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“IGOR SIKORSKY KYIV POLYTECHNIC INSTITUTE”

# **DIGITAL STRATEGIES IN BUSINESS**

## **EDUCATIONAL AND METHODOICAL COMPLEX OF THE DISCIPLINE**

*Recommended by the Methodical Council of Igor Sikorsky KPI  
as a study guide for applicants of the second (master's) level  
under the educational and professional program "Management and business  
administration"  
specialty 073 "Management"*

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The educational and methodological complex of the discipline "Digital strategies in business" is designed for students of the second (master's) level of higher education who study in the specialty 073 "Management". It presents the thematic plan of the discipline, basic methodological tips for studying the lecture material and the topics of discussions during practical classes, a list of questions for students' independent work, test tasks and a list of questions for testing knowledge, criteria for current and final control.

## CONTENT

INTRODUCTION .....	4
EDUCATIONAL AND THEMATIC PLAN OF THE DISCIPLINE .....	6
THEMATIC PROGRAM OF THE DISCIPLINE.....	7
METHODOLOGICAL ADVICE FOR STUDYING TOPICS OF THE DISCIPLINE	9
Topic 1. Digital economy and transition to digital business.....	9
Topic 2. Digital technologies of Industry 4.0 as a basis for developing digital strategies of industrial enterprises .....	12
Topic 3. Digital industry and digitalization of industrial enterprises .....	16
Topic 4. Digital strategies of enterprises and rethinking of business. A place of digital transformation .....	19
Topic 5. Digital transformation of an industrial enterprise as an element of corporate strategy .....	24
Topic 6. Business processes in digital transformations of industrial enterprises .....	26
Topic 7. Personnel issues in the development of digital strategies of enterprises.....	30
Topic 8. Assessment of the enterprise's readiness for digital transformation.....	34
THEME OF PRACTICAL LESSONS .....	39
INDEPENDENT WORK OF STUDENTS .....	45
Questions and tasks for independent study of topics of the discipline .....	45
Test tasks for self-testing of knowledge .....	47
INDIVIDUAL TASK.....	56
CURRENT AND FINAL CONTROL.....	59
Current control of knowledge .....	59
A list of questions for preparing for modular control work.....	59
Scoring criteria .....	61
Final control of students' knowledge .....	62
EDUCATIONAL AND METHODOLOGICAL MATERIALS .....	64
REFERENCES .....	65

## INTRODUCTION

The initial discipline "Digital strategies in business" is aimed at studying the essence of digital strategies, digital transformation strategies and digitalization strategies, the role of digitalization of business processes in the formation of a digital strategy; study of personnel issues of digitization and digital transformation; assessment of the organization's readiness for digital transformation as a basis for developing a digital strategy. In the process of studying the discipline, the experience of global companies in changing their strategy to a digital one will be considered.

As a result of studying the discipline, the student will gain theoretical knowledge and practical skills in using modern information and digital technologies to optimize the company's activities and develop digital strategies of various levels.

The purpose of the course is to provide future specialists with theoretical knowledge and practical skills and abilities in developing digital strategies, selecting the optimal technology option that will form the basis of building a digital strategy.

The subject of study is digital strategies, digitalization strategies and modern digital technologies, which are the basis of digital strategies (both corporate and functional).

*The course is focused on the formation of students with the following competencies:*

GC 3 Ability to use information and communication technologies;

GC 6 Ability to generate new ideas (creativity);

PC 5 Ability to create and organize effective communications in the management process;

PC 9 Ability to analyze and structure organizational problems, make effective management decisions and ensure their implementation;

PC 14 The ability to develop, economically justify and implement management solutions taking into account digital business strategies in order to effectively use resources, increase profitability and ensure the development of the enterprise.

*The objectives of the course are realized through the achievement of the following program learning outcomes:*

- PLO 4      Substantiate and manage projects, generate business ideas;
- PLO 8      Use specialized software and information systems to solve management problems of the organization;
- PLO 10     Demonstrate leadership skills and ability to work in a team, interact with people, influence their behavior to solve professional problems;
- PLO 13     Be able to plan and implement information, methodological, material, financial and personnel support of the organization (unit);
- PLO 16     Apply modern information technologies to manage changes in industrial enterprises, develop effective models of organizational development, digital business strategies.

## EDUCATIONAL AND THEMATIC PLAN OF THE DISCIPLINE

The educational and thematic plan of the discipline provides for the study of the following topics and the following distribution of them by types of classes:

Topic	Distribution by types of classes			
	Total	Lectures	Practical	IWS
Topic 1. Digital economy and transition to digital business	9	2	4	3
Topic 2. Digital technologies of Industry 4.0 as a basis for developing digital strategies of industrial enterprises	15	4	6	5
Topic 3. Digital industry and digitalization of industrial enterprises	9	2	5	2
Topic 4. Digital strategies of enterprises and rethinking of business. A place of digital transformation	10	2	5	3
Modular control work part 1	3		1	2
Topic 5. Digital transformation of an industrial enterprise as an element of corporate strategy	10	2	4	4
Topic 6. Business processes in digital transformations of industrial enterprises	10	2	4	4
Topic 7. Personnel issues in the development of digital strategies of enterprises	8	2	3	3
Topic 8. Assessment of the enterprise's readiness for digital transformation	10	2	1	7
Modular control work part 2	3		1	2
Essay	10			10
Credit	8		2	6
<b>Total</b>	<b>105</b>	<b>18</b>	<b>36</b>	<b>51</b>

## **THEMATIC PROGRAM OF THE DISCIPLINE**

The study of the discipline includes the following topics:

### **Topic 1. Digital economy and transition to digital business**

Transition to digital business. The essence of the digital economy. Factors affecting the digitalization of the economy. Directions of business change under the influence of digital technologies

### **Topic 2. Digital technologies of Industry 4.0 as a basis for developing digital strategies of industrial enterprises**

Internet of things, industrial Internet of things. Cloud technologies and computing. Big Data and analytics. Blockchain. Digital twins. Additive manufacturing.

### **Topic 3. Digital industry and digitalization of industrial enterprises**

Trends in the field of digital industry. Virtual factory, smart factory, digital factory. Joint development of products. Open innovation.

### **Topic 4. Digital strategies of enterprises and rethinking of business. A place of digital transformation**

Digital strategy, digitalization strategy, digital transformation strategy. Change in the field of activity under the influence of digitalization. Changing the business model of an industrial enterprise, the role of platforms. Changes in the value chain. Changes in communications with clients.

### **Topic 5. Digital transformation of an industrial enterprise as an element of corporate strategy**

Enterprise-to-enterprise digital transformation models depending on the level of strategy. Evaluation of the results of digital transformation

## **Topic 6. Business processes in digital transformations of industrial enterprises**

Management in the digital economy. Digitalization of business processes. Network management. Transition to digital management. IT infrastructure in digital transformation.

## **Topic 7. Personnel issues in the development of digital strategies of enterprises**

Key competencies in the digital economy. Skills, abilities and talent management in digitalization. Change management in digital transformation. Chief Digital Officer (CDO)

## **Topic 8. Assessment of the enterprise's readiness for digital transformation**

Approaches to assessment of readiness. Enterprise architecture and management system. Determination of maturity of business processes. Digital culture of the company.



## **METHODOLOGICAL ADVICE FOR STUDYING TOPICS OF THE DISCIPLINE**

### **Topic 1. Digital economy and transition to digital business**

#### *Topic questions*

- 1.1. Transition to digital business.
- 1.2. The essence of the digital economy.
- 1.3. Factors affecting the digitalization of the economy.
- 1.4. Directions of business change under the influence of digital technologies

#### *Methodical tips for studying the topic:*

First of all, it is necessary to consider the issue of transition to digital business in conditions of active development of digital technologies. Digitalization of business has been a global trend for the past decades, but it has significantly accelerated during the COVID-19 pandemic. At the same time, it should be taken into account that digitalization is not limited exclusively to the sphere of electronic commerce, it covers all spheres in one way or another.

Prerequisites for the digitalization of business are the transfer of a significant part of information into electronic form (in 1986, only 1% of all information that existed on a global scale was stored in electronic form, the rest was stored in analog form, and in 2002 already 50% of all global information was stored in electronic form [1]), change in user behavior, ICT development. The COVID-19 pandemic gave a significant impetus to the activation of business digitalization processes. At the same time, it showed that even stable companies can face circumstances that will significantly affect their activities.

For further study of the topics of the discipline, it is worth distinguishing the concepts of "digitalization", "digitization" and "digital transformation". Scientific literature has only recently begun to interpret these concepts as different. In essence, digitization-digitalization-digital transformation is a chain of gradual introduction and penetration of digital technologies with a change in the scale of influence on the company's activities [2].

Foreign scientists propose to consider business digitalization as the implementation of business processes and methods that allow organizations to effectively compete with competitors in a world that is increasingly "digitalized" [3]. This interpretation contains 3 consequences [3]:

- digital trends develop independently of business, i.e. there is an objective need for digitalization, therefore the management's task is to adapt the work of their company to various forms of use of digital technologies by customers, partners, employees and competitors, as well as predict how their expectations and behavior may change at the same time;
- the introduction of new technologies in itself is not the whole of digitalization, as they are only a tool for solving a larger problem. Therefore, the development of a digital strategy, personnel management, organizational structure and leadership become relevant;
- to become a leader in the digital world, you do not need special knowledge or skills. The world is being transformed by digital tools, and all standard management is becoming digital management. However, there is a huge gap between effective "digital" leaders and leaders who are not, which is all the more pronounced the less people are ready to transform and adapt.

The consequence of global digital changes is the formation of a digital economy. Therefore, the second question of the topic should consider the essence of the digital economy. There are many approaches to the interpretation of this term.

The digital economy is the activity of creating, spreading and using digital technologies and related products and services [4].

The digital economy is an economy based on digital computer technologies and information and communication technologies (ICT), but, unlike informatization, digital transformation is not limited to the introduction of information technologies, but fundamentally transforms spheres and business processes based on the Internet and new digital technologies [5]. The digital economy is the basis of the Fourth Industrial Revolution.

