



AL-FARABI KAZAKH NATIONAL UNIVERSITY  
HIGHER SCHOOL OF ECONOMICS AND BUSINESS

# **COURSE**

# **"Economics of information"**

**EP "6B04109 - Economics"**

Mrs. Dinara Rakhmatullayeva

Ph.D., Senior Lecturer

Economics Department

Almaty, 2023

# About me



- Education: Al-Farabi KazNU, pedagogical experience - 24 years.
- Ph.D. degree. Thesis topic: "Social effects of FDI in the regions of Kazakhstan" (2016).
- Scientific internship under the Bolashaq program at the University of Kansas, USA (2022 - 2023). Topic: "Direct Measurement of Welfare in Kazakhstan".

- Supervisor of the research project funded by the National Bank of the Republic of Kazakhstan (2021-2022). Subject: "Private capital market in Kazakhstan, prospects for its development".
- Supervisor of the research project funded by the Ministry of Science and Higher Education for 2023-2025 on the theme: "Research of new tools for the development of business environment in the regions of Kazakhstan to improve the investment attractiveness and competitiveness of the country in the Eurasia region".
- Courses taught: Microeconomics, Macroeconomics, Microeconomic Analysis, Macroeconomic Modeling, Financial Mathematics, Business Economics, Investment Design, etc.
- Author of 2 and co-author of 5 textbooks and more than 60 scientific publications (including in the Scopus, WoS, CCSON databases).



# Course structure

## Theoretical block:

**MODULE 1** Economics of Information: Basic Concepts and Issues - **4 weeks**

**MODULE 2** Fundamentals of Information Theory - **3 weeks**

**MODULE 3** Fundamentals of Contract Theory: Risk and Uncertainty - **5 weeks**

**MODULE 4** Information Theory and Digital Economy - **3 weeks**

## Practical block:

1. Active work at seminars (discussion, abstract with oral defense) - **5 points**
2. Student Independent Work - 4 (Week 3, Week 7, Week 11, Week 14) - **15-20 points**
3. Examination - final project (during the session)

# Some facts about information



- World Information Day is **November 26**
- Celebrated since 1994 on the initiative of the International Academy of Informatization and the World Informatizational Parliament

## Trends:

- Since the mid-twentieth century, the role of information has greatly increased due to social progress and the rapid development of science and technology.
- Modernization of television broadcasting through the transition to digital technologies, development of high-speed Internet and mobile communications.
- Psychologists note that the inability to use information technology and the information received leads to "information stress".
- "Information stress" is a source of social consequences and health problems.



# **MODULE 1**

## **Economics of information: basic concepts and problems**

**Topic 1: Introduction to the course.  
Role and importance of information  
in economy and life of society**

# Concepts

---

**Information** (from Latin Informatio) - data, explanation, statement.

- ❑ The concept of "information" has different meanings depending on where it is considered: in science, technology, ordinary life, etc.
- ❑ In general terms, information is any data or information that someone is interested in (a report of some events, someone's activities, etc.).



# Some definitions

**Information** is an **info** (messages, data) irrespective of the form of its presentation.

**Information** is the **info** about the surrounding world and processes occurring in it, perceived by a person or a special device (Dictionary).

**Information** is realized **info** (knowledge expressed in signals, messages, news, notifications, etc.) about the surrounding world, which is an object of storage, transformation, transfer and use.

# Main types of information

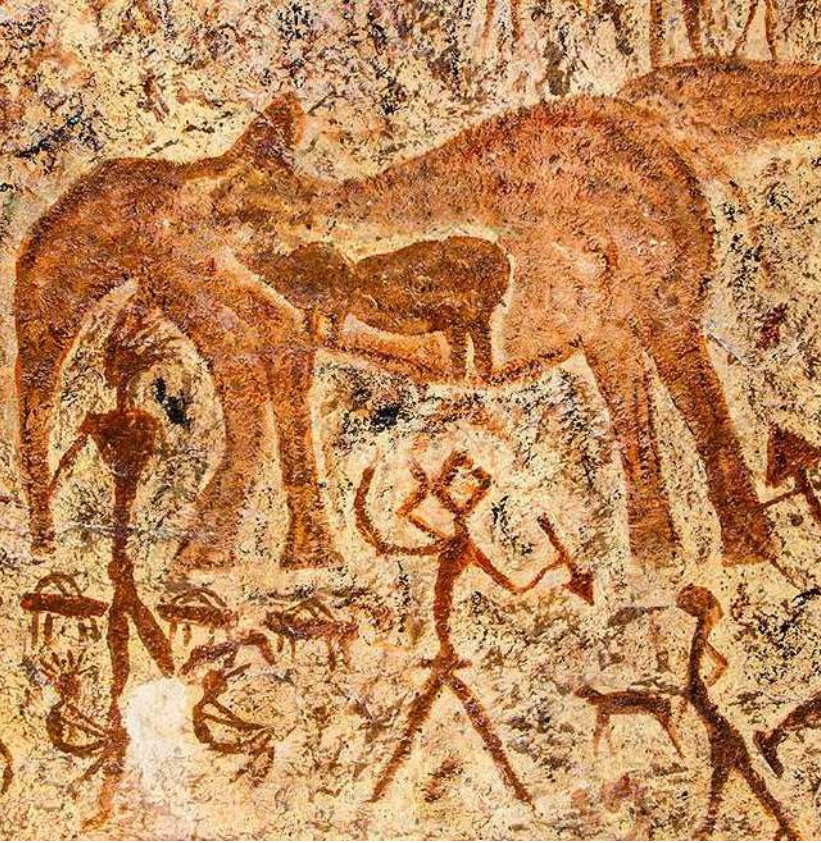
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**Criteria** by which **types of** information are distinguished:

- form of presentation
- coding methods
- storage methods







## 1. Graphic

one of the oldest types of representation, transmission and storage of information about the surrounding world

## 2. Numerical

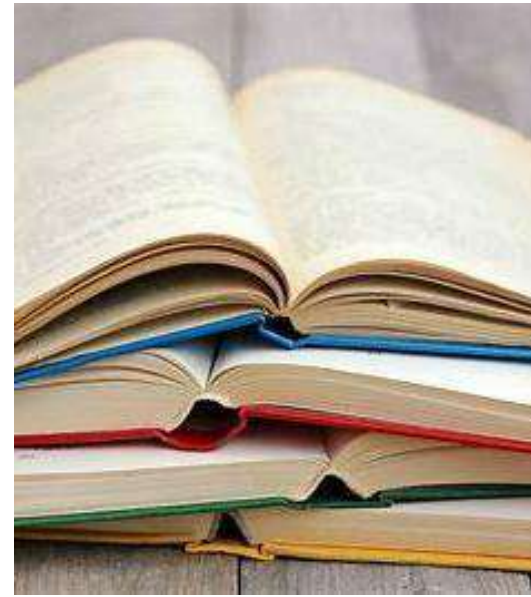
- Encodes a quantitative measure of 5 objects and their properties in the surrounding world using special symbols - digits (different for each coding system).
- It became especially important with the development of trade, economy and monetary exchange



### 3. Sound (acoustic)

- To store sound information, the sound recording device was invented in 1877.
- For musical information - a method of encoding using special symbols has been developed, which makes it possible to store it as graphical information.





## 4. Text, paper and video information

- special symbols - letters (different for each nation)
- notebook entries, book printing, etc.
- a way of storing "live" pictures of the world around us, which came about with the invention of cinema.

Which of the following definitions of "information" is most acceptable to you:

- ✓ information is an info about the world around us that reduces the level of human uncertainty.
- ✓ information is the designation of content received from the external world in the process of adapting to it.
- ✓ information is the communication in which uncertainty is resolved.
- ✓ information is the human experience acquired, stored and communicated to others in a social form.

## Task 2

**What are the similarities and differences between the two given messages in terms of the concepts: "givenness" and "information"?**

- Night is followed by morning, and morning is followed by day.
- The Chinese language presents folk wisdom, the knowledge of which can make up the meaning of your life.

Let us define the thesaurus as a set of terms reflecting the concepts and attributes of the world around us and the relations between them. Then the thesaurus of an individual can be considered as his information capacity. It is natural to consider that the thesaurus of an academic is much larger than that of a first-grader.

## Task 3

**Why do you think academics don't teach first graders?**

Argue for your answer.



The End



**Thank you for  
your attention!**



# The End



**Thank you for your attention!**



# Assignment 1

## Study the text given.

Aging ... The meaning of this concept does not require explanation, it is familiar to everyone. Our planet is getting older, the trees are getting older. Things age and the people to whom they belong. Documents age. Book pages yellow, letters fade, covers deteriorate. But what is it?

A student, waving away a book offered to him in the library, scornfully remarks: "It's out of date!" while the book still looks brand new! There is no secret here, of course. The book is new, but the information contained in it may have become outdated. In the case of documents, aging does not mean the physical aging of the information carrier, but a rather complex process of aging of the information contained in it.

**What causes of information ageing can you name?**

## Assignment 2

**Write the missing words in the following sentence:**

“The more and longer ..... demand information about a certain knowledge, the ..... that knowledge is in scope.”

**Justify the proposed options.**



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# Topic 2: Information products and markets. Regulation of the information market

# Information as a commodity

- ❑ **Information** is the result of intellectual labor.
- ❑ It influences **the creation of new intellectual and material products** such as projects, forecasts, ideas, samples of techniques, products, technologies, etc.



# The main features of information as a commodity

1. Prevalence.
2. Selectiveness.
3. Another mechanism of aging.
4. Declining marginal utility.
5. Impossibility of unambiguous cost estimation.
6. Objectivity.
7. Credibility.
8. Relevance.
9. Adequacy




1. Information is an international commodity because many people in the world have access to it.
2. Many people have access to information, but only a fraction of them can use and consume it.
3. The value of information can increase over time, but at the same time it can also decrease.
4. The first dissemination of information can be more costly than subsequent dissemination.
5. There is a lot of information, but assessing its usefulness to the consumer is subjective.
6. They are qualitative characteristics of information goods that are different from those of tangible goods.

- Information becomes a commodity only in **market conditions**, when it acquires consumer and exchange values.
- The market sells **the right to use the information**, NOT the information itself.
- In the information market, information appears in the form of **information products and services.**



# Main criteria for assessing the quality of information products

- **relevance**
  - **credibility**
  - **reliability**
  - **objectivity**
  - **actuality**
  - **adequacy**
  - **timeliness**
  - **accessibility,  
clarity,  
unambiguity,  
orderliness,  
conciseness**
- 
- 1) correspondence of information to the user's request
  - 2) completeness, novelty, absence of "noise"
  - 3) reflects the facts
  - 4) independence of information from subjective opinion
  - 5) significance and relevance of information for the current moment of time
  - 6) a certain level of correspondence of the created image to a real object, process or phenomenon with the help of the received information.
  - 7) timely provision and receipt of information
  - 8) conformity of the form of information product to the consumer capabilities of the buyer



The description of a specific **information product** includes the **characteristics of the resources used**:

- ❑ aggregate information resources of the region and country
- ❑ foreign databases and documentary collections
- ❑ reference and search apparatus and information catalogue of the institution providing the service
- ❑ personal knowledge of expert specialists involved in the creation of the information product, etc.



# What does the price of an information product/service depend on?

- Price is determined based on the **consumer value** of the information.
- IP's consumer value derives from its **consumer properties**, which express the **ability to satisfy (to fulfil) specific users' needs**.
- In other words, the **consumer properties of information product/service** determine the **demand** for them, also their **attractiveness** and **value**.



*It is a set of properties of a good, directly related to both the good itself and related services, which determine its ability to satisfy human needs.*



## We can conclude that...



- ❑ Consumer properties of IP are **different** from similar characteristics of tangible objects.
- ❑ Thus, the **price of an information product or service** is determined by **its usefulness** to the consumer.

# IP's consumer properties

- targeting of information
- time costs
- timeliness of information provision
- possibility of multidimensional information search;
- reliability of the data provided;
- aspects of coverage of the topic or problem



- orientation to specific categories of users and target settings
- for preparation and using of information benefits;
- terms of fulfilment of requests;
- within the main and related fields of knowledge and practical activity;

# IP's consumer properties

- possibility of electronic processing and dissemination of information
- ease of use
- accessibility
- protection against unauthorized access and impact
- aesthetics, modern design, corporate style, etc.



- user-friendly interface, program of languages for information retrieval, detailed user instructions
- in terms of communication channels, types of media, price
- for information products

# What is an "information marketplace"?

This is a system of economic, legal and socio-psychological relations that develop under conditions of various forms of ownership and competition and arise in the process of **exchange of information products (services)** between the creator (seller) and the user (consumer) in connection with the satisfaction of information needs.

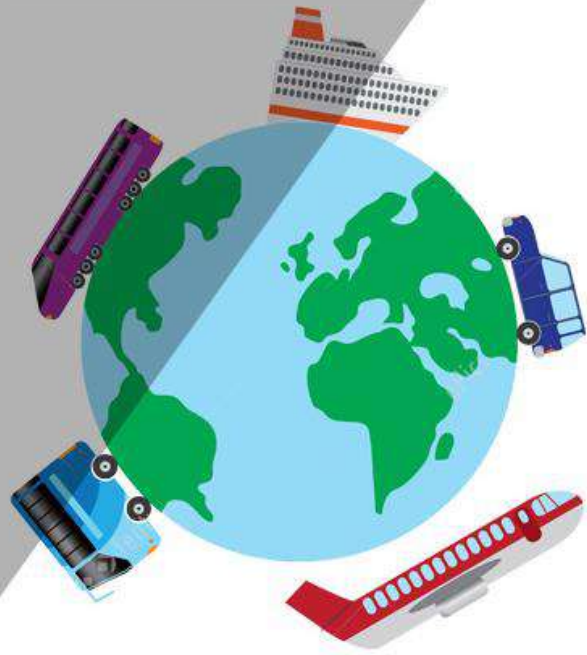


The information market began to emerge in the mid-50s of the last century.

# Objectives of the information market

1. Satisfaction of information demand and needs.
2. Full realization of the country's information potential.
3. Providing mutually beneficial co-operation with foreign information systems.





## 3 market areas information

- The market for information and information services and products.
- Electronic Transaction Marketplace.
- Electronic Communications Marketplace.



# The are 5 sectors of the market for information products and services

## **The 1st sector** is **business information**:

- **Exchange and financial information** - stock quotes, exchange rates, discount rates, commodity and capital markets, investments, prices
- **Statistical information** - series of dynamics, forecast models and estimates in economic, social, demographic areas.
- **Commercial information** on companies, lines of business and their products, prices; financial status, connections, deals, executives, business and economic news.





## 2nd sector - information for specialists:

- **professional information** - special data and information for lawyers, doctors, pharmacists, teachers, engineers, etc.
- **scientific and technical information** - documentary, bibliographic, abstract, reference information in the field of natural, technical, social sciences, by branches of production and spheres of human activity
- **access to primary sources** - organization of access to information sources through libraries and special services, the possibility of purchasing primary sources, their receipt by interlibrary loan in various forms.



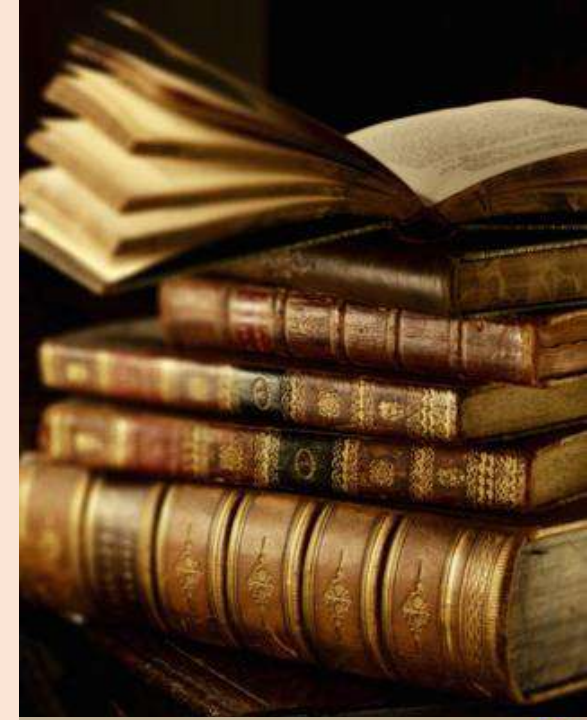
The **3rd sector** is  
**mass consumer**  
**information:**

- **news and literature** – media information, electronic books and magazines, encyclopedias, etc;
- **consumer information** about a transportation schedules, booking tickets and hotel reservations, ordering goods and services, banking transactions, etc;
- **entertainment information** - games, teletext, videotext.



## Sector 4:

- **Education services:** preschool, school, special education, secondary professional, higher education, advanced training and retraining.
- **Educational products:** tutorials, textbooks, workshops, developing computer games, computer-based learning and control systems, teaching methods, etc.





## Sector 5 - supporting information systems and tools



SOFTWARE PRODUCTS:  
SYSTEM SOFTWARE,  
GENERAL ORIENTATION PROGRAMS,  
APPLICATION SOFTWARE



TECHNICAL MEANS -  
COMPUTERS,  
TELECOMMUNICATION EQUIPMENT,  
OFFICE EQUIPMENT,  
RELATED MATERIALS  
AND COMPONENTS



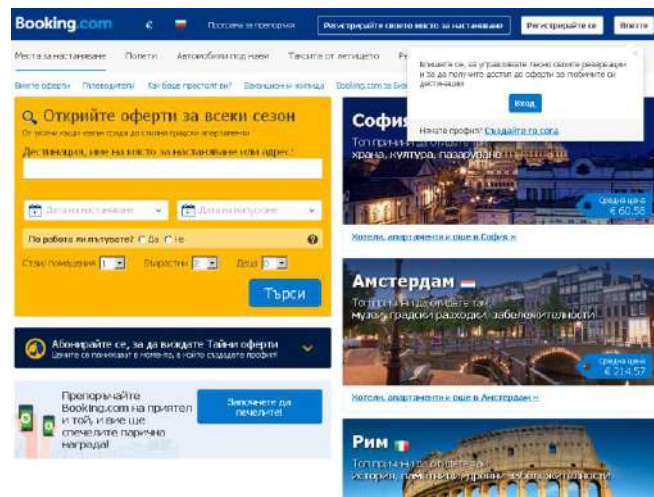
DEVELOPMENT  
AND  
MAINTENANCE  
OF  
INFORMATION  
SYSTEMS AND  
TECHNOLOGIES



CONSULTING ON  
VARIOUS  
ASPECTS OF THE  
INFORMATION  
INDUSTRY



CREATION OF  
DATABASES ON A  
GIVEN TOPIC,  
AREA, ETC.



# Electronic transaction market

**Electronic transactions** (transactions, transactions) include:

- ticket and hotel reservation systems
- ordering, selling and exchanging goods and services
- banking and settlement operations.

# Electronic communications market

- Most electronic communication services are provided via the Internet.
- Systems based on modern communications:
  - commercial and public data networks;
  - electronic mail systems;
  - commercial dialogue systems that bring
    - together owners of personal computers;
    - teleconferencing;
    - electronic online noticeboards and newsletters, etc.



# Structure of the information market

- ❑ market **objects** - information and information products and services.
- ❑ market **subjects** - persons involved in the process of creating, storing, transforming, transmitting and receiving information.
- ❑ **Economic market relations** are formed between various subjects of commodity exchange: sellers and buyers, or sellers and creators of products, etc.

## 5 main groups of information market actors

- information producer or developer
- owner of the information
- information intermediary
- user or consumer of information
- information custodian.



- Active methods of state stimulation of exports based on the high economic potential of the industry.
- Aggressive policy of development of foreign markets.
- Very high economic barriers to entry into the industry for foreign firms.

Main models of countries' entering the world market of non-periodical publications, print and electronic media



## North American model

- Active methods of state export promotion using transnationalization and internationalization.
- Creating high entry barriers to the industry.
- Application of administrative methods to curb the inflow of imported information products.

Main models of countries' entering the world market of non-periodical publications, print and electronic media



**European model**

- High level of liberalization.
- Low entry barriers for importers
- Formation of a trend towards transnationalization and movement towards the American model of information market development.



Main models of countries' entering the world market of non-periodical publications, print and electronic media

**Asian model**

# Regulation of the information market in Kazakhstan

## **Concept of Digital Transformation, Information and Communication Technology Industry Development and Cybersecurity for 2023-2029**

The results of the reform implementation:

- 99% of the population is covered by the Internet,
- more than 90% of public services are available online,
- the share of large and medium-sized enterprises using elements of Industry 4.0 was 5%,
- the info communication infrastructure was expanded
- the implementation of the new generation 5G mobile communication technology began,
- the share of e-commerce increased from 2.2% to 5.2% in 2020,
- digital farms for processing cryptocurrencies were created,
- work on the creation of model factories and smart fields continues.

# Kazakhstan's achievements in 2021-2022

- The level of digital literacy (basic) in Kazakhstan is more than 87.3% (in 2020 - 82.1%).
- The telecommunications infrastructure index in Kazakhstan is 0.75 out of 1 and indicates the need for its further development.
- According to SpeedtestGlobalIndex, Kazakhstan ranks 95th among 141 countries in terms of mobile internet speed and 96th among 174 countries in terms of fixed broadband speed.
- At the beginning of 2022, there are 10,989 companies operating in the information technology sector in Kazakhstan.
- In 2022, the number of IT startups supported by techno-parks, incubators and accelerators reached 1,014, and the total number of IT companies operating in the market exceeded 7,000.
- The volume of taxes paid by information technology companies in 2021 amounted to 122 billion tenge.



Thank you for  
your  
attention!

# Homework

Study and write a brief abstract on the subject “Regulation of the information economy in Kazakhstan”.



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# **Topic 3: Genesis and development of information economy.**

## **The knowledge economy.**

# What is an “information economy”?

**Information economy** is represented by the economic theory of information society.

In a narrow sense




**Information economy** is a separate industry related to labor and information, as well as the computer industry and everything related to it.



In a broad sense



**Information economy** is the economic pattern of the information society, which is characterized by the dominant role of information products, as well as the prestige and importance of creative intellectual labor.



## What is an “information economy”?

- An **information economy** is a global economy based on combined data from products, prices, and customers throughout the world.
- **Information economics** or the **economics of information** is the branch of microeconomics that studies how information and information systems affect an economy and economic decisions.



## Characteristics of information economy

- ❑ Internet accessibility;
- ❑ diversity and widespread use of information and communication technologies;
- ❑ high marketability of knowledge and information;

# "Information economy" - what is it?

- One app embodies information on the types of goods that are "expensive to produce but cheap to reproduce".
- For example, Microsoft Windows computer software, pharmaceuticals, and technical books.



# Success or disadvantage?

- **Combining information** allows consumers to see and purchase goods in a global marketplace.
- In an information economy, consumers have **access to information** about product inventories and prices from multiple sellers.





## Success or disadvantage?

- The use of the **Internet** has allowed consumers to **compare prices instantly**.
- Consumers can **quickly determine** the best value for an item by doing a **quick search for prices** and **customer reviews** of a particular product.
- The economy is becoming **more receptive to real-time consumer feedback** as it is available for review by the public.



## Characteristics of the information economy

- ❑ development of information exchange, which takes various forms and types.
- ❑ changes in the nature of work and employment, in the requirements of employers to employees.



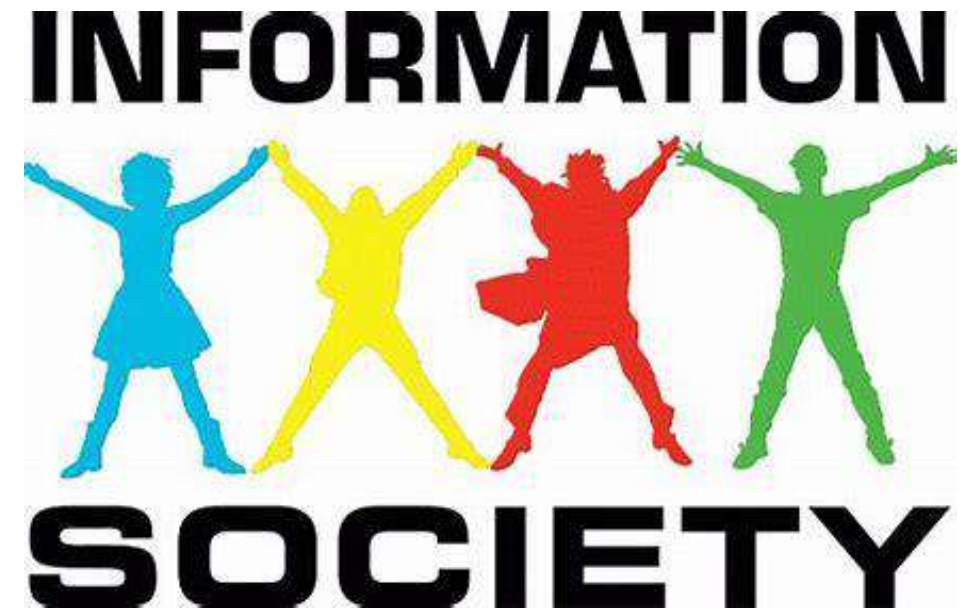


**Self-employed / freelancer?**

# Stages of information community formation

The social consequence of the information revolution since the second half of the 20th century has been the **formation of the information society**.

There are **three stages in the** realization of digital technologies for data processing and dissemination



# 1st stage

## Computerization (since the 1950s).

It laid the foundation for the automation of managerial labor in accordance with the concept of building automated control systems (ACS).



## 2nd stage

## Telecommunications (since the 1990s)

As a basis for creating a new environment for **mass information interaction** of people in the process of activity (personal computers and the Internet).



