of future professional activity;
- make payments for work performed;
- carry out calculations of the economic efficiency of the main aspects of the production and economic activity of the enterprise;

**have a skill:**

- methods for assessing the availability, movement and efficiency of using the main economic resources of an enterprise;
- methods of calculating depreciation of fixed assets;
- methods of calculating taxes, planning prices, assessing the financial condition of an enterprise;
- methods for calculating the economic efficiency of the main aspects of the production and economic activity of the enterprise.

Mastering this academic discipline should ensure the formation of the following competence:

SC-4 for the major “Industrial robots and robotic systems”, speciality 6-05-0713-05 “Robotic systems”): use the basics of economics, methods of conducting production surveys and preparing a feasibility study for the project when developing production;

SC-1 (for the major "Automation of technological processes and production in instrument making and radio electronics" speciality 6-05-0713-04 "Automation of technological processes and production": apply the laws of development of market relations, principles of enterprise management, taking into account technical, financial and human factors;

SC-6 (for the major “Automation of technological processes and production in the energy sector”, speciality 6-05-0713-04 “Automation of technological processes and production”: know the basics of the economics of an enterprise, be able to conduct a production survey and draw up a feasibility study for the project.

According to the curriculum for full-time (full-time) higher education in the speciality 6-05-0713-04 “Automation of technological processes and production” of the profiles “Automation of technological processes and production in the energy sector”, “Automation of technological processes and production in instrument engineering and radio electronics”, only 130 hours are allocated for studying academic disciplines, including in-class 68 hours.

According to the curriculum for full-time (full-time) higher education in the speciality 6-05-0713-05 “Robotic systems”, only 170 hours are allocated for studying academic disciplines, including in-class 68 hours. 40 hours of independent work are allotted for course paper.

The distribution of in-class hours by courses, semesters and types of classes is shown below.

Table 1

Full-time higher education by speciality 6-05-0713-04 «Automation of technological processes and production» profiling «Automation of technological processes and production in the energy sector», «Automation of technological processes and production in instrument making and radio electronics»					
Course	Semester	Lectures, h.	Labouratory classes, h.	Practical trainings, h.	Intermediate assessment form
3	5	34	-	34	test

Table 2

Full-time higher education by speciality 6-05-0713-05 «Robotic systems»					
Course	Semester	Lectures, h.	Labouratory classes, h.	Practical trainings, h.	Intermediate assessment form
3	5	34	-	34	test, defense of course paper

## **LEARNING MATERIAL CONTENT**

### **UNIT I. ENTERPRISE IN THE SYSTEM OF NATIONAL ECONOMY**

#### **Topic 1.1. Enterprise economics as an economic science and as a field of activity. Basics of enterprise management**

Purpose and objectives, object and subject of study of the discipline. The place of the discipline in the system of economic sciences. Features of the development of the national economy in modern conditions. An enterprise as an element of the national economy and as an economic entity. Classification of enterprises. Economic environment of the enterprise. Properties of the external economic environment (macroenvironment) of the functioning of the enterprise, its assessment. Properties of the internal economic environment (microenvironment) of the functioning of the enterprise, its assessment. Types of activity of the enterprise and their distinctive features.

Contents, goals and objectives of enterprise management. Basic management functions: forecasting and planning of enterprise activity, organization of production, analytical and accounting functions, coordination, control, stimulation. The control and managed subsystems of the enterprise are subjects and objects of management.

### **UNIT II. ENTERPRISE RESOURCES**

#### **Topic 2.1. Production resources and factors of production**

The concept of production resources, their classification and structure. Resource base of an industrial enterprise. Production resources as factors of production. The concept of resource consumption and resource saving in an enterprise. State priorities in the field of resource conservation at the current stage of development of the National Economy. Problems of balanced provision of the production process with material, intangible, information, human and financial resources.

#### **Topic 2.2. Fixed assets and intangible assets of the enterprise**

Economic essence of fixed assets, their classification. Accounting and valuation of fixed assets. Physical and moral wear and tear of fixed assets. Depreciation of fixed assets. Methods for calculating depreciation. Depreciation policy of the enterprise.

Methods for determining an enterprise's need for fixed assets. Indicators of use of fixed assets. Main factors and directions for improving the use of fixed assets. Simple and expanded reproduction of fixed assets, their forms and sources of financing.