Since digitalization is a continuous process, a radical change in business processes is taking place, that is, a digital transformation is taking place. Features of the digital economy are that [5]:

- all elements of the economic system are present simultaneously in the form of physical objects, products and processes, as well as their digital copies (mathematical models);
- all physical objects, products and processes have a digital copy and are elements of "connectivity", therefore they become part of an integrated IT system;
- due to the presence of digital copies (mathematical models) and being part of a single system, all elements of the economic system continuously interact with each other in a mode close to real time, simulate real processes and predicted states, ensure constant optimization of the entire system.

The segments of the digital economy are ICT and digital infrastructure, e-business and digital production, e-commerce.

It should be noted that the digital economy is not identified with e-commerce and is not limited to it.

The next question should be considered factors affecting the digitalization of the economy. Research agencies include various technologies that digitize business to the list of these factors.

Table 1.1 – Factors affecting the digitalization of the economy

<b>Accenture</b>	<b>Boston Consulting Group</b>	<b>G. Press iz Forbes</b>	<b>Deloitte</b>
<ul style="list-style-type: none"> <li>– the Internet of Things</li> <li>– Artificial Intelligence</li> <li>– blockchain technology</li> <li>– big data</li> <li>– automation of robotic processes</li> </ul>	<ul style="list-style-type: none"> <li>– autonomous works</li> <li>– Industrial Internet of Things</li> <li>– horizontal and vertical system integration</li> <li>– additive manufacturing</li> <li>– augmented reality</li> <li>– modeling</li> <li>– big data and analytics</li> <li>– cloud computing</li> <li>– informational security</li> </ul>	<ul style="list-style-type: none"> <li>– intelligent agents</li> <li>– augmented and virtual reality,</li> <li>– the Internet of Things</li> <li>– cognitive technologies for the development of artificial intelligence</li> <li>– hybrid wireless technologies as interfaces and software</li> </ul>	<ul style="list-style-type: none"> <li>– virtual and augmented reality</li> <li>– blockchain technology</li> <li>– "dark" data</li> </ul>

Source: compiled by the author based on [1]

The last question should be considered directions (components) in which business is changing under the influence of digital technologies. These include [6]:

- business rethinking (change of business models, change of scope, platformization);
- reassessment of the value chain;
- communication with clients (their involvement, measurement);
- reorganization of the organization (skills, transition, organizational planning).

## **Topic 2. Digital technologies of Industry 4.0 as a basis for developing digital strategies of industrial enterprises**

### *Topic questions*

- 2.1. Internet of things, industrial Internet of things.
- 2.2. Cloud technologies and computing.
- 2.3. Big Data and analytics. Blockchain.
- 2.4. Digital twins.
- 2.5. Additive manufacturing.

### *Methodical tips for studying the topic:*

This topic explores the key technologies underlying the development of digital strategies and digital change.

First of all, it is worth considering such a technology as the Internet of Things. It is the basis of other technologies that will be discussed further. Gartner defines the Internet of Things as a network of physical objects that have built-in technologies that allow interaction with the external environment, transmit information about their state, and receive data from the outside. In simple words, it is the connection of all devices and objects to a common network using sensors, where they can transmit data and exchange information. In addition to the Internet itself, technologies are based on [4]:

- RFID (Radio Frequency IDentification) radio frequency identification methods;
- wireless sensor networks WSN (Wireless Sensor Network);

- NFC (Near Field Communication) short-range communications;
- machine-to-machine M2M (Machine-to-Machine) communication.

The Industrial Internet occupies a central place in the concept of the Internet of Things. It provides the underlying infrastructure that supports connected hardware and data. The term, which mainly applies to industrial giant General Electric, refers to the integration of machines with sensors, software and communication systems that together form the Internet of Things. The Industrial Internet combines technologies and processes from such areas as big data, self-learning of machines and machine-to-machine communication (M-M) [7].

The next group of technologies is Cloud technologies and computing. This group of technologies also ensures the functioning of the Internet of Things.

Cloud technologies are defined both as a remote space for data storage, and as the possibility of using remote services, and as data processing technologies in which the user is provided with remote computer resources for performing calculations. Inextricably linked with cloud technologies is the term "cloud computing" - renting services and resources for storing and processing data in a global network instead of own infrastructure [4]. Today, such technologies are used by many companies to one degree or another - whether using Google Docs or complex information accounting systems in the cloud (Amazon).

There are 4 levels of Clouds:

1. Private Cloud.
2. Public Cloud.
3. Hybrid Cloud.
4. Community Cloud.

Cloud computing comes in the following forms: IaaS, PaaS, SaaS, and XaaS. These are models of cloud services provided to the user for rent; the difference between them lies in the level of solved tasks. As part of the IaaS model, the client receives the computing power of the cloud; software solutions are built taking into account this infrastructure. PaaS is a model that provides cloud resources and a set of installed tools. The SaaS user receives a ready-made solution that remains only to be applied. These

models somehow meet the definition of XaaS, that is, everything as a service. "X" in the abbreviation means that such a service can be anything. In the context of cloud infrastructures, this abbreviation often denotes additions to the IaaS cloud (for example, BaaS (Backup-as-a-Service), an automated data backup service in the cloud) [8].

Cloud technologies are always accompanied by Big Data. In most cases, the cloud is the place for storing and processing Big Data. Not every significant mass of information can be called Big Data. The "five Vs" are noted as defining characteristics for big data - volume, velocity, variety, veracity, and value [9].

The role of Big Data is primarily the ability to accumulate large amounts of information that can be processed and used. In essence, Big Data analytics is similar to business analysis, but has a number of significant advantages: the data are real, they can be specially collected (be experimental); data collection and analysis can take place in real time, which significantly reduces decision-making time; data can take different forms and be unstructured (not only numbers and text, but also photos, videos, audio recordings, etc.); the volume of such data is measured in terabytes and petabytes).

From the peculiarities of Big Data follows the fact that, in addition to traditional methods of their processing and analysis, there are also specific ones [9]:

- Data Mining;
- crowdsourcing;
- mixing and integration of data;
- machine learning;
- artificial neural networks, network analysis, optimization, including genetic algorithms;
- spatial analysis;
- statistical analysis:  $\alpha/\beta$ -testing and time series analysis;
- visualization of analytical data.

The next technology is blockchain, which is often associated with cryptocurrencies. However, its use is not limited to this area. Technologies of the distributed register (blockchain) are algorithms and protocols of decentralized storage

and processing of transactions, structured in the form of sequentially connected blocks without the possibility of their further change [4].

A transaction block is a special structure for recording a group of transactions. At the same time, the transaction is carried out only when it is considered confirmed. It is convenient and reliable when it comes to making payments or transferring confidential data. For a transaction to be considered valid ("confirmed"), its format and signatures must be verified. After that, a group of transactions is recorded in a special structure (the so-called block). Information can be quickly checked in these blocks. And each subsequent one stores information about the previous one [10].

Blockchain can be used in document circulation (smart contracts), international settlements, and logistics.

Digital twins technology is a relevant technology for industrial enterprises. A digital twin is a virtual model of physical objects, systems, and processes. This technology combines the Internet of Things and digital modeling. A digital twin can be created both for a specific thing – a product, and for more complex objects – machines, devices, equipment, production lines or entire production systems. With the help of a Digital twin, you can reduce the time and costs of developing an innovation, because there is no need to create a physical object. Accordingly, it is easier to make changes, to quickly respond to changes in the state of the simulated system, there is no need to stop production lines for testing, etc. Testing on twins allows you to avoid risks and often more efficiently design complex systems (for example, terminals, warehouses, production shops, etc.).

As part of the last question, additive manufacturing or 3D printing should also be considered.

Additive manufacturing is the general name of technologies that involve the production of a product based on the data of a three-dimensional digital model by the method of layer-by-layer addition of materials. The perspective of the technology is determined by the fact that the specific consumption of materials for the production of parts when using additive methods decreases by almost 10 times, and labor costs decrease by an average of 5 times [11].

The advantages of the technology include [12]:

- the ability to quickly launch the production of complex parts or unique products in small quantities;
- the ability to develop 3D models in one place in the world and in a few seconds transfer them to another where there is a suitable printer;
- if the print is of high quality, the product exactly corresponds to the 3D model;
- economical consumption of materials and minimization of waste;
- profitability in the case of small-scale production;
- printing at any moment when there is a need for a detail;
- the ability to quickly make corrections to the project already at the production stage;
- simple changes to structural elements without affecting the durability of the item;
- the ability to print prefabricated structures, which allows you to quickly and easily manufacture large-scale objects.

Unlike traditional production, this technology makes it possible to create personalized goods, since the effect of scale does not work for it.

### **Topic 3. Digital industry and digitalization of industrial enterprises**

#### *Topic questions*

- 3.1. Trends in the field of digital industry.
- 3.2. Virtual factory, smart factory, digital factory.
- 3.3. Joint development of products. Open innovation.

#### *Methodical tips for studying the topic:*

The first issue of the topic is to consider the key trends in the field of digitization of industry and industrial enterprises. The main trends in industry can be digitalization of technological processes, means of labor (equipment, devices), new ways of organizing production.



Leading concepts for industry are: Industry 4.0 (Industry 4.0), Smart Manufacturing (Smart Manufacturing), Digital Manufacturing (Digital Manufacturing), Internet of Industry (Internet of Manufacturing), Open Manufacturing (Open Manufacturing) [13].

