Digital Transformation of Business Processes of Enterprises on the Way to Becoming Industry 5.0 in the Gig Economy

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Abstract: - The purpose of scientific research is discovering the stages, protocols, ways and instruments of becoming the Industry 5.0 through the prism of innovation, technology in management of industry and business, and introducing the features that define the new quality of smart industry, smart business, and smart services among which modularity, interoperability, virtual reality. The rapid emergence of the Industry 5.0 declares new quality of economic relations through innovation, discoveries and technologies in management of industry and business. Key features of the Industry 5.0 include: full automation of the production process; high communication between staff and machine through Internet technologies; cyber-physical systems that integrate into one network, interact in real-time, self-tune, self-study. The structural elements of the ecosystem of Industry 5.0 are presented, and it is proved that they determine an effective digital economic relation that shapes the gig-economy, as a result of step-by-step content of the stages of becoming a smart business, assets, and digital platforms. Tools and mechanisms that will accelerate the emergence of the Industry 5.0 have been identified. The content of the concept "ecosystem of the Industry 5.0" is disclosed. A number of practical measures are proposed, aimed at deepening the development of high-tech industries and expanding the new quality of life of people. The main characteristics that determine the emergence of smart industry and smart services are indicated. The visual section of the structural elements of the Industry 5.0 concept presented in this paper is an attempt to understand the essence of the Industry 5.0 for the reason that it differs significantly from the theory in its incompleteness and lack of verification. The value of the presented research is that the understanding of the Industry 5.0 content is through the prism of its structural elements in the conditions of virtual reality and the functioning of Industry exclusively within the 7th technological system. In order to use

all the power of available information technology, authors propose to abandon old processes, rethink the content of work, radically restructure processes and give businesses a new format of cooperation. This requires ensuring the variability, dynamism and adaptability of economic development processes based on digital context. Development of production processes in terms of their digitalization and innovation of the economy is proposed to be divided into stages of standardization, adaptability and predictability, which will allow for consistent digital transformation, which opens fundamentally new opportunities for added value in almost all sectors of the economy.

Key-Words: - Industry 5.0, digital economy, innovation, gig-economy, digital business, innovative technologies.

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1 Introduction

The issue of accelerated formation and development of the Industry 5.0 is an important world-class problem, the relevance of which is growing in the context of new digital solutions, the growth of virtual mobility and global socialization. In the context of rapid institutional change and technological structure, developments of only digital experience with clients or the digitization of business operating models is no longer sufficient. It is necessary to be prepared to disrupt the established business model, change the market, and rethink product lines and service models. The Industry 5.0 that provides not only the introduction of innovations, but also the change in business processes, the creation of a modern IT infrastructure, the development of corporate culture aimed at encouraging employee participation in generating new ideas for the development of innovative business and increasing the level of customer service efficiency.

We share the opinion of Jack Ma Yun, a co-founder of Alibaba Group, claiming that the key to future business success lies in:

- Making society, customers and employees happy;
- Investing in people working for the company because they believe in its success;
- Investing in small businesses and the private sector, develop and protect entrepreneurs;
- Being not afraid of artificial intelligence, because robots will never replace humans as they do not have a heart and self-confidence. It is creativity, innovation and critical thinking that makes human beings different from machines;
- A teacher should believe that his student will succeed and devote more time to him unleashing his potential. It is worth appreciating good teachers and becoming even better for our future learners;
- Learning from real business, from mistakes done in it, which forms high-quality knowledge that needs to be applied;
- Thinking about how communications and advertising of the future will help their clients;
- Working in various industries and constantly learning.

The digital space, constant and accelerated changes and the pace of development of innovations lead to constant systemic and complex modernization. Instruments, mechanisms and theories that worked qualitatively in such a relatively stable world cannot be combined with new development institutions, and their behavior is unpredictable. This creates a need to study the traditional concept of competition that has dominated business research for the past decade. But times have changed, and old theories do not always work in practice, as entrepreneurship has become digital, commerce has become electronic.

2 Problem Formulation

2.1 Literature Review

M. Porter's world-famous model of the five forces of competition that used to dominate in the world of strategic thinking for a long time, but the digital transformation of business has changed the situation. According to this model, the strategic position of a particular business is influenced by the following threats: the threat of appearance on the market of substitute products; the threat of the emergence of new market players; the threat of market power of consumers; the threat of market power of suppliers; the level of competition in the industry.