# 3rd stage

## Info-communication (today)

As a result of the **convergence of digital technologies** for data preservation, dissemination and processing to build a global information field.



## Formation of the information economy as a knowledge economy

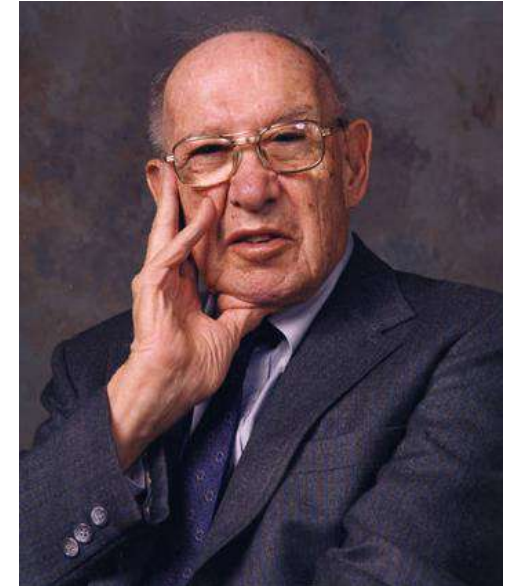


Fritz Machlup  
(Fritz Machlup)

## Concepts of knowledge economy and human capital



Mark Porat  
(Marc Porat)



Peter Drucker  
(Peter Drucker)



Thank you for  
your  
attention!

# Homework

## **Prepare materials for class discussion**

- Daniel Bell's post-industrialism
- Postmodernism of Jean Baudrillard
- Manuel Castells' theory of informationalism and network capitalism



# Task

The social value of information is higher the more people are interested in it.

**State the special properties of information** (at least - 2) based on:

- a) the relationship of information to the form of the medium;
- b) the way in which information arises;
- c) the nature of information transfer and storage.



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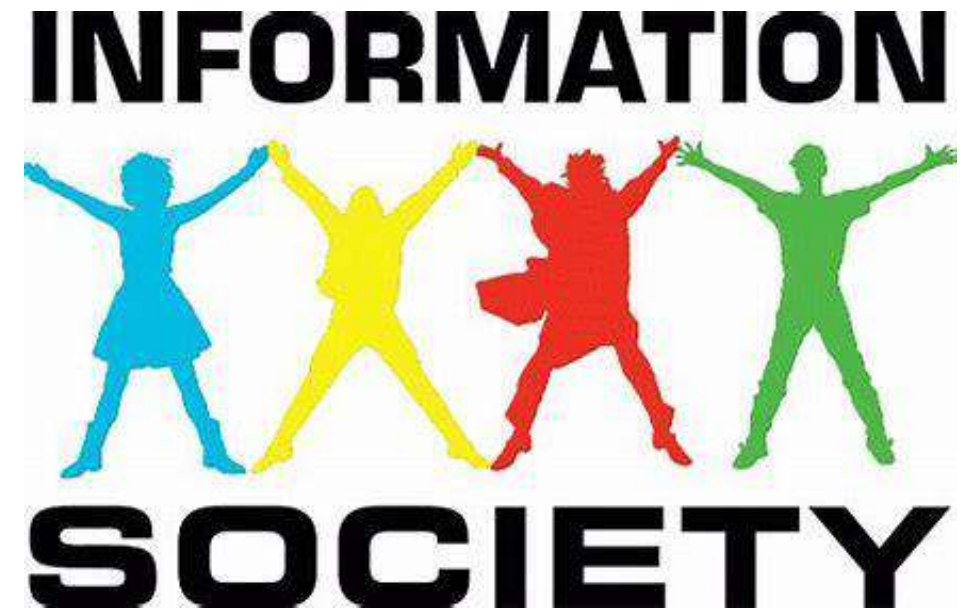


# **Topic 3: Genesis and evolution of information society. Knowledge economy**

# Stages of information society formation

The social consequence of the information revolution since the **second half of the 20th century** has been the **formation of the information society**.

**Three stages** can be distinguished in the implementation of digital data processing technologies and distribution.



# 1<sup>st</sup> stage

## Computerization (since the 1950s).

Computerization formed the **basis** for the automation of managerial work and the construction of **automated control systems** (ACS).



# The characteristics of Stage 1

- ❑ advanced development of scientific-technical and information-technological directions providing directly for the effective application of computer technologies.
- ❑ modernization of design, technological and production bases of production of information tools and their elements.
- ❑ widespread use of computer technologies in various fields of human activity.
- ❑ organization of an education system providing universal computer literacy as a basis for information culture of the population.



# Mainframes

***The technical base of informatization at this stage was created by mainframes (ACS).***

- The introduction of ACS contributed to the improvement of management efficiency and rational managerial decision-making.
- They appeared in the 50s of the XX century and were the only expensive type of computers available only to large organisations.
- The creation of mainframes in their modern sense is associated with the standardization of hardware and software in the 60s and the appearance of IBM System/360 in 1964.
- In the USSR, the analogue of IBM computers was a series of EC computers.



## 2<sup>nd</sup> stage

# Telecommunications (since the 1990s)

As a basis for creating a new environment of **mass information interaction of people** in the process of activity (personal computers and the Internet).





# Digital data transmission technology

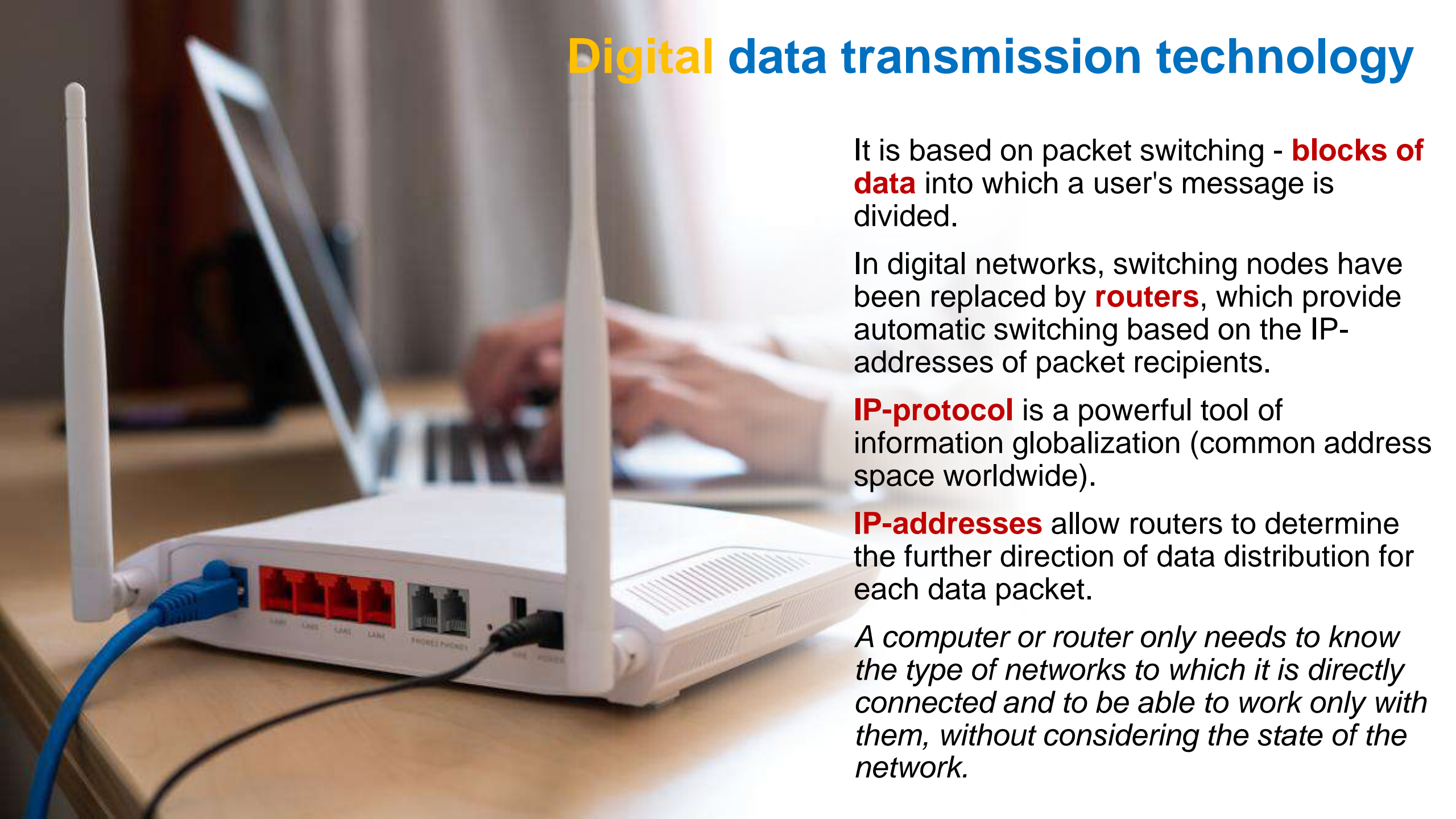
It is based on packet switching - **blocks of data** into which a user's message is divided.

In digital networks, switching nodes have been replaced by **routers**, which provide automatic switching based on the IP-addresses of packet recipients.

**IP-protocol** is a powerful tool of information globalization (common address space worldwide).

**IP-addresses** allow routers to determine the further direction of data distribution for each data packet.

*A computer or router only needs to know the type of networks to which it is directly connected and to be able to work only with them, without considering the state of the network.*





# Benefits of digital technologies

- All segments of the population have become involved in everyday life in the information and communication environment.
- The number of regular Internet users continues to grow, and the number of users occasionally connected to the network is approaching 90 per cent.
- The ways of economic management, social relations in the sphere of production, distribution, exchange and consumption have changed.
- The ways in which people exercise their civil rights have changed, and new methods and forms of raising and education have emerged.

*In the first decade of the 21st century, the second stage of the digital information society was completed.*

# 3<sup>rd</sup> stage

## Info-communication (today)

As a result of the convergence of digital technologies for data preservation, dissemination and processing to build a global information field.



# Features of Stage 3

- ❑ The avalanche growth of data accompanying human activity.
- ❑ Such processes are observed in all spheres of human activity: culture, economy, politics, science, education and others.
- ❑ More and more people are involved in the information industry. (The proportion of people employed in information production and dissemination in the 21st century is significantly higher than in other activities).
- ❑ Over 60% of new jobs in developed countries today involve some form of information transformation.
- ❑ The technological basis for the realization of the 3rd stage is **information technologies** that ensure the development of each country's information infrastructure and the conditions for its inclusion in the global structure of the information society.
- ❑ Access to new information resources presented digitally in the global information space was opened.

# Convergence of information technologies

- ❑ Developed a qualitatively new info-communication technology in the form of an **integrated info-communication environment** "covering" all information systems and resources with a digital network.
- ❑ The information fund of mankind, which has become the property of almost every person, has become the main resource for the development of society.
- ❑ The accumulation of huge amounts of information resource gives birth to the problem of complexity of data access in the process of convergence.
- ❑ Today there are magnetic, semiconductor, optical data storage technologies, data storage networks are being formed, global information resource is being formed, etc.



## Emergence of the information economy as a knowledge economy

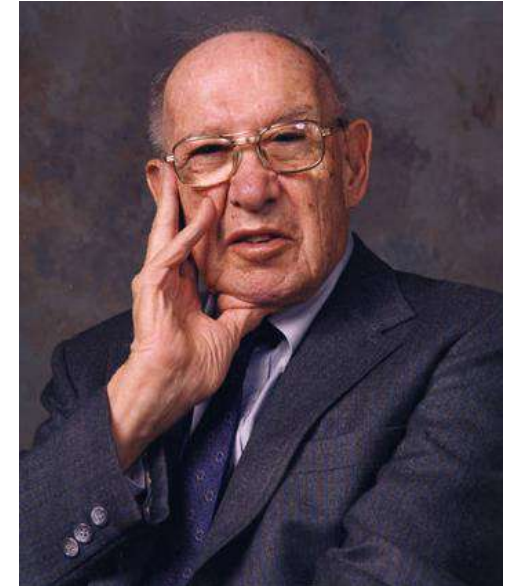


Fritz Machlup  
(Fritz Machlup)

## Concepts of knowledge economy and human capital



Mark Porat  
(Marc Porat)



Peter Drucker  
(Peter Drucker)

# Fritz Machlup



Fritz Machlup  
(Fritz Machlup)

- Used the term "knowledge-based economy".
- in 1962 published a paper on the production and distribution of knowledge in the United States.
- Introduced the term "information society".
- Tried to reveal the structure of knowledge by breaking it down into its components:
  - 1) Knowledge known to someone (what is known);
  - 2) The production of new unknown knowledge using known knowledge (how someone learns something new, unknown;
  - 3) Obtaining new unknown knowledge from someone else.



# Michael Porat

Entrepreneur, an angel investor, first coined the term "information economy."

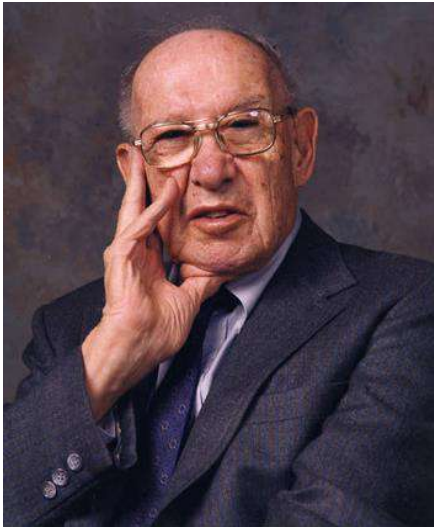
He published a paper titled "Information Economics" in 1976.

The following economic activities should be included in the information sector:

- 1) production of new knowledge and inventions (research and development, information services);
- 2) Information dissemination and telecommunications (education, media, telecommunications);
- 3) Risk management (mainly in the insurance and financial sectors);
- 4) search and coordination (brokerage, etc., similar porsedniki services, advertising);
- 5) information processing and transmission services services;
- 6) production of "information" goods (microcalculators, computers of various types, semiconductor devices, etc.);
- 7) information services of the public sector of the economy (public education, postal service);
- 8) auxiliary activities related to the production and processing of information (construction and operation of special buildings and structures, cable lines, etc.);
- 9) wholesale and retail trade in information goods and services.



# Peter Drucker



- ❑ American scientist, economist, "father" of management.
- ❑ He called the new formation the information society, where knowledge plays the main role.
- ❑ Knowledge is the ability to apply information to a specific area of business, and the specific, special knowledge possessed by a group of people in a given business is the source of special specialization, and with it the survival of the business and its growth.
- ❑ He wrote the book "Manager's tasks in the XXI century", in which he proves that in the new economic conditions knowledge is the only resource that matters at all



Thank you for  
your  
attention!



AL-FARABI KAZAKH NATIONAL UNIVERSITY  
HIGHER SCHOOL OF ECONOMICS AND BUSINESS

# **COURSE**

# **"Economics of Information"**

**OP "6B04109 - Economics"**

Rakhmatullayeva Dinara Zhaksylykovna

Ph.D., Senior Lecturer

Economics Department

Almaty, 2023

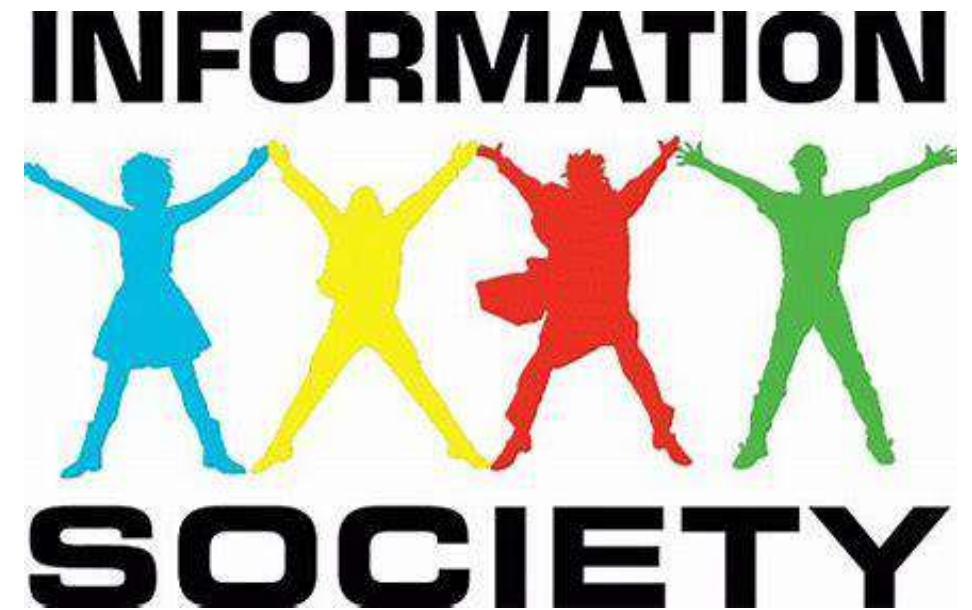


# Topic 4: Basic concepts of information society.

# Stages of information society formation

The social consequence of the information revolution since the **second half of the 20th century** has been the **formation of the information society**.

**Three stages** can be distinguished in the implementation of digital data processing technologies and distribution.



# Frank Webster: "Information is something special..."



- ❑ British sociologist, author of *Theories of the Information Society*
- ❑ Critically described the theories of information society of many scientists (D. Bell, M. Castells, G. Schiller, etc.).

## **Five spheres of change in society:**

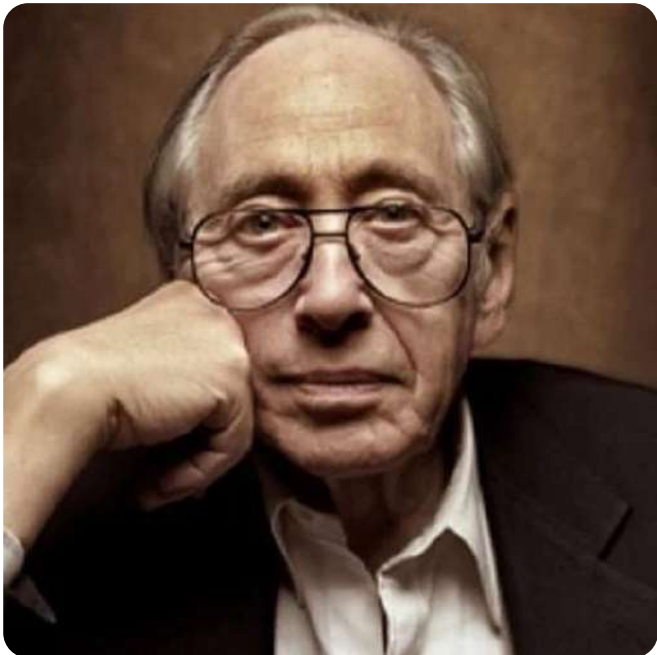
1. technological (network logic penetrates all spheres of society, and through the convergence of digital technologies - into integrated systems).
2. economic (growth of the share of information industries in GNP).
3. Professional (labor market transformation).
4. Cultural (new ideas about the essence of culture).
5. Spatial (change of ideas about space and time).



# Emergence of information society theory

- ❑ **Tadao Umesao**, a Japanese philosopher, formulated the term "information society" and published a paper in which he wrote about the increasing importance of information as a social phenomenon
- ❑ **Alvin Toffler** is an American philosopher, sociologist and futurologist, one of the authors of the concept of post-industrial society: the Third Wave.

His main works contain the thesis: "Mankind is moving to a new technological revolution (super-industrial). The 1st wave (agrarian society) and the 2nd wave (industrial society) are being replaced by a new one leading to the creation of an information or post-industrial society".



# Emergence of information society theory

"We are experiencing one of the most fundamental shifts in history - a change in the actual belief structure of Western society.

No economic, political or military force can match the power of changing consciousness.

By consciously changing their perceptions of reality, people change the world."



**Willis W. Harman**



# Emergence of information society theory

**Willis W. Harman** and his research team emphasized environmental and human development in their research, pointing to the emergence of a variety of ecosystem macro-problems - overpopulation, resource depletion, pollution. The social macro problems included unemployment, competition within and between countries for the possession of resources and the emergence of mass destruction technology dangerous to humans, and the potential for misuse of genetic engineering.



# Core values of the information society

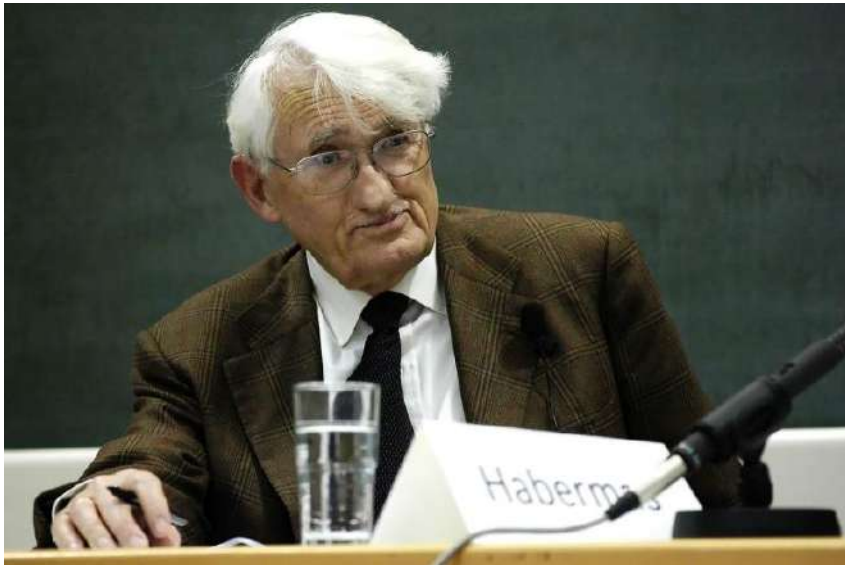
1. Information and communication
2. Knowledge
3. Information and communication relations
4. Information literacy of people
5. Free exchange of information
6. Information culture



# Concepts of the information society

## □ A new social order:

- Daniel Bell's post-industrialism
- Postmodernism of Jean Baudrillard
- Manuel Castells' theory of informationalism and network capitalism



The modern stage of post-industrial society - Jürgen Habermas' concept of the public sphere. Author of the Theory of Communicative Behavior.



Thank you for  
your  
attention!

# Homework

## **Prepare materials for class discussion**

- Daniel Bell's post-industrialism
- Postmodernism of Jean Baudrillard
- Manuel Castells' theory of informationalism and network capitalism



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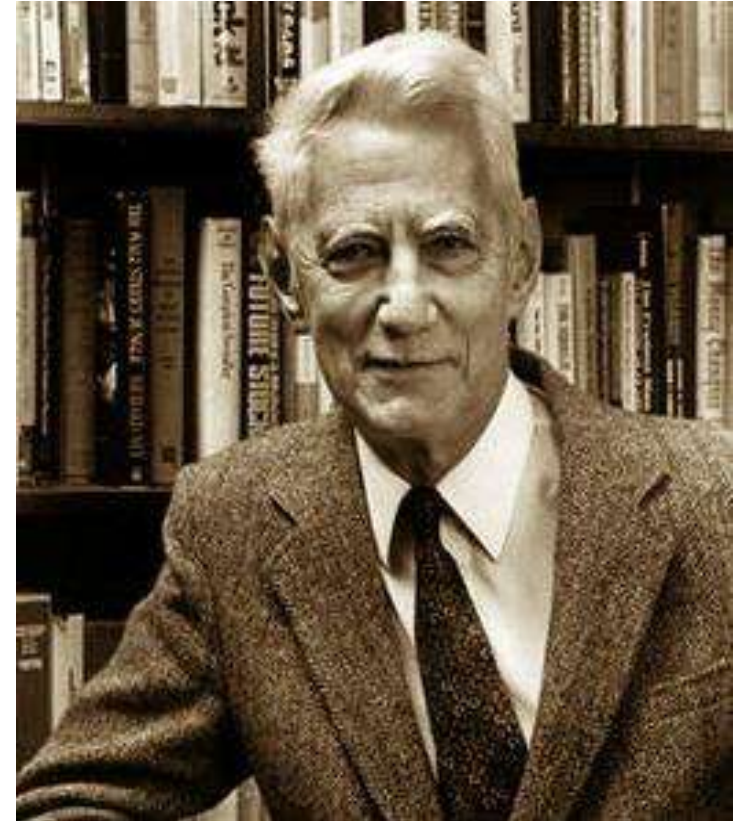


# **Topic 5: The value of information. Information management and production.**

# Claude Shannon (American engineer, cryptanalyst, and mathematician)

---

- **Founder** of the **general theory of information**.
- He laid the foundations of **digital communication**.
- He is the author of the book "Mathematical Theory of Communication" (1948).
- He gave the fundamental concepts, ideas, and their mathematical formulations that today **form** the **basis of modern communication technologies**.