Technological trends in the field of digital transformation of industry:

- 1) mass introduction of intelligent sensors into equipment and production lines (Industrial Internet of Things technologies);
- 2) transition to unmanned production and mass introduction of robotic technologies;
- 3) transition to information storage and computing from own capacities to distributed resources ("cloud" technologies);
- 4) end-to-end automation and integration of production and management processes into a single information system ("from equipment to the ministry");
- 5) use of the entire mass of collected data (structured and unstructured information) for the formation of analytics ("big" data technologies);
- 6) transition to mandatory digitized technical documentation and electronic document management ("paperless" technologies);
- 7) digital design and modeling of technological processes, objects, products throughout the entire life cycle from idea to operation (application of engineering software);
- 8) application of technologies for building up materials instead of cutting them ("additive" technologies, 3D printing);
- 9) application of services for automatic ordering of consumables and raw materials for production of products and automatic delivery of finished products to the consumer, bypassing intermediary chains;
- 10) application of unmanned technologies in transport systems, including for the supply of industrial goods;
- 11) application of mobile technologies for monitoring, control and management of processes in life and at work;
- 12) transition to the sale of industrial goods via the Internet.

As part of the second question, it is worth considering one of the important objects in digital changes – these are virtual factories and smart factories.

The latest technologies of the digital industry are [14]:

- new production technologies;
- computer engineering;
- industrial internet.

Key technologies for the digital transformation of industrial enterprises include: digital factory, production assets, virtual product presentation, communication, modular production equipment, flexible production methods, process visualization, integrated production planning, autonomous internal logistics, predictive analytics, big data analysis, intelligent cost optimization systems, a replicated package, accounting systems for the movement of raw materials and finished products [14].

It is also appropriate to consider such concepts as virtual factory, digital factory, smart factory. In the literature, these concepts are often equated, since they are relatively new, but from the point of view of the scope of the subject, these concepts can be delimited.

The US National Institute of Standards and Technology (NIST) defines the term Smart Manufacturing as follows: it is "fully integrated corporate production systems that are capable of responding in real time to changing production conditions, supply chain requirements, and meeting customer needs" [15].

Since the concept of "smart production" is rather vague, and the transition to it takes place in several stages that take more than one year, attempts are made to divide this concept into three. Thus, E. Filos, coordinator of ICT projects in the seventh framework program of the European Union for scientific and technical cooperation, divides the factories of the future into three main types – Digital, Smart and Virtual [15].

As part of the last question, it is necessary to consider the essence of open innovation and joint development of products. Digitization makes it easier to tap into the expertise and knowledge of users outside the organization – that is, open innovation. Such an approach was used, for example, by NASA. An example is Procter & Gamble

(P&G), which used a method proposed by a professor from Bologna who ran a bakery to implement a solution with printing an image and text on each Pringles chip. This indicates a shift from R&D (research and development) to C&D (connection and development). Open innovations are also implemented by GE, Coca-Cola, and Samsung [6].

The relevance of open innovation also lies in the fact that the life cycle of goods is becoming shorter, and research costs are growing. Technologies make it possible to facilitate communications and make open innovation accessible not only to large companies.

Collaborative Product Development (CPD) is a business strategy, workflow, and collection of software applications that make it easier for different organizations to work together on product development. It is also known as joint product definition management [4].

#### **Topic 4. Digital strategies of enterprises and rethinking of business. A place of digital transformation**

##### *Topic questions:*

- 4.1. Digital strategy, digitalization strategy, digital transformation strategy.
- 4.2. Digitization and digital transformation in the hierarchy of strategies.
- 4.3. Change in the field of activity under the influence of digitalization. Changing the business model of an industrial enterprise, the role of platforms.
- 4.4. Changes in the value chain.
- 4.5. Changes in communications with clients.

##### *Methodical tips for studying the topic:*

The first question should be devoted to the study of terminology related to digital strategy.

In studies, the concepts of "digital strategy", "digitalization strategy" and "digital transformation strategy" are equated. They mean the use of digital technologies to change business models and create a new competitive business potential [16].

Digital strategy is defined as a strategy that focuses on using technology to improve business performance, whether that means creating new products or rethinking current processes. This strategy indicates the direction in which the organization will create new competitive advantages with the help of technology, as well as the tactics it will use to achieve these changes [17]. Digital strategy is a strategy of transforming a firm into a digital one, in which digital communication ensures the interaction of a business organization with its customers, individualized and personalized product/service offers, decision-making based on data, under the influence of changes in the external and internal environment of the firm [18].

It is also worth considering the distinction of terms according to the model of the levels of digital maturity of companies: according to the development of the company from a beginner to digitari, the distinction of strategies that will be used will be followed: digitalization strategy - digital transformation strategy - digital strategy [19].

Digital strategizing changes [20]:

- marketing strategies, interactions with consumers (clients);
- competitive strategies;
- HR strategies.

Scientists offer 2 types of strategies [3]:

- The engagement strategy is based on a complex individualized approach that should ensure customer loyalty.
- A digital solutions strategy focuses on information-enhanced products and services that provide new value to customers.

Choosing the best of these models should be determined by the company's real capabilities and how it wants to compete. At the same time, there is a mandatory key requirement: you must choose only one of the two above-mentioned strategies, and not both. Theoretically, as a third option, a digital strategy could be singled out in order to optimize business operations, but increasingly it turns out to be just a minimum

requirement for conducting business in a digital format, but in no way a basis for obtaining a sustainable competitive advantage [3].

As part of the second question, it is worth considering the place of digital strategy and digital transformation in the hierarchy of enterprise strategies.

Research by Mariam H. Ismail, Mohamed Khater, Mohamed Zaki showed that the development of a digital strategy of large or medium-sized companies requires strategic decisions in several key areas, which will be formed at the level of operational strategy through the incorporation of digital strategy into the business model, company technology and promotion a product that will provide opportunities to compete on the markets and at the functional level in the field of managerial, organizational, structural decision models and the operational dimension of strategic decisions to create competitive business advantages [21].

In large and medium-sized businesses, the exploitation and integration of digital technologies often affects a large part of the company and can extend beyond them, affecting products, business processes, sales channels and supply chains. The potential benefits of digitization include increased sales or increased productivity, the creation of new value or new forms of interactions with counterparties. The study of the place of digital strategy in the corporate strategy of a large business showed that digital strategy is one of the corporate strategies that transforms the digital level of business strategy into functional strategies of the enterprise [21].

A digital strategy can have 3 levels depending on the level of digitalization – to be a corporate strategy, to be a functional strategy and to be simply a business direction of the enterprise.

The third issue is to consider the possibility of changing the company's field of activity under the influence of digitalization. Thus, it can be said that the enterprise can use digital strategies to change the business model. This change should be considered on the example of such giants as Amazon (the transition from an online store to a multi-vector activity – an online store, an online platform, cloud services, online viewing, financial calculations, studio photography. Today, their search engine can become a competitor Google), John Deere (transition from an equipment manufacturer to a

moderator company that provides weather forecasting, crop optimization and irrigation through remote sensors), General Electric (GE's Digital Journey and the creation of the Predix platform) [6].

Features of business changes under the influence of digitalization are manifested in the following:

- Building a business around the consumer, not the product;
- Competition goes beyond the boundaries of industries;
- Low costs are not the main competitive advantage;
- The advantage is created by network effects;
- Data becomes an asset;
- Transition to product as a service.

In most cases, the basis for such a digital transition for an enterprise is a platform, and this also applies to industrial enterprises (as in the example of GE, when the transition "from product to platform" took place). The growth of such platforms allows you to form an ecosystem by attracting partners. Platforms and ecosystems allow you to "lock" the consumer within the framework of one circle and thus not only attract new customers, but also retain existing ones. Both the consumer and the enterprise receive benefits (win-win principle).

It is worth considering the model of strategy formation based on the number of products and customers (one product, a chain of customers – network effects, a closed circle; one product, one customer – a traditional strategy, cheaper or better products; a chain of customers, a chain of products – network effects and additions; of goods, one customer – addition, razor strategy) [6].

The next question to consider is changes in the value chain. In this case, there are changes that are reflected in the use of open innovations (and thus the simplification and cheapening of innovations, increasing the ability to introduce new products and technologies), operational excellence (smart factories, such as the Siemens factory, Industry 4.0, 3D printing , augmented and virtual reality (in industry can be used in

warehousing, factory worker training such as Bosch, General Motors), supply chain transformation, warehousing and logistics.

At the same time, you can change the value of the product by offering complementary products. Complementarity can be customer-specific and customer-lifecycle-specific.

A final issue to consider is connecting with customers through digital technologies (customer acquisition, engagement, and measurement).

According to scientists, attracting new customers is not always the main goal and is effective - it is much more necessary to keep existing ones. Studies show that when talking not about income, but about profitability, instead of the 80–20 rule, the 200–20 rule becomes relevant (20% of customers provide 200% of profit, because 80% of customers destroy profitability, that is, they are unprofitable). This postulate is confirmed by the graph of the dependence of profit and customers of the Swedish manufacturer Kanthal – according to the analysis, 5% of customers brought 150% of profit, only 40% of customers were profitable at all [6].

The search for customers has changed significantly under the influence of digital technologies. Enterprises can monitor their consumer behavior, observe through the sensor system the experience of using the product (working time, idle time – for example, equipment manufacturers can even predict and notify the consumer about the need for repair or service through the sensor system). Therefore, there are opportunities to influence the consumer's decision-making regarding the purchase of this or that product. With the help of digital technologies, products can be personalized. There is a tendency to move industrial producers to social networks (getting closer to the consumer, building trust and contacts).

A customer journey map (CJM, customer journey map) can be used for customer analysis - it is a marketing tool that is necessary for visualizing customer needs and pain points, thanks to which it is possible to trace how people interact with the company [22].

## **Topic 5. Digital transformation of an industrial enterprise as an element of corporate strategy**

### *Topic questions:*

5.1. Enterprise-to-enterprise digital transformation models depending on the level of strategy

5.2. Evaluation of the results of digital transformation

### *Methodical tips for studying the topic:*

As part of the first issue of the topic, it is necessary to consider approaches to the digital transformation of enterprises. When making management decisions during digital transformation, it is necessary to choose a method of digital transformation, and then to develop a strategy and change the business model. Boston Consulting Group offers 2 ways:

- the first is the path of gradual transformation, which is considered ineffective, because changes in digital technologies occur too quickly;
- the second is leap-like and more risky, during which firms build up their internal technological capabilities as quickly as possible.

Scientists distinguish online strategy and digital strategy of the firm [20].