The concept of intangible assets, their classification. Objects of industrial property. Methods for calculating amortization of intangible assets. Accounting and valuation of intangible assets. Main factors and directions for improving the use of intangible assets.



### **Topic 2.3. Working capital of the enterprise**

Economic essence, structure, circulation of working capital of the enterprise. Classification of working capital.

Standardized and non-standardized working capital. Methods for rationing working capital.

Determining the enterprise's need for working capital. Sources of formation and replenishment of working capital. Indicators of the level of efficiency in the use of working capital. Main factors and directions for improving the use of working capital.

### **Topic 2.4. Enterprise labour resources and organization of remuneration**

The concept of enterprise labour resources. Composition and structure of the enterprise personnel. Calculation and statistics of the number of employees. Balance of working time for one employee.

The essence and principles of organizing remuneration, its functions. Composition of an employee's salary. Tariff system of the Republic of Belarus, its structure. Tariff-free (flexible) wage systems. Forms and systems of remuneration, their characteristics. Payroll Fund.

Labour productivity and the economic significance of its growth. Labour productivity indicators: natural, labour, cost. Reserves for growth of labour productivity.

## **UNIT III. ENTERPRISE OPERATION**

### **Topic 3.1. Manufacturing program. Productive capacity**

The concept of a production program. Formation of a production program. Optimization of the production program.

Enterprise production capacity: concept and determining factors. Calculation of production capacity of enterprise divisions.

### **Topic 3.2. Costs of production and sales of products. Cost of products, works, services**

The concept of costs (costs), expenses and costs of production and production. Composition of costs included in the cost of production. Classification of costs for production and sales of products.

Factors determining the cost structure. Organization of cost accounting. Calculation of indirect (overhead) costs. Calculation of product costs. Types of cost according to the place where costs are formed.

Unit cost structure. Sources, factors and main directions for optimizing costs for production and sales of products.

### **Topic 3.3. Tax Basics**

The concept of taxes and non-tax payments (deductions), the tax system and the tax mechanism. Principles of taxation. Functions of taxes. Basic elements of the tax system. Tax rates and benefits. Sources of tax payment.

Classification of taxes. Tax policy of the enterprise. Taxes included in the price of the enterprise (indirect turnover taxes). Taxes included in the cost of production. Taxes and deductions paid by an enterprise from profits.

### **Topic 3.4. Pricing Basics**

Economic content of the price. The purpose and objectives of pricing. Principles and functions of pricing. Factors determining the level and dynamics of prices.

Types of prices, price composition by elements. Justification of prices for the company's products. Pricing methods. Pricing policy of the enterprise: strategy and pricing tactics. State regulation of prices for enterprise products.

## **UNIT IV. PERFORMANCE OF THE ENTERPRISE**

### **Topic 4.1. Income, revenue and profit of the enterprise. Product and production profitability**

The concept of income, revenue and profit of an enterprise. The types of activity of the enterprise by which income is determined. Revenue recognition.

The economic content of profit, its role in the effective functioning and development of the enterprise. Types of profit. Formation, distribution and use of profit in the enterprise.

The concept of profitability. Profitability of production and profitability of products.

### **Topic 4.2. Enterprise performance efficiency**

The concept of effect and efficiency. Types of effects from the activity of the enterprise. Economic efficiency of the enterprise and the use of its resources. Efficiency of production and functional departments.

Indicators of economic efficiency Criteria for the economic efficiency of an enterprise. Methods for determining the economic efficiency of enterprises.

## **COURSE PAPER REQUIREMENTS**

In accordance with the academic programme, only 40 hours of individual work are allotted for course paper. Course paper is carried out using the example of complex high-tech products. With the design task, each student is given the necessary initial data and appropriate recommendations.

## EDUCATIONAL AND METHODOLOGICAL MAP OF THE ACADEMIC DISCIPLINE

### full-time education

(speciality 6-05-0713-04 “Automation of technological processes and production”

profiles “Automation of technological processes and production in the energy sector” and “Automation of technological processes and production in instrument engineering and radio electronics”)