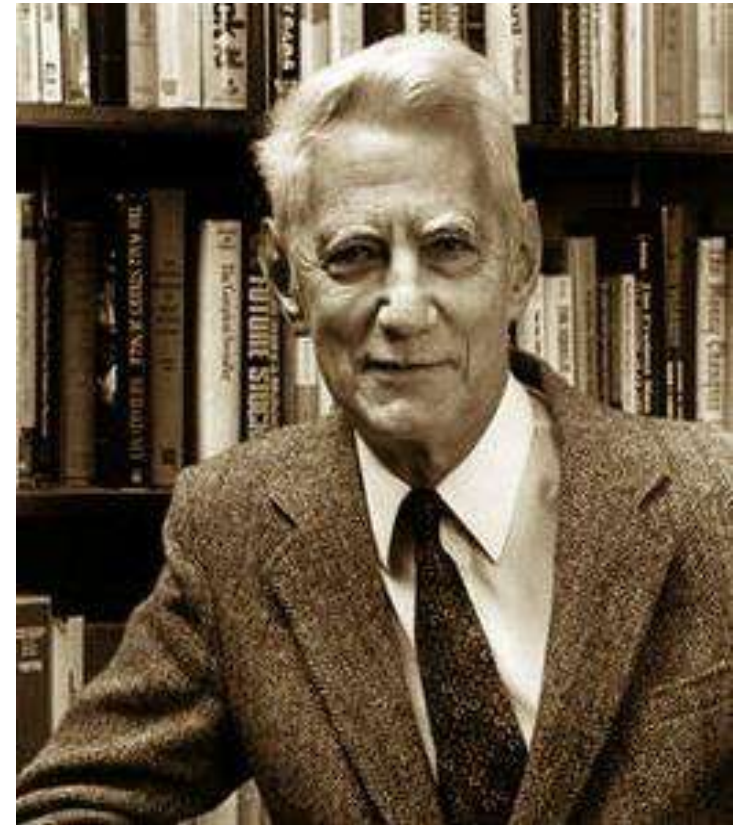




# Claude Shannon (American engineer, cryptanalyst, and mathematician)

---

- He was the first to substantiate the possibility of **using binary code to transmit information**.
- He introduced the concept of "**information measure**" - a **measure of orderliness of motion**.
- A **bit** is the smallest unit of information.
- He thought it possible to establish a connection **between information and energy**, considering **energy as a measure of the intensity of motion**.



# How is the value of information determined?

- **The value of information is** directly related to the **goal** that the economic actor is trying to achieve.
- *The more the information contributes to the goal, the more valuable it is.*



# How is the value of information determined?

- **Don't forget!** *Information may be useful and valuable for achieving one goal, and completely useless for achieving another.*
- From the point of view of a **rational economic actor**, information is valuable if it **reduces uncertainty in his decision-making process.**



# The value of information from the perspective of economic theory

- Economists consider the **value of information** based on the **gains** that can be obtained from its **additional portion**.
- In **neoclassical theory**, the goal is to **maximize utility** for individuals or to **maximize profits** for firms.
- **K. Arrow** proposed to measure the **value of information** by the information received through **some communication channels**.
- To do this, comparing the usefulness of this or that decision **before and after** using the channel is enough.
- Thus, the "**demand**" for a given channel is determined.
- **Hirshleifer and Reilly** derived the value of information through the **utility function**.
- In their case, information is a **received message**, and they introduced the concept of **information structure as a message about various events that may occur**.

# The value of information today

- ❑ **Information technologies** - a new value for the development of society
- ❑ **Information technology** is a set of knowledge about ways and tools of organizing production processes and management of natural processes, aimed at creating artificial objects.
- ❑ **Information technology** – a combination of technical capabilities of computing, telecommunications, and informatics, aimed at selecting, accumulating, analysing and bringing information to the consumer.



# The value of information today

- With the **introduction of information technology** and the **widespread use of the concept of information**, ideas about strategic interaction between enterprises are changing, and new types of competition are emerging.
- **Information** is a source of revenue and a tool for dominating the information technology market.





# Information management

- ❑ In typical cases, **Information management** is a collection of information about the state and processes within and outside the organization (**verbal or digital portrait**).
- ❑ The number of **characters, letters, and symbols** measures the amount of information.



# Information management

Qualitative indicators are used in the evaluation:

- 1) **excess information** (increasing the quality of decisions, but labor-intensive),
- 2) **required amount** of information,
- 3) **information gap** (difficulties in decision-making.)



# Information management

- **Reliability of information** is an indicator of conformity of the received information to the real one.
- The less intermediaries involved in the information transfer process, the more reliable it is.
- **Distortions** can occur due to objective and subjective reasons.



# Sources of management information

## Internal:

- accounting and statistical reporting,
- customer accounts,
- current observations,
- special studies (both planned and those conducted by special decision of the management).
- acts on audits and inspections, audit results,
- information on personnel movements, deliveries, production and sales volumes, etc.

## Externals:

- employees (managers and specialists of supply, sales, marketing, information services);
- upper management;
- partners (buyers, sellers, employees of financial, credit, insurance institutions);
- mass media, information systems, periodicals, samples of equipment, technical documentation, reference books, magazines, catalogs, business documents, photographs, microfilms, instrument readings, etc.



# Information Services

**Information Services** - departments in companies engaged in planning, collecting, processing, analyzing, evaluating information, making recommendations to management, and creating strategic data bases. Information services include:

- scientific and technical information departments, databases
- technical archives
- other departments.

# Information / Communication

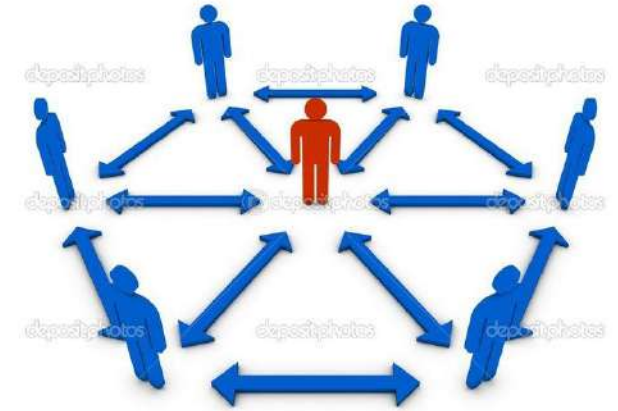
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## FACTS

- ❑ **Communication** is the **exchange of information** between the manager, the management body, and the performers.
- ❑ *A manager spends up to 85% of their time on communications.*



# The information is transmitted by **in three ways:**



Reports on inspection results, reports on assignment performance, personal opinions of employees, etc



Tasking, coaching



Exchange of views,  
coordination of  
actions

# Production of information

Human labor is a **necessary condition** for the creation of information.

**Information production** is realized in **two forms**:

- **Direct production** of information.
- **Information processing/ additional processing** (extracting information and presenting it in an appropriate form for consumption).

# Production of information

- ❑ **Information** can at the same time act as a **subject of labor**, as a **tool of labor**, and as a **component of the labor force** of society (multifunctionality of information and the possibility of its rapid transformation from one labor process to another).
- ❑ Every process of human labor aims **to transform information or change its form**.
- ❑ "There is no way of productive application of labor that would not be at the same time the application of information" (T. Stoner).

# Organizations working with information

Consulting companies

Financial companies

Scientific organizations



# Production of information

- 1. Production:** information, data, facts, knowledge → collection, processing, analysis → information technologies, human abilities → information resource
- 2. Distribution:** addressing, transformation → ownership relations → information product
- 3. Exchange:** information product → value + communication channels → information commodity
- 4. Consumption:** information commodity → personal (productive) consumption → information capital

# Production of information

At the distribution stage, the received information resource is divided into:

1. the property of the producer of the information good, the so-called "information stock"
2. An information good that must reach the buyer (customer).

The information stock is accumulated in the form of knowledge and experience of workers producing the information product and is its intellectual capital and intangible asset.



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# **Topic 6: Confidentiality of information and channels of its dissemination.**

# Legal basis for information protection

The legislation **guarantees the right** of the owner **to use information and protect it from access** by other persons (organizations).

If access to information is **restricted**, such information is **confidential**.

## Legislation of Kazakhstan

1. Act "On Informatization."
2. Act "On Access to Information."
3. Act "On Personal Data and its Protection," etc.



## — Confidentiality of information

- ❑ **Confidentiality** is an integral indicator of information security. It characterizes the degree of compliance with the level of availability, secrecy, and imitostability of data (documents) with their established status, reflecting the information's value.
- ❑ Imitostability is understood as the resistance of information to unauthorized interference from the outside
- ❑ Imitosecurity, as well as imitostability, is one of the fundamental concepts in modern cryptography.

A close-up photograph of a hand wearing a black leather glove pointing to a document. The document is white with the word 'CONFIDENTIAL' printed in large, bold, red capital letters. Below this, in smaller black text, it says 'Business in Europe and Am' and 'Ocean'. The document is part of a blue folder or binder. The background is dark and out of focus.

CONFIDENTIAL

Business in Europe and Am

Ocean

# What qualifies as confidential information?

- ❑ **State secret** is information belonging to the state (state institution)
- ❑ **Trade secret** (information belonging to an individual, firm, corporation, etc.).

Information of value to the state may be assigned one of three possible degrees of secrecy: "**secret**", "**top secret**," or "**of special importance**".

*According to the Act "On Protection of State Secrets of the Republic of Kazakhstan", "State secrets of the Republic of Kazakhstan are divided into three categories: state, military and official secrets."*



# Trade secret

A **trade secret** is a regime of confidentiality of information that allows its owner, under existing or possible circumstances, to increase income, avoid unjustified expenses, maintain a position in the market of goods and services, or obtain another commercial benefit

*(Wikipedia)*





## Trade secret

This is scientific, technical, technological, production, financial, economic, or other information, including **trade secrets (know-how)**, which has actual or potential commercial value because it is unknown to third persons, to which there is **NO free access on a legal basis**, and in respect of which the owner of such information has introduced a trade secret regime. *(Wikipedia)*

# Liability

**Liability** is provided for disclosure (intentional or negligent) and unlawful use of information constituting a trade secret:

- disciplinary,
- civil,
- administrative,
- criminal,
- material.

*Material liability arises independently of other forms of liability.*



# Regime of the trade secret

1. Determination of the list of information forming a commercial or trade secret.
2. Restriction of access to the information related to the trade secret (procedure of work with this information and control over its observance).
3. Accounting of persons with access to the information related to the trade secret and (or) persons to whom it was provided or transferred.



## — Regime of the trade secret

4. Regulation of relations on the use of information forming a TS by employees based on labor agreements and by counterparties based on civil law agreements.
5. Labeling of material carriers (documents) containing information related to the trade secret as "Trade Secret," indicating the owner of this information.



# Primary sources of "secret" information

**Information holders** – organization's managers and workers, and persons interacting with them.

**Public sources** – publications about the company and its developments, advertising publications, and exhibition materials.

**Service sources** – documentation (paper, magnetic storage data, electronic documents) and databases.

**Physical sources** – electromagnetic fields and acoustic waves, radiation and inductions accompanying the work of computing and other office equipment, and communication devices.

**Private sources** – personal diaries and work plans of employees, personal creative scientific and technical developments, draft reports, articles, documents, etc.

CONFIDENTIAL

business in Europe and Am  
Ocean

# — Data security threats

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**Data security threats** are actual or potential risks that can break information security and lead to the leakage of important information

## Threat types:

- Threat to accessibility.
- Threat to integrity.
- Threat to confidentiality (privacy).



*The key rule is that only a certain number of people can access essential data.*

# Threat to accessibility

Employees of the organization are potential abusers...

- Entering incorrect information.
- Making systemic errors.

*It creates a favorable environment for hackers.*

## Ways to protect:

- administrative control
- process automation





# Threat to integrity

*The key rule is that the information cannot be tampered with.*

The abusers are unscrupulous employees of the organization.

- Forgery.
- Theft.

## Ways of forgery:

- entering incorrect data or changing data,
- duplicating, supplementing data,
- failure to perform necessary actions, etc.



# Threat to privacy

*The key rule is to protect data from unauthorized access.*

## **Threat Sources:**

- Storing reusable passwords in sources that attackers can access.
- Using the same passwords in different systems.
- Use of technical equipment - wiretaps and special software – by hackers.
- Presentation of the equipment with sensitive data.
- Placing information in backup storage.
- Distributing information through a large number of channels, which makes it easier to intercept.
- Leaving equipment unattended (attackers can snoop on a password or steal physical information storage).
- Employees abuse their authority.

# Data protection

**Information security** in the management system is an inherent property of the functional subsystem of information control and protection, which characterizes the degree of protection of data (or documents) and consists in the ability to prevent accidental or purposeful distortion or destruction, disclosure or modification of data (or documents) in the information base of the management system.



Protection

## — Ensuring the protection of information

**1. Organizational and legal tools.** Various tools used in the building an IT infrastructure that provides data storage - during construction and renovation of buildings and premises, system design (applicable standards and contracts, including international ones).

**2. Engineering and technical means.** Basic tools responsible for physical security: protection against unauthorized access, interception and eavesdropping, natural disasters, fires, control of activities and movements of employees and other measures.



# Ensuring the protection of information

**3. Cryptographic means.** Encryption of information during its storage and transmission. Cryptography helps to ensure the confidentiality and authentication of data, preserve its integrity and prohibit access to software by unauthorized persons.

**4. Software and hardware tools.** These are various tools that allow the identification employees, encrypt information, signal unauthorized entry, and destroy data on media. Hardware means are built into the equipment (various circuits, registers), physical means are realized in electronic and mechanical devices (magnetic locks, surveillance cameras), and special software is used as software.





## Channels of information dissemination

- This is a way of moving confidential information from one source to another in an authorized (permitted, legal) mode, for example, discussing a confidential issue in a closed meeting, writing down on paper the content of an invention, negotiating with a potential partner, working on a computer, etc.
- Regulated information dissemination channels are input, output, and internal document flows as part of the document flow cycle.

# Methods of obtaining information



## Legal:

"simple espionage,"  
"intelligence in business,"

## Illegal:

Stealing, copying,  
elaborate deception,  
eavesdropping,  
forgery, bribery,  
blackmail, etc.

Legal methods are distinguished by legal security and, as a rule, predetermine the emergence of interest in a competing firm, the need to identify or form and use channels of unauthorized access to its valuable information

Illegal methods of obtaining valuable information are always prohibited methods cannot obtain in nature and are used to access protected information that cannot be obtained by legal methods





Thank you for  
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# **Topic 7. Information as a consumer good. Usefulness of information.**



# What is an economic good?

**Economic goods** are tangible or intangible objects that have the properties of satisfying people's economic needs.

Economic goods:

- are **created** because of the economic activity of people
- have a **price** (commodity).

**Economic resources** are needed to obtain economic goods.

# Limited commodities VS unlimited needs

- ❑ Economic goods are **limited**, determined by the ratio between their need and the quantity available for disposal.
- ❑ The perfection of **modern information technology** does **NOT** wholly solve the problem of **unlimited human needs**.



# Limitations of information

- ❑ Information can be disseminated at **minimal cost**.
- ❑ A **limited** number of people can **create** information.
- ❑ Information is **NOT consumed** like many other goods.
- ❑ Information **loses relevance** over time, so consumers need **more and more new information**.



# Information is an economic good!

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*Information* as an internal element of today's economic system is **NOT** only a **resource** but also a **consumer GOOD**.





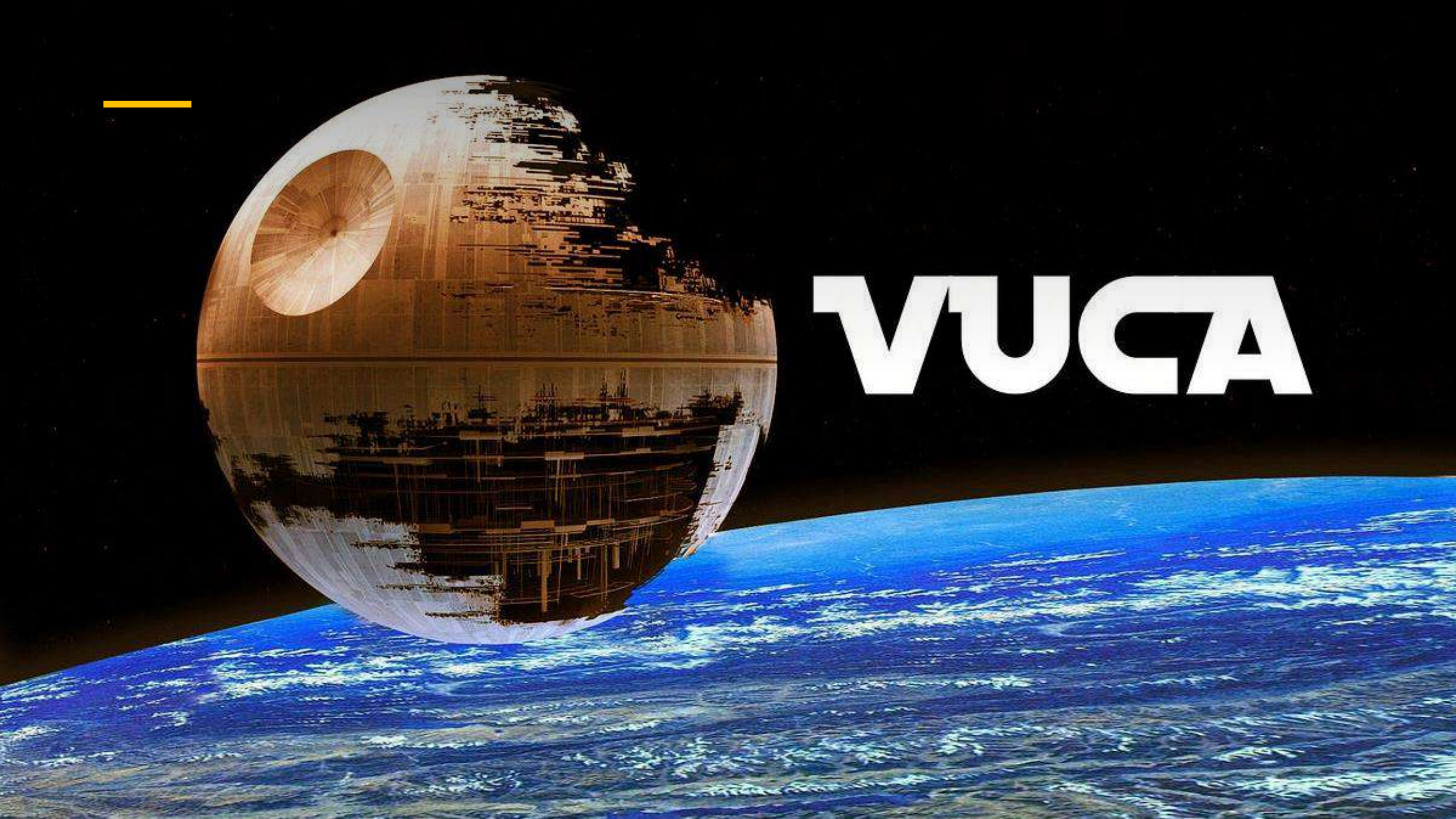


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## As a result ...

- People **are used** to living in **uncertainty**.
- The amount of **information used** is **constantly increasing**.
- People **want to reduce uncertainty!**





**VUCA**



- V** – volatility;
- U** – uncertainty;
- C** – complexity;
- A** – ambiguity

The concept of a **"VUCA world"** first appeared in 1987 to describe the state of countries after the end of the Cold War.

*It is a stressful, ever-changing world that requires processing vast amounts of information quickly and adequately*

## VUCA – what is it?

It is a counterbalance to the **stationary, simple and predictable time** that **ended** with the rapid development of technology and the **active expansion of the information field.**



«In the new information-active and ever-changing world, those who are tolerant and patient with uncertainty are the most comfortable in life.»

People of the **VUCA world** have adequate self-evaluation, which allows them **to react calmly** to all circumstances and **not to panic** at personal failures.





## **so-called Soft Skills**

- flexible mind and ability to analyze quickly;
- out-of-the-box thinking, creativity;
- high level of intelligence;
- good sensitivity to interpersonal relationships;
- ability to perceive new things with curiosity;
- easily find several options for solving problem situations;
- not to panic in case of difficulties;
- have a good intuition.

# Imperfect information



- ❑ Information is not evenly distributed, leading to different consumer behavior.
- ❑ People are better informed about the prices of the goods they produce and sell than the prices of the goods they buy.
- ❑ Imperfect information refers to the situation where buyers and/or sellers do NOT have the necessary information to decide the product's price or quality.

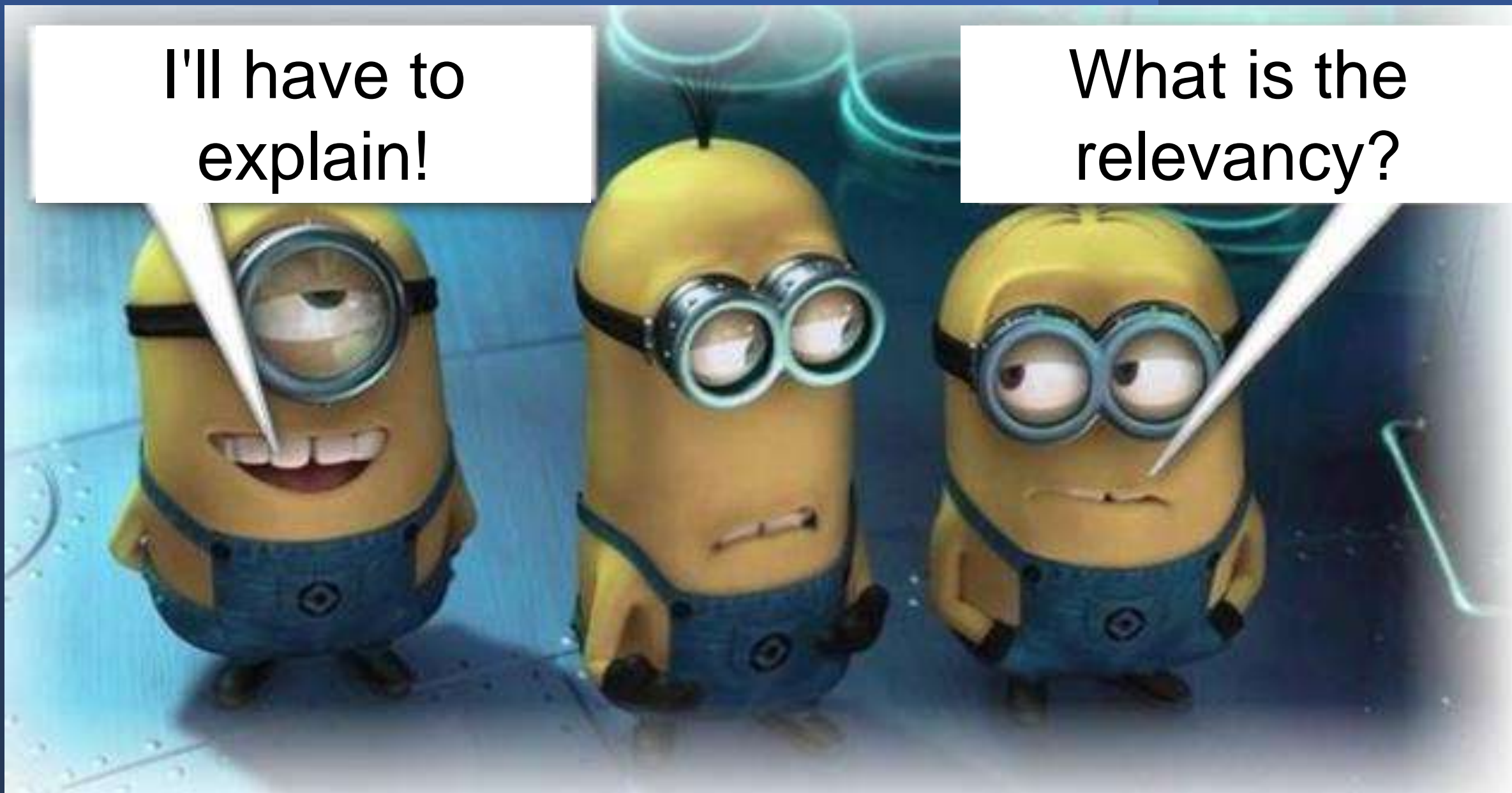
# Value of information



- ❑ The **value of information** is a property determined by **its suitability for intended use**.
- ❑ **Information quality** is the degree of development of information properties that determine its practical suitability (completeness, reliability, etc.).
- ❑ The **usefulness of information** is determined by the extent to which **it reduces the uncertainty of the situation** and is related to the assessment of its necessary quantity.

I'll have to explain!

What is the relevancy?





➤ Quality and quantity of information **are NOT combined** into one indicator!

➤ There are **estimated characteristics** of information.

## Two approaches:

- Synchronic approach
- Diachronic approach.





## The synchronic approach

focused on studying information's semantic, pragmatic, and axiological properties.

A **semantic theory** emerged as an attempt to **measure the meaning** of messages that have the form of judgments, using terms such as "state description" and "state description measure."

- **Semantic information** is the **content** of a particular message.
- Semantic theory allowed us to **clarify** the concept of "**quantity of information**."



THESAURUS

DICTIONARY

Schrader proposed a way to quantify symbols' imaginative, semantic meaning - he used the concept of **THESAURUS**.

*It is a specific stock of knowledge fixed in the form of words and semantic relations between them.*

- The meaning embedded in a message is described by correlating it with semantic information **stored** in the thesaurus.
- Its quantity is expressed by the **degree of change in the thesaurus** under the influence of the message perceived by the recipient.



- ❑ **The axiological theory** defines a **measure** of estimating the amount of information constituting a message **by reducing the uncertainty** contained in one random variable relative to the other.
- ❑ **The pragmatic aspect** of information **reflects** its characterization in terms of **its usefulness and suitability** for specific tasks.

# Diachronic approach

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The **diachronic scenario** of analyzing the information parameters implies considering its **process's semantic** and **value-pragmatic** characteristics.



Thus, the semantic information contained in a message is evaluated by the degree to which the thesaurus is modified by that message.