An online strategy is a strategy for using a firm's digital (online) assets to maximize its business results.

Digital strategy is a strategy of transforming a firm into a digital one, in which digital communication ensures the interaction of a business organization with its customers, individualized and personalized product/service offers, decision-making based on data, under the influence of changes in the external and internal environment of the firm.

Depending on the level of isolation of the digital strategy relative to the corporate strategy of the enterprise, 3 models are distinguished:

- the corporate strategy is conditionally digital; digital technologies are implemented at the level of basic business processes and change the business model;



- corporate strategy is the sum of functional strategies and digital strategies of individual business units. Such business units can be separate projects that are performed in parallel with the main activity and thus do not immediately change it. Projects can either exist separately or connect with each other to achieve certain strategic goals;
- creating a business in a digital environment, that is, a digital strategy is a corporate one. Characteristic of digitally native companies.

As part of the second question, it is necessary to consider the effects of digital transformation. Thus, General Electric estimated the expected total effect of the introduction of digital technologies at 220 billion dollars. until 2035. The industry can save \$2 billion annually just by optimizing the management of the main equipment.

Digital transformation causes the emergence of a new type of assets – digital assets, which can be divided into:

- a set of data in digital form and means of their processing, the use of which leads to obtaining economic benefits;
- a set of data that is autonomous, unique and has value.

Digital assets are assets of the organization expressed in material (digital technologies) and intangible form (data, software, information systems), the use of which leads to obtaining economic benefits.

Often, digital assets include only cryptocurrency. The term crypto-assets is also proposed – these are digital assets that are recorded in a distributed ledger (like an electronic ledger – "distributed ledger"). They get their name from the cryptographic security mechanism used in public, permissioned distribution ledgers. Crypto assets are used by modern businesses as a means of payment and exchange for general purposes and have a certain specific classification [23].

Gartner offers this definition: A digital asset is anything stored digitally and uniquely identifiable that organizations can use to realize value. Examples of digital assets include documents, audio, video, logos, slide presentations, spreadsheets, and websites [24].

Taking this into account, the following digital assets can be distinguished (since each of them using the latest data processing technologies can bring benefits):

- digital tokens, including cryptocurrency (Digital tokens)
- digital content: photos, videos, documents (Content digital assets)
- arrays of data, including BigData (Data packages or big data collections)
- digital models: virtual reality, Internet of Things (Digital models)
- digital products: for example, cloud solutions (Digital commodities)
- domains and network infrastructure, IP addresses (Domain names and network infrastructure assets).
- user accounts: e-mail addresses, addresses in social networks (User accounts).

Evaluating digital project performance includes commercial performance (APR, Net Present Value (NPV), Profitability Index (PI), Internal Rate of Return (IRR), Modified Rate of Return (MIRR), etc.) and evaluation of non-financial criteria (creating a competitive advantage, cyber security, information protection, customer satisfaction level, etc.).

## **Topic 6. Business processes in digital transformations of industrial enterprises**

### *Topic questions:*

- 6.1. Management in the digital economy. Digitalization of business processes.
- 6.2 Network management.
- 6.3 Transition to digital management.
- 6.4 IT infrastructure in digital transformation.

### *Methodical tips for studying the topic:*

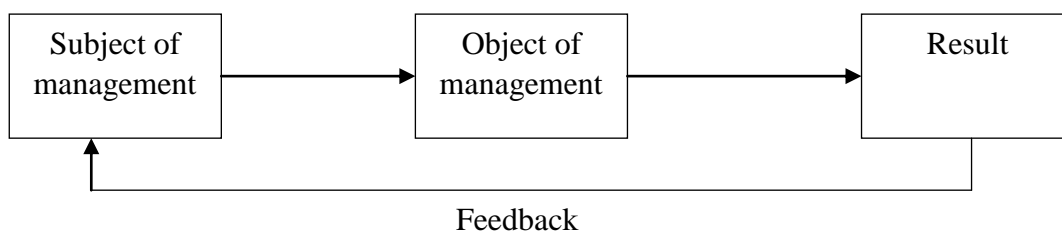
First of all, within the framework of the topic, it is necessary to consider the transformation of management in the languages of the formation of the digital economy. Its main characteristic is a change in the management paradigm – from a hierarchy of managers to a hierarchy of algorithms and platforms (Fig. 5.1).

The basis of digital changes are business processes. At the same time, business processes are one of the areas of digital transformation, since a radical change of strategy to a digital one involves, first of all, digitization and transformation of business processes.

The digitalization process from the point of view of business processes takes place in the following stages [25]:

- 1) Company analysis, goal setting and strategy development.
- 2) Introduction of digital technologies.
- 3) Analysis of the obtained results.

#### **Traditional management scheme**



#### **Management in the digital economy**

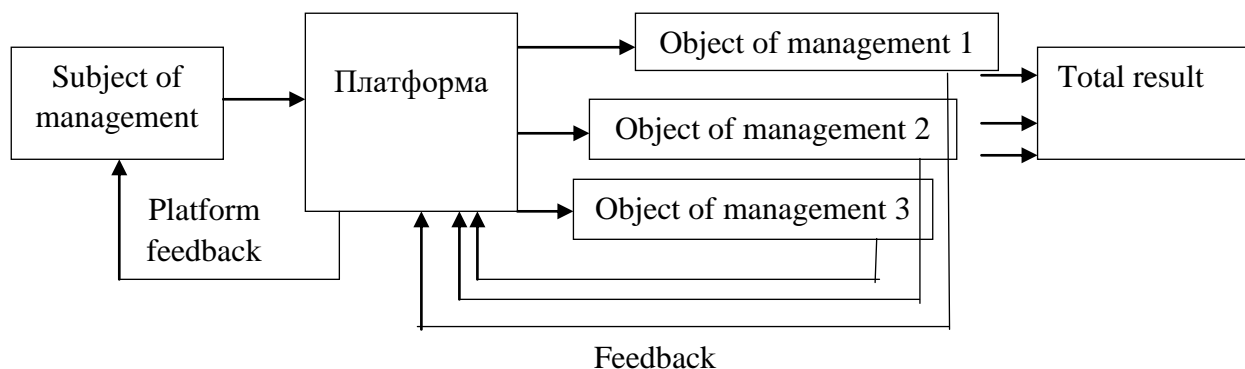


Figure 5.1 – Evolution of the management process in the digital economy  
source: [26]

The main result of digitalization of business processes is their automation. However, digital technologies improve communications, information exchange, control, and accounting. The review of scientific works made it possible to single out the directions of digitalization of business processes (compiled by the author taking into account [27]):

- creation of unified information spaces (directories, classifiers, instructions) that can be used for any business process in the mode of constant access through clouds;
- use of methods and algorithms (SADT, IDEF, UML, BPMN) that provide automation of work flow management;
- the use of software tools that carry out constant control of the state of the production system and the execution of business processes, forecast changes in certain conditions and allow early avoidance of negative consequences (prognostic analysis);
- accounting automation;
- automation of control of the state of production equipment through a system of sensors and the formation of digital duplicates of production systems;
- automation of labor efficiency assessment.

This list is not exhaustive.

The next issue to consider is network management. Modern organizations have established contacts (i.e. networks) with employees, contractors, intermediaries, etc. Since there is a constant exchange of information between them, there is a need for network management.

Basic definitions in network management [26]:

1. Network management is the management of a system of horizontal and vertical connections, nodes between equal members of the organization, which provides access, operational exchange of information, resources and cooperation to achieve the goals of the network organization.

2. A network organization is a union of people, organizations and their resources as equal members working in a single information space to achieve specific goals set by the ideologist (ideologists) of the organization.

3. A member of the organization is any business entity that is part of a network organization.

4. The ideologist of the organization is a specific person (or group of persons) who forms the concept of interaction for the members of the organization.

5. The unified information space is a software product that provides access to information, prompt exchange of information, and cooperation for all members of the organization.

Digitalization significantly simplifies inter-firm network relations, including for the creation of joint innovations, conducting joint research. In some cases, such cooperation is quite deep – when one company provides its own facilities to a research company, and in return uses the results of its research.

The third question provides an overview of the transition to digital management. In general, the changes caused by digitalization and digital transformation significantly affect the business processes and business models of companies up to their complete change. Often the basis of such changes is a platform of various scales – from platforms-information spaces within the organization to platforms of an international scale. Accordingly, new management functions related to platform management appear. Management of such platforms includes the emergence of a network management hierarchy.

As for business processes, their changes under the influence of digitalization, taking into account the continuity of digital changes, are based on the Deming-Shewhart cycle.

When all business processes are automated and digitized, there are 3 components that can signal the transition to digital management: optimization of business processes at all levels, formed IT infrastructure of the company, automated business processes and a developed management platform.

IT infrastructure plays an important role in digitization. The role of the IT infrastructure is explained by the fact that, according to the requirements of the modern user, the company must be available and open to him 24/7 – the consumer wants to receive information about the availability of the product, about the working conditions, and place an order at any time. Accordingly, such "onlineness" of the company requires the formation of an information management structure. Another reason is the need to accumulate software tools that will help in analytics and decision-making – because

today management decisions are not based solely on the manager's knowledge and experience, but can be supported (and even formed) by analytics (data mining, big data analytics, etc.).

IT infrastructure is the organization of the company's software, computer programs, which provides the necessary resources to solve the company's business tasks. It includes devices with Internet access, databases, software, corporate mail and much more. All these elements are combined through the Internet and work in a connection, which allows you to effectively perform various tasks and create a business environment for the coordinated work of the entire company and each of its divisions. The correct operation of the IT infrastructure ensures communication between departments or departments that may be physically distant from each other, the transfer and receipt of files and information, as well as the correct operation of all company services. IT infrastructure is not limited to hardware and technical solutions, it is also a set of systems responsible for effective work [28].

Building an IT infrastructure is an expensive and difficult task, but modern technologies make it possible to deploy a rented IT infrastructure – from renting servers, data storage systems to renting software. For industrial enterprises, such an infrastructure can provide the information component of the production process and at the same time be located in the cloud and provide access to management, responsible persons, etc.