The goal of the strategy itself is to put under control these five threats and thus keep the business secure. However, this model does not work in the digital space. Let's take as example, platforms as

one of the common business models for the digital economy. The main players in digital platforms are consumers, manufacturers and business partners. On these platforms, high-quality and effective interaction has the greatest value for consumers and manufacturers. The digital platform itself is designed to maximize this value and reduce risks. In practice, expectations come true in terms of the threat of the emergence of new players and market power of consumers in M. Porter's model, which can fail and cause devastating damage to the digital platform.

Digital platforms, as they develop, form an innovative ecosystem around them, which promotes the platform and is responsible for its revenue side. But in practice, it is not economically profitable when development partners outgrow the development company and "bypass" it, so it is worth strengthening the quality of management. If such a threat exists, then it is worth immediately taking countermeasures, such as the buyback of a block of shares in support of the developers. Therefore, this situation testifies to how the first two conditions are fulfilled in M. Porter's model. In terms of the level of competition as the fifth component in this model, then through the prism of the digital economy, it is dynamic and three-dimensional. "This is due to the fact that the following enter into competition: platforms among themselves, trying to make the transition and interaction more expensive; platform with partners, in order to prevent them from growing the volume of the platform; partners with each other for market share, [10]".

In the digital economy, one more feature can be traced, namely, that competition allows you to significantly increase profits and increase the share of digital business. In the context of the digitalization of the economy and the existing hypercompetition, the proliferation of technological progress, the establishment of the institution of ownership of infrastructure and the uniqueness of resources no longer provide adequate permanent competitive advantages. However, for a platform economy operating on the basis of digitalization, there are such resources available and this is valuable interaction and information. Therefore, such unpredictability in the digital space suggests that as a result of using M. Porter's model for digital business, the outcome can turn both positive and negative.

The number of scientific researches and publications devoted to this problem in the world is growing explosively. Innovative countries are currently developing key signs of the emergence of the Industry 5.0. They are manifested in the transformation of existing business processes under the influence of new technologies and the formation of smart assets, e-services for digital business and e-government, the formation of Education 5.0 and Society 5.0, launching a quality educational and research process in University 5.0. It is digital entrepreneurship in terms of virtual mobility contributes to the rapid development of the concept of the Industry 5.0 in terms of creating qualitatively new business models, logistics, e-commerce, smart manufacturing in gigonomics. This study is performed in the interests of the national security of Ukraine, as evidenced by the provisions of paragraph 51 of the National Security Strategy of Ukraine (Decree of the President of Ukraine from 14.09.2020 № 392) and paragraph 18 of the Economic Security Strategy of Ukraine (corresponding decree from 11.08.2021 №347): "guaranteeing national economic independence and the ability to protect national economic interests, in particular in high-tech sphere". The research presented in the article is interdisciplinary, the results of its implementation have every chance to become relevant for related fields of science.

The following names of such scientists as R. Azum [3], W. Isaacson, [17], D. Lichtblau, [29], T. Stock and G. Seliger [45], E. Schaeffer, [41] are associated with the study of the general aspects of transformational changes and the comprehensive modernization of the economy in the direction of its innovative and digital development. In the course of writing the article, it was the book by Eric Schaeffer, a researcher, "Industry X.0: Realizing Digital Value in Industrial Sectors", [41], which really attracted our scientific attention having become a bestseller in the scientific world. In addition, it clearly demonstrates the powerful impact of the Industrial Internet of Things on manufacturing and explains in detail how to realize the possibilities of technology to increase competitiveness, profits and further the development of business digitization.

Well-known researchers and economists, including H. Androshchuk, K. Alieksieieva [37], Yu. Bazhal and V. Vyshnevskyi [48], V. Vitlinskyi [47], V. Heiets and G. Davtyan [8; 9; 11], Ya. Zhalilo, N. Yehorov, S. Koliadenko, O. Kryvoruchko [24], P. Leonenko [27], V. Liashenko [28], O. Manzhura [32], V. Nekrasov [36], I. Novikova and V. Osetskyi [37], B. Paton [39], M. Slabko [47], S. Shchehliuk [42], O. Yurchak [49] were involved in the formation of digital platforms in the world, the disclosure of the institutional content of their work and the formation

of the Industry 4.0 on the scale of the global system, the innovation of the Ukrainian economy, the possibility of its breakthrough development and the study of the prospects, directions and mechanisms for the development of the smart industry in the era of digitalization.