Unit number, topic	Name of unit, topic	Number of in-class hours					Individual work, hours	Knowledge control form
		Lectures	Practical trainings	Seminars	Labouratory classes	Other		
1	2	3	4	5	6	7	8	9
	5th semester							
1	ENTERPRISE IN THE NATIONAL ECONOMY SYSTEM							
1.1.	Enterprise economics as an economic science and as a field of activity. Basics of enterprise management	2					6	
	Practical training No. 1. External and internal economic environment of the enterprise		2					Survey
2	ENTERPRISE RESOURCES							
2.1.	Production resources and factors of production	2					4	
2.2.	Fixed assets and intangible assets of the enterprise	4					4	
	Practical training No. 2. Fixed assets of the enterprise		4					Test
	Practical training No. 3. Intangible assets		2					Survey

Unit number, topic	Name of unit, topic	Number of in-class hours					Individual work, hours	Knowledge control form
		Lectures	Practical trainings	Seminars	Labouratory classes	Other		
1	2	3	4	5	6	7	8	9
2.3.	Working capital of the enterprise	4					6	
	Practical training No. 4. Working capital of the enterprise		4					Test
2.4.	Enterprise labour resources and organization of remuneration	4					6	
	Practical training No. 5. Enterprise labour resources		2					Test
	Practical training No. 6. Organization of remuneration at the enterprise		2					Test
3	ENTERPRISE OPERATION							
3.1.	Manufacturing program. Productive capacity	2					4	
	Practical training No. 7. Production program. Productive capacity		2					Survey
3.2.	Costs of production and sales of products. Cost of products, works, services	4					6	
	Practical training No. 8. Enterprise expenses and production costs		4					Test
3.3.	Tax Basics	2					4	
	Practical training No. 9. Basics of taxation		2					Survey
3.4.	Pricing Basics	2					4	
	Practical training No. 10. Basics of pricing		2					Test

Unit number, topic	Name of unit, topic	Number of in-class hours					Individual work, hours	Knowledge control form
		Lectures	Practical trainings	Seminars	Labouratory classes	Other		
1	2	3	4	5	6	7	8	9
4.	PERFORMANCE OF THE ENTERPRISE							
4.1.	Income, revenue and profit of the enterprise. Product and production profitability	4					6	
	Practical training No. 11. Income, revenue, profit of the enterprise. Product profitability and production profitability		4					Test
4.2.	Enterprise performance efficiency	4					6	
	Practical training No. 12. Efficiency of the enterprise. Basic methods of economic justification of technical solutions		4					Test
	Total for the semester	34	34					Test
	Total academic hours	68					130	

## EDUCATIONAL AND METHODOLOGICAL MAP OF THE ACADEMIC DISCIPLINE

### full-time education

#### (specialty 6-05-0713-05 “Robotic systems”)

Unit number, topic	Name of unit, topic	Number of in-class hours					Individual work, hours	Knowledge control form
		Lectures	Practical trainings	Seminars	Labouratory classes	Other		
1	2	3	4	5	6	7	8	9
	5th semester							
1	ENTERPRISE IN THE NATIONAL ECONOMY SYSTEM							
1.1.	Enterprise economics as an economic science and as a field of activity. Basics of enterprise management	2					6	
	Practical training No. 1. External and internal economic environment of the enterprise		2					Survey
2	ENTERPRISE RESOURCES							
2.1.	Production resources and factors of production	2					4	
2.2.	Fixed assets and intangible assets of the enterprise	4					4	
	Practical training No. 2. Fixed assets of the enterprise		4					Test
	Practical training No. 3. Intangible assets		2					Survey
2.3.	Working capital of the enterprise	4					6	
	Practical training No. 4. Working capital of the enterprise		4					Test

Unit number, topic	Name of unit, topic	Number of in-class hours					Individual work, hours	Knowledge control form
		Lectures	Practical trainings	Seminars	Labouratory classes	Other		
1	2	3	4	5	6	7	8	9
2.4.	Enterprise labour resources and organization of remuneration	4					6	
	Practical training No. 5. Enterprise labour resources		2					Test
	Practical training No. 6. Organization of remuneration at the enterprise		2					Test
3	ENTERPRISE OPERATION							
3.1.	Manufacturing program. Productive capacity	2					4	
	Practical training No. 7. Production program. Productive capacity		2					Survey
3.2.	Costs of production and sales of products. Cost of products, works, services	4					6	
	Practical training No. 8. Enterprise expenses and production costs		4					Test
3.3.	Tax Basics	2					4	
	Practical training No. 9. Basics of taxation		2					Survey
3.4.	Pricing Basics	2					4	
	Practical training No. 10. Basics of pricing		2					Test
4.	PERFORMANCE OF THE ENTERPRISE							
4.1.	Income, revenue and profit of the enterprise. Product and production profitability	4					6	