## **Topic 7. Personnel issues in the development of digital strategies of enterprises**

### *Topic questions:*

- 7.1. Key competencies in the digital economy.
- 7.2. Skills, abilities and talent management in digitalization.
- 7.3. Change management in digital transformation.
- 7.4. Chief Digital Officer (CDO).

*Methodical tips for studying the topic:*

Digitalization changes not only consumer behavior, but also employee behavior. At the same time, it makes new demands on employees and their competencies. Research shows that in-depth knowledge in one or another area is no longer the main requirement for a "digital" manager. That is why the first question is designed to consider key competencies in the digital economy.

The digital economy significantly changes the requirements for employees. The requirements for the competencies of "old" employees are changing: the director of development must increasingly master technologies, and the content producer must work with statistics and attention analytics. Narrow specializations are no longer valued. The value of additional professional training and retraining is increasing. The key task of internal communications is the development of the cultural environment of digital transformation and the organization of employee interaction. The focus of the work of the traditional "HR" is changing, as technical work is transferred to machine learning and Big Data, but an HR manager focused on the human capital of the organization and the development of the employer's brand becomes necessary [29].

The reflection of changes in the requirements for competencies is also evident in the fact that on January 17, 2018, the updated version of key competencies for lifelong learning was approved - recommendation 2018/0008 (NLE) of the European Parliament and the Council (EU). Both the 2006 edition and the 2018 edition include a competency called Digital Competence.

Digital competences are a set of knowledge, abilities, characteristics of character and behavior that are necessary for a person to be able to use ICT and digital technologies to achieve goals in his personal or professional life. Competence in the field of digital technologies should be perceived not only as knowledge related to technical skills, but also as knowledge more focused on cognitive, social and emotional aspects of work and life in a digital environment [30].

The basic digital skills that are needed in the conditions of the formation of the digital economy are divided into cognitive skills; socio-behavioral; technical.

The second question should be considered skills, abilities and talent management in digitalization. Today, information is becoming a very important resource, and therefore there is a need for people who can extract value from this resource.

Scientists believe that one of the technologies that can significantly affect workplaces is artificial intelligence, as it can potentially replace a large part of human labor [6]. The study of the University of Oxford is interesting. They studied 702 typical occupations and found that 47% of US workers could lose their jobs to automation. The probability of automation by profession: 99% for telemarketers, 94% for accountants and auditors, 92% for workers in the field of retail sales, and only 0.4% for dentists [6].

In the conditions of digital transformation, the most in-demand technical competencies (hard skills) are: creation of new business models (platforms, ecosystems, networks); data analysis (data science); integration with partners through an open API; digital security at the system design level (security by design); possession of at least one of the breakthrough technologies (artificial intelligence, robotics, 3D video, cloud services, virtual and augmented reality, Internet of Things, blockchain); e-management, that is, highly effective management organized with the help of information technologies; mastery of modern managerial practices [29].

The most in-demand soft skills are: design thinking, i.e. user orientation when developing products and services; digital psychology, that is, behavioral economics taking into account the analysis of big data; emotional intelligence; communication skills, etc. [29].

Also, within the framework of this issue, it is necessary to consider the experience of companies in the field of personnel recruitment, in particular, changes in who and how to hire. For example, the experience of the Knack company, which evaluates an employee based on how he plays a 10-minute mobile game (reproduction of micromotives - active and passive decisions, actions, reactions, learning, etc.). In addition, this game approach allows you to identify strengths and weaknesses, and therefore - to set goals for the employee's development. Reverse mentoring (Unilever) is also used in training. Changes are also taking place in performance evaluation processes (PD@GE application, Ongoing Feedback 360+, Impraise, DevelopMe). In addition,



modern technologies allow predicting employee turnover, for example, GE can predict the probability of leaving an employee 6 months in advance and react in time by retaining the employee.

Employees are also an important aspect of change management, as technology implementation is often met with resistance from employees. Therefore, it is important to consider change management in digital transformations from the perspective of employee management. There are 6 layers of resistance to change: from employee disagreement with the fact that something needs to be changed to agreement with the need for change, but reluctance to do anything. The problem is that the manager needs to manage the change process, maintain the functioning of the old systems until the new systems are put into operation. Therefore, within the framework of this issue, it is necessary to consider typical mistakes in change management, such as, for example, a formal expression of interest on the part of the management, maintaining the ability to return to the previous state of the organization.

In the conditions of digitalization, the creation of the position of director of digital technologies / chief digital officer - Chief Digital Officer (CDO) becomes an important task of strategic managers. Therefore, as part of the last question of the topic, the specifics of such a position should be considered.

Deloitte has identified three types of CDO [20]:

- Ex-agency – digital marketing and interaction with the customer;
- Digital transformation strategists – agents of change and rethinking of their organization (in industries where digital transformation has already begun: media, entertainment, education);
- Technologists – those who consider digitalization to be the primary task of the organization.

When implementing digital technologies and searching for suitable specialists, the question of distinguishing the functions of the director of digital technologies (CDO) and the director of information technologies (CIO - Chief Information Officer) often arises. The answer may be this.

Chief Digital Officer (CDO) [20]:

1) is responsible for digital transformation: his key task is the transformation of the firm itself, but the CDO is primarily focused on the firm's front office, collecting and analyzing client data, digitizing the firm's existing services or creating new ones in the "Digital" format;

2) is obliged to develop a strategy and a detailed plan of action regarding the transfer of the company's business processes, products and services into a digital format, with the possibility of providing services to clients in a digital form;

3) must have experience in the field of Internet marketing, social media, e-commerce, transactional business, digital sales channels, as well as know the possibilities of digital transformation technologies, digital strategies and business models built on digital technologies.

## **Topic 8. Assessment of the enterprise's readiness for digital transformation**

### *Topic questions:*

- 8.1. Approaches to assessment of readiness.
- 8.2. Enterprise architecture and management system.
- 8.3. Determination of maturity of business processes.
- 8.4. Digital culture of the company.

### *Methodical tips for studying the topic:*

The first issue of the topic is to consider the approaches to readiness for the digital transformation of enterprises. Ukrainian industry does not demonstrate high rates of implementation of Industry 4.0 technologies, some enterprises have not yet completed the transition to Industry 3.0. At the same time, to remain competitive, they need to make a digital leap from Industry 3.0 to Industry 4.0.

The transformation can be carried out in an evolutionary or revolutionary way, in order to choose the optimal method, it is necessary to understand the current level of digital maturity of the enterprise.

Digital maturity defines:

- readiness (organizational and strategic) of the enterprise for digital transformation;
- the level / intensity of the implementation of digital technologies in practical activities, as well as the depth of changes in the production process, in the structure and content of the business model.

Among the approaches to the assessment of readiness for digital transformation, one can highlight the approaches proposed by consulting companies, the approaches of IT companies, and the approaches of the academic community.

Among the approaches of consulting companies, we can distinguish:

- The MIT Center for Digital Business and Capgemini Consulting evaluated three areas of digital transformation: Transforming Customer Experience, Transforming Operational Processes, and Transforming Business Models. According to their approach, all companies are divided into newcomers, digital trendsetters, conservatives and digital intellectuals;
- Deloitte's Digital Maturity Model covers digital capabilities from 5 key dimensions: consumers, strategy, technology, production, organization structure and culture;
- Digital Transformation Index of the analytical agency Arthur D. Little, evaluates the following areas: strategy and management; products and services; customer management; operations and supply chains; corporate services and control; Information Technology; workplace and culture;
- The Digital Business Aptitude by KPMG. Includes the following areas: vision and strategy, digital talent, key digital processes, agile sourcing and technology, leadership;
- Digitization Piano, proposed by the Global Center for Digital Business Transformation. Evaluates 7 categories that constitute the main elements of an organization's value chain: business model, organizational structure, employees, processes, IT capabilities, offerings, interaction model.

The academic community offers the following approaches:

- Industry 4.0 Maturity Model [31];

- Digital READiness Assessment Maturity model (DREAMY) [32];
- Digital Services Capability Model [33];
- Organizations digital readiness framework [34].

To optimize the company's activity, it is first of all to describe it. If business processes are modeled, then for the company as a whole, the enterprise architecture is formed. Therefore, the second question of the topic should consider the essence of the enterprise architecture and management system.

Enterprise architecture (EA) is an approach to standardizing and organizing IT infrastructure in accordance with business goals. It includes support for digital transformation, development and modernization of the IT department. EA is based on the business requirements (needs) of the organization. It helps define how information, business and technology interact with each other. The EA approach is based on a "comprehensive picture of the entire enterprise from the point of view of its owner" [35].

Methodologies (frameworks) for enterprise architecture are [35]:

- TOGAF
- Zachman Framework
- FEAF (Federal Enterprise Architecture Framework)
- Gartner

When preparing for the transformation, it is also worth considering the readiness of the management system. The main readiness criteria can be called: consistency of management at the level of goals, tasks and plans; high quality feedback in the management system; change management effectiveness.

In the above-considered approaches to assessing readiness for digital transformation, the following characteristics are attributed to the management system: vision and strategy, goal setting, digital strategy, understanding of leadership, implementation of strategies, involvement of IT and business management in digital decision-making, regulation of policies and processes, etc. associated with the transformation, a dedicated organizational unit responsible for digitalization, risk management.

As part of the third question, it is worth considering the level of readiness (maturity) of business processes for digital changes, since business processes are an important element of it. The main criteria for the readiness of business processes for changes from the point of view of digitalization can be called: automation of business processes, standardization of business processes, integration of business processes, measurement of business processes.