S. Bespalov, H. Holotsukov, V. Ivlichev, S. Ivanov, M. Pustovoit, I. Malchevskyi, D. Nikolenko, V. Kirsanov, O. Khimich and I. Shchetynin, [19] were engaged in the development and implementation of distributed information technologies related to the processing of documents accompanying the opening, execution, control, accounting, closing of research and development works. But a significant number of problems, such as the formation of digital platforms and in general the formation of a quality the Industry 5.0 in terms of innovation and digitalization of economic relations in the gig-economy, remain insufficiently disclosed.

Kenneth S. Laudon and Jane P. Lodon are scientists and practitioners in the field of information systems, who managed to present systems through a sociotechnical view in the organizational changes of their textbook for teaching information systems management. This view states that "optimal organizational efficiency is achieved by joint optimization of both social and technical systems used in production, [25]". Thus, they argue that system performance is optimized when both technology and organization mutually adapt to each other until a satisfactory match is obtained.

Some aspects of the implementation and operation of smart innovations, the main components of digital infrastructure (applications, data centers, information and communication networks, information collection systems), mastering the technology of the Industry 5.0 and analysis of their potential application are revealed in the works of scientists such as P. Maddikunta, Q. Pham, B. Prabadevi, N. Deepa, K. Dev, T. Gadekallu, M. Liyanage, [30], M. Javaid and A. Haleem (reveal new digital technologies and critical components of the Industry 5.0, point out changes brought by the Industry 5.0 for the economy, determine the factors for successful implementation in the field of production), [18]. Completed scientific and practical work, which examines the practical measures, tools and methods of accelerating the emergence of Industry 5.0 in terms of defining new role of workers, safe and inclusive work environment, attracting and retaining talents that shape Society 5.0 is the work of M. Breque, L. De Nul, A. Petridis, [6].

The use of artificial intelligence and innovation in the age of Internet of Things and the Industry 5.0, the work of digital twins, the efficient use of renewable energy sources is revealed in the works of F. Aslam, W. Aimin, M. Li and K. Rehman, [2], J. Müller, [35].

The problems of transformation of the Industry 4.0 into the Industry 5.0, which go from digital production to Society 5.0, as well as the security of critical infrastructure are revealed in the scientific work of P. Skobelev and S. Borovik, [44]. The role of soft skills in improving the efficiency of companies during the modern digital revolution has been thoroughly revealed by F. Caputo, V. Cillo, E. Candelo and Y. Liu, [7].

Given the existing developments, authors consider it necessary to continue work on some vectors of the research aimed at solving the urgent problem of developing new approaches to the formation of the Industry 5.0 on the basis of digitalization of economic relations in virtual mobility and in the context of global socialization. Results of COVID-19 and economic convergence, congruence and collaboration with the countries of the European Union, in order to ensure national economic security.

2.2 Tasks of the Article

The purpose of the publication is to present the opportunities and threats of the Industry 5.0 concept in the national economy; it has every chance of becoming a decisive step in the implementation of Ukraine's digital development strategy by introducing smart assets, smart services and launching smart business and smart government through the latest technologies that determine a new quality of life for people. Among the tasks that are set in the article are the following: to reasonably reveal the content of possible ways and tools that will accelerate the formation of the Industry 5.0; to present the author's vision of a visual cross-section of the structural elements of the Industry 5.0 concept; propose a protocol for the formation of the Industry 5.0 through the prism of innovations, technologies in industry and business management; explore the taxonomy and categorization of terminology with the help of which it is possible to reveal the formation of the Industry 5.0 and its further development; indicate the main parameters that determine the formation of a smart industry, smart business, smart services, including modularity, time reality, decentralization, interoperability, virtual reality.

2.3 Methodology

Methodological support of the study will be based on a systematic approach, which will justify the necessary transformations of digital economic relations in the transition to the Industry 5.0. On the basis of dialectical and systematic methods, the vectors, priorities and means of formation of the Industry 5.0 will be substantiated, which determines new quality and format of digital business in the conditions of virtual mobility.

It is envisaged to use Sociotechnical systems (STS) as a scientific approach to the design of the labor process in terms of human interaction and technical and technological factors of labor in the formation of the Industry 5.0. In a general sense, the term refers to the study of the interaction of infrastructural elements of society, substantive realizations of society, on the one hand, and human behavior – on the other hand. It is the scientific approach of STS that makes it possible to reveal society, social institutions and their substructures as complex socio-technical systems. The term "sociotechnical systems" was coined by Eric Trist, Ken Bamfort, and Fred Emery during World War II, based on their work with English coal miners at the Tavistock Institute in London, [5].