**Information quality is a process:**

- 1) it is subject to the action of the time factor (time can reduce or eliminate information qualities inherent in the subject or object);
- 2) information quality formation and functioning **is accompanied by its transformations.**





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# **Topic 8: Risk and its measurement. Risk insurance.**

# Frank Knight

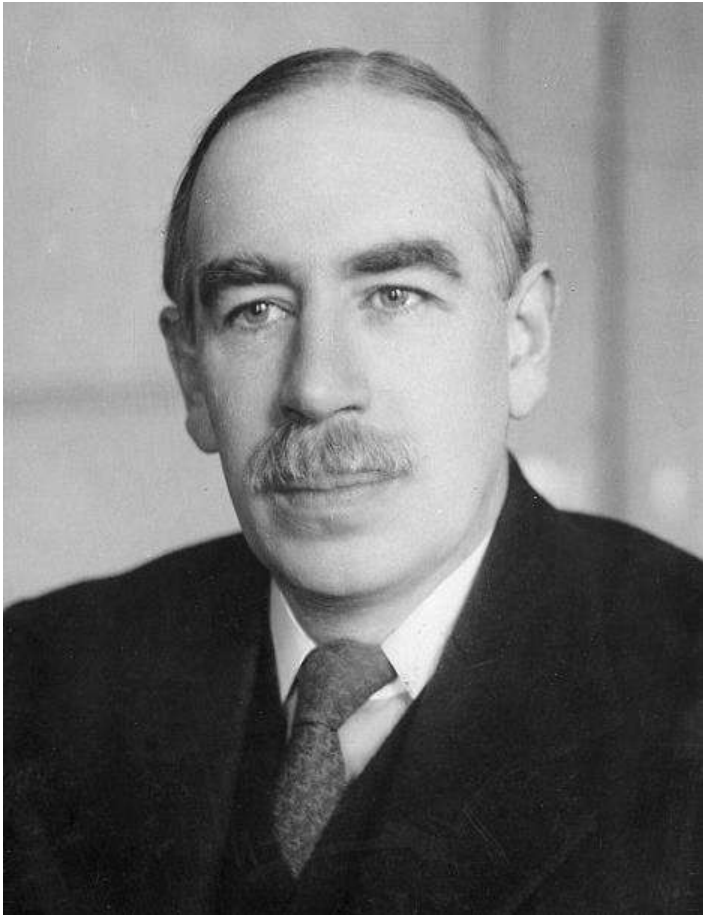
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- ❑ American economist, founder of the fundamental study of risk in Economics.
- ❑ Author of the work “Risk, Uncertainty, and Profit” (1921).
- ❑ He combined the concepts of uncertainty and risk.
- ❑ He justified the necessity of introducing the concept of "uncertainty" into the model of perfect competition.
- ❑ He said: “The key to understanding the problem of risk is not the change itself but the imperfection of our knowledge of the future.”
- ❑ He developed a classification of probability types.



# John Maynard Keynes

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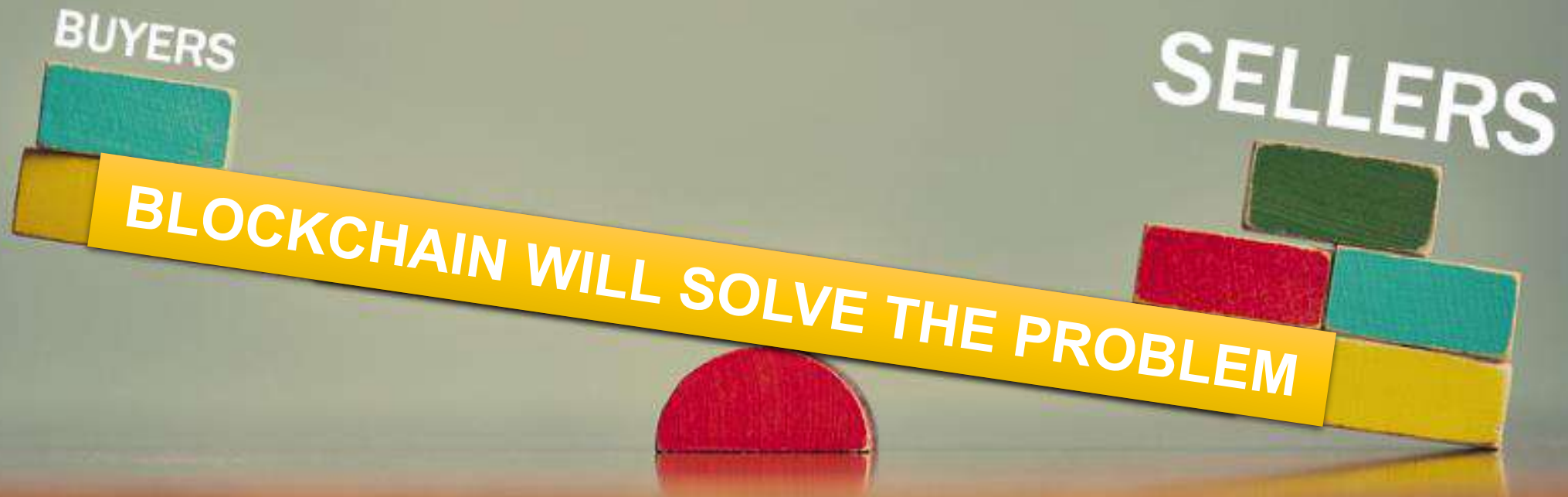


- ❑ Author of "The General Theory of Employment, Interest and Money" (1936).
- ❑ He gave macroeconomic interpretations of the concept of risk.
- ❑ He identified the following types of risks:
  - **entrepreneurial risk** is related to the uncertainty of receiving the expected income from invested funds;
  - **lender's risk** is the risk of evasion of loan repayment and the risk of insufficient covering;
  - **monetary unit value risk** is the probability of loss of funds due to changes in the exchange rate of the national currency.



- ❑ **Uncertainty is the** most important property of **economic information**.
- ❑ Economic analysis based on the "information paradigm" is known as the "economics of information" (Stiglitz, Akerlof and Arrow).
- ❑ **Information** is a factor in **reducing risk and uncertainty** (information asymmetry, moral hazard, etc.) in market choice situations.

# Information is a factor in reducing asymmetry



The information economy creates all conditions for **maximizing the degree of awareness of market agents.**

**IS THAT REALLY THE CASE?**





# Why is there a problem?

First, economic **information cannot be perfect because** it depends on the conscious actions of economic agents, i.e. **it is endogenous.**

A hand is shown at the top, holding a coiled metal spring. The spring extends downwards and is attached to a gold coin. The background is a gradient of blue, with a white semi-circle on the right side. The text is overlaid on the white semi-circle.

# Why is there a problem?

Second, **information saturation** has certain **limits**, but prices should fluctuate **randomly** and **change unpredictably** and **randomly**.





## Eugene Fama: the efficient market hypothesis

*"A market is **efficient** with respect to any **information** if it is **immediately and fully reflected** in the price of an asset."*

# Forms of market efficiency

1. A **weak form of efficiency** if the value of a marketable asset **fully reflects past information** relating to that asset.

This is publicly available information about the past state of the market (in terms of the dynamics of the exchange rate value and trading volumes of a financial asset).



# Forms of market efficiency:

2. **Medium form of efficiency** if the value of the market asset **fully reflects not only past but also public information.**

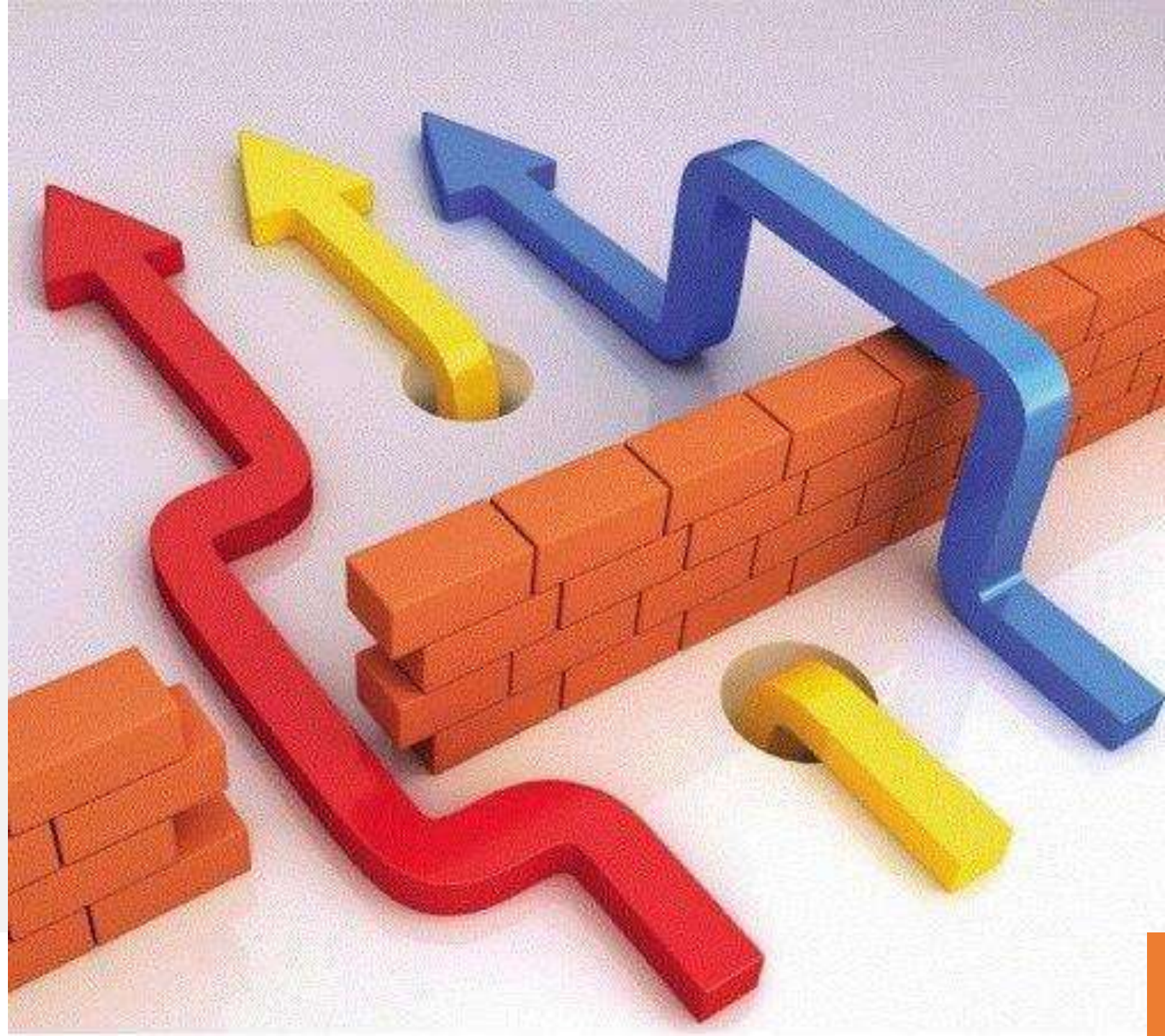
This is current information that becomes publicly available at the present moment (provided in the media, company reports, speeches of government officials, analytical forecasts, etc.).



# Forms of market efficiency

3. A **strong form of efficiency** if the value of a market asset **fully reflects all information - past, public and internal.**

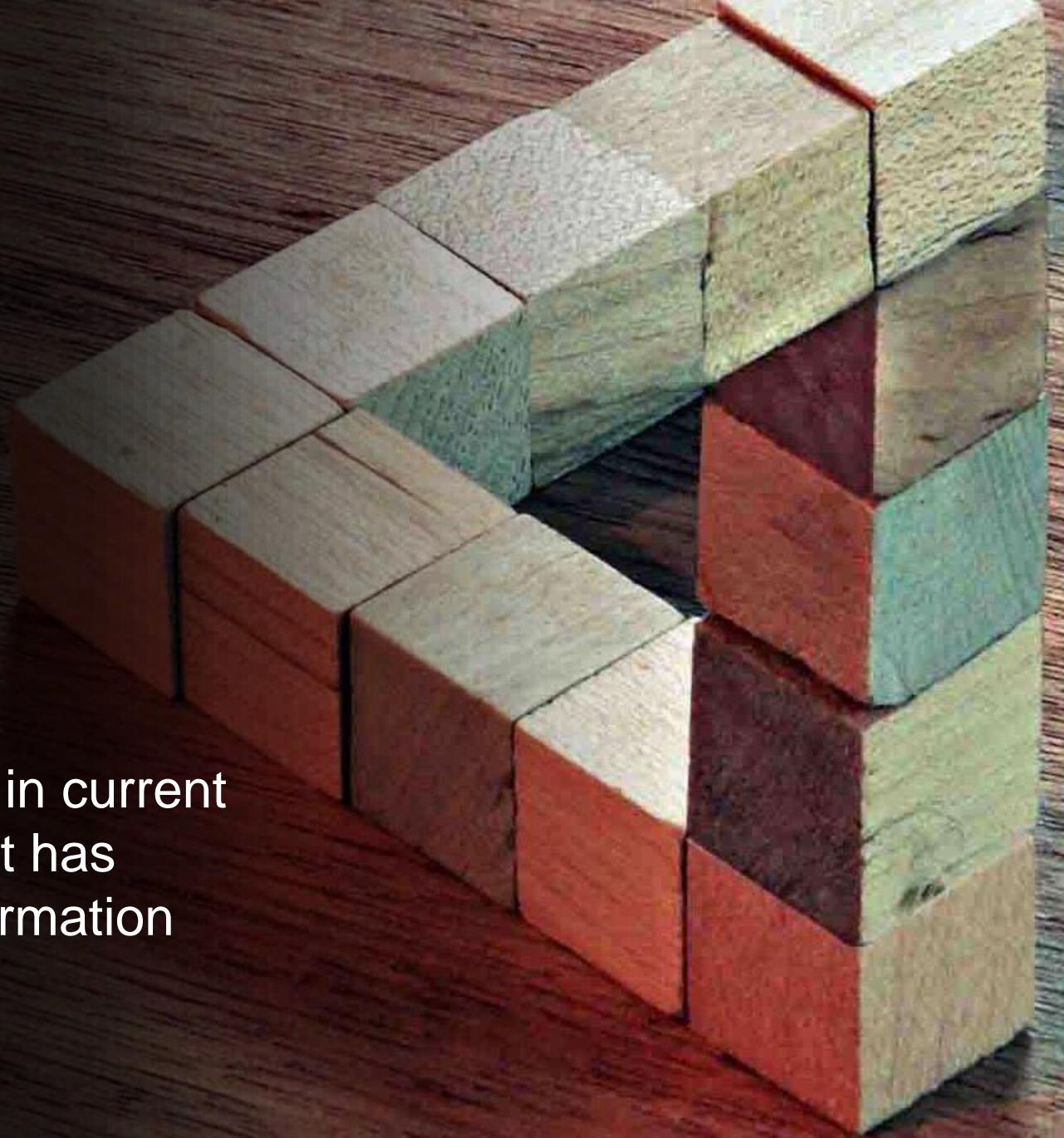
This is insider information that is known to a narrow circle of persons due to official position, or other circumstances.



# Paradox Grossman- Stiglitz

*The market, even theoretically,  
**CANNOT** become *fully  
efficient over the long term.**

"If all available information is reflected in current market prices, then no economic agent has sufficient incentives to acquire the information upon which prices are set."



ИСТИНА ГДЕ-ТО РЯДОМ



**Economic information** is.

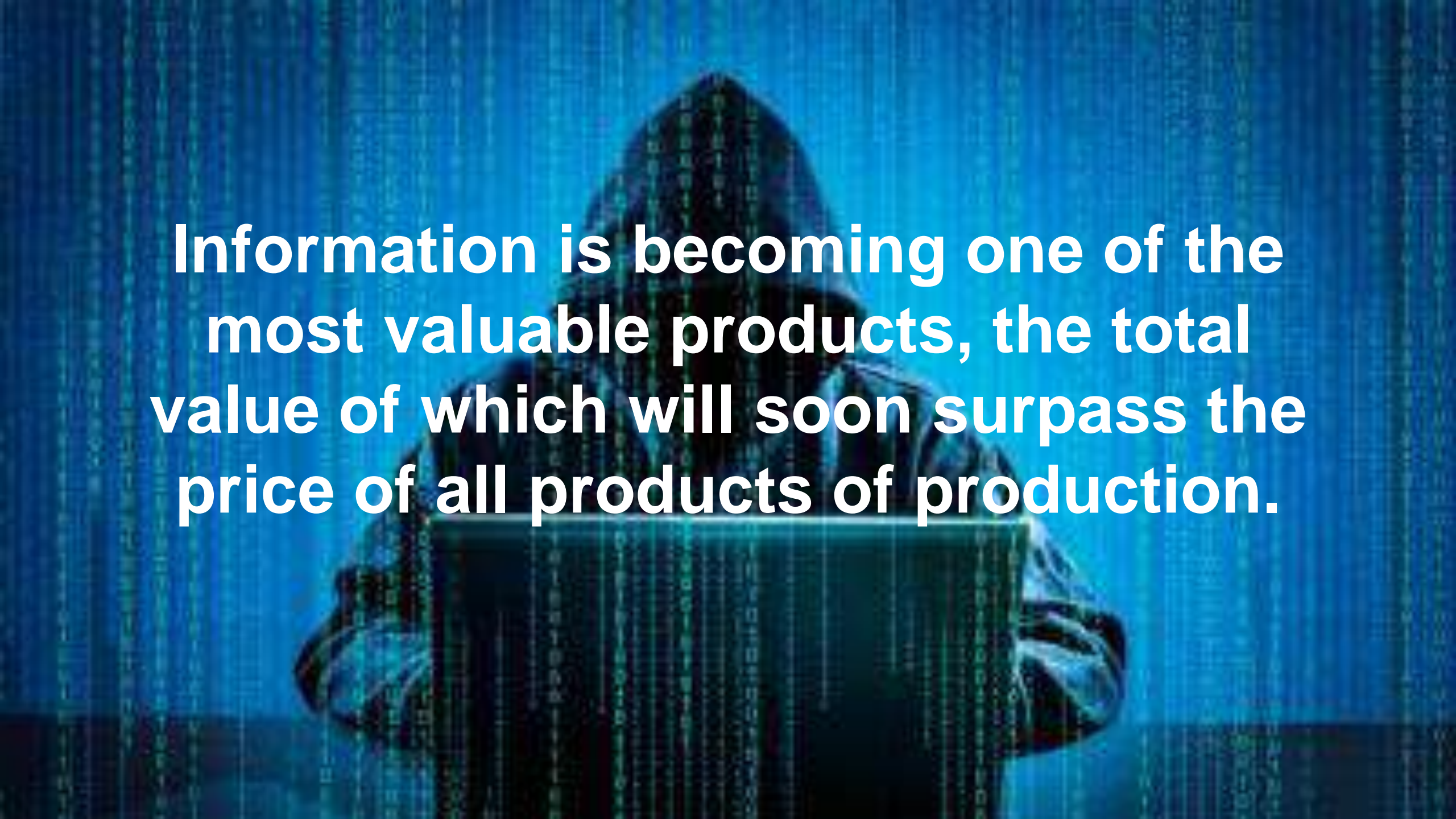
are primarily **signals between the company and the external market environment.**

For market agents, price and non-price information is of great importance.

# Relevance and objectivity of information

Market actors can only **make the right decisions** and choices when the incoming **information CORRECTLY REFLECTS THE** situation.



A person wearing a dark hoodie is seen from the chest up, holding a laptop. The background is a deep blue with a digital rain effect, where vertical lines of light blue and white pixels fall from the top. The text is overlaid in the center in a bold, white, sans-serif font.

**Information is becoming one of the most valuable products, the total value of which will soon surpass the price of all products of production.**



# Information risk: definitions

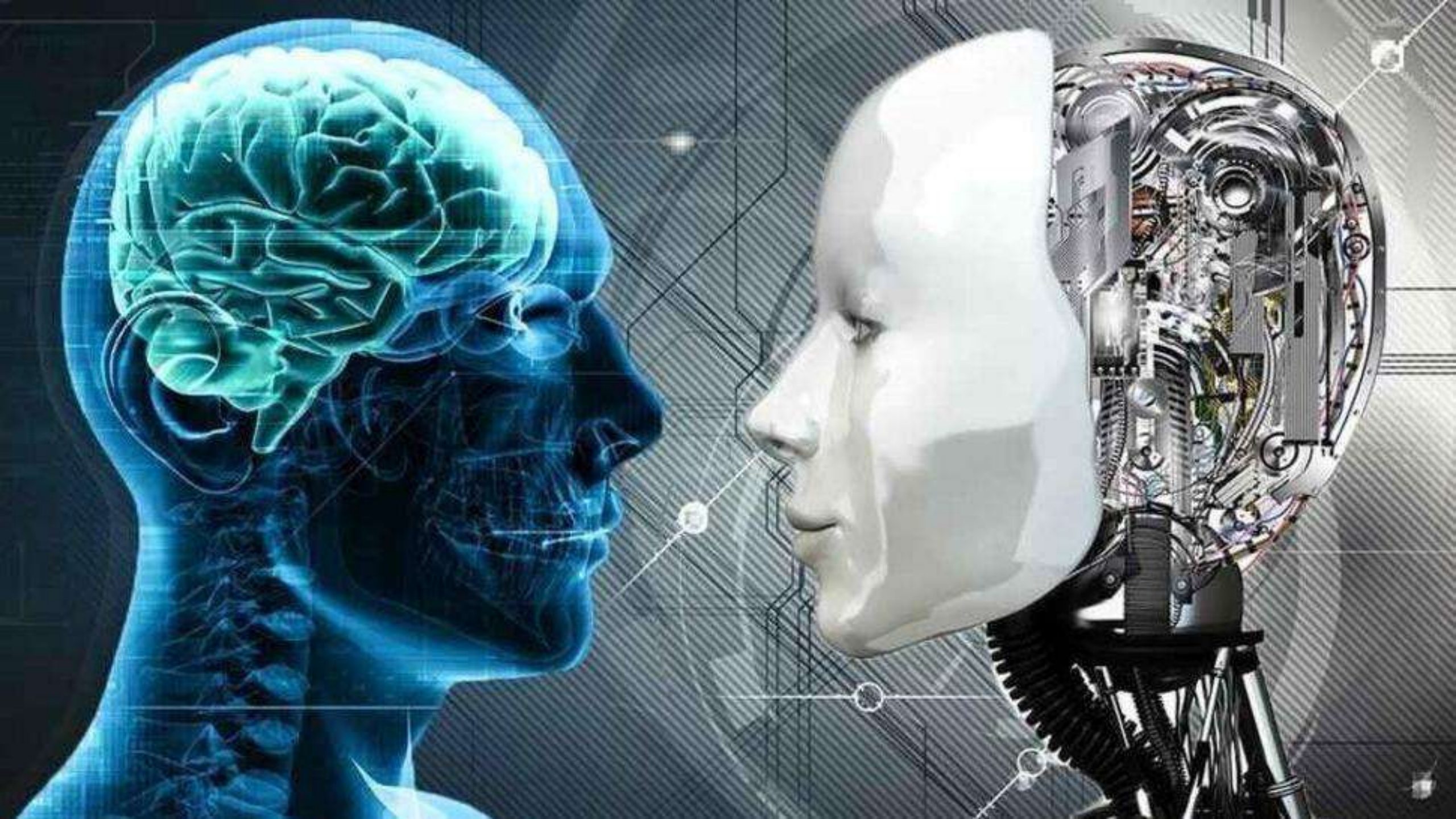
**Information risk** is an event that has a direct impact on information: its deletion, distortion, breach of confidentiality or availability.

**Information risk** is the presence of events that affect the reliability of the data obtained, its completeness and relevance.

**Information risks** are risks associated with the occurrence of failures in information processing algorithms, programs that are used to develop management decisions.

**Information risks** are risks associated with data arising at the stage of receipt, when there is a high probability of incorrect perception and processing of information.