Unit number, topic	Name of unit, topic	Number of in-class hours					Individual work, hours	Knowledge control form
		Lectures	Practical trainings	Seminars	Labouratory classes	Other		
1	2	3	4	5	6	7	8	9
	Practical training No. 11. Income, revenue, profit of the enterprise. Product profitability and production profitability		4					Test
4.2.	Enterprise performance efficiency	4					6	
	Practical training No. 12. Efficiency of the enterprise. Basic methods of economic justification of technical solutions		4					Test
	Course paper						40	Defense of course paper
	Total for the semester	34	34					Test
	Total academic hours	68					170	



## INFORMATIONAL AND METHODOLOGICAL PART

### Legal acts

1. Constitution of the Republic of Belarus.
2. Civil Code of the Republic of Belarus.
3. Labour Code of the Republic of Belarus.
4. Tax Code of the Republic of Belarus.
5. Code of the Republic of Belarus on Administrative Offences.
6. Law of the Republic of Belarus dated July 12, 2013 No. 53-Z «On Investments».
7. Law of the Republic of Belarus of July 17, 2002 No. 124-Z «On the establishment and procedure for increasing the minimum wage».
8. Law of the Republic of Belarus dated May 5, 1998 No. 157-Z «On state forecasting and programs for socio-economic development of the Republic of Belarus».
9. Law of the Republic of Belarus dated July 13, 2012 No. 419-Z «On public procurement of goods (works, services)».
10. Decree of the President of the Republic of Belarus dated January 16, 2009 No. 1 «On state registration and liquidation (termination of activity) of business entities».
11. Decree of the President of the Republic of Belarus dated December 19, 2008 «On some issues of leasing permanent structures (buildings, structures), isolated premises, parking spaces».
12. Decree of the President of the Republic of Belarus dated March 29, 2012 No. 150 «On some issues of lease and gratuitous use of property».
13. Decree of the President of the Republic of Belarus dated May 10, 2011 No. 181 «On some measures to improve state regulation in the field of remuneration».
14. Decree of the President of the Republic of Belarus of August 11, 2011 No. 361 «On improving the procedure for determining the cost of construction of facilities and introducing amendments to some decrees of the President of the Republic of Belarus».
15. Decree of the President of the Republic of Belarus dated December 29, 2012 No. 576 «On some issues of public procurement of goods (works, services)».
16. Decree of the President of the Republic of Belarus dated January 23, 2009 No. 49 «On some issues of stimulating the sale of products, goods (works, services)».
17. Decree of the President of the Republic of Belarus dated February 25, 2014 No. 99 «On issues of regulation of leasing activity».
18. Resolution of the Council of Ministers of the Republic of Belarus dated November 9, 1999 No. 1748 «On additional measures of material incentives for highly productive and high-quality labour».
19. Resolution of the Ministry of Economy of the Republic of Belarus, the Ministry of Finance of the Republic of Belarus, the Ministry of Architecture and Construction of the Republic of Belarus dated February 27, 2009 No. 37/18/6 «On

approval of the instructions on the procedure for calculating depreciation of fixed assets and intangible assets».

20. Resolution of the Ministry of Economy of the Republic of Belarus, the Ministry of Finance of the Republic of Belarus, the Ministry of Architecture and Construction of the Republic of Belarus dated November 5, 2010 No. 162/131/37 «On the procedure for revaluing fixed assets, profitable investments in tangible assets, equipment for installation».

21. Resolution of the Ministry of Economy of the Republic of Belarus, Ministry of Labour and Social Protection of the Republic of Belarus dated May 31, 2012 No. 48/71 «On approval of methodical recommendations for calculating labour productivity and the ratio of growth in labour productivity and wages at the organizational level».

22. On approval of methodical recommendations for calculating value added and value added per average employee (labour productivity based on value added) at the organizational level: Min. Economics, Min. labour and social protection Rep. Belarus May 31, 2012 No. 48/71 // Consultant Plus: Version Prof. Technology 3000 [Electronic resource] / LLC «YurSpektr». – M., 2018.

23. Resolution of the National Academy of Sciences of Belarus, State Committee on Science and Technology of the Republic of Belarus dated January 3, 2008 No. 1/1 «On approval of methodical recommendations for assessing the effectiveness of scientific, scientific, technical and innovative developments».