Sociotechnical systems relate to the theory of social aspects of people and society and technical aspects of organizational structure and processes. In this sense, when we talk about technical aspects, we do not necessarily mean material technology. The focus is on procedures and related knowledge, i.e. the ancient Greek term "techne". "Technical" is a term used to describe the structure and broader meaning of technical subtleties. Sociotechnical refers to the relationship of social and technical aspects of the organization or society as a whole, [4; 40].

The use of synergetic and evolutionary methods is expected in the development and disclosure of tools and mechanisms that will accelerate the formation of the Industry 5.0; the content of the concepts "the Industry 5.0", "gig-economy", "7th technological way"; a series of practical measures aimed at the in-depth development of high-tech industries and the expansion of a new quality of life; main characteristics that determine the protocol of formation of the Industry 5.0 through the prism of innovation, technology in industry and business management.

Methodological approaches to assessing domestic competitiveness of digital products / services in the global market will be developed by presenting the content of the work of Ukrainian companies whose activities have the characteristics of the Industry 4.0. The development of new tools should be an important element in improving the strategic planning of virtual economy on the basis of the Industry 4.0 and the Industry 5.0 and will improve approaches to the new quality of digital policy of the Government of Ukraine in digitalization of business in the long run.

During the writing of the article general and special research methods were used, namely methods of deduction and induction, methods of synthesis and analysis, unity of historical and logical in clarifying the nature and role of the Industry 5.0 in the development of a phased protocol of its formation through the prism of innovation, technology in management of industry and business. Based on dialectical, systemic and matrix methods, the characteristic features and differences between the Industry 4.0 and the Industry 5.0 in virtual reality, which are now becoming a field of practical implementation of economic entities of different sectors of the economy in the course of digitalization.

The method of comparison was used to find out the essence of the latest technologies that determine the new quality of people's lives. The method of grouping and generalization is applied at studying the successful experience of functioning and development of Ukrainian companies whose activity has all signs of the Industry 4.0. The process and system approach were used in formulating practical recommendations for developing ways and tools to accelerate the emergence of the Industry 5.0, as well as implementing a number of steps in the context of the Industry 5.0, which is a high-tech industry and the driving force and engine of economic growth of innovatively developed countries.

3 Problem Solution

3.1 The Latest Technologies of Modern Society

In the rating of innovative economies 2020 by the Bloomberg agency, Ukraine lost 3 positions and took 56th place out of 60 possible. For the ranking, Bloomberg analyzes 60 economies of countries, among which are mainly representatives of Europe, North America and Asia. The rating was topped by Germany (88.21 points), which moved the South Korea for the first time in during 6 years. South Korea and Singapore are in second and third places respectively. Switzerland and Sweden are closing in the Top-5. The Top-10 includes Israel, Finland, Denmark, the USA and France. Japan lost 3

positions and took 12th place. China is in 15th place (+1 position). The Russian Federation in the ranking of 2020 is in 26th place (adding one position), Poland – 25 (-3 positions), [46].

The rating of innovative economies is calculated on the basis of information on the intensity of research and development, the production of innovative services and goods, labor productivity, patent activity and other indicators. The index also takes into account the quality of education and the concentration of high-tech companies in the country, [34]. The result of Ukraine in 2019 worsened due to the low level of education efficiency and the number of scientists, and in addition, there is a low level of use of high technologies and the number of registered patents.

The Deloitte's study, "Forecasting the Development of High-Tech, Media and Telecommunications" has identified five key technologies that could dramatically change people's lives already in 2020. A brief summary of them has been presented in Table 1.