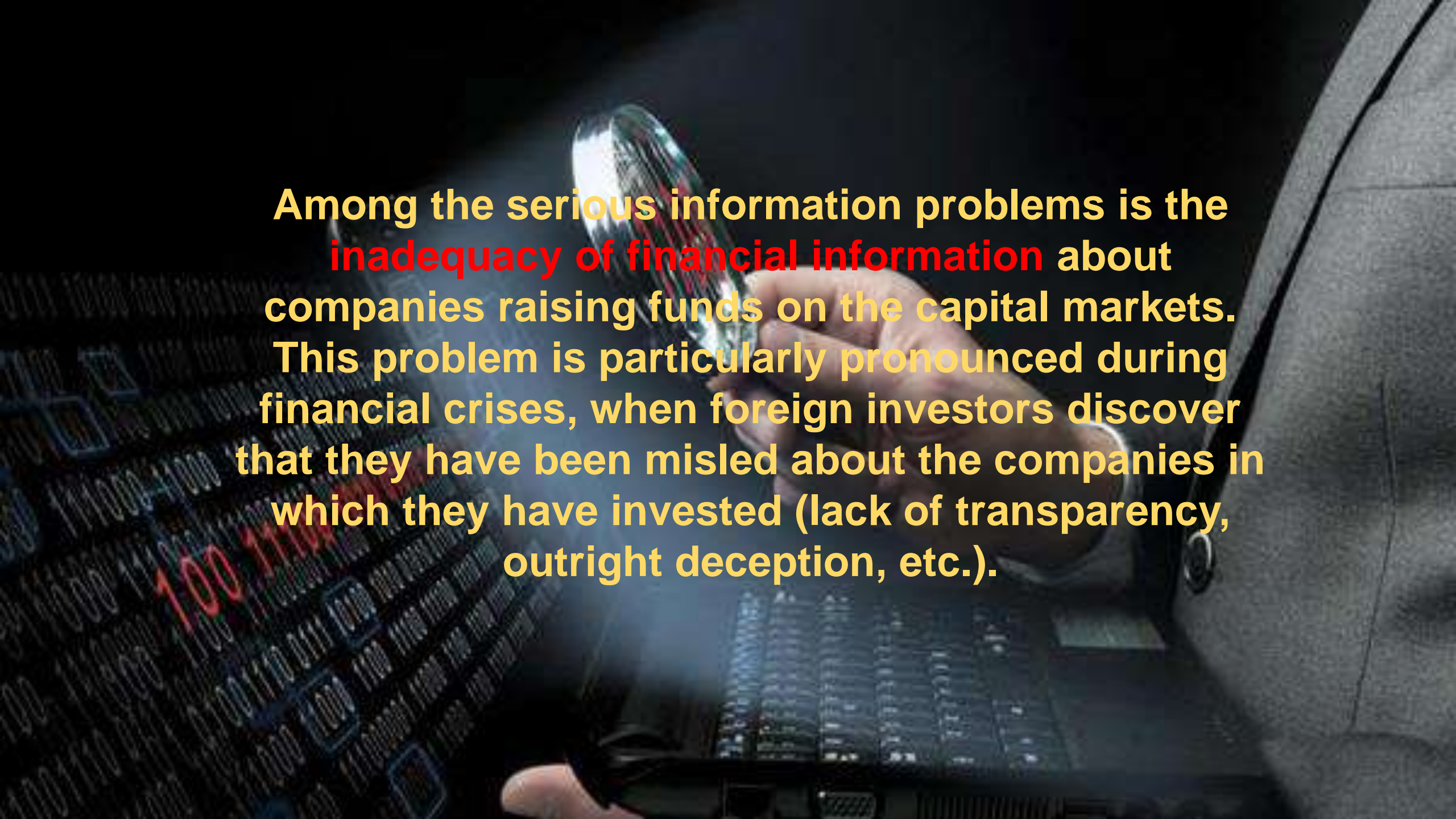
## Information risk

It is also a risk associated with the **improper implementation and use of information technology.**

# Classification of information risks

1. **By sources**, information risks are divided into internal and external.
2. **By nature**, into intentional and unintentional.
3. By type - direct or indirect.
4. **By result** - violation of information reliability, violation of information relevance, violation of information completeness, violation of confidentiality, etc.
5. **By mechanism of impact**: natural disasters, accidents, mistakes of specialists, etc.



A person in a dark suit is holding a magnifying glass over a laptop screen. The screen displays financial data, including a large red number '100' and various columns of numbers and text. The background is dark and blurry, suggesting a professional setting.

**Among the serious information problems is the inadequacy of financial information about companies raising funds on the capital markets. This problem is particularly pronounced during financial crises, when foreign investors discover that they have been misled about the companies in which they have invested (lack of transparency, outright deception, etc.).**

# Information risk management



**Information risk management** encompasses processes such as the **creation, transmission, storage and use of information through the** use of all kinds of media and communications.

# Information risk analysis

It is the process of **assessing the level of protection of information systems everywhere**, determining the **quantity** (monetary resources) and **quality** (low, medium, high risk) of all kinds of risks.





The process of analysis is carried out through various **methods and tools** to create ways to protect information and **insure risks**.

## Information risk analysis







**Thank you  
for your  
attention!**



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# **COURSE**

# **"Economics of Information"**

**EP "6B04109 - Economics"**

Rakhmatullayeva Dinara

Ph.D., Senior Lecturer

Economics Department

Almaty, 2023



# **Topic 9: The problem of moral hazard and adverse selection.**



## Imperfect information

- Information is distributed unevenly among market participants.
- Imperfect information can lead to information asymmetry and market failures

# Symmetry / asymmetry

- ❑ If the **information is symmetrically distributed**, all participants have the **same access** to it, there is **NO uncertainty**, which allows to apply means and resources in the **most efficient way**.
- ❑ **Asymmetric information** is a situation where there is an **unequal distribution of commodity data between the parties to an agreement**, where one party has essential information about the subject matter of the contract and the other does not.

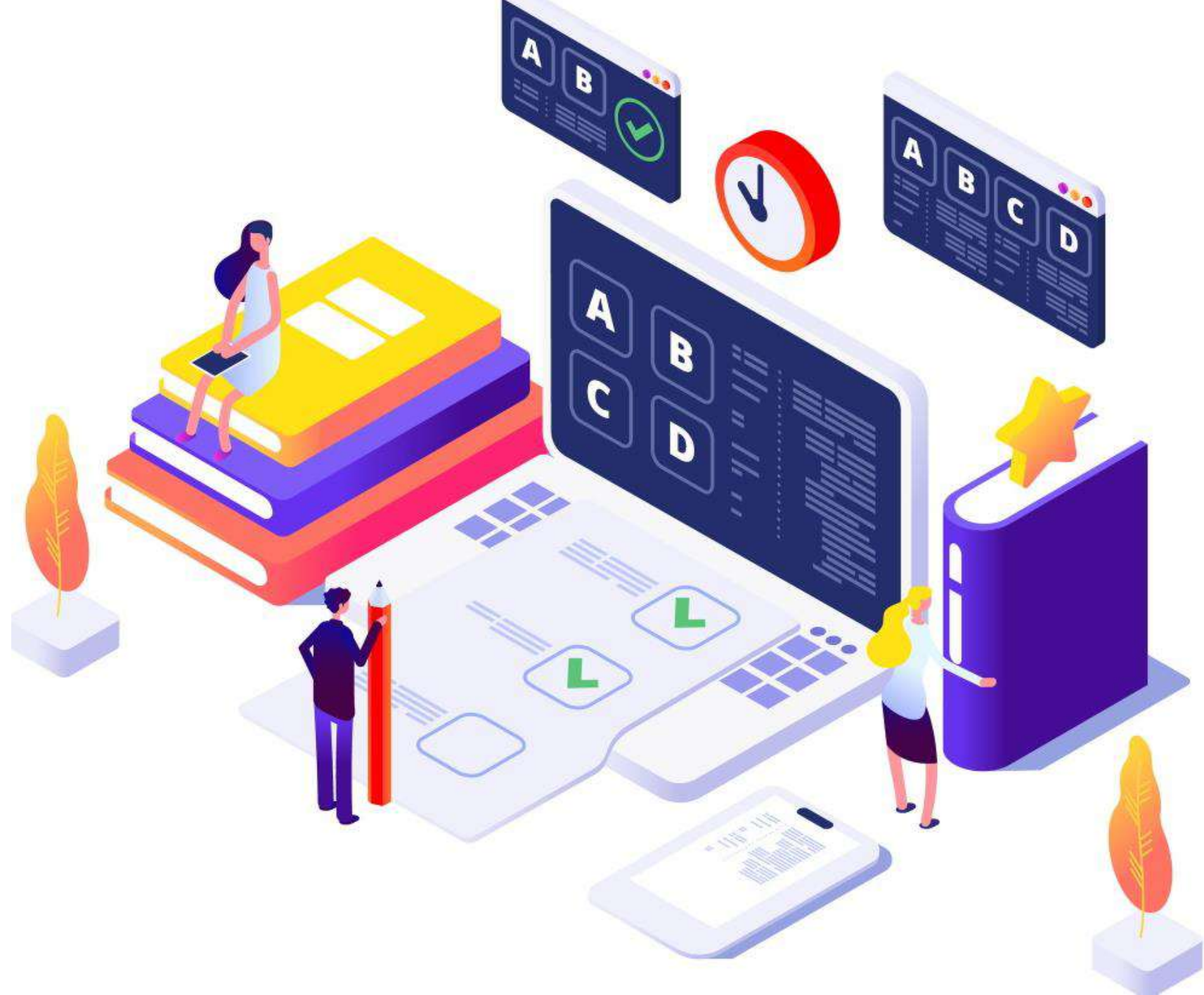




# **Causes of asymmetric information**



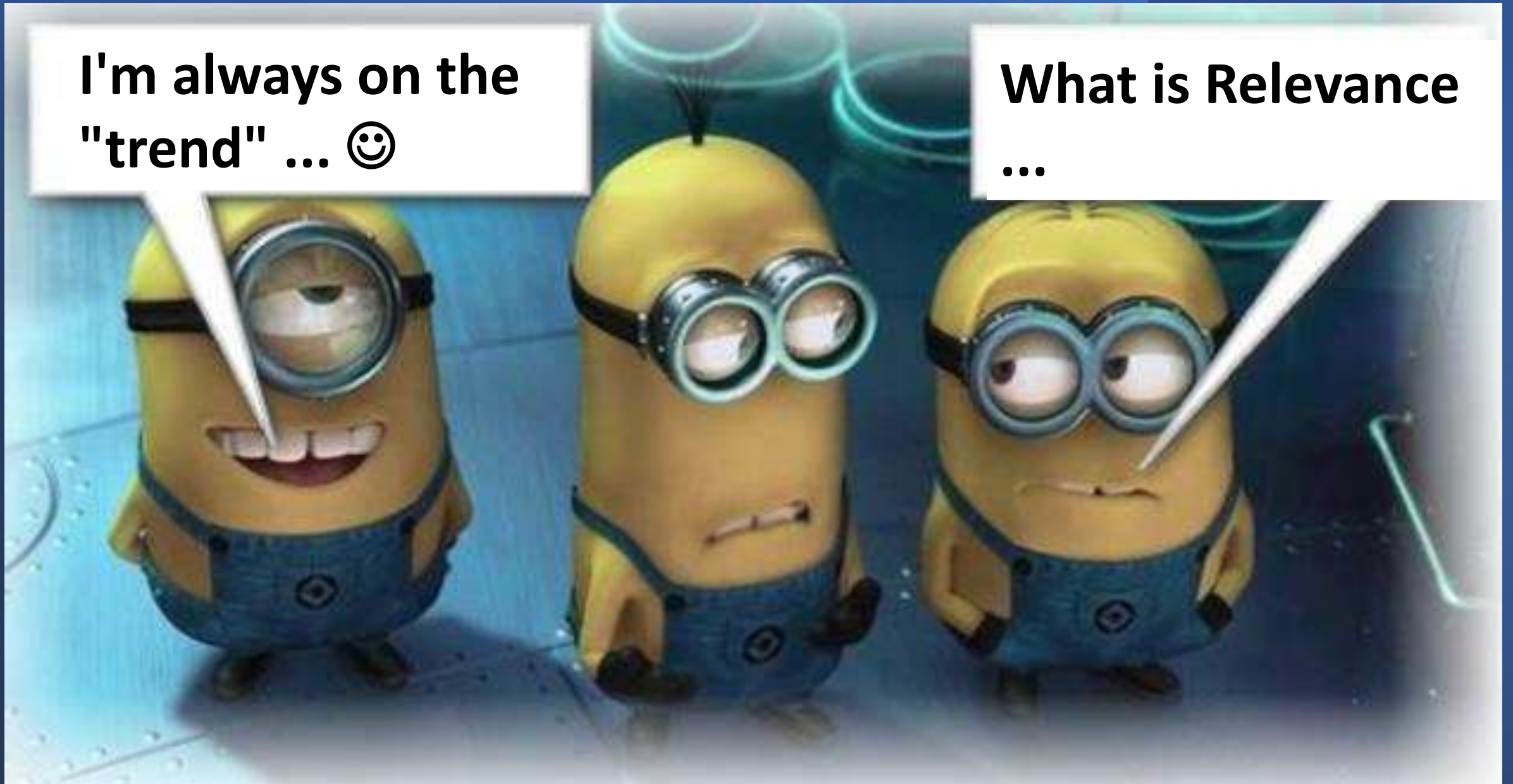
- ❑ Low level of reliability of the information obtained.
- ❑ Lack of sufficient knowledge and skills to evaluate incoming information.

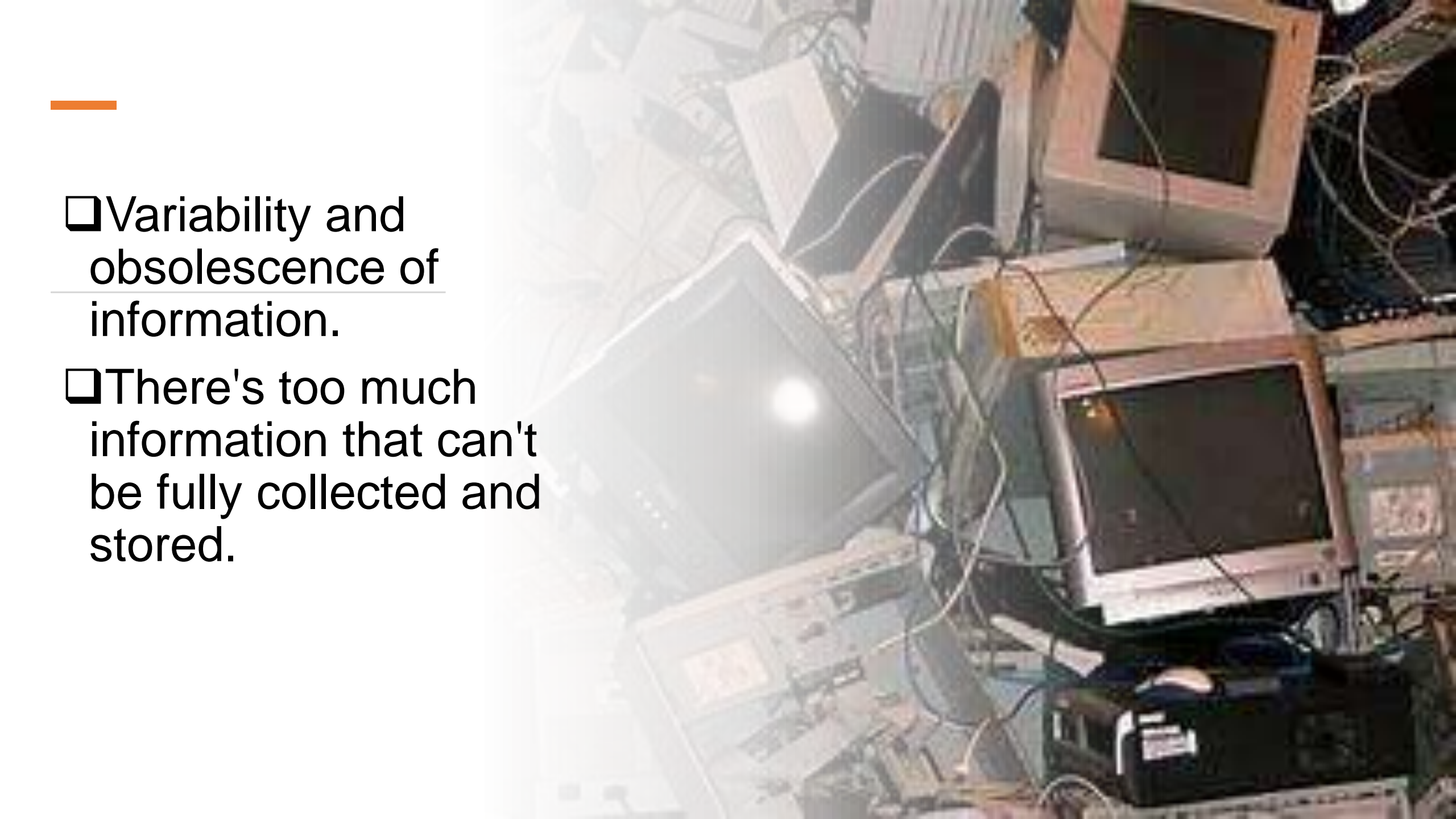




I'm always on the  
"trend" ... 😊

What is Relevance  
...



- 
- A photograph showing a large, messy pile of discarded computer monitors and peripherals. The monitors are of various sizes and colors, some with glowing screens. Cables and other electronic components are scattered throughout the pile, suggesting a large volume of obsolete information.
- ❑ Variability and obsolescence of information.
  - ❑ There's too much information that can't be fully collected and stored.

**Asymmetric  
information covers  
different areas of  
activity**



- 1. Product market**
- 2. Insurance market**
- 3. Credit market**
- 4. Labor market**



# George A. Akerlof

- Nobel Prize-winning American economist; first established the role of asymmetric information in determining product quality in "**The Market for Lemons**" (1970).
- His work is based on *The Used Car Market*, whose authors won the Nobel Prize in 1996.
- "**Lemons**" (Amer. slang) - cars with defects discovered only after purchase.

## Conclusion:

*"If buyers do not have information about the quality of goods to the same extent as sellers, bad goods crowd out good goods until the market disappears altogether."*



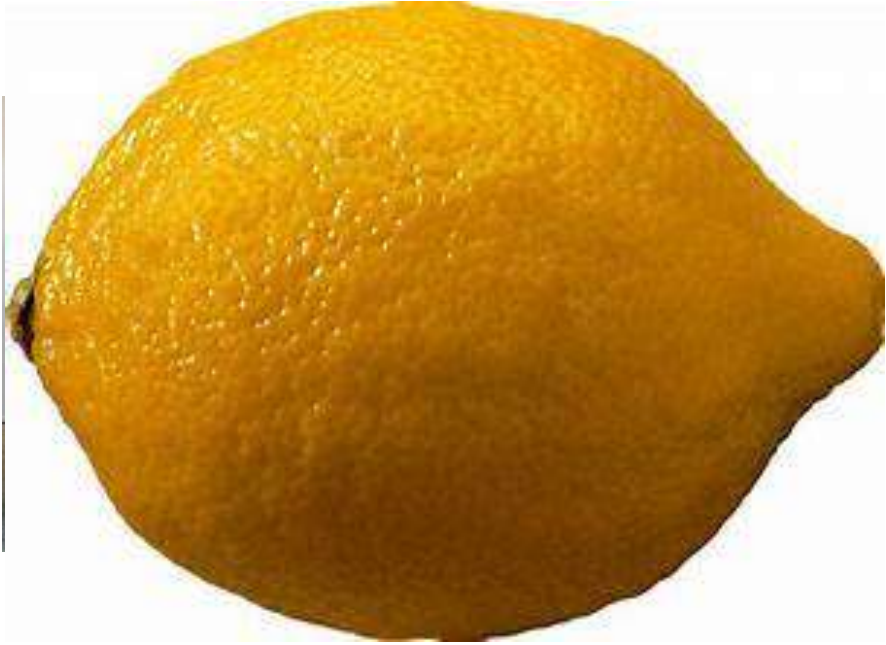


# Used car market ("lemons")

- The buyer knows the model, age, mileage of the car, but **does not know its individual features, which are revealed only in the course of operation and which are known to the seller.**
- Buyer **demand is determined by the statistical characteristics of a group of cars possessing a given set of explicit attributes.**
- The market sets a **uniform price for the whole group** - both the best specimens and the "lemons".



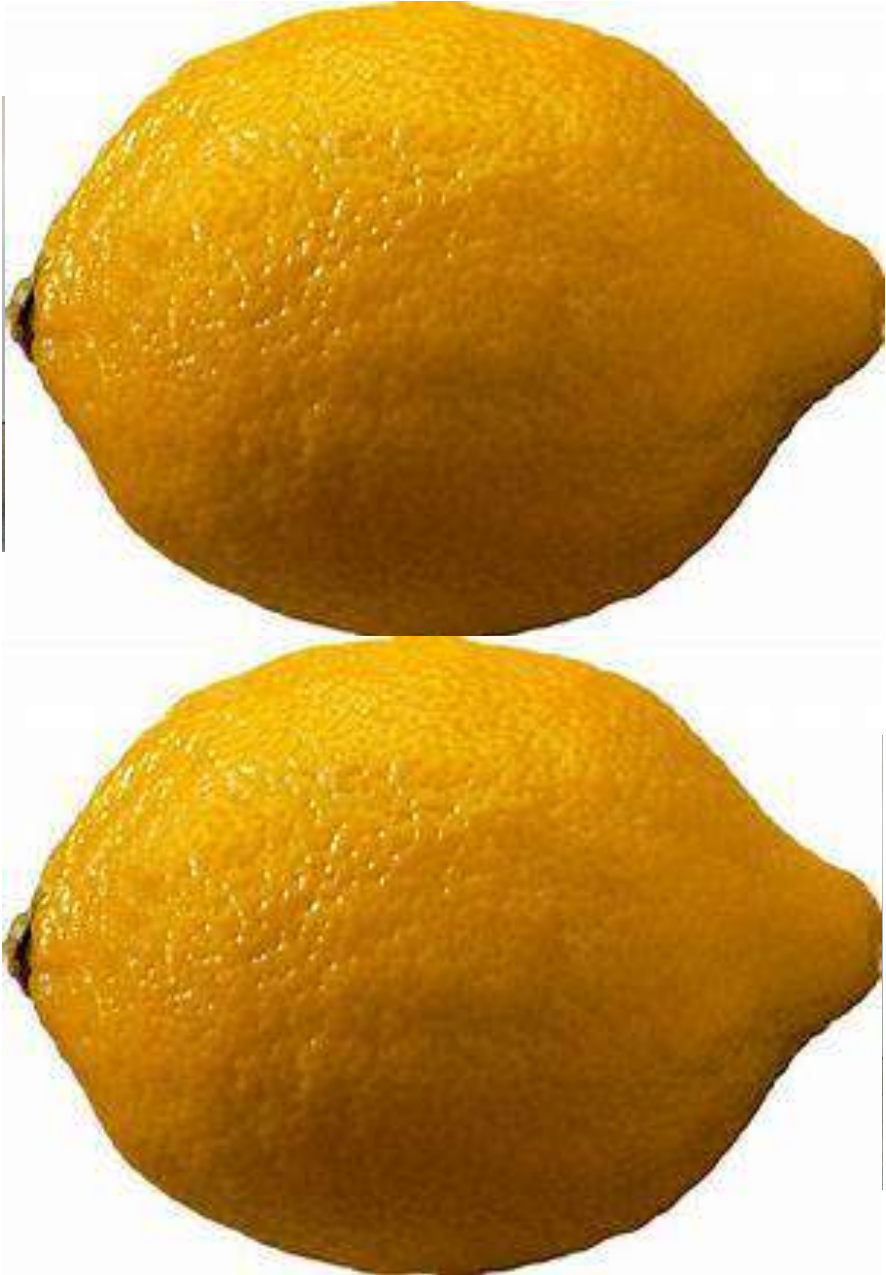
# The market for "lemons": a hidden mechanism



## Situation 1:

### 50% good cars / 50% "lemons"

- The price in the market is the arithmetic average of the prices of good and bad cars.
- Sellers of good cars will refuse to sell them, and for owners of bad cars, it's a good chance to sell them at a higher price.
- As a consequence, bad cars will gradually dominate the market.



# The market for "lemons": a hidden mechanism

## Situation 2:

25% good cars / 75% "lemons"

- Buyers will assess the situation and reduce the demand for cars.
- As a result, the price in the market will drop even further.
- The sellers of good cars will be forced out of the market, which means only the "lemons" will be left.

**CONCLUSION:** *Due to asymmetric information, low-quality goods drive high-quality goods out of the market.*

# Asymmetry of information in labor markets



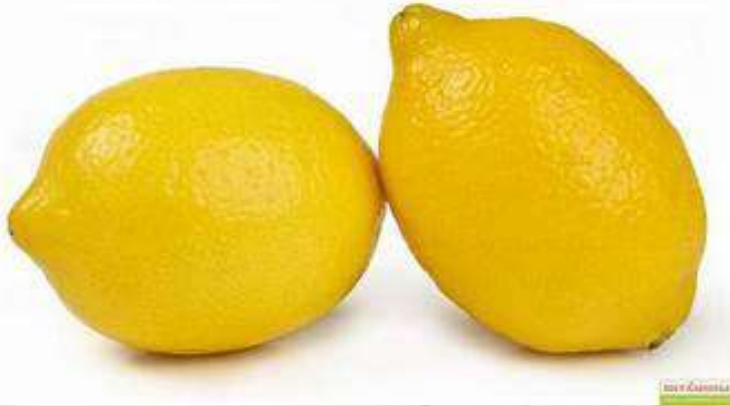
- The employee is clearly aware of their training, skills, physical abilities, etc.
- The employer has a statistical understanding of the category of employees: gender, age, education, etc.
- The wage rate is based on the statistical structure of the labor supply.
- The pay is satisfactory for workers with low business credentials, but insufficient for a worker with a high skill level.
- The consequence will be a corresponding change in the structure of supply - low quality workers will prevail on the market.



# Asymmetric information and the insurance market



- The policyholder knows their health status better than the insurer - the risk of adverse selection increases.
- Seniors have a very high risk of getting sick, and the price of an insurance policy doesn't go up as the risk increases - insurance companies are reluctant to insure seniors.
- People with poor health seek insurance, their share is growing - the price of insurance policy is increasing.
- As a result, young and healthy people are not insured - selecting individuals for insurance risks jeopardizing the existence of the insurance market.



# Information asymmetry and adverse selection



- Whoever has more complete information - seller or buyer - **asymmetric distribution of information** leads to complete or partial ousting of "good" goods with "lemons" from the market.
- This phenomenon has been called **adverse selection** (perhaps in contrast to biological natural selection - selection for favorable traits).
- **The damage** from adverse selection is suffered by those market participants on whom the effect is significant.

# Risk of unfairness

*This is a situation in which one party to a contract has the opportunity to exploit the lack of control of the other party for gain.*

For example, selling on a subscription basis - buffet, monthly payments for phone, gas, etc.

- **The marginal cost of a** person paying for a buffet is **zero** - any amount of food is paid for.
- The mechanism of **adverse selection is** triggered, resulting in a price that can only be attractive to those who like to eat.
- In reality, this is **excluded**, because the opportunity to use the buffet is not purchased separately, but is usually provided as a **package with other services** when buying a tourist trip, hiring a hotel room, ordering conference services, etc.