24. Resolution of the Ministry of Economy of the Republic of Belarus dated September 30, 2011 No. 161 «On establishing standard service life of fixed assets and invalidating certain resolutions of the Ministry of Economy of the Republic of Belarus».

25. Resolution of the Ministry of Labour and Social Protection of the Republic of Belarus July 11, 2011 No. 67 «On approval of recommendations for determining tariff rates (salaries) of employees of commercial organizations and on the procedure for their increase».

26. Resolution of the Ministry of Labour and Social Protection of the Republic of Belarus October 21, 2011 No. 104 «On approval of recommendations for the use of flexible wage systems in commercial organizations».

27. Resolution of the Ministry of Economy, Ministry of Finance, Ministry of Architecture and Construction of the Republic of Belarus dated November 5, 2010 No. 162/131/37t «On the procedure for revaluation of fixed assets, profitable investments in tangible assets, equipment for installation» // Consultant Plus: Version Prof. Technology 3000 [Electronic resource] / LLC «YurSpektr», - M., 2018

28. Resolution of the National Academy of Sciences of Belarus, State Committee on Science and Technology of the Republic of Belarus dated January 3, 2008 No. 1/1 «On approval of methodical recommendations for assessing the effectiveness of scientific, scientific, technical and innovative developments».

## Bibliography

### Main literature

1. Economics and organization (enterprises): textbook / L.N. Nekhorosheva [and others]; edited by L.N. Not good. – Minsk: BSEU, 2014. – 573 p.
2. Economics of an industrial enterprise: textbook / I.M. Babuk, T.A. Sakhnovich – Minsk: New knowledge; M.: INFRA-M, 2013. – 439 p.: ill.
3. Golovachev, A.S. Economics of organization (enterprises): a textbook for students of higher education institutions in economic specialties / A.S. Golovachev. – Minsk: Higher School, 2015. – 687 p.: ill.
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7. Enterprise Economics: a textbook for universities / under. ed. A.E. Karlika, M.L. Schuchgalter. – 2nd ed., revised and expanded. – St. Petersburg: Peter, 2009. – 464 p.: ill.
8. Economics of construction: textbook / O.S. Golubova, L.K. Korban, S.V. Valitsky. – Minsk: New knowledge, 2016. – 577 p.: ill.
9. Enterprise economics: textbook and workshop for academic bachelor's degree / L. A. Chaldaeua. – 5th ed., revised. and additional – M.: Yurayt Publishing House, 2015. – 435 p. – Series: Bachelor. Academic course.
10. Enterprise economics: textbook / [A.P. Aksenov and others]. – M.: KNORUS, 2014. – 346 p.

### Additional literature

11. Babuk, I.M. Enterprise economics: a textbook for students. technical spec. institutions, provision received higher education / I.M. Babuk. – 2nd ed. – Minsk: Information Computing Center of the Ministry of Finance, 2008. – 327 p.
12. Letter of the Ministry of Labour and Social Protection of the Republic of Belarus dated February 4, 2005 No. 10 «Approximate methodology for calculating economic losses in connection with industrial accidents and occupational diseases».
13. Green economy and sustainable development goals for Russia: collective monograph / scientifically. ed. S.N. Bobyleva, P.A. Kiryushina, O.V. Kudryavtseva. – M.: Faculty of Economics of Moscow State University named after M.V. Lomonosova, 2019. – 284 p.

## **Diagnostic tools for educational activity**

The estimation of student's knowledge level is made using a ten-point scale in accordance with the criteria approved by the Ministry of Education of the Republic of Belarus

To estimate a student's achievements, it is recommended to use the following diagnostic tools:

- oral survey during practical classes;
- conducting tests on specific topics;
- student's presentation at scientific conferences on the prepared abstract;
- defense of course paper;
- protection of individual assignments completed during practical classes;
- test.