There are also models in the field of process management. These include [36]:

- Michael Hammer's PEMM model. The PEMM model has four maturity levels: from "just getting started" to "best in class";
- Infrastructure Optimization Model, IOM, which is based on the maturity models of companies developed by the Gartner Group (Infrastructure Maturity Model) and MTI (Architecture Maturity Model). The model contains nine criteria: 1) omnichannel level in working with consumers; 2) development of the channels themselves; 3) degree of use of new business models; 4) degree of change in value chains; 5) degree of creation of new values with the help of digital resources; 6) the degree of significance of these values for the enterprise; 7) degree of IT support; 8) the ability and readiness of the organization to conduct digital business; 9) the priority of digitization in the company's strategy;
- Capability Maturity Model Integration (CMMI Software Engineering Institute, Carnegie Mellon University). According to the CMMI model, business processes can have the following levels of maturity: initial, iterative, standardized, managed, optimized;
- the Process Capability Model, based on the international standard ISO/IEC 15504 Software Engineering – Process Assessment in the Cobit 5 standard. According to the PCM model, business processes can have the following levels of maturity: non-existent, initial, repeatable, controlled, defined (certain level), optimized;
- the IPMA Delta (International Project Management Association) model has 5 maturity levels: initial, defined, standardized, managed, optimized.

The last question should be considered the essence of the company's digital culture. Digital culture is a set of principles and values in corporate culture that

characterizes the use of technologies for interaction with society and solving tasks in professional activities [37].

10 principles for the formation of digital culture [37]:

1. Customer orientation.
2. Value approach.
3. Work on the basis of data.
4. Openness to radical changes.
5. TL-approach (test and learn).
6. Dynamics of decision-making.
7. Expand rights and opportunities for employees.
8. Openness.
9. Collaboration.
10. Formation of the ecosystem.

## **THEME OF PRACTICAL LESSONS**

Practical classes correspond to the thematic program of the discipline and cover the consideration of issues raised in lectures and for independent work of students. The purpose of practical classes is to check the level of students' assimilation of the material, their understanding and the ability to use the acquired theoretical knowledge in modeling possible practical situations. They are conducted in the form of surveys, express tests, case discussions, and presentations.

### **Topic 1. Digital economy and transition to digital business**

#### **Practical lesson 1-2**

Questions for discussion:

- 1.1. What factors influence the digitalization of the economy?
- 1.2. What is the role of enterprises in digitalization of the economy?
- 1.3. What is the state's role in the digitalization of Ukrainian enterprises?
- 1.4. What trends are observed in the digitalization of industrial enterprises?
- 1.5. What are industrial revolutions?
- 1.6. To which of the industrial revolutions can Ukrainian enterprises be classified and why?
- 1.7. Can we say that the digital economy is replacing the real economy? Explain the answer.
- 1.8. Are the concepts of informatization and digitization the same?
- 1.9. Does digitalization of the economy carry threats and what are they?

Task 1 (work in groups). Place the industrial enterprises of Ukraine on the graph of technological structures. Make reports in groups, explain your decisions, draw conclusions.

### **Topic 2. Digital technologies of Industry 4.0 as a basis for developing digital strategies of industrial enterprises**

#### **Practical lesson 3-5**

Questions for discussion:

2.1. How the Internet of Things is used by industrial enterprises. Are there threats to using the technology?

2.2. How clouds are used by industrial enterprises. Are there threats to using the technology?

2.3. What are the characteristics of Big Data compared to ordinary data?

2.4. VR/AR in business and industry. What is the difference in technology (give examples)?

2.5. Digital leap on the example of an enterprise. What technologies are needed?

2.6. Directions and risks of using artificial intelligence for industrial enterprises.

2.7. What is cyber security? How to ensure digital security at an industrial enterprise?

2.8. What other technologies can be attributed to Industry 4.0, what are the possible directions of their use?

2.9. Is digitization always connected with going online? Explain your point.

Case 1. Digital transformation of Ukrainian enterprises: DTEK and MODUS, Darnytsia, Kernel, BKW Group, Ukrnafta, Metinvest Digital, Farmak.

Task 1. Practical examples of the use of Industry 4.0 technologies - Ukrainian and world experience. Prepare presentation reports. Discussion.

### **Topic 3. Digital industry and digitalization of industrial enterprises**

#### **Practical lesson 6-7**

Questions for discussion:

3.1. Which of the technological trends in the field of digital transformation of industry are characteristic of Ukrainian industrial enterprises?

3.2. Virtual factory, smart factory, digital factory - explain the difference.

3.3. Conditions for successful implementation of joint innovations.

3.4. The role of the consumer in open innovation.

3.5. Advantages and risks of digitization of industrial enterprises.

3.6. Give examples of new production technologies.



3.7. Common and distinctive features of digital initiatives in Ukraine and the world.

Case 1. Siemens Smart Factory and Samsung's problem with the Galaxy Note 7 phone.

Case 2. Open innovation - NASA, "crowd knowledge".

#### **Topic 4. Digital strategies of enterprises and rethinking of business. A place of digital transformation**

##### **Practical lesson 8-10**

Questions for discussion:

4.1. How digitalization changes marketing strategies, interaction with consumers; competitive strategies; personnel strategies?

4.2. In which cases is it better to use an engagement strategy and in which cases is it better to use a digital solutions strategy? Explain the examples of Kaiser Permanente and Schindler Group.

4.3. In which cases should the digitalization strategy be developed as a corporate strategy, in which cases as a functional strategy, and in which cases as a business direction?

4.4. What elements of the business model change with digitization in the first place?

4.5. What is the role of traditional (rather than breakthrough) technologies in the development of a digital strategy?

4.6. What are the differences between digital and non-digital strategy development?

4.7. How can you add value to traditional products with the help of digital technologies? How does it change internal business processes? Give examples.

Case 1. Changing the field of activity with the help of digital technologies. John Deere, BMW (BMW DriveNow), Nike, GE, The Weather Channel Company.

Task 1. Choose an industrial enterprise, analyze the level of its digitalization. Offer technologies that will make it possible to change 1) methods of communication

with the client; 2) creation of product value; 3) business model; 4) internal business processes of the enterprise. Which of the ways should be used and why?

Task 2. For the enterprise from task 1, propose new ways of creating value according to the model of one product, a chain of customers - network effects, a closed circle; one product, one customer – traditional strategy, cheaper or better products; chain of customers, chain of goods - network effects and additions; chain of goods, one customer – addition, razor strategy.

Task 3. For the same enterprise, propose a journey map of a typical customer and find points where his decision can be influenced. Determine how this can be done.

Task 4. Develop proposals for changing the business model based on platformization or ecosystem formation.

Task 5. Draw a pyramid of digital transformation for the chosen enterprise.

In practical lesson 10, part 1 of the modular control work is conducted.

## **Topic 5. Digital transformation of an industrial enterprise as an element of corporate strategy**

### **Practical lesson 11-12**

Questions for discussion:

5.1. Which path of transformation, gradual or jump-like, is relevant for Ukrainian industrial enterprises and why? In which case should a gradual path be used, and in which – a revolutionary one?

5.2. What is the difference between digital and online strategies?

5.3. What level of digital strategy is most effective and why?

5.4. Give examples of companies that are digital from birth.

5.5. What are digital assets? Give examples.

Task 1. Choose an industrial enterprise. Analyze the level of its digitalization - the number and type of digital technologies, find "bottlenecks". Establish digitalization goals and propose technology that will enable increased efficiency. Calculate the performance indicators of technology implementation. Draw conclusions about its

feasibility. Answer the question - are such changes a digital transformation, explain the answer.

Task 2. Work in groups. One group offers a certain enterprise to another, the other determines what digital assets this enterprise has and how it can benefit from these assets.

## **Topic 6. Business processes in digital transformations of industrial enterprises**

### **Practical lesson 13-14**

Questions for discussion:

- 6.1. How are business processes changing under the influence of digitalization?
- 6.2. What is the role of business processes in the development of a digital strategy?
- 6.3. Are the concepts of automation and digitization of business processes identical?
- 6.4. For which enterprises, which methods of business process automation are better to use (insourcing: purchasing software licenses from a service automation provider; internal contracting and consulting: purchasing licenses directly from a service automation provider and engaging a consulting firm for installation, configuration, and service ; using the services of a traditional BPO provider: purchasing a service automation service as part of a set of integrated services provided by a traditional BPO provider; outsourcing with the participation of a new provider: purchasing services from a new outsourcing provider specializing in service automation; cloud sourcing : purchase of service automation services as a cloud service)?
- 6.5. What are the advantages of network management and the formation of intercompany networks? What is the complexity of such management? How does modern ICT facilitate it?

Task 1. Choose an industrial enterprise and display its main business processes, as well as the root model of business processes. Determine which business processes

can be automated and which can be digitized. How will it affect the company's activities?

Task 2. Display the IT infrastructure of the same enterprise.

## **Topic 7. Personnel issues in the development of digital strategies of enterprises**

### **Practical lesson 15-16**

Questions for discussion:

7.1. How have key competencies changed over the past 10 years?

7.2. What key competencies are in demand by Ukrainian industrial enterprises?

7.3. If you were a recruiter for a wood products company, what competencies would you look for when hiring a department manager, laborer, or sales manager? How would these requirements change (and would they change) when hiring for the same positions for a precision equipment company?

7.4. What problems may arise for the manager when managing changes in the digitalization of the production enterprise?

7.5. Analyze the possibility of applying the technologies of recruitment and personnel evaluation mentioned in the lecture for Ukrainian industrial enterprises.

Task 1. Analyze your own key competencies and their relevance to the digital economy.

## **Topic 8. Assessment of the enterprise's readiness for digital transformation Practical lesson 17.**

Questions for discussion:

8.1. What is the readiness of Ukrainian industrial enterprises for transformation?

8.2. Are there digirate enterprises in Ukraine? What were the prerequisites for their creation?

8.3. Is there a connection between the positions of Ukraine in digital ratings and the readiness of industrial enterprises for transformation?

8.4. Based on the previously analyzed data on the use of modern ICT, explain the readiness of enterprises for digital transformation.

8.5. Are the interests of management and individual departments always aligned in matters of digitalization?

8.6. Is there a digital culture at industrial enterprises of Ukraine?

8.7. What is the role of management in shaping the digital culture of the enterprise?

Task 1. Using any approach to assessing the readiness of an enterprise for digital transformation, assess the readiness of the selected enterprise.