# The principal-agent problem



- ❑ A special sphere of **unfairness risk** manifestations is **contractual relations between the parties**, one of which entrusts the other to perform some actions for remuneration.
- ❑ The party giving the assignment is the **principal** and the party executing the assignment is the **agent**.
- ❑ Both principal and agent can be an individual, a firm, an organization, or a government agency

# The principal-agent problem

An example is the real estate market and the relationship between a realtor and a buyer.

The conditions for the risk of bad faith arising from the principal-agent problem:

- 1) A misalignment of interests between the principal and the agent;
- 2) information asymmetry (in favor of the agent) regarding the quality of contract performance;
- 3) imperfections in the market for agency services





# Information asymmetry and standardization



- Retail stores
- Restaurants
- The handymen of the utilities



- Good customer service
- Grocery Freshness, reviews
- Good references

**Standardization is** used to eliminate the "lemons" problem. For example, McDonald's offers standardized products that include the same ingredients at any point of service.



# How to reduce information asymmetry?

- ❑ Asymmetry of information reduces the efficiency of the market, in general.
- ❑ It is disadvantageous to sellers of good goods, who are interested in the buyer being able to distinguish their goods from the general mass of goods offered on the market.
- ❑ Various market signals serve this purpose: quality certificates, certificates and other documents, reputation of the seller (manufacturer), positive shopping experience, positive recommendations and feedback from other buyers, etc.





## How to reduce information asymmetry?


- Buying goods from a company with a good reputation - eliminating counterfeiting (original packaging, labels, etc.).
- In the marketplace of credit - checking the borrower's credit history.
- Warranty service for durable goods.





ИСТИНА ГДЕ-ТО РЯДОМ

*If buyers are able to get at least a **rough idea of the quality of the product**, it will provide an opportunity to support the market for both good and bad products.*

ЛОВИМ  СИГНАЛ

РЫНКА



# Joseph Stiglitz

- 
- American economist, winner of the 2001 Nobel Prize in Economics.
  - He has made significant contributions to the study of markets with asymmetric information.
  - "The fact of asymmetric information calls for greater government involvement in regulating the economy, for insufficient or erroneous information can destroy markets."

# Role of the state

---

State **to overcome asymmetries** in the market:

- Realizes public health care or insurance for the elderly;
- provides information about socially important goods and forms an image of unacceptability of consumption of "unworthy" goods;
- promotes awareness-raising;
- Adopts laws against the appearance of substandard goods on the market (Consumer Protection Act).





Thank you for  
your  
attention!



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# Topic 10. Information risk assessment methods.



- **Uncertainty** and economic information are closely related.
- **Relevance and objectivity of information.**



Influencing the **decision-making process** and the **choice** of market actors.

**In the most open and vivid form,  
information uncertainty and risks  
manifest in financial markets.**



**bears and bulls**

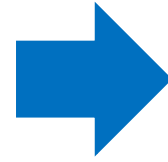




**RISK**

# Information risk: definition

This is **the probability of occurrence of events** related to:



:

- deletion and distortion of information;
- violation of its properties (confidentiality, availability, reliability, completeness, and relevance);
- incorrect perception and processing of information;
- incorrect implementation and use of information technologies.



# Information risk analysis

This is a process of **aggregate assessment** of the degree of information system security with the determination of

- **quantitative** (in the form of money) and
- **qualitative** (risk levels: high, medium, low) **risk indicators.**





**The analysis uses various tools and methods to shape information protection processes.**

# IMPORTANT! There is **NO** single methodology for the quantitative assessment of information risk.

1) There is a lack of statistical information on the possibility of a specific threat.

2) Sometimes, it is very difficult to determine the cost of a particular information resource.





## **Risk assessment methods**

- CRAMM (CCTA Risk Analysis & Management Method)
- COBRA (Consultative, Objective, and Bi-functional Risk Analysis)
- RuSecure
- BS (British Standard)
- Hierarchical Criteria Model (Multicriteria analysis)
- OCTAVE (Operationally Critical Threat, Asset, and Vulnerability Evaluation)
- FMEA (Failure Mode and Effects Analysis)



# CRAMM method - CCTA Risk Analysis & Management Method

*CCTA - Central Communication and  
Telecommunication Agency*

**CRAMM** - is a comprehensive approach to risk assessment, combining **quantitative** and **qualitative** analysis methods.

*It allows you to justify the company's information security and business continuity costs.*

# Qualitative assessment of information risks

## Objectives:

- Identify risk factors,
- Identify possible vulnerable risk areas,
- Assess the impact of each type of risk.



# RISKS



# Expert analysis of information risks



Step 1. Expert evaluation

**1. Asset Value (AV)** reflects the value of a particular information resource.

**Scale:** from 1 to 3, where

1 – the **minimum value** of the resource,

2 – the **average value** of the resource,

3 – the **maximum value** of the resource.

# Expert analysis of information risks

**2. Degree of resource insecurity from the threat (Exposure Factor - EF)** - indicates how vulnerable a resource is to the threat in question.



**Scale: 1 - 3**, where

- 1 - the **lowest degree** of vulnerability (negligible impact),
- 2 – the **medium degree** (high probability of resource recovery),
- 3 – the **highest level** (requires complete resource replacement after the threat is eliminated).

# Expert analysis of information risks



**3. Assessing the possibility of a threat** (**Annual Rate of Occurrence - ARO**) shows the probability of a threat occurring within a certain period of time (most often within one year). It takes **values from 1 to 3 (low, medium, high)**.



**Step 2:** Based on expert data, an **estimate of the expected losses** from the impact of the threat over a specified period is generated - **Annual Loss Exposure (ALE)**.

**Step 3.** The obtained values are ranked **in order of significance** to determine **low, medium, and high levels of information risks**.

# Acceptance and allocation of risks

**Risk** can be:

- ❑ **accepted** - accept the risk and suffer losses caused by it;
- ❑ **reduced** - take a particular list of measures aimed at minimizing the risk;
- ❑ **transferred** - to assign the costs of covering the damage to the insurance company or to transform the risk into a risk with a lower threat level with the help of unique mechanisms.

After that, the **risks are distributed by rank**, and those risks that require attention in the first place are identified.



# Risk acceptance and ranking



- ❑ The primary **method of managing such risks** - is reducing them, sometimes transferring the risk.
- ❑ **The interval of ranking the risks** is defined based on the calculation of their **qualitative value** that was performed.
- ❑ The general interval is [1-18]
- ❑ **low** - from 1 to 7,
- ❑ **medium** - from 8 to 13,
- ❑ **high** - from 14 to 18.

Risk management consists of **reducing the values of high and medium risks to values of low information risks** at which it becomes possible to accept them.

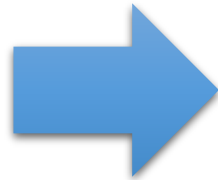


Risk reduction can be achieved by reducing AV, EF, or ARO through specific measures.

# OCTAVE method

It is a rapid assessment method of critical threats, asset identification, and vulnerability detection.

The information security risk assessment algorithm using the **OCTAVE methodology** is as follows.



1. The criteria by which damage and risks will be assessed are defined.
2. Critical resources of the organization are identified.
3. The current state of information security in the company is assessed.
4. Security requirements are defined.
5. A list of hazards for all critical resources is determined.
6. A comprehensive analysis of the corporation's information infrastructure is performed.
7. Risks are identified and analyzed.
8. Damage from the possible occurrence of threats is assessed.
9. Probabilistic criteria for threat assessment are established.
10. The probability of threat realization is estimated.



# Matrix method of risk analysis

- ❑ This **analysis method** links assets, vulnerabilities, threats, and controls and determines the importance of various relevant controls to the organization's assets.
- ❑ The assets of an organization are defined as material objects that can be tangible and intangible.



# Matrix method of risk analysis

## Matrix of the definition of simple risk

		Influence		
		High	Medium	Low
Probability	High	High	High	Medium
	Medium	High	Medium	Low
	Low	Medium	Low	Low

# HAZARD RISK ASSESSMENT MATRIX

Frequency of Occurrence	Hazard Categories			
	1 Catastrophic	2 Critical	3 Serious	4 Minor
(A) Frequent	1A	2A	3A	4A
(B) Probable	1B	2B	3B	4B
(C) Occasional	1C	2C	3C	4C
(D) Remote	1D	2D	3D	4D
(E) Improbable	1E	2E	3E	4E



Unacceptable



High



Medium



Low



# Information risk management

encompasses the following information processes

- **Creation,**
- **Transmission,**
- **Storage,**
- **Utilization.**

*There are 26 international standards in the field of risk management*

# Practical work (discussion club)

## Assignment 1

Using concrete examples, explain why labor is an exceptional resource in the context of the “principal-agent” problem.

## Assignment 2

Give examples of markets or areas of activity with the highest and lowest degree of asymmetric information. Use the Kazakhstan’s cases.

Suggest measures to reduce information asymmetry.

## Assignment 3

The principal risks of the digital economy are:

- the risk of an information security failure;
- the risk of unemployment;
- the risk of increasing of socio-economic inequality.

Propose a set of measures to manage each of these risks.



Thank you  
for your  
attention!



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# COURSE

# "Economics of Information"

EP "B01109 - Economics"

Rakhmatullayeva Dinara  
Ph.D., Senior Lecturer  
Economics Department

Almaty, 2023



# **Topic 11. The economic efficiency of information systems. Part 1.**



# Lecture plan

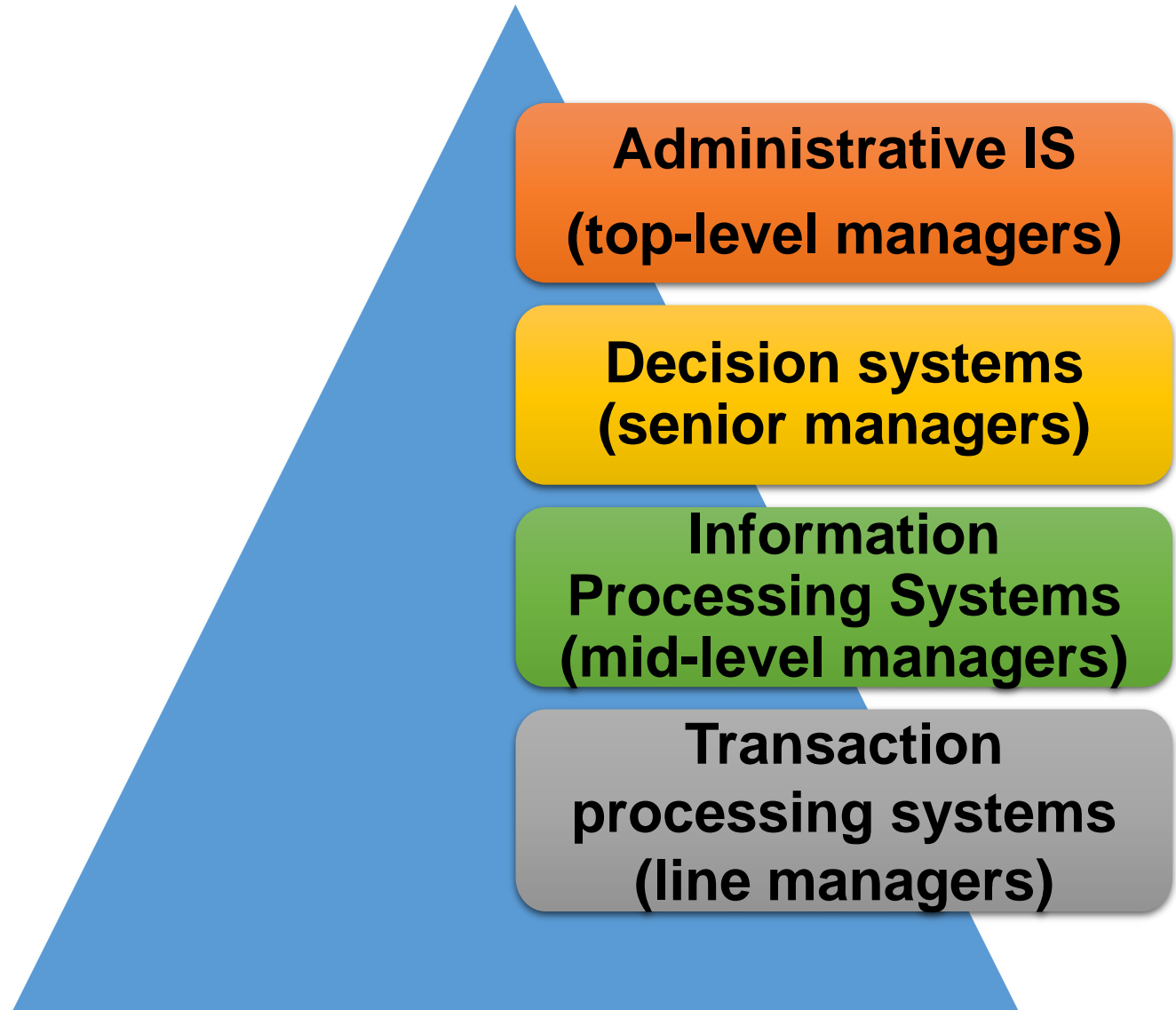
1. Classification of methods for estimating the costs of development, implementation, and operation of information systems
2. Estimation and management of total cost of ownership of information system

# Definition

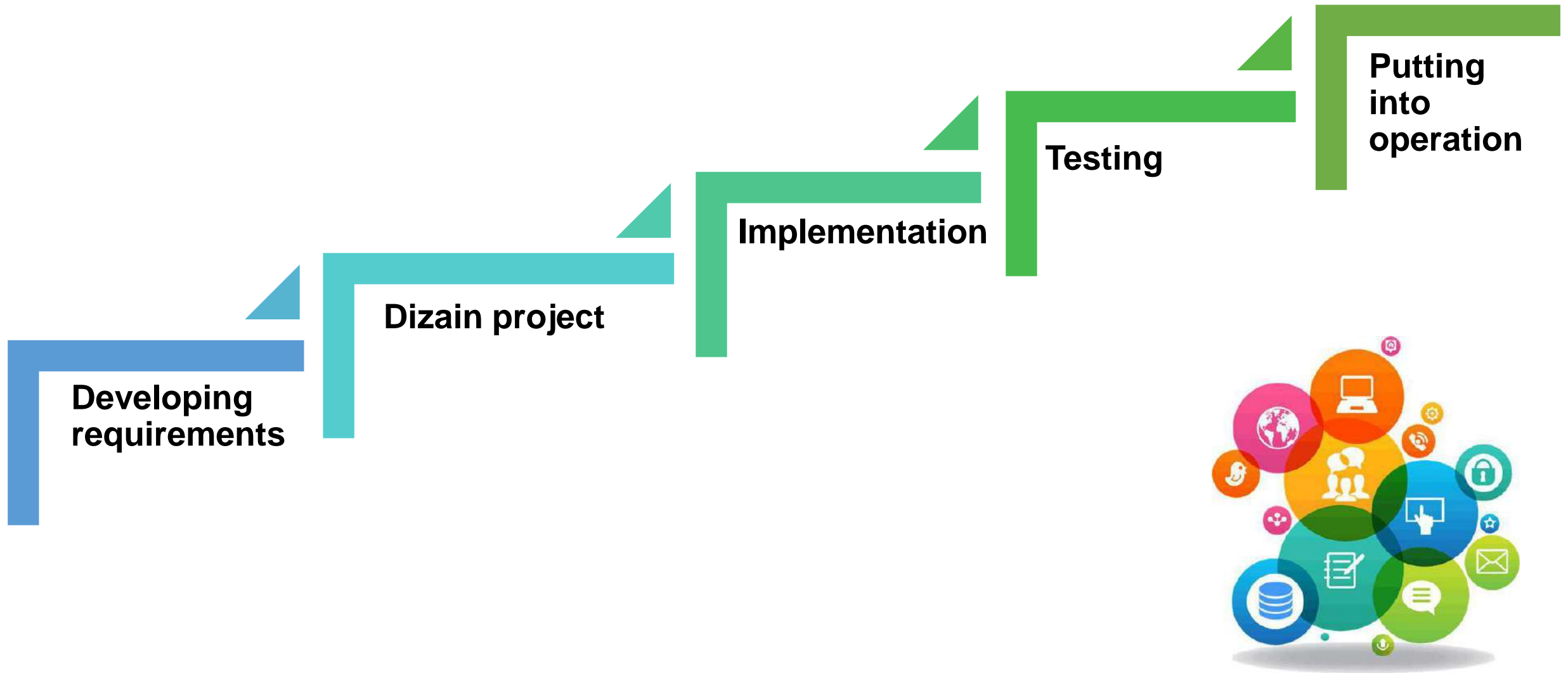
## **Information system**

is an **interrelated set of equipment, methods, and personnel**

used to store, process, and release information.



# Cascade model of IS project life cycle





# Methods for estimating the information system's costs



## NON-ALGORITHMIC METHODS

**Qualitative** methods are used to estimate the value of IS



## ALGORITHMIC METHODS

**Quantitative** methods are used to estimate the value of IS



Expert evaluation method –  
to receive **expert judgments**

A man in a black suit and sunglasses is seated in a futuristic, curved chair. He is interacting with a virtual reality interface. Several floating panels display data, including a circular gauge, a bar chart, and a profile for 'YANNIS THOMAS'. The floor is covered in glowing blue lines and circles, suggesting a digital or virtual environment.

# NON-ALGORITHMIC METHODS

**The expert evaluation method** is used in projects that utilize :

- **new technologies,**
- **new processes**
- or processes that solve **innovative** tasks.



# 1. Expert evaluation method

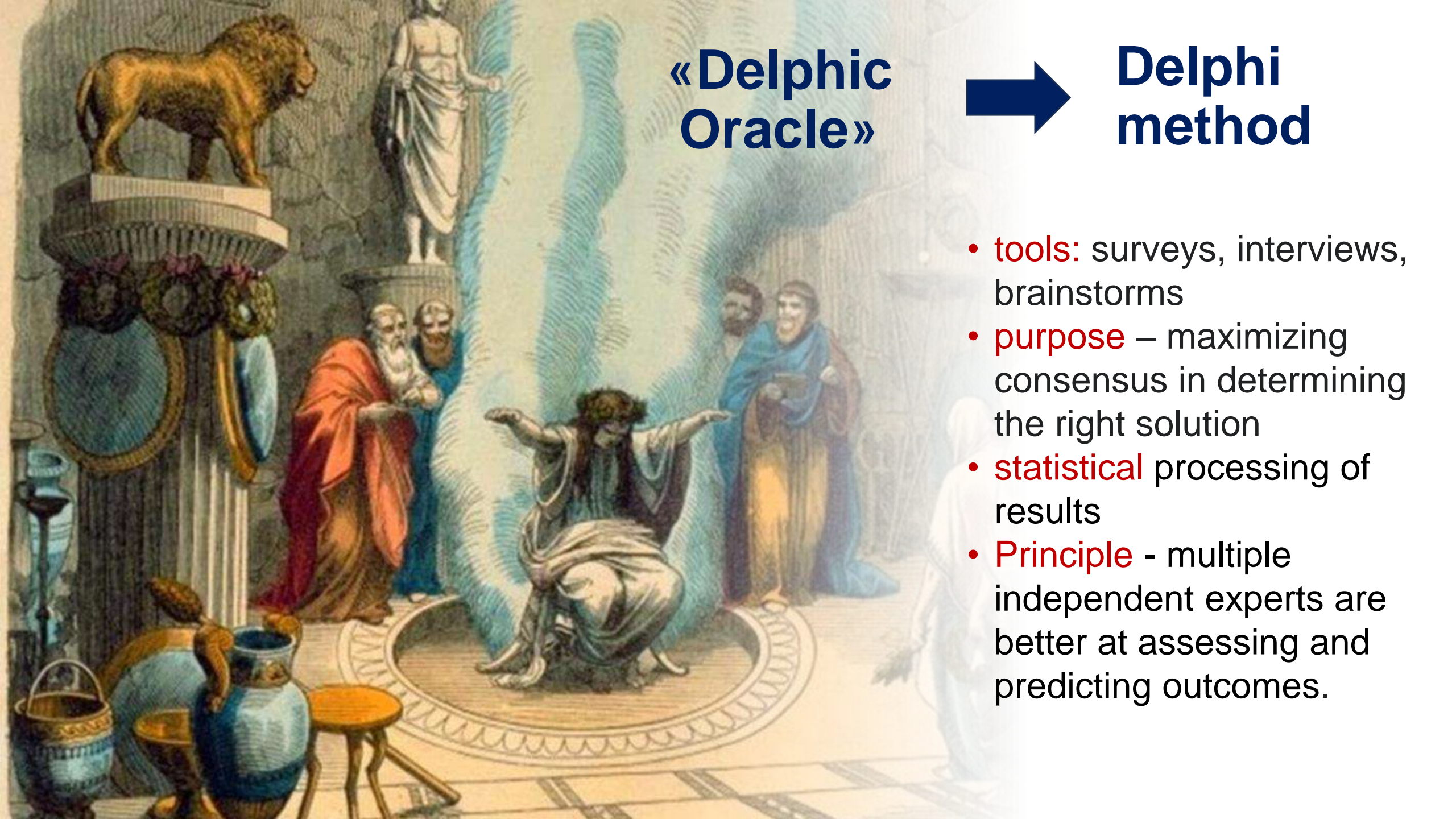
- **Experts** (latin "expertus" - experienced) – are persons who have the **knowledge** and can give a **reasoned opinion** about the phenomenon under study.
- **Expertise** - procedure for obtaining **expert judgments** (peer review).
- **The Delphi method**

«Delphic Oracle»



Delphi method

- **tools:** surveys, interviews, brainstorming
- **purpose** – maximizing consensus in determining the right solution
- **statistical** processing of results
- **Principle** - multiple independent experts are better at assessing and predicting outcomes.





# Peer review procedure



1. Involvement of experts
2. Survey experts - Delphi methodology
3. Open Discussion
4. Integration of individual assessments into a single system
5. Balance of assessments



## 2. Valuation method by analogy

- Based on principle of **analogy**.
- Empirical data should be collected on the characteristics of **completed** projects.
- This allows you to select **similar** projects.

**Analogical evaluation** is a method in which the project manager

- analyzes a previous project,
- examines its variables, and
- uses this information

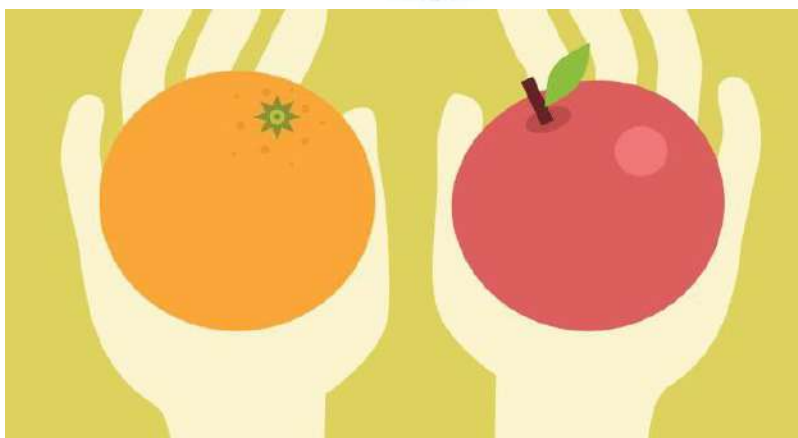
**to determine** the duration and **cost** of the current project.



# IS valuation scheme: stages



1. **Data collection** - analyzing and evaluating requirements and design
2. **Finding** and **analyzing "similar"** designs - ISs that have the smallest differences in numerical values of evaluation characteristics
3. Method of measuring **Euclidean distance** in **n**-dimensional space
  - Each characteristic receives a "**weight**" (multiplier) determining the **significance** of the characteristic for the IS design
  - in a simplified version "**weight**" = 1, i.e. all characteristics of the IS project are considered **equally important**.
  - IS projects and their corresponding characteristics are displayed in the n-dimensional space **in the form of "points"** (n equals the number of variables, each variable has its own dimension).
  - The **Euclidean distance** between the corresponding points is calculated



# ALGORITHMIC METHODS

The model for estimating the **labor intensity** (other costs) of IS development is presented in the form of a **cost function**, which describes the relationship between the characteristics of the project and the cost of its implementation.

For example, simple cost function  $F = TC(K_1, \dots, K_n)$

$$F = G \frac{m_1 m_2}{d^2}$$

$$i\hbar \frac{\partial}{\partial t} \psi = \hat{H} \psi$$

$$\phi(x) = \frac{1}{\sqrt{2}}$$

$$E = mc^2$$

$$= C^2 \frac{\partial^2 u}{\partial x^2}$$

$$\frac{df}{dt}$$

# COCOMO (COnstructive COst MOdel)

стандарт

- ❑ A model for estimating **software development costs** (1981)
- ❑ **Barry Boehm** - American software engineer, professor of computer science, industrial and systems engineering
- ❑ **made** a major contribution to the **development of scientific approaches to software project management**
- ❑ **predicted** that in the future the cost of software will exceed the cost of hardware.



# COCOMO includes three models:



- **Basic** - a static model that calculates software development costs depending on the size of the program.
- **Intermediate model** - includes basic model + a set of 15 correction factors (subjective estimates of products, equipment, personnel, design attributes).
- **Advanced model** - includes intermediate model + estimates of cost impact at each stage (analysis, design, etc.) of the development process.