### **List of course paper topics**

1. Feasibility study of an investment project for a workshop for the production of a 3D printer.
2. Feasibility study of an investment project for a workshop for the production of a laser printer.
3. Feasibility study of an investment project for an inkjet printer production workshop.
4. Feasibility study of an investment project for a tractor production workshop.
5. Feasibility study of an investment project for a loader production workshop.
6. Feasibility study of an investment project for a bus production workshop.
7. Feasibility study of an investment project for a workshop for the production of cranes and manipulators.
8. Feasibility study of an investment project for a workshop for the production of radial ball bearings.
9. Feasibility study of an investment project for a workshop for the production of LCD monitors.
10. Feasibility study of an investment project for a cell phone production workshop.
11. Feasibility study of an investment project for a TV production workshop.
12. Feasibility study of an investment project for a video camera production workshop.
13. Feasibility study of an investment project for a workshop for the production of roller angular contact spherical single-row bearings.
14. Feasibility study of an investment project for a refrigerator production workshop.
15. Feasibility study of an investment project for a workshop for the production of semiconductor devices.
16. Feasibility study of an investment project for a camera production workshop.
17. Feasibility study of an investment project for a workshop for the production of electronic equipment.

18. Feasibility study of an investment project for a workshop for the production of a dishwasher.
19. Feasibility study of an investment project for a workshop for the production of information boards.
20. Feasibility study of an investment project for a workshop for the production of gear shafts for a car.
21. Feasibility study of an investment project for a workshop for the production of a 3-cylinder engine.
22. Feasibility study of an investment project for a workshop for the production of a 4-cylinder engine
23. Feasibility study of an investment project for a workshop for the production of a 3-cylinder engine
24. Feasibility study of an investment project for a workshop for the production of a diesel pump unit
25. Feasibility study of an investment project for a scooter production workshop

### **Topics of abstracts**

1. State regulation of the economy.
2. Organizational and legal forms of enterprises.
3. Joint ventures as a progressive form of production organization.
4. Enterprise labour resources – problems of formation and effective use.
5. Problems of formation and efficient use of fixed assets.
6. Problems of updating fixed assets of an enterprise and ways to solve them.
7. Determination of future needs for fixed assets.
8. Depreciation policy of the enterprise.
9. Valuation of intangible assets: problems and main ways to solve them.
10. Working capital of an enterprise - problems of formation and effective use.
11. Methodical approaches to rationing working capital.
12. Formation of costs for material resources.
13. Cost: essence and methods of calculation.
14. Cost calculation.
15. Cost estimates, their contents and methods of formation.
16. The tax system of the Republic of Belarus – the essence and main directions of improvement.
17. Characteristics of value added tax and its role in generating enterprise profits.
18. Characteristics of the tax mechanism of the enterprise.
19. Prices in enterprise economics and pricing policy in enterprise marketing.
20. Financial insolvency of the enterprise. Main problems and ways to solve them.
21. Sources of financing the production and economic activity of the enterprise.
22. The financial deficit of an enterprise and methods for eliminating it.
23. Investments and capital investments.
24. Investment policy of the enterprise.
25. Feasibility study of an investment project for a workshop (enterprise) for the production of new products.
26. Profit in the system of production efficiency indicators.
27. Enterprise profit planning.

28. Profitability as an indicator of production efficiency.
29. Innovative activity of the enterprise.
30. Preparing production for the development of innovations.
31. Export-oriented policy of the enterprise.

### **Methodical recommendations for organization and implementation individual work of students**

During the study of the discipline, it is recommended to use the following forms of individual work:

- solving individual problems;
- preparation of messages, thematic reports, presentations on given topics;
- preparation of abstracts on individual topics;
- preparation of course paper for individual assignments;
- work at topics (issues) are for self-study;
- compiling a thematic selection of literary sources and Internet sources.

### **Final questions and tasks list for individual work**

1. The real sector of the economy of the Republic of Belarus: level of development, dynamics of the sectoral structure.
2. Priority directions of socio-economic policy of the Republic of Belarus. Problems of modernization and increasing the level of competitiveness of industrial production.
3. Economic environment of the enterprise. The influence of the external economic environment on the strategy and tactics of the enterprise.
4. Economic entities of the Republic of Belarus: organizational and legal characteristics.
5. Strategy for attracting foreign direct investment to the Republic of Belarus.
6. Concentration and combination of production. Determining the optimal enterprise size.
7. Diversification of production in modern conditions
8. Specialization and cooperation in industry.
9. Problems of production development and demand for resources. State policy of the Republic of Belarus in the field of resource conservation.
10. Modern approaches to assessing the value of fixed assets of an enterprise.
11. Methodical approaches to determining the future need for fixed assets.
12. Depreciation policy of the enterprise and problems of formation of depreciation funds.
13. Problems of updating fixed assets of an enterprise. Economic justification for choosing the form of equipment renewal.
14. Technical re-equipment of industrial enterprises on the basis of leasing.
15. Intellectual property market in the Republic of Belarus: current state and development prospects.
16. Features of intellectual property objects as participants in market relations. Types of value of intellectual property objects
17. Features of the formation and use of working production assets of the enterprise.

18. Features of the formation and use of circulation funds.
19. Insurance as a means of increasing the efficiency of using working capital of an enterprise.
20. Methodical approaches to determining an enterprise's need for working capital.
21. Efficiency of use of working capital of the enterprise. Absolute and relative release of working capital.
22. The main directions of rational and economical use of raw materials and fuel and energy resources at the enterprise.
23. Economic efficiency and ways of efficient and rational use of secondary resources.
24. Methods for assessing the level of integrated use of resources.
25. Modern approaches to planning an enterprise's labour resource needs.
26. Forms of training, retraining and advanced training of enterprise employees.
27. Planning wages at the enterprise.
28. State and contractual regulation of wages. Main directions of wage reform.
29. Tariff system of remuneration. Types and methods of calculating tariff rates.
30. Contract system of labour organization.
31. Bonus system at enterprises: current state and directions of development.
32. Methodical approaches to calculating labour productivity.
33. Basic principles of formation of production costs. Product cost indicators.
34. Sources and factors for reducing costs of production and sales of products.
35. Management accounting in calculating the cost of production of an industrial enterprise.
36. Sources and factors for the formation and increase of enterprise profits. Profit maximization methods.
37. Assortment policy of the enterprise and its impact on the formation and distribution of profits.
38. Profit in the system of international standards.
39. Justification of directions for increasing product profitability and production profitability.
40. State regulation of pricing in the Republic of Belarus.
41. Pricing policy of the enterprise.
42. Pricing policy in enterprise marketing. Price and product life cycle.
43. Characteristics of the tax system of the Republic of Belarus.
44. Characteristics of the main taxes and the procedure for their calculation.
45. Innovative activity and receptivity of industrial enterprises in Belarus.
46. The state and main directions for increasing the efficiency of the formation and use of the innovative potential of an enterprise.
47. State policy of the Republic of Belarus in the field of innovative development of the national economy.
48. Formation of an enterprise's innovation strategy and its impact on the competitiveness of products and the enterprise
49. Innovation infrastructure: characteristics of the main structural elements.
50. Main directions for stimulating innovation activity in the Republic of Belarus.
51. Investment policy in the Republic of Belarus. State priorities in investment activity

52. Investment strategy of an industrial enterprise and stages of its formation.
53. Planning the investment process. Investment cycle.
54. Evaluating the effectiveness of investment projects.
55. Risk assessment in investment calculations.
56. The influence of foreign capital on the national economy. Promising forms of attracting foreign investment.
57. Financial insolvency of an enterprise: determining factors and methods of determination.
58. Modern methods of bringing enterprises out of crisis situations.
59. Regulation of cash income and expenses of an enterprise.
60. Methodical approaches to determining the economic efficiency of an enterprise.
61. Sources and factors for increasing the economic efficiency of an enterprise at the present stage.
62. The essence and principles of building a product quality management system at an enterprise.
63. Assessment methods and factors for increasing the competitiveness of products and enterprises.
64. Economic methods of stimulating export and import-substituting production.



## MINUTES FOR APPROVAL OF THE ACADEMIC PROGRAM

Name of academic discipline, from which required agreement is required	Department name	Offers about changes in the content of the academic programme higher educational establishments education by academic discipline	The decision made by the department that designed the academic programme (indicating the date and number of the minutes of the department meeting)
Agreement is not required	Department of Engineering Economics	No	The content of this academic programme does not require agreement with other academic disciplines of the speciality.  Minutes No. 4 dated November 14.11.2023

## ADDITIONS AND CHANGES TO THE HEE ACADEMIC PROGRAMME

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_ academic year

№	Additions and changes	Base

The academic programme was revised and approved at a meeting of the Department of Engineering Economics (minutes №\_\_\_\_ dated \_\_\_\_\_ 20\_\_)

Head of the department \_\_\_\_\_  
(signature)

\_\_\_\_\_  
(N.S. Surname)

### APPROVED

Dean of the Faculty \_\_\_\_\_

\_\_\_\_\_  
(academic degree, academic title)

(signature)

(N.S. Surname)