Table 1. The latest Technologies Defining a New Quality of Life for People

The latest technology/ product/ service	*Characteristic content features, new opportunities that open up as a result of the application of technology, obtaining service, use of a product*
Autonomous artificial intelligence (AI) in a smartphone	"Neural processor" (edge AI) is a chip designed to process information using AI directly on the device, without a "cloud" connection. Nowadays, in every smartphone, i-pad, TV, smartwatch, fitness tracker, wireless headphones, AI will work without an Internet connection. That is, we are talking about autonomous AI. Face recognition on the smartphone screen while taking a photo, biometric access to the gadget, image filters, voice recognition, language translation, voice assistance, virtual reality, applying 3D effects, hiding wrinkles, incredible photos in low light conditions – all this works on the basis of machine learning technology. These technologies operate on the power of a conventional processor or in the "cloud" using an Internet connection. However, when they run an AI neural processor, they will run faster and use less power, increasing battery life. It is better to store and process the user's personal information on devices in terms of privacy and security. Personal information that is always on the phone cannot be intercepted or used improperly. When the phone has an AI chip, it can do all these things without connection to the network.
Professional robot assistants	Unlike industrial robots, professional robots are used outside of production. They usually help people, not replace them. Professional robots are most popular in retail, hotel business, healthcare and logistics. Some of them are used in space and defense, agriculture and construction. There is also a class of robots for end-users. They are designed for home cleaning, lawn maintenance and window cleaning. The price, power and flexibility of robots are driven by the advancement of 5G and AI chips. An archetypal industrial robot is a mechanical arm with varying levels of freeness and flexibility found in factories around the world. The largest users of industrial robots are automobile manufacturers, electrical and electronic products, metal, plastics, chemicals, food products and drinks.
Available satellite Internet	Satellite broadband can provide high-speed Internet for people outside the reach of cell towers or high-speed lines. The world is expected to receive social and economic dividends that benefit entrepreneurs, hospitals, schools and governments.
The rise of audiobooks and podcasts	Podcasting is an audio or video broadcast on the Internet in the style of radio and television programs on a specific topic and with a specific broadcast frequency. Market growth of audiobooks and podcasts shows that they are characterized by crisp sound.
Cycling technology revolution	As a result of the growth in cycling, a number of technological innovations are also increasing, such as: predictive analytics, mobile applications, wireless communications, digital urban planning tools, 3D printing, electrification. These innovations make the bicycle safer, faster, more comfortable and provide accurate speed and route information. The bike becomes more attractive to use. The growing use of city bicycles can bring significant positive social changes: reducing traffic, reducing nature pollution, reducing load on public transport systems, and improving health. Due to improvements in lithium-ion battery technology, lower prices and increasing production capacity the electric bike market is growing rapidly. More than 130 million of them are expected to be sold during 2020-2023.

Source: Compiled by the authors based on [36; 23; 12]

In a digital environment, one of the main strategic advantages is technology, so a company can be successful or even a monopoly until another company creates a new technology that is superior to it. And most importantly, collaborative interaction with all participants in the digital environment, based on the institution of trust. For these reasons, the participants of the digital platform, if they see the technology, are interested in the market, then willingly cooperate with the companies that own it. Main participants in digital platforms are: the platform itself, manufacturers, users, terminals. The platforms are entrusted with the right to establish rules and ensure transactions between manufacturers and the users who are connected to the platform through terminals (smartphones, computers, etc.). The goal of the digital platform is to create value for all parties and maximize profitability.

A striking example demonstrating the work of a digital platform is the experience of Huawei: entering the Huawei market, it did not create a new mobile platform, there was no need, it was the experience of Microsoft. Therefore, Huawei as a terminal has connected to the Android platform, playing by the rules of the digital environment. But the US sanctions and Google's actions have violated one of the main pillars of cooperation, namely, trust. And this left an imprint not only on Huawei, but on the available other terminals (for example, Samsung, Xiaomi, etc.). The solution to the problem and the preservation of Huawei's strategic superiority lies in the creation of its Harmony OS operating system. Therefore, if Huawei manages to turn it into a full-fledged platform, comprehensively enforce the rules of cooperation and, at the same time, provide protection from local laws in order not to "fall into the trap" like Google, the company will take possession of a significant share of the smartphone user market, [11].

3.2 Innovative Digital Technologies of the Industry 4.0 and the Industry 5.0

We are convinced that digitalization and innovation of the economy can be realized only through the development and implementation of innovative digital technologies on an ongoing basis, the formation of high-quality legal, organizational, socio-economic and other conditions for the transformation of society and the reincarnation of the traditional economy to a new level of development, namely, the formation of gig-economy, [38]. The gig-economy is a new form of relationship between employer and employee based on the development of technologies and the emergence of new types of economic activity, when the employer does not own the means of production, but becomes the acquirer of intellectual property, due to which service providers are not protected by any mechanisms in front of the owner of the digital platforms and consumers of services, [42].

The emergence of the gig-economy is causing revolutionary changes in literally all spheres of life. We are talking about the creation of qualitatively new models of business, logistics, trade, production. Transformational changes are not bypassed by the education system, health care, and public administration. It can be affirmatively stated that the concept of the gig-economy today defines a new paradigm for the development of the economy, society and the state. We share the scientific views of the Ukrainian professor V. Vitlinskyi, who is convinced that "the basic core of the gig-economy is mobile services that allow workers to interact in the economic field without intermediaries, such as state institutions, institutions of power, etc., [47]".

If we consider the gig economy from the standpoint of sociotechnical systems, it will mean that technology, in terms of its content, should not be a governing factor in the implementation of new operating systems. Therefore, in order to be classified as "sociotechnical", equal attention should be paid to providing a high-quality and pleasant working environment for employees. Work System Theory (WST) and the Work System Method (WSM) simplify the conceptualization of traditional complex sociotechnical system (STS) approaches. Expanding previous STS studies that separate social and technical aspects; WST combines two perspectives in the work system and outlines the structure of WSM, which considers the work system as a system of interest and offers appropriate solutions, [1].

Gig economy statistics show a free market system where organizations and independent workers engage in short-term work arrangements. BLS data suggest that in 2017 the US gig economy had 55 million participants. It's estimated that 36% of US workers take part in the gig economy and 33% of companies extensively use gig workers. The word "gig" refers to the transient nature of the job itself. Gig economy definition encompasses all sorts of contingent work arrangements, for example: Freelancers; Consultants; Independent contractors and professionals; Temps (temporary contract workers).

Gig economy is not a new phenomenon-freelancers have been around for a while. So have

consultants, temps, and so on. The reason why the gig economy has been under scrutiny for the past couple of years is that technology has lowered barriers to entry so much that "gigs" have become easily accessible to an unprecedented number of people, [15]. What was perceived as a side hustle only a couple of years ago, turned into a trillion-dollar industry with millions of participants. Because of the very technology that made all this possible, it became increasingly hard to clearly classify what counts as part of the gig economy and what doesn't.

What's more, studies vary so much in terms of their design that many arrive at conflicting conclusions. Just like in the case of the Contingent Worker Supplement from the BLS and the study conducted by Alan Krueger of Princeton University and Larry Katz of Harvard University – with the latter saying that the gig economy is rapidly growing and the former that it's slowly shrinking. Let's get in sync on the definitions first. Say gig economy and people will think of: Uber/Lyft drivers; TaskRabbit workers; Airbnb landlords; Online marketplace sellers; Volunteers; Artists. But the list should also include: On-call workers; Multiple job holders; Contingent and part-time workers; Highly skilled contractors; Seasonal workers; Consultants; And many others. The gig economy participants sometimes treat their gigs as their main source of income, and sometimes as a secondary one. Some of them are highly skilled and this mode of work is their choice, some are unskilled and have no alternatives, [14].

We believe that a deep understanding of the opportunities and threats of the implementation of the concepts of Industry 4.0 and Industry 5.0 in Ukraine can become a decisive step in the implementation of the digital economic development strategy of the country. Within the framework of the study, we consider it necessary to note the difference between these Industries (Table 2, Table 3). The Industry 4.0 is an updated concept of "smart factory", identified with the Fourth Industrial Revolution and the emergence of cybersystems, it is one of the phases of digitalization and demonstrates full automation and robotization of production, development of information and communication technologies, [31], [43], [50].

Table 2. General characteristics of the Industry 4.0 and the Industry 5.0

Industry 4.0	*Industry 5.0*
Focus on equipment connectivity	Focus Customer Experience
Mass personalization	Hyper-Customization
Smart Supply Chain	Responsive & Distributed Supply Chain
Smart Products	Interactive Products (Experience-Activated)
Remote workforce	On-site Workforce

Source: Author's development

"The Industry 4.0" is one of the higher phases of digitalization (functionality exclusively within the 6th technological mode), compared to "smart factories", where such technologies as big data analytics (Big Data), machine learning, m2m-communications, artificial intelligence, a new generation of robots, [12]. "Smart factories" (from the English – smart factory, "smart production") – the concept of "digitalization" of industrial production in order to improve their operational activities and business efficiency, work within the 5th and 6th technological way. "Smart factories" appeal to such technologies as "cloud" computing, wireless communications, remote control and maintenance, cybersecurity, integration of control systems, integration and better cooperation in the value chain, 3D printing, [12].

So, the Industry 1.0 is about Mechanization, Industry 2.0 is about Electrification, the Industry 3.0 is about Automation, the Industry 4.0 is about Digitalization, and the Industry 5.0 is about Personalization and about the interdependence of man and machine using cognitive computing and human intelligence. Mass customization and personalization for humans. The Fifth Industrial Revolution, or the Industry 5.0 will be focused on the co-operation between man and machine, as human intelligence works in harmony with cognitive computing. By putting humans back into Industrial production with collaborative robots, workers will be upskilled to provide value-added tasks in production, leading to mass customization and personalization for customers. The Industry 5.0 can be considered as a new quality of collaboration, customization, personalization, human intelligence, cognitive computing, optimal balance of efficiency and productivity. The Industry 5.0 is a new production model where the focus lies on the interaction between humans and machines, [6; 35].

The previous tier, the Industry 4.0, emerged with the arrival of automation technologies, IoT and the smart factory (characterizes the content of the 6th

technological way). The Industry 5.0 takes the next step, which involves leveraging the collaboration between increasingly powerful and accurate machinery and the unique creative potential of the human being (characterizes the 7th technological structure). The Industry 5.0 provides a vision of industry that aims beyond efficiency and productivity as the sole goals, and reinforces the role and the contribution of industry to society. It places the wellbeing of the worker at the center of the production process and uses new technologies to provide prosperity beyond jobs and growth while respecting the production limits of the planet. It complements the existing "the Industry 4.0" approach by specifically putting research and innovation at the service of the transition to a sustainable, human-centric and resilient European industry.

Technological structure is a set of related industries that have a single technical level and develop synchronously. The change of technological devices dominating in the economy causes an uneven course of scientific and technological progress. The 7th technical-technological structure is a combination of "fusion" technology and psi-technology, which are synchronously evolving with bioenergy, cognitive technologies (such as neuroimaging, cognotropic drugs, cognitive assistants, brain-machine interfaces), artificial organs, technologies and organs related to morality and responsibility. This technological way of life is realized with the help of hyperintelligence, hyperknowledge, hyperinformation, hypercommunication.

Analyzing the content of Table 2 through the prism of the concept of sociotechnical systems in contrast to theories of technological determinism, which argued the unilateral effect of technology on man in the process of labor operations, we conclude that the Industry 5.0 is also based on human-machine interaction. We are convinced that the design of technical and social conditions should be carried out in such a way that technological efficiency and humanitarian aspects do not contradict each other. The formation of the Industry 5.0 lies in the plane of interaction of subsystems of the sociotechnical system. Namely:

- We develop a technical subsystem through devices, tools and technologies that convert input into output and in a way that improves the economic efficiency of the organization;
- We strengthen the social subsystem with knowledge, skills, mood, values, attitudes to the functions performed, the system of incentives, quality management structure of industrial development institutions 5.0;
- Considering the connections of organizations with the environment, we have the opportunity to develop a new quality of the subsystem of the Industry 5.0 environment, through social values, state and social institutions with which the organizations of Industry 5.0 interact.

Achieving high efficiency of the Industry 5.0 organization is possible only when its subsystems, their interaction and their harmonized work are optimized.

Table 3. Characteristics and Differences between the Industry 4.0 and the Industry 5.0

Type	*Industry 4.0*	*Industry 5.0*
1	*2*	*3*
The type of economy in which the corresponding Industry is being implemented	Lays foundations for the formation of the digital economy. Acquires the characteristics of the network economy.	The development of the digital economy, at the same time, the formation of the gig-economy can be traced, the economy functions in conditions of virtual and augmented reality.
Features inherent in the production of Industry	Automation of production, its standardization, harmonization of initiatives and development programs. The emergence of cyber production, cyber systems, cyber machines that exist and are not yet integrated into one network at all levels of economic aggregation.	"Living" devices, smart services, smart assets, smart business. Cyber-physical systems, united into one network, interact in real time, self-adjusting, self-learning. Virtual secretaries, smart advisors, virtual assistants.
Technological mode that is the core of industry	6th technical and technological mode	7th technical and technological mode
	Submarine super liners, string transport, electric vehicles, aerospace transport systems. Waste-free and closed technological	Technologies of "thermonuclear fusion", psi-technologies (achievements in modern psychology, including new means of managing people), bioenergy, technologies related to morality and

Possible implementation options	"chains". Nanotechnology, amorphous metals, materials with memory, high-temperature superconductivity, torsion technologies for processing materials. Water purification, seawater desalination, modified agriculture, disease treatment, cloning. Bioenergy, optics, quantum vacuum computers, artificial intelligence, torsion communication systems. Hydrogen energy, synthetic fuel, solar energy converters, closed-cycle nuclear power plants, fast reactors, vortex heat generators.	responsibility. The 7th mode is implemented on the basis of the formation of Industry 5.0 with the help of: - hyperintelligence, - hyperknowledge, - hyperinformation, - hypercommunication, - "Games with the subconscious and mind". The presence of 5 cognitive technologies is predicted: - neuroimaging, - cognotropic drugs, - cognitive assistants, - Brain-Machine interfaces, - artificial sense organs.
The main factor of production	novation and innovation	creative intelligence
Type of enterprise	Innovative enterprise prevails. Innovative enterprise – enterprise (association of enterprises), develops, produces and sells innovative products and (or) products or services, the volume of which in monetary terms exceeds 70 percent of its total volume of products and (or) services (*zakon.rada.gov.ua*, 2012).	Digital entrepreneurship and e-business are represented in small, medium and large businesses. Digital entrepreneurship – entrepreneurship that is fully digitized as a result of the use of digital business technologies based on digital platforms with ERP, CRM, SaaS systems, etc., digital specialists who develop, produce and implement a digital product / service, at the same time, is accelerator of the socio-economic life of Society 5.0 in virtual reality and is able to increase quickly the GDP of any country.
Electronic commerce model that prevails	Business-to-consumer model (B2C) – the subject (producer of goods / services) is the business, and the object (consumer of goods / services) is the consumer. The model is consumer oriented.	Business-to-business model (Business-to-business: B2B) – the subject (producer of goods and services) is business and the object (consumer of goods / services) is business. Priority and concentration of efforts on the development and implementation of the so-called industrial orientation of the Internet, which provides for the application of high technologies in industry. A limitless B2B market will be created for digital companies, the development of new areas and development factors will be stimulated, where the leading role will be given to production innovations solely based on "green" and low-carbon technologies.
General characteristics, presentation of the content of the Industry	Develops industry, taking into account the trends of the new industrial era. This is about the transition to fully automated digital production, controlled by intelligent systems in real time in constant interaction with the external environment, going beyond the boundaries of one enterprise, with the prospect of their network interconnection on a global scale.	This is the highest stage of digitalization and represents the concept of innovative digital production, which includes sufficient assets, smart services, smart business and smart government. The ecosystem of the Industry 5.0 is a dynamic, adaptive "organism" that is aimed at the technological development of the country according to the 7th technological mode and not only because of territorial cooperation, the participants of which, by combining their resources, pursue the goal of joint achieving innovative results on mutually beneficial principles, but also full use of the potential of virtual and augmented reality that opens up from the use of public digital platforms (public economy / sharing economy).

Source: Author's development

3.3 Content of the Industry 5.0 Concept and Prerequisites for Transition to It

Industry 5.0 is currently the highest stage of digitalization and at the same time is a concept of innovative digital production, which consists of smart assets, smart services, smart business and smart government. The visual components that in our understanding reveal the content of the concept of the Industry 5.0 are presented in Figure 1. However, it should be noted that we tried to present the concept of the Industry 5.0 for the reason that the concept differs significantly from the theory not only in its incompleteness, but also insufficient verification (confirmation). Within the topic of the article, we consider the concept as a system of views on the understanding of the Industry 5.0 and its institutionalization, or as a single idea that defines some preliminary, incomplete, and our assumptions for current and future research on understanding the content of the Industry 5.0 through the prism of its structural elements in the conditions of virtual reality and functioning of the given Industry exclusively within the limits of the 7th technological way, [33; 22]. In our opinion, the characteristic features of the Industry 5.0 are:

- Full automation of the production process, the management of which is carried out in real time, taking into account constant dynamic changes, can be traced in the external environment;
- Decentralized decision-making that controls physical processes and creates virtual copies of objects of the physical world of exclusively cyber-physical systems;
- High communication maintained between staff and machine, provided by Internet technologies;
- Cyber-physical systems, being united into one network, interact in real time, self-adjusting, self-learning;
- Production of goods within the limits of the needs and requirements of an individual order, optimizing the production cost.
- Production within the needs and requirements of the individual order, optimizing the cost of production. The concept of the Industry 5.0, presented visually in Figure 1, is understood by us as a synergy of innovation-digital and business environment with the use of research [20], organizational-managerial, institutional, financial-economic and educational resources, which is provided by high-quality work of mechanisms and tools of knowledge transfer, for the purpose of production of the newest products / services by all subjects of an ecosystem of the Industry 5.0, through network interrelations of various formal and informal institutes which form public interaction in the course of creation of idea and its commercialization, [21]. The ecosystem of the Industry 5.0 is a kind of dynamic, adaptive "organism" aimed at the technological development of the country in the 7th technological way and not only through territorial cooperation, whose participants, combining their resources, pursue the goal of jointly achieving innovative results on mutually beneficial principles, but also the full use of the potential of virtual and augmented reality, which opens up from the use of digital sharing platforms (sharing economy / line economy).