# 2

## Assessing and managing the total cost of ownership of the IS

- ❑ **Total Cost of Ownership** is a methodology designed to determine the value of information system calculated at all stages of its life cycle.
- ❑ **TCO** is a model for analyzing the financial side of information technology use today.
- ❑ Creating a corporate information system is **costly** for an enterprise.
- ❑ There is research going on worldwide **to reduce the total cost of ownership** of IT solutions used in creating corporate information system.
- ❑ Costs include **fixed** and **variable costs** - different TCO models are used.

# Gartner Group's TCO framework

## IT-costs

### Fixed costs (investment)

- On the stage of projecting the IS

### Current costs

- On the stage of functioning of IS

**Fixed costs** are as follows:

- cost of project development and implementation;
- engagement of external consultants;
- initial purchase of core software;
- initial procurement of additional software;
- initial equipment purchases.



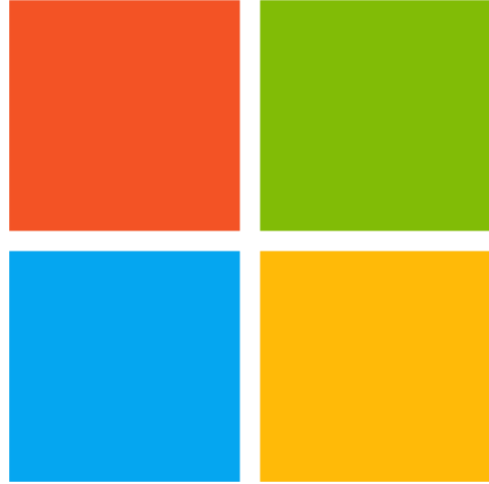
# Gartner Group's TCO framework

**Current costs** are as follows:

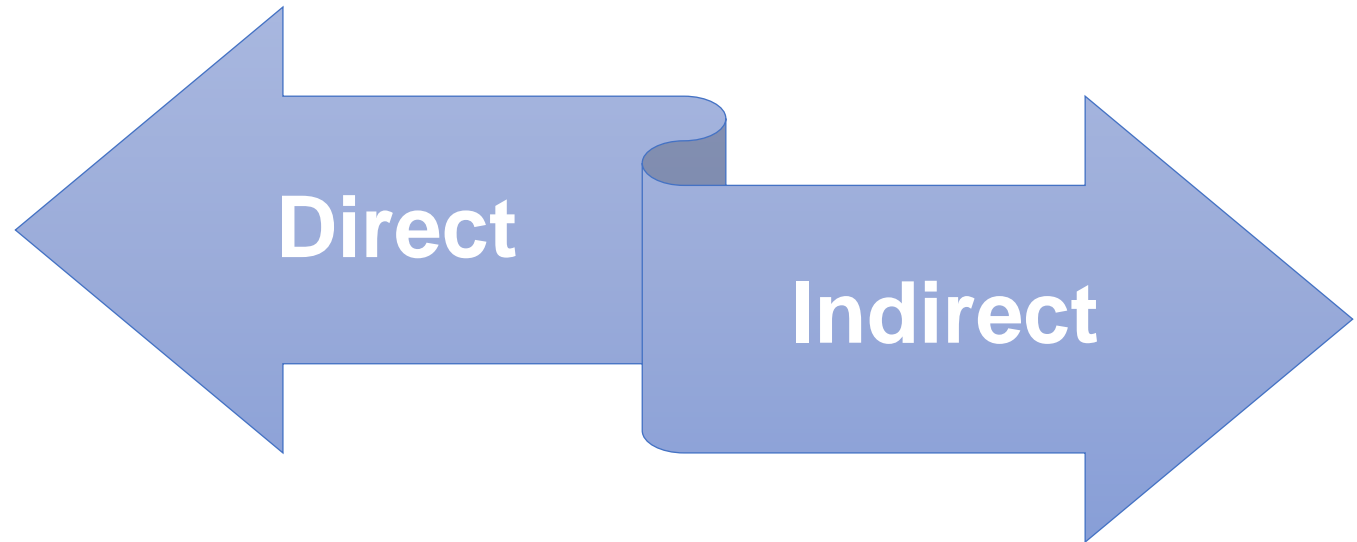
- cost of system upgrades and modernization;
- the cost of managing the system as a whole;
- costs arising from the activities of users of the information system ("user activities").



# Microsoft and Interpose's TCO model



**IT-costs**





# Microsoft and Interpose's TCO model



**Direct costs** are the ones that are considered when planning the budget.

- hardware and software costs (purchase or lease, new installation or upgrade, etc.);
- management costs (network and system administration, engineering);
- development costs (problem statement and application development, documentation, testing and maintenance);
- support costs (helpdesk, training, support and maintenance contracts);
- telecommunication costs (communication channels and their maintenance).



# Microsoft and Interpose's TCO model



**Indirect costs** are costs that cannot be planned for and often go unaccounted for.

- user costs (personal support, informal learning, errors and mistakes);
- downtime (loss of productivity due to equipment failure or preventive planned work stoppages).

*According to Interpose research, indirect costs account for more than 50% of organizations' average IT spend.*



## IT cost management

### **Required for:**

to identify redundant cost items to optimize overall costs,

to assess the possibility of return on investment in IT, i.e., to analyze the attractiveness of IT as an investment object.

for financial assessment of corporate costs.



Thank you  
for your  
attention!



AL-FARABI KAZAKH NATIONAL UNIVERSITY  
HIGHER SCHOOL OF ECONOMICS AND BUSINESS

DEPARTMENT OF ECONOMICS

# "Economics of Information"

OP "6B04109-Economics"

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Almaty-2023



# Topic 12. Economic efficiency of the information system. Part 2



# Lecture plan

3. Managing the total cost of information system expenditures
4. Functional cost analysis of information system costs

# 1. Managing the total cost of information system expenditures

- **The main task** is determining the quantitative values of **the total cost of ownership components** and their attribution to a specific cost item.
- *Proper allocation of costs is essential!*

## «visible» costs

- **initial**

## «invisible» costs

- **in the operation and utilization process**

unpredictable growth of **additional costs**

significant **increase** in the role of the **human factor**

requires identification of **redundant cost items**

**Increasing the complexity of information system**

The **purpose of TCO calculation** is to assess the possibility of return of funds invested in information technologies.  
(In other words, to analyze the attractiveness of IT as an object for investment.)

The IT manager can be able to create an actual, **reasonable IT budget** based on quantifiable metrics.

TCO is used as one of the components for the **financial evaluation of corporate costs**.

The main task of an **IT manager** is to **optimize information system costs** by **continuously managing them**.

- IT costs need to be reduced,
- the company's losses from information system downtime need to be assessed,
- the risks of threats leading to increased costs need to be evaluated.



An important tool for **managing IT costs** – **planning the TCO** of an information system.





# Cost planning scheme for determining TCO

## Step 1. Defining the "visible" and "invisible" costs.

(Direct hardware and software costs typically don't exceed 30% of the TCO, but personnel and system management costs are at least as high.)

Step 2. Determining the possible indirect costs caused by the information system's inoperability.



# Cost planning scheme for determining TCO

**Step 3. Allocation of costs** to budget items.

**Step 4. Calculation of TCO indicators** is the most complicated and expensive procedure.

*Special software can be used (TCO Analyst, TCO Manager, TCO Snapshot Tool, etc.).*



# Cost planning scheme for determining TCO

**Step 5. Identify** the most significant cost items and **assess** the possibility of **reducing** the cost of the information system.

**Step 6.** Considering the tools for reducing TCO.



# Tools for reducing TCO

## Procedural tools

- Administrative measures are taken at the construction and operation stages of the information system.

## Technological tools

- Measures are taken at the stage of information system operation.
- But it is important to plan them **BEFORE** operation!





# Technological tools



- purchase of software, allowing a significant reduction in the cost of its implementation and subsequent use;
- use of standard databases;
- use of remote workstation management tools;
- equipping workplaces with only the necessary software and hardware;
- use of software components specially adapted for a particular IS;
- use of technologies that reduce downtime (uninterruptible power supplies, network software installation systems, etc.);
- use of solutions for automated backup and recovery, etc.



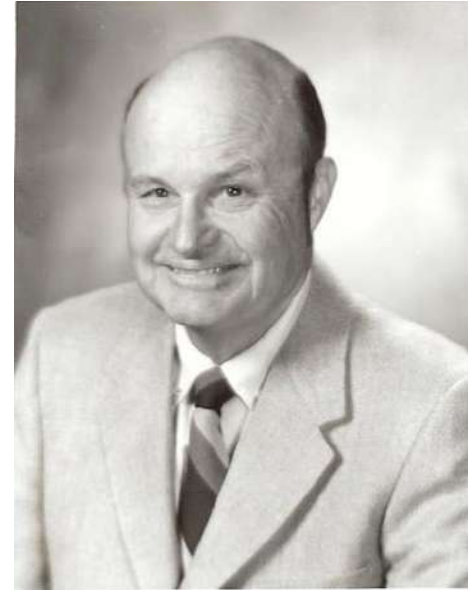
# Procedural tools



- Creation of a working group specially trained to implement a system of user training and subsequent information system maintenance at the initial stages of an IT project.
- Use of international and internal IT standards and implementation methods of leading companies.
- Introduction of a corporate policy of software and hardware standardization.
- Creation of a centralized helpdesk with a knowledge base of possible problems.
- Develop a plan of action in emergencies (e.g., in case of failure, hacker or virus attacks.)

## 2. *Functional cost analysis* of information system costs

- Lawrence D. Miles(USA)
- Founder of **Activity Based Costing - ABC** or **Functional Cost Analysis - FCA** (1949)
- It is a **method of determining the cost and other characteristics** of products, services, and customers **using as a basis the functions and resources** involved in production, marketing, sales, delivery, technical support, service delivery, customer service, and quality assurance.



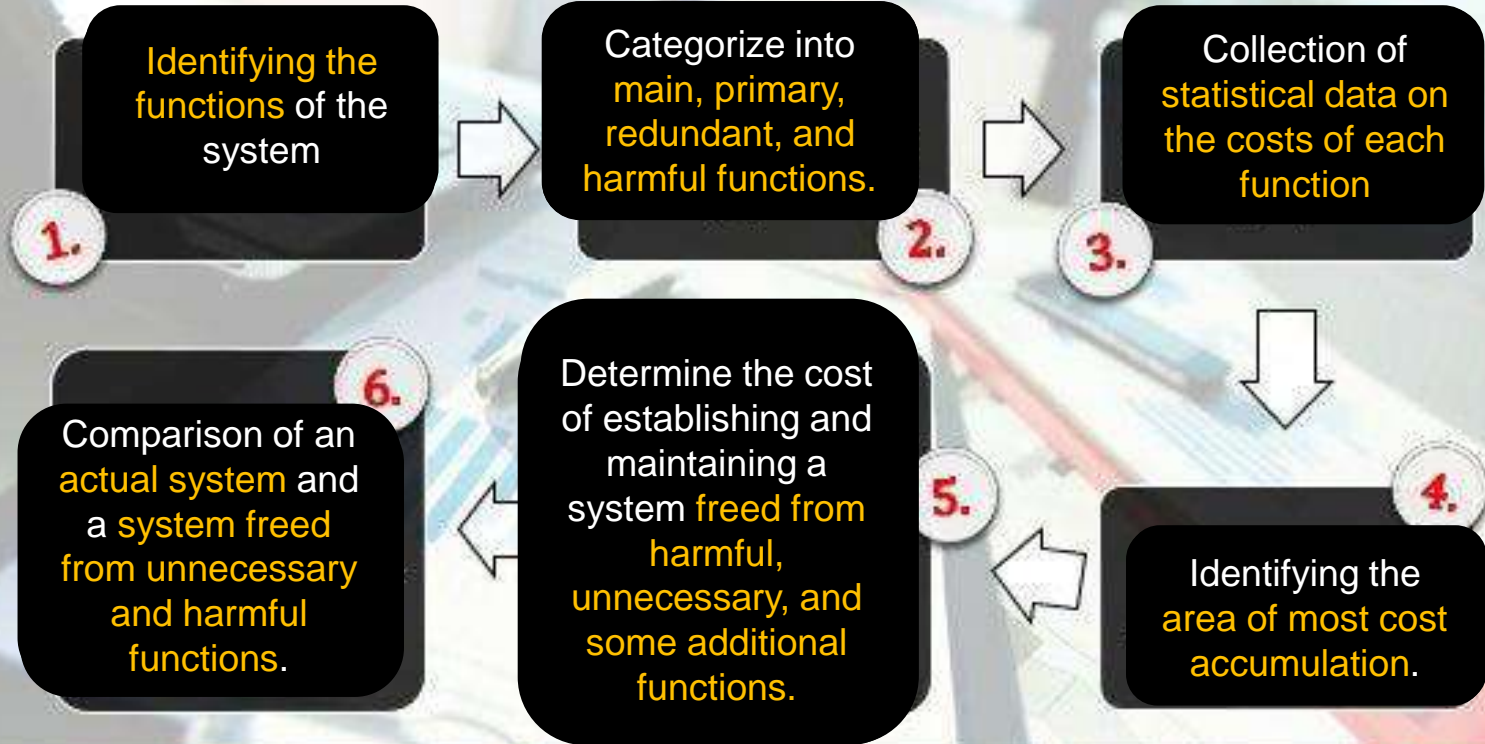
# Functional-cost analysis

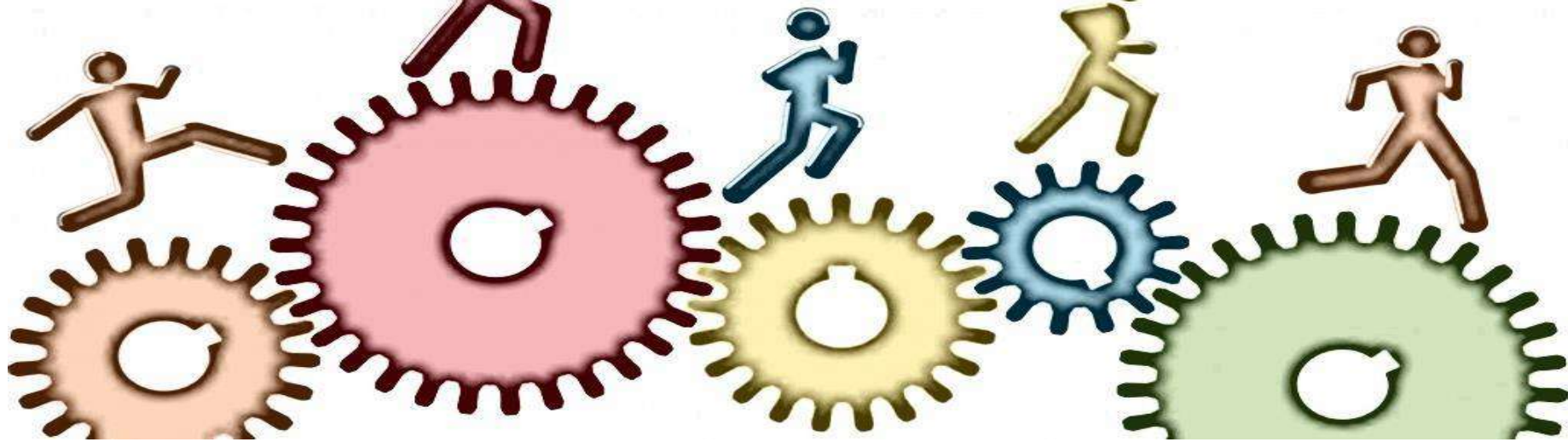


□ FCA is a method of technical and economic research of systems aimed at optimizing the relationship between consumer properties (quality) and the costs of achieving these properties.

□ Currently, FCA continuously improves products, services, production technologies, and organizational structures.

# Steps of Functional Cost Analysis



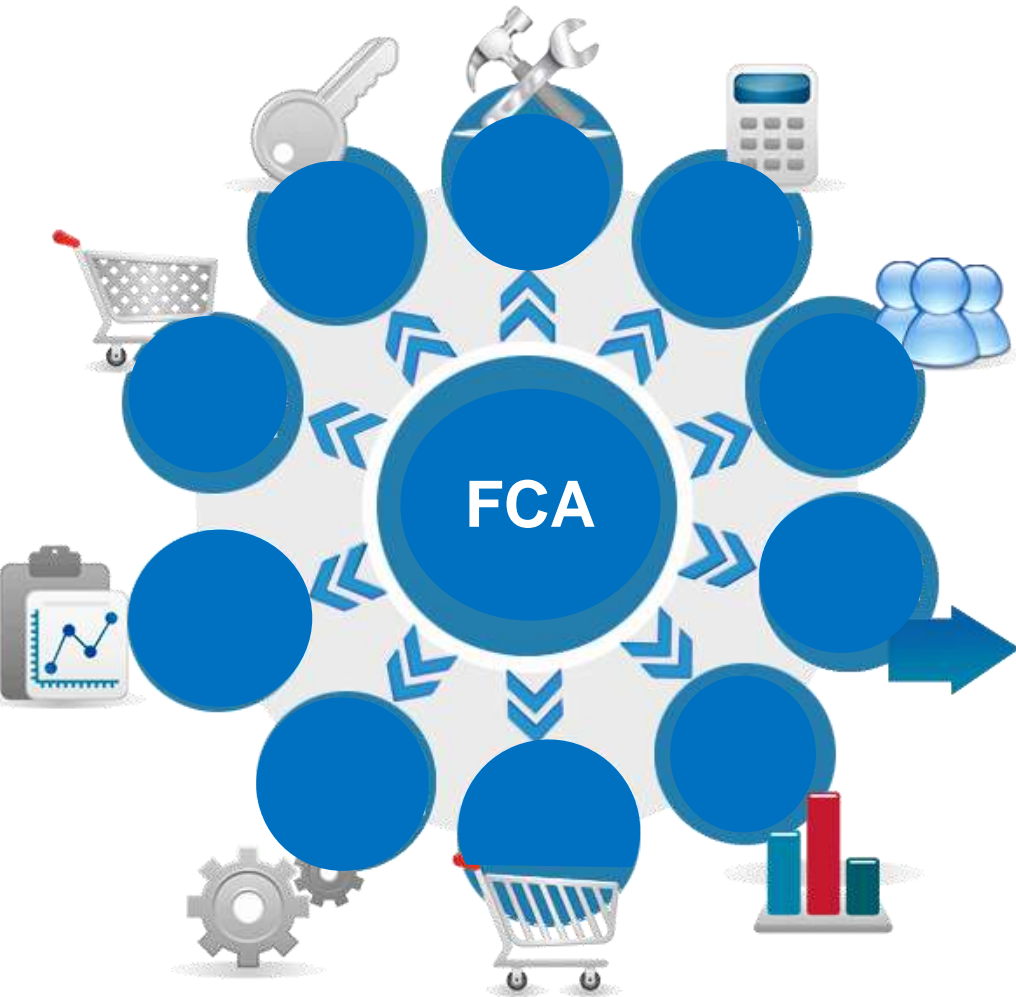


## At a strategic management level

- **FCA helps decide** on enterprise reorganization, changing the range of products and services, entering new markets, diversifying, etc.
- **FCA information shows** the **optimal reallocation of resources**, helps to **identify the capabilities of those factors** (quality, maintenance, cost reduction, reduction of labor intensity) that matter most, and determines the best options for capital investment.



# At the operational level



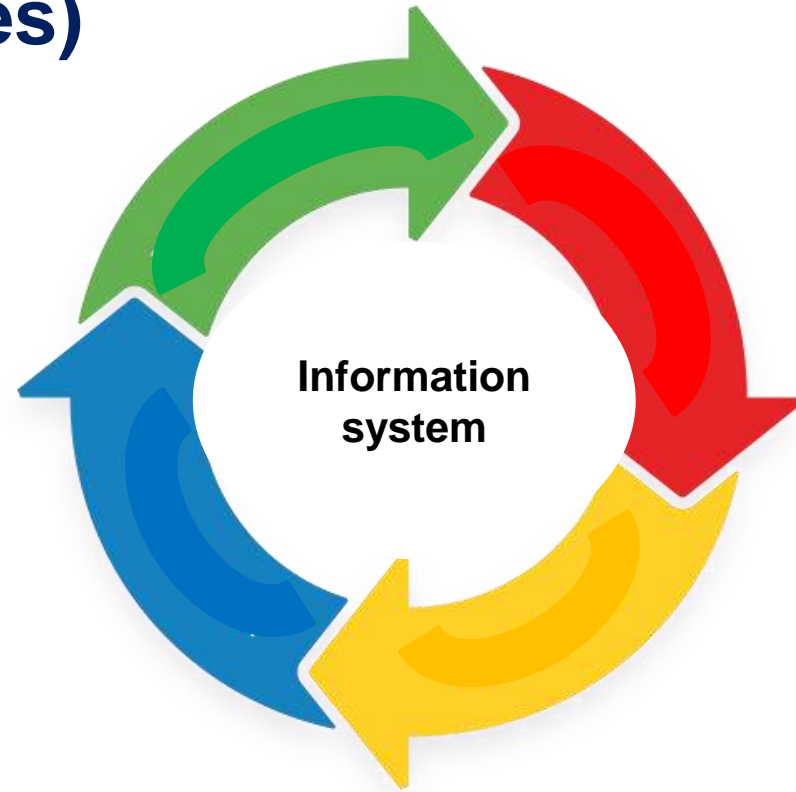
- **FCA information** is used to formulate recommendations to increase profits and improve the system's efficiency.
- The main areas of using FCA model results **for systems reengineering** are - productivity improvement, cost reduction, and quality improvement.

# Improving the productivity of information system (3 stages)

**Stage 1** - the **functions** that make up information system are analyzed to identify reserves for improving its efficiency.

**Stage 2** - the **causes of unproductive time expenditures** and ways to eliminate them are identified.

**Stage 3** – **monitoring** is conducted by measuring key performance parameters and **accelerating the performance of desired functions**.





# Reduction of the cost of information system

- **Eliminate redundant functions** that make up information system.
- **Generate a ranked list of alternative functions** by cost, labor intensity, or execution time and **select from this list** the **functions with low cost, labor intensity, and execution time**.
- **Organize possible combinations** of information system functions.
- **Reallocate resources** released because of improvements made.

# Procedure for determining the cost of IT services

## 1. Gathering information on resources

(expenditures on salaries, on the use of real estate, on the purchase of equipment, materials).

**Building of a model** of service classification and service business processes.

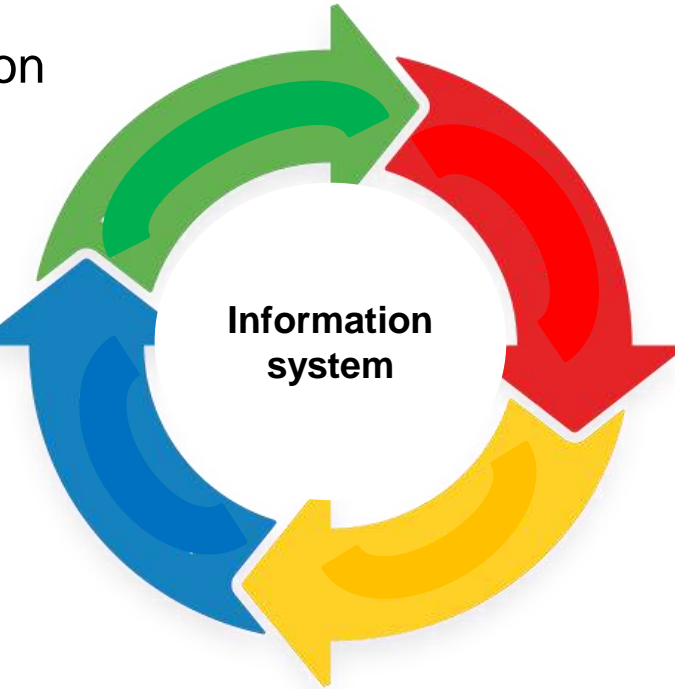
## 2. Decomposition of service business processes

into separate functions.

## 3. Analyze the nature of resource utilization by functions

by establishing which resources and how resources are consumed by each function.

The **mechanism for transferring the cost of resources to the cost of a particular function** is determined.



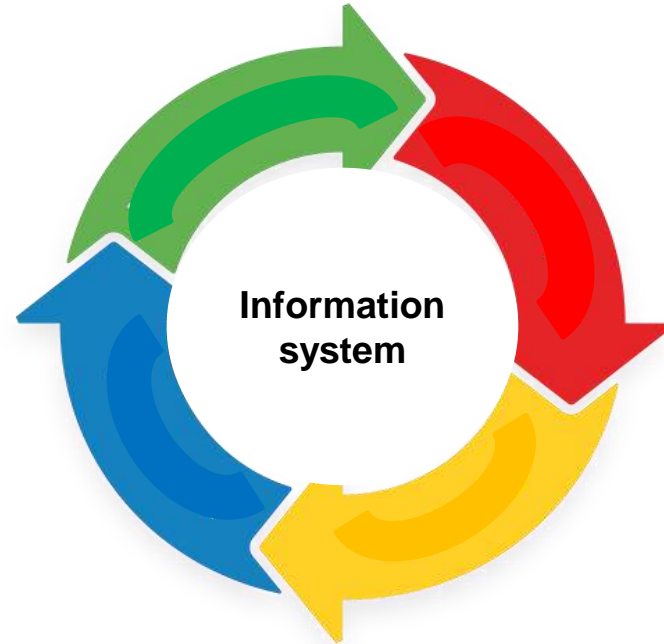
# Procedure for determining the cost of IT services

4. **Determining the cost of each function** based on the cost of resources and a defined mechanism for transferring their cost to that function.

5. **Analyzing the nature of the use of functions in the business process** of service provision by establishing which functions and with what intensity are used in the provision service process.

The mechanism of transferring the cost of each function to the cost of the service is determined.

6. **Determining the cost of each service** based on the cost of the functions through which it is realized and the intensity of consumption of these functions by this service.





**THANK YOU**



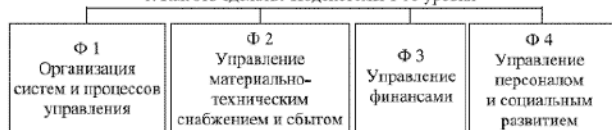
**FOR YOUR**



**ATTENTION!**

Ф – функциональное назначение системы управления обеспечить эффективное и планомерное использование технических, экономических, организационных и социальных возможностей для достижения целей деятельности фирмы в современных условиях

1. Как это сделать? Подсистемы 1-го уровня



2. Функциональная значимость (определяется экспертным путем)

Ф=1 (данные Ф1-Ф4 условные)

Ф1 = 0,4	Ф2 = 0,2	Ф3 = 0,2	Ф4 = 0,2
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3. Сколько эта функция стоит? (Все затраты на менеджмент)

Ф = 1000 (данные условия)

Ф1 = 300 30% = 0,3	Ф2 = 400 40% = 0,4	Ф3 = 200 20% = 0,2	Ф4 = 100 10% = 0,1
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4. Анализ информации и сделанные выводы

Результат (например): Ф = 100, т.е. фирма работает с требуемой прибылью

1-й вариант подхода: Не снижать общие затраты

Ф 1. Затраты подсистемы можно увеличить до 0,4 (400)	Ф 2. Затраты подсистемы снизить до 0,2 (200)	Ф 3. Затраты подсистемы оставить без изменений 0,2 (200)	Ф 4. Затраты подсистемы можно увеличить до 0,2 (200)
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2-й вариант подхода (правильный): Снизить затраты на производство\*

Ф 1. Затраты подсистемы оставить без изменений (300)	Ф 2. Затраты подсистемы снизить до 0,2 (200)	Ф 3. Затраты подсистемы оставить без изменений (200)	Ф 4. Затраты подсистемы оставить без изменений (100)
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\* Снижение затрат на 100 денежных единиц за счет проводимых технико-организационных улучшений процесса производства.

Рис. 3.1. Упрощенная схема проведения ФСА для действующей системы управления малым бизнесом

# Practical work. Algorithm of applying FCA

Step 1. Choose any economic system and describe it.

Step 2. Define and categorize all its functions into main, primary, redundant, and harmful.

Step 3. Determine the approximate costs of each function and find the costliest functions.

Step 4. Exclude the redundant and harmful functions and calculate the costs of unnecessary functions.

Step 5. Define how you can spend the redundant money and the opportunities for development, describing scenarios of their implementation.

Step 6. Compare with the initial system state and conclude how its effectiveness would change.





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Almaty, 2023



# **Topic 13. Brand management in the information economy and features of creating virtual enterprises.**



# Branding

This is a set of actions and activities to develop a holistic brand image (visual and communication).

# BRAND MANAGEMENT



1. Idea formulation
2. Market analysis



# EFFICIENT BRAND MANAGEMENT

- capture the attention of the target audience
- increase sales
- find a suitable market segment
- show the substantial value of the product and create a positive image
- attract reliable investors, partners



# Branding strategy

Its place in the market  
(newcomers, leaders,  
middle sector, its specific  
weight in the given  
market niche)

Competitiveness  
analysis (advertising and  
marketing policy,  
capacity, equipment)

## PRELIMINARY MARKETING

Analysis of brands existing  
on the given market (brand  
characteristics - by name,  
target audience, popularity)

Market analysis and  
defining its criteria  
(growing, competitive,  
undeveloped, etc.)



SWOT  
analysis

COMPANY



TRENDS

Content  
analysis



COMPETITORS

Comparative analysis



CONSUMERS

Structure-function method

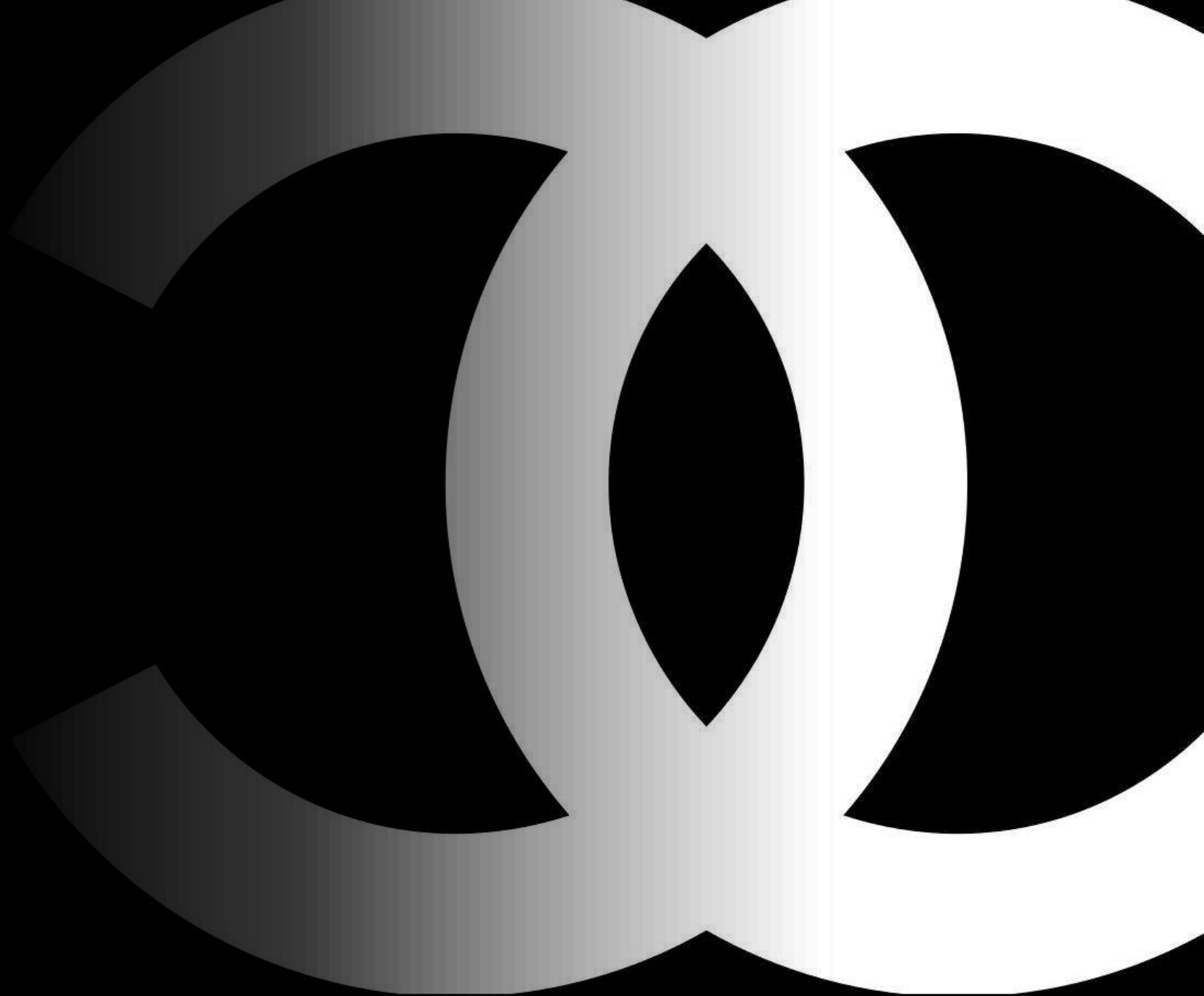




## 2. NAMING

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Creation of the product **name**, i.e., search, selection, and development of a **unique and adequate** name reflecting the essence of the firm's brand.



# 3. Brand identity and logo

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**Unified principle of the company's visual image:**

- brand colors,
- scripts,
- slogan,
- norms of communication with consumers, etc.

Using a set of elements allows a company to **stand out in the market and gain customer loyalty.**



# LOGO

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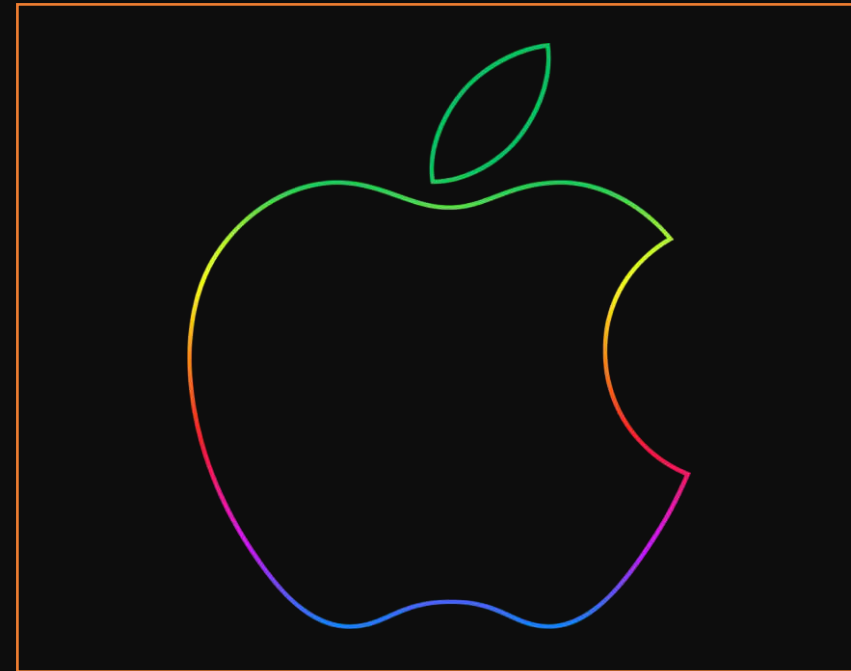
Considered the face of the company.

Clear.

Interesting.

Easy to accept.

IT IS THE BEST ADVERTISEMENT FOR  
A PRODUCT, SERVICE OR AN ENTIRE  
ORGANIZATION



## 4. Package design



### What a buyer evaluates?

- Level of informativeness.
- Memorability of the product.
- Usefulness of all information.

JUST DO IT.



**«Fashion comes  
and goes, but  
style lasts  
forever»**

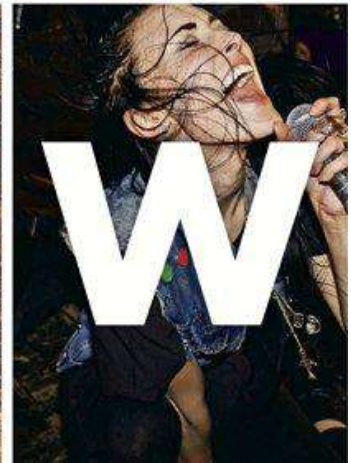




«Live for NOW»  
(2012)



«For the LOVE of it»  
(2019)



# Guess what?

«Just Do It»

«Think Different»

«Because You're Worth It»

«There are some things money can't buy. For everything else, there's ...»

«The Ultimate Driving Machine»

«Melts in Your Mouth, Not in Your Hands»

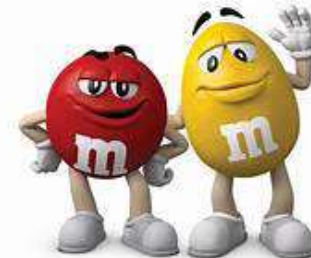
«I'm Lovin' It»

«Impossible is nothing».

«Uncola»



L'ORÉAL  
PARIS







**“Honest” slogans**

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# Failed slogans

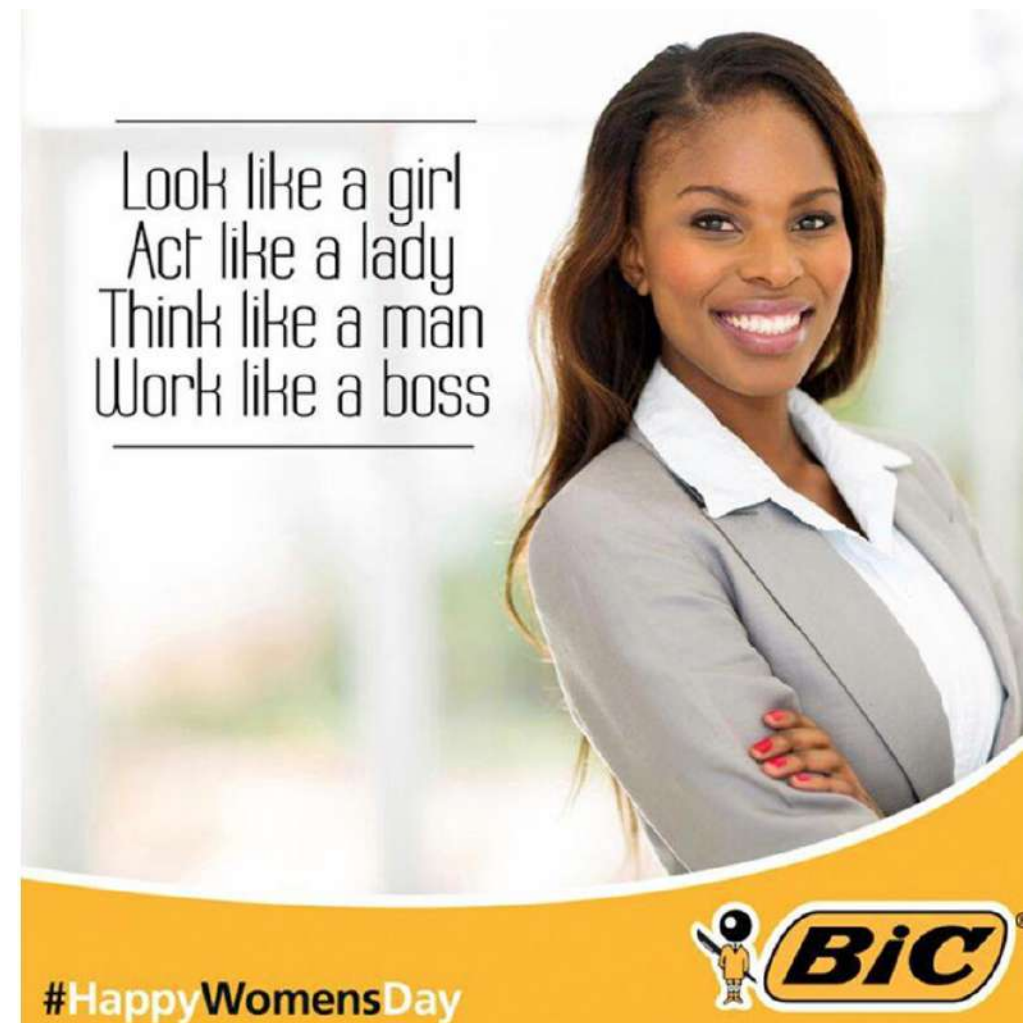




# Failed slogans



# Failed slogans





## 5. Development strategy

1. Marketing costs.
2. Business plan.
3. Customer's feedback.
4. Product line, new product's production plan.
5. Sell tools, promotion.





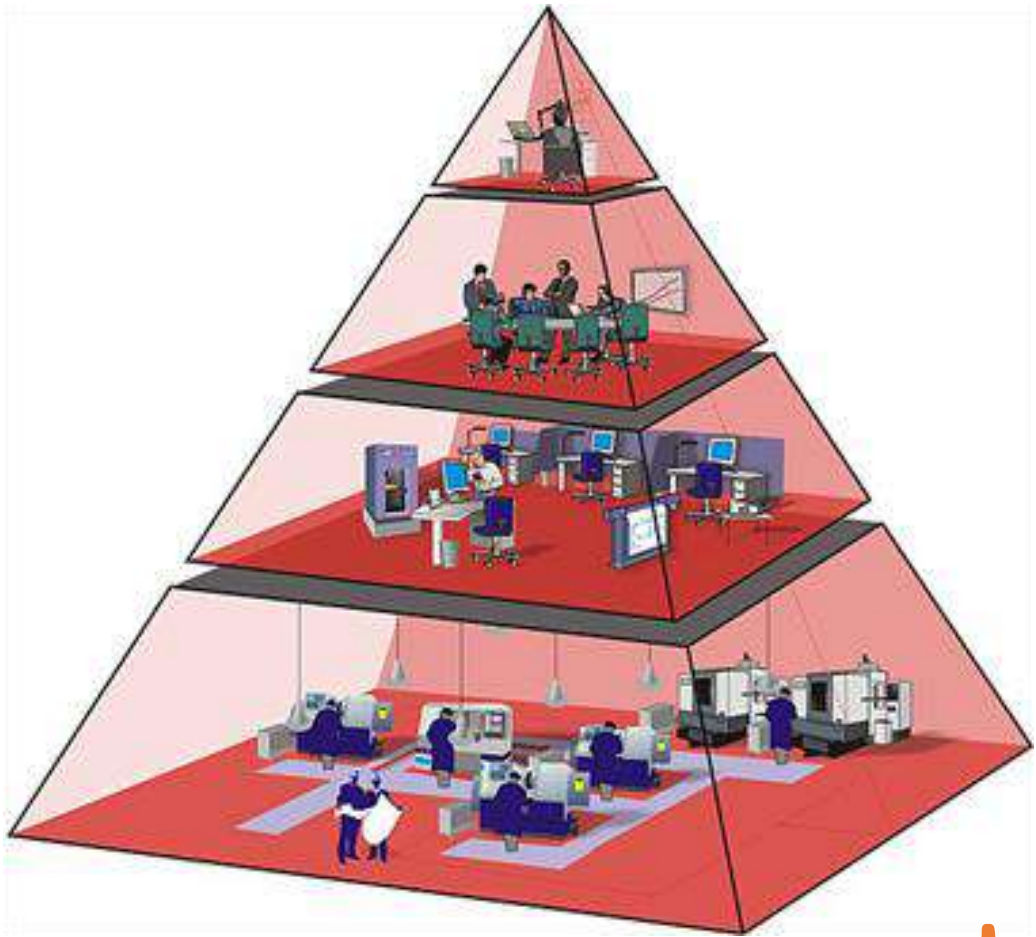
## **6. Project startup**



## Features of brand creation on the Internet

- High communication abilities (negotiate quickly).
- Low or no cost (tools, free, etc.).
- Predictability and measurability (tracking and forecasting).
- Responsiveness (quick popularity).
- Technological (websites, social media).
- Personalization of interaction. (communication through personal website)





# Virtual companies



It is a form of organization of real-life, geographically separated economic agents working on a joint project using the latest information technology..



# Faster and better

- Objective - to generate profit by maximizing the satisfaction of consumers' needs and demand for goods (services) faster and better than potential competitors.
- Tools:
  - combining the resources of partners
  - satisfaction of certain requests of specific consumers (customers).

# Assessment of key success factors of business models in Kazakhstan for their sustainable development

- Kaspi
- BI Group
- Air Astana
- Glovo
- Magnum



Благодарю за  
внимание!



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# **Topic 14. Information logistics as the basis of institutional relationships in the digital economy.**



# LOGISTICS



# Logistics goal

This is about providing the consumer with products at the “right” time and place with minimal costs for logistics operations and production resources used.

*Logistics manages physical distribution and material resources.*



# Six rules of logistics

1. CARGO.
2. QUALITY.
3. QUANTITY.
4. TIME.
5. PLACE.
6. EXPENSES.

**The goal of logistics** is achieved if the right product, of the required quality, in the required quantity, is delivered at the right time to the right place with minimal cost.



# Definitions

Information logistics can be viewed from **two perspectives**:

- ❑ **Information logistics** as a functional area of information management.
- ❑ **Information logistics** as a system for managing a company's information resources, based on logistics principles.



# 5th-Party Logistic Service



**5PL** (Fifth Party Logistic ) - “virtual” logistics is a logistics outsourcer that, using the global information technology space, can provide a full range of services – online stores such as eBay, Aliexpress, Amazon, etc.

## Information

**logistics** is the organization and use of information support systems for production and economic processes at an enterprise.



**Logistics information** is purposefully collected information necessary to support the process of managing the enterprise's logistics system.

# Information logistics

**The object of research** is information systems that provide management of material flows, the microprocessor technology used, information technologies and other issues related to the organization of **information flows** (associated with material flows).



# Information flows

*The information flow can exist in the form of paper and electronic documents (media).*

*Information flow* is a set of circulating messages between the logistics system and the external environment necessary for the management, analysis, and control of logistics operations.

# ADVANTAGES

*Digital logistics* leads to *faster innovation* .



Information logistics contributes to **an increase in labor productivity** (at the initial stage up to 15%) **by significantly reducing time spent** on production and sales operations and **saving resources**, which allows reduce prices.

# Internet logistics or e- logistics

Digital logistics  
**scheme :**

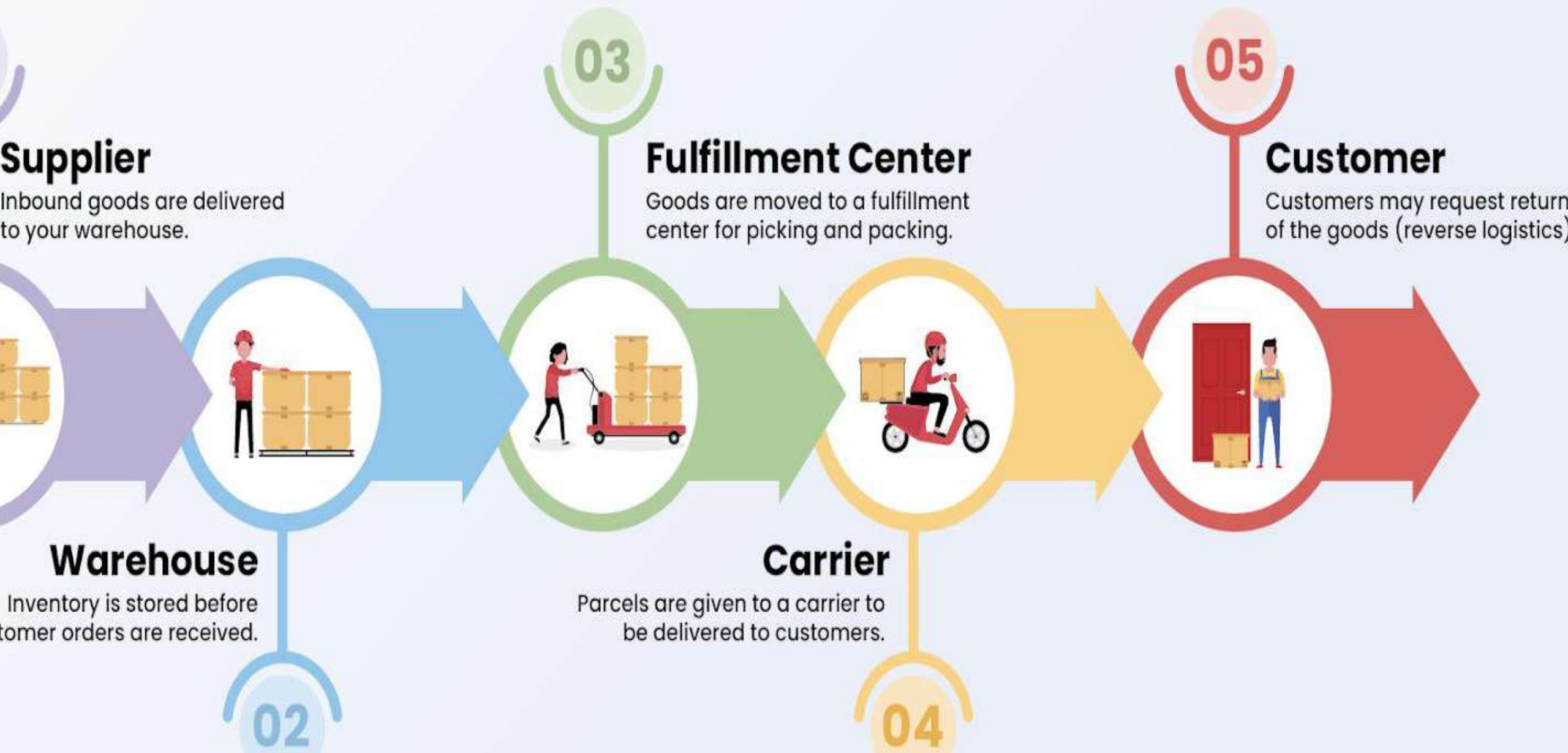
- Provider.
- Stock.
- Order fulfillment center.
- Carrier.
- Client.



*The e-commerce logistics process doesn't end once your product reaches the buyer's hands. There is a possibility that customers will return what they purchased, so you should prepare for **reverse logistics as well**.*



# E-commerce Logistics Process



# Three best practices for optimizing supply chain management

## 1. Inventory management optimization

- (a) Implementation of proper inventory accounting
- (b) Investing in Inventory Management Software
- (c) Data synchronization across all channels

## 2. Cooperation with a third-party logistics company

- Reduction in capital investment
- Economies of Scale
- Labor savings
- Access to external resources
- Reducing distractions

## 3. Reverse logistics

- (a) Create conditions for a painless return of goods
- (b) Offer free returns
- (c) Use product returns data for demand planning

# The power of automation

In the context of inventory planning

**30%**

decrease in the cost  
of inventory planning

**10%**

decrease in  
inventory write-offs

**9%**

increase in gross  
profit margins

# Robots in Amazon warehouses



# Logistics strategies

1. Automation of warehouse operations
2. Building a reliable logistics network
3. Innovation to improve customer experience.

Winning the e-commerce logistics race ***requires a strong combination of strategy, foresight, and execution ability.***

But what underlies the apparent success of fast-growing e-commerce companies is **financing**.



Thank you for  
attention!