Task 2. Describe the business processes of the enterprise. Determine the level of readiness of business processes for changes. To highlight those business processes that can slow down digital transformation and offer ways to optimize them.

In practical lesson 17, part 2 of the modular control work is conducted.

**Practical lesson 18.** Credit

## **INDEPENDENT WORK OF STUDENTS**

### **Questions and tasks for independent study of topics of the discipline**

#### **Topic 1.**

- 1.1. Industrial revolutions as stages in the formation of the digital economy
- 1.2. National digitalization programs and strategies
- 1.3. Ukraine in "digital" indexes and ratings

#### **Topic 2.**

- 2.1. Prospects for the development of IoT technologies
- 2.2. Artificial intelligence and machine learning in business
- 2.3. Virtual and augmented reality (VR/AR) in business.
- 2.4. Cyber security in the conditions of digitalization.
- 2.5. Digital security of industrial enterprises.

**Topic 3.**

- 3.1. Digital initiatives (strategies and programs) - Ukraine and the EU
- 3.2. Advantages and risks of digitization of industrial enterprises
- 3.3. Digital convergence.

**Topic 4.**

- 4.1. Modern business models. Digital business models.
- 4.2. Examples of successful platformization in Ukraine.
- 4.3. Assessing customer value in a digital environment.
- 4.4. The role of data in the development of digital strategies.

**Topic 5.**

- 5.1. Impact of COVID-19 on digitalization of industrial enterprises and change of strategies
- 5.2. Experience of digital transformation of Ukrainian industrial enterprises.

**Topic 6.**

- 6.1. IT outsourcing - essence and role.
- 6.2. Prospects for the development of IT outsourcing in Ukraine and Europe

**Topic 7.**

- 7.1. The concept of digital development of Ukraine
- 7.2. Changes in personnel training for digital transformation.

**Topic 8.**

- 8.1. Use of modern ICT by enterprises of Ukraine (statistics).
- 8.2. Digital Civility Index.

## **Test tasks for self-testing of knowledge**

1. The use of CRM systems for production management refers to

- a) digitization
- b) digitalization
- c) digital transformation

2. Choose the correct statement

- a) Digitalization is purely the introduction of digital technology.
- b) Digitalization is the implementation of digital technology with a corresponding change in the organizational structure, business processes, etc.
- c) Digitalization does not affect either business processes or organizational structure, it involves the improvement of a separate production process.

3. The e-commerce is...

- a) the entire digital economy
- b) a segment of the digital economy
- c) does not correlate in any way with the digital economy

4. It is NOT a feature of the digital economy

- a) focus on the service sector
- b) availability of mathematical models of all economic objects
- c) interconnection of objects via the Internet

5. Philips' approach, which assumes that the consumer pays for the burning time of the lamp, not the lamp itself, is a transformation

- a) value chain
- b) method of communication with the client
- c) business process

6. Connecting all objects using sensors into a system where they can exchange data and transmit information is

- a) Cloud data
- b) Blockchain
- c) Internet of things
- d) Digital twins
- e) There is no correct answer

7. Using a ready-made software solution in the cloud is

- a) SaaS
- b) IaaS
- c) PaaS

8. Big Data and cloud technologies enable

- a) store data separately, get access from any point
- b) process and analyze data
- c) to connect machine learning
- d) correct answers are 1 and 2
- e) all answers are correct

9. Choose the conditions that allow data to be classified as Big Data (5 conditions)

- a) volume
- b) velocity
- c) complexity
- d) variety
- e) stackability
- f) veracity
- g) variability
- h) value



10. The virtual factory differs in that

- a) Does not provide for the presence of physical production
- b) It bases its activities on the basis of the use of virtual planning and development with the help of digital doubles
- c) Includes suppliers in the network and uses automated enterprise management systems

11. Open innovation involves

- a) Involvement of specialized specialists to solve a production problem or task
- b) Involvement of outsiders (sometimes from other fields) to solve a production problem or task
- c) Use of publicly available developments (open patents, etc.)

12. The digital transformation of business is characterized by

- a) exit of competition outside the industry
- b) basing activity exclusively in virtual space
- c) a complete change in the field of business

13. The purpose of creating an ecosystem is

- a) expansion of own influence on the market
- b) effective struggle with competitors
- c) maintenance of the consumer

14. The customer journey map displays

- a) how the user contacts the company
- b) how the user makes a purchase decision
- c) consumer basket of the client

15. Changes in the value chain are NOT included

- a) smart factories
- b) offer of complementary goods

- c) use of open innovation
- d) all answers are correct
- e) there is no correct answer

16. Non-financial evaluation criteria for digital projects include:

- a) NPV
- b) cyber security
- c) level of customer satisfaction
- d) correct answers 1, 2
- e) correct answers 2, 3
- f) all answers are correct

17. Digitalization of business processes is exclusively their automation

- a) Yes
- b) No

18. A network organization involves association

- a) personnel, organizations, resources in a single information field
- b) personnel, resources using online technologies
- c) groups of organizations in a single virtual space
- d) there is no correct answer

19. IT infrastructure includes

- a) only servers, computer devices
- b) hardware, software

20. Where is the content of digital transformation described in the correct order?

- a) digital data, digitization, digitalization, digital economy
- b) digital data, digital infrastructure, digital models, digital economy
- c) digitization, digital infrastructure, digital economy, digital models

21. Digital platform is

- a) software application
- b) information system
- c) business model
- d) set of participants
- e) correct answers 1, 3, 4
- f) correct answers 2, 3, 4
- g) correct answers 1, 2, 3
- h) all answers are correct

22. What types of clouds are emitted?

- a) private, business, public, state
- b) private, public, social, state
- c) private, public, social, hybrid

23. The digital economy is characterized by the fact that

- a) the manufacturer produces products, the buyer chooses from the available ones
- b) producer and consumer agree on production
- c) the consumer is a participant in the creation of consumer value

24. In network management

- a) all objects are equal
- b) there is legal subordination
- c) there is no legal, but there is organizational subordination

25. The ideologist in network management is

- a) the one who determines the parameters of subordination
- b) the one who forms the network system
- c) the one who forms the concept of interaction

26. The transition to digital management is NOT based on

- a) optimization of business processes at all levels
- b) automation of business processes
- c) robotization of business processes
- d) improvement of the IT infrastructure

27. This is essentially a technological singularity

- a) acceleration of technological progress
- b) constant technological development
- c) technological revolutions

28. What is not included in the competencies of the 21st century?

- a) deep knowledge of the specialty
- b) scientific literacy
- c) initiative
- d) creativity
- e) cooperation

29. Professional skills are

- a) Soft skills
- b) Hard skills
- c) Digital skills

30. Obtaining knowledge by specialists about the basics of digitization and digital transformation provides an opportunity

- a) eliminate the digital divide between countries
- b) build strategies based on digital technologies
- c) to quickly spread knowledge about digital technologies
- d) all answers are correct

31. Do NOT belong to digital competences

- a) information skills
- b) skills of working with a large number of documents
- c) collaboration using digital tools
- d) problem solving
- e) there is no correct answer

32. The formation of digital competences is important because

- a) there is a threat of backward development of countries in the digital age
- b) the development of ICT is impossible without the formation of digital literacy in the majority of the population
- c) ICT competences are the basis of all spheres of life

33. Does NOT belong to digital competences

- a) ability to solve software problems
- b) creation of digital content
- c) ability to protect content
- d) there is no correct answer

34. Digital skills are divided into groups:

- a) security, informational, behavioral
- b) technological, informational, behavioral
- c) psychological, emotional, communicative
- d) cognitive, social, technical

35. Digital psychology, design thinking - this

- a) soft skills
- b) hard skills
- c) do not belong to either soft skills or hard skills

36. The use of typical IT solutions to solve problems, the construction of IT infrastructure are part of the competence

- a) Chief Digital Officer
- b) Chief Information Officer

37. The problem of implementing digital changes from a manager's point of view includes

- a) the need to support the functioning of new and old systems at the same time
- b) the ability to quickly remove the old system from circulation

38. The purpose of digital strategy is

- a) aimed at digitization and has goals different from the goals of the business strategy
- b) aimed at the same goals as the business strategy

39. Digitalization strategy and digital transformation strategy is

- a) strategies of the same level
- b) strategies of different levels
- c) it is the same thing

40. Components of a small business digital strategy...

- a) differ from the components for big business
- b) similar to the components for big business

41. A transformation strategy can transform a business model, which means developing new digital products and services

- a) attraction of new customer segments
- b) obtaining new sources of income
- c) exclusively complete transformation of the business model
- d) correct answers 1, 3
- e) correct answers 1, 2

- f) correct answers 1, 2, 3
- g) all answers are correct

42. Using digital assets to maximize business results is

- a) digital strategy
- b) online strategy

43. According to which model is the digital strategy a corporate strategy?

- a) Penetration of digital ideology
- b) Creating a portfolio of digital projects
- c) Creating a business in the digital ecosystem

44. The term "digital native" means

- a) the company is formed according to the platform business model
- b) the company that implemented a portfolio of digital technologies at the initial stage of formation
- c) the company that has started digital transformation at the initial stage of formation

45. Digital assets have

- a) both tangible and intangible form
- b) material form is excluded
- c) exclusively intangible form

46. Instagram user page and content on the page

- a) is a digital asset
- b) is not a digital asset

47. Evaluation of the effectiveness of the digital project is based on

- a) exclusively on financial indicators
- b) exclusively on non-financial indicators
- c) both on financial and non-financial indicators

## **INDIVIDUAL TASK**

The volume of the essay is 15-20 pages, not including the title page, table of contents, and list of used sources.

The introduction indicates the relevance of the chosen topic, the extent of its research; a short list of domestic and foreign scientists researching the topic is provided.

The main part of the essay is divided into points, the number of which is determined based on the volume and structure of the information provided by the student. However, it is not advisable to divide the essay into a large number of points, if their volume is 1-2 pages, and the content does not contain significant conclusions and analysis. The content of the essay is not a simple copying of literary sources, it should contain an analysis and review of theoretical sources, a study of the world's practical experience on this or that issue.

The conclusion should briefly contain the main results obtained by the student. The conclusion is not a compilation of certain provisions of the essay, but is a generalization of the analyzed information.

Requirements for writing an essay.

The essay is prepared in accordance with the general requirements for scientific works according to DSTU 3008:2015 Reports in the field of science and technology. Structure and rules of registration (National Standard of Ukraine).

The text of the essay is typed on a computer, A4 format; interval 1.5; font – Times New Roman; font size – 14; alignment of the text - along the width of the page.

Margins: at least 25 mm on the left, at least 15 mm on the right, top and bottom. Paragraph - 12.5 mm.

The structural elements of the essay must start on a new page. At the top of the page, in the center, the title of the structural part is indicated in bold without a period: Contents, Introduction, Conclusion, List of used sources.

Paragraphs of the essay are numbered with Arabic numerals (1, 2, ...). The name of the new item is given in bold type with one paragraph indentation after the text, alignment - along the width of the page. Do not put a period at the end of the item names. The names of the structural elements of the essay are not numbered.



Pages are numbered through Arabic numerals. The number is placed in the upper right corner of the page without a period. The title page is included in the general numbering, but the number is not placed on it.

If there are tables and figures in the abstract, they are numbered with Arabic numerals (for example, Table 1, Figure 1). The names of figures are capitalized according to the scheme "Figure (number of figure) - (Name of figure)" and placed below the figure with center alignment.

The names of the tables are given with a capital letter according to the scheme "Table (table number) - (Table name)" and are placed above the table with a paragraph indentation [1]. Times New Roman font is used in the table; font size – 12; the interval is 1.15 or 1.0.

If the figures and tables were not created by the author of the essay, when citing them, you must indicate the link to the source.

References to sources are given in square brackets indicating the number of the source (according to the given List of used sources) and page. For example, [5, p. 12] – the text contains information from page 12 of the source listed in the List of used sources under number 5.

Indirect citation should accurately reproduce the opinion of the author and not distort it.

The list of used sources lists literary sources in the order of their use in the text. The bibliographic description is drawn up in accordance with DSTU 8302:2015.

**Approximate list of essay topics:**

1. Smart industry
2. The Internet of Things – history and role in industry.
3. Big data and data analysis
4. Digital platforms: modern examples of successes and failures
5. Cloud tools in organizing the work of the enterprise
6. The problem of training personnel for digital transformation. Foreign and domestic experience.
7. IT outsourcing in Ukraine

8. Ecosystem of digital transformation.
9. Infrastructure of digital transformation.
10. Digital strategies in practice - global and Ukrainian experience.
11. Artificial intelligence and machine learning in industry and business.

Upon agreement with the teacher, the student can choose a different subject of the essay, if it corresponds to the topic of the discipline. The abstract should not be a retelling of the information received by the student while listening to lectures, but should be the result of his independent research and study of the information base.

## **CURRENT AND FINAL CONTROL**

### **Current control of knowledge**

Current control of knowledge takes place in 2 forms:

- answers to practical classes, reports on topics of independent work;
- writing a modular control paper, which consists of two parts.

At practical classes, students answer the teacher's questions, participate in the discussion of problematic issues, make presentations, participate in the discussion of situational tasks and cases.

The control work is designed to check the level of students' assimilation of the lecture material, their understanding and ability to use it when solving tests and practically-oriented questions. The test is performed after studying topic 4 and topic 8. It consists of 10 test questions (0.5 points each question) and 2 theoretical questions, one of which requires an answer with a description of a practical example (each is valued at 5 points). The questions include questions submitted for independent study by students.

### **A list of questions for preparing for modular control work**

1. The essence and features of digital business.
2. The essence and prerequisites of the formation of the digital economy.
3. Factors influencing the digitalization of the economy
4. Digitization, digitalization, digital transformation – transparency and differences.
5. Directions (components) in which business changes under the influence of digital technologies.
6. The essence and differences of the Internet of Things and the Industrial Internet?
7. Levels of clouds.
8. Forms of cloud computing (Saas...).
9. The essence and characteristics of Big Data.
10. Advantages of using big data and big data analytics.
11. Digital twins, levels of digital twins.
12. Virtual and augmented reality - essence and application in industry.

13. Additive manufacturing is the essence of the areas of application in industry.
14. Describe the leading concepts for industrial enterprises.
15. Describe the main technological trends in the field of digital transformation of industry.
16. Virtual factory, digital factory, smart factory – essence, features and difference.
17. The essence and role of joint innovations.
18. What does it mean to "use the knowledge of the crowd"?
19. What is a digital strategy and how does it differ from a firm's strategy?
20. Digital and online strategy.
21. Name the levels of digital strategies.
22. How are corporate and digital strategies related?
23. What are the differences in the development of digital strategies for large and small businesses?
24. What is the essence of strategies of closeness to the consumer, organizational efficiency, the best product?
25. What are the features of business changes under the influence of digitalization?
26. Describe the components of digital transformation strategies.
27. What elements of the business model are affected by digital transformation?
28. Display the digital transformation pyramid.
29. Describe 3 models of digital strategy.
30. The essence of the digital platform. Name its elements.
31. Advantages of platforms from the point of view of industrial enterprises.
32. What are digital assets? What assets do they include?
33. How to evaluate the results of digitization?
34. What is the evolution of management in the digital economy?
35. What is network management? Name the main concepts of network management.
36. Name the principles of building interfirm network relations.
37. Stages of digital transformation based on the Deming-Schuhart cycle.
38. Name the elements of transition to digital management.
39. The essence and role of IT outsourcing.

40. Name the features of personnel training in the conditions of digitalization of the economy?
41. Name the key competencies in the digital economy.
42. What are digital competences?
43. What are digital skills?
44. Change management in digital transformation from a manager's point of view.
45. What is the difference between CIO – Chief Information Officer and CDO – Chief Digital Officer?
46. The essence of digital maturity of the enterprise. The need for evaluation during transformation.
47. What are the areas of readiness for digital transformation?
48. What is IT architecture of the enterprise and what is its role?
49. What is the readiness of the management system for digital transformation?
50. How can the maturity of business processes be assessed?
51. What is the digital culture of the enterprise?

### **Scoring criteria**

The student's rating is formed from:

- answers to questions, participation in the discussion of problematic issues by topic: 5 points – fluency in the material, active participation in the discussion of at least 2/3 of the problematic issues; 4 points – fluency in the material, participation in the discussion of half of the problematic issues; 3 points – partial possession of the material, participation in the discussion of several problematic issues; 2 points – participation in the discussion of several problematic issues; 1 point – supplement on problematic issues;
- presentation reports (2 during the semester) on issues submitted for independent study – a maximum of 10 points per report (20 points per semester);
- modular control work – a maximum of 15 points for one work (30 points during the semester). The student receives 10 points if both questions of the test work

are fully disclosed, examples are given; 8-9 points – if there are inaccuracies in the answers, but practical examples are given; 6–7 points, if the answers are inaccurate and incomplete, but correct, examples are given that do not fully correspond to the questions asked; 4–5 points – if the answers are non-verbal, there are no practical examples; 1–3 points, if the answers contain only some correct elements, practical examples are not given;

- individual task (essay) – a maximum of 15 points.

Students can receive incentive points (no more than 10% of the maximum rating) for writing abstracts (maximum 5 points) or articles (maximum 10 points) on one of the topics of the discipline, if they are at least submitted for publication.

There are no penalty points.

A student receives a positive intermediate certification on the condition that he/she scores at least 20 points for the first intermediate certification and at least 45 points for the second intermediate certification.

### **Final control of students' knowledge**

The final control of knowledge has the form of a credit. The student's grade point average, which he received during the semester, makes up his grade point average, which is 100 points. The student's rating consists of the points he received during practical classes and writing 2 modular control works.

A student who scored at least 60 points receives a positive credit score in accordance with the scored rating without additional tests.

Otherwise, the student writes a final test.

Admission to the test is possible if the student receives at least 25 points.

The final test includes 4 theoretical questions from a list that covers all topics of the discipline, as well as 1 task from those provided for by practical tasks. Theoretical questions are valued at 10 points each; practical task – 20 points. Thus, the student receives 60 points for the test.

Evaluation criteria of the credit control work:

- 55-60 points – the answers are correct and complete, the practical task is described in detail and correctly; small errors may be allowed;
- 45-55 points – the answers are complete and correct, the practical task is completed at a sufficient level and reflects the situation;
- 35-44 points – the answers are correct, but not detailed, may be inaccurate, the practical task is completed enough to understand the answer, but not detailed;
- 25-34 points – the answers contain errors, there are answers to not all questions, the practical task contains a short answer;
- 15-24 points – the practical task is not completed, the answers to the questions are incomplete and inaccurate or there are answers to not all questions;
- 1-14 points – partial and partially correct answers to theoretical questions, practical task not completed;
- 0 points – no answers.

The maximum score for the course is 100 points.

Table of correspondence between rating points and grades

<i>Number of points</i>	<i>Grade</i>
100-95	Excellent
94-85	Very good
84-75	Good
74-65	Satisfactory
64-60	Sufficiently
Less than 60	Unsatisfactory
Admission conditions are not met	Not admitted

## EDUCATIONAL AND METHODOLOGICAL MATERIALS

### Basic literature:

1. Schwerdt, B. (2018). How to build an online business: Australia's top digital disruptors reveal their secrets for launching and growing an online business. John Wiley & Sons. 296 P.
2. Gupta, S. (2018). Driving digital strategy: A guide to reimagining your business. Harvard Business Press. 266 P.

### Additional literature:

1. Fox, V. (2012). Marketing in the age of Google: Your online strategy is your business strategy. John Wiley & Sons. 256 P.
2. Rogers, D. L. (2016). The digital transformation playbook: Rethink your business for the digital age. Columbia University Press. 298 P.
3. Sacolick, I. (2017). Driving Digital: The Leader's Guide to Business Transformation Through Technology. Amacom. 305 P.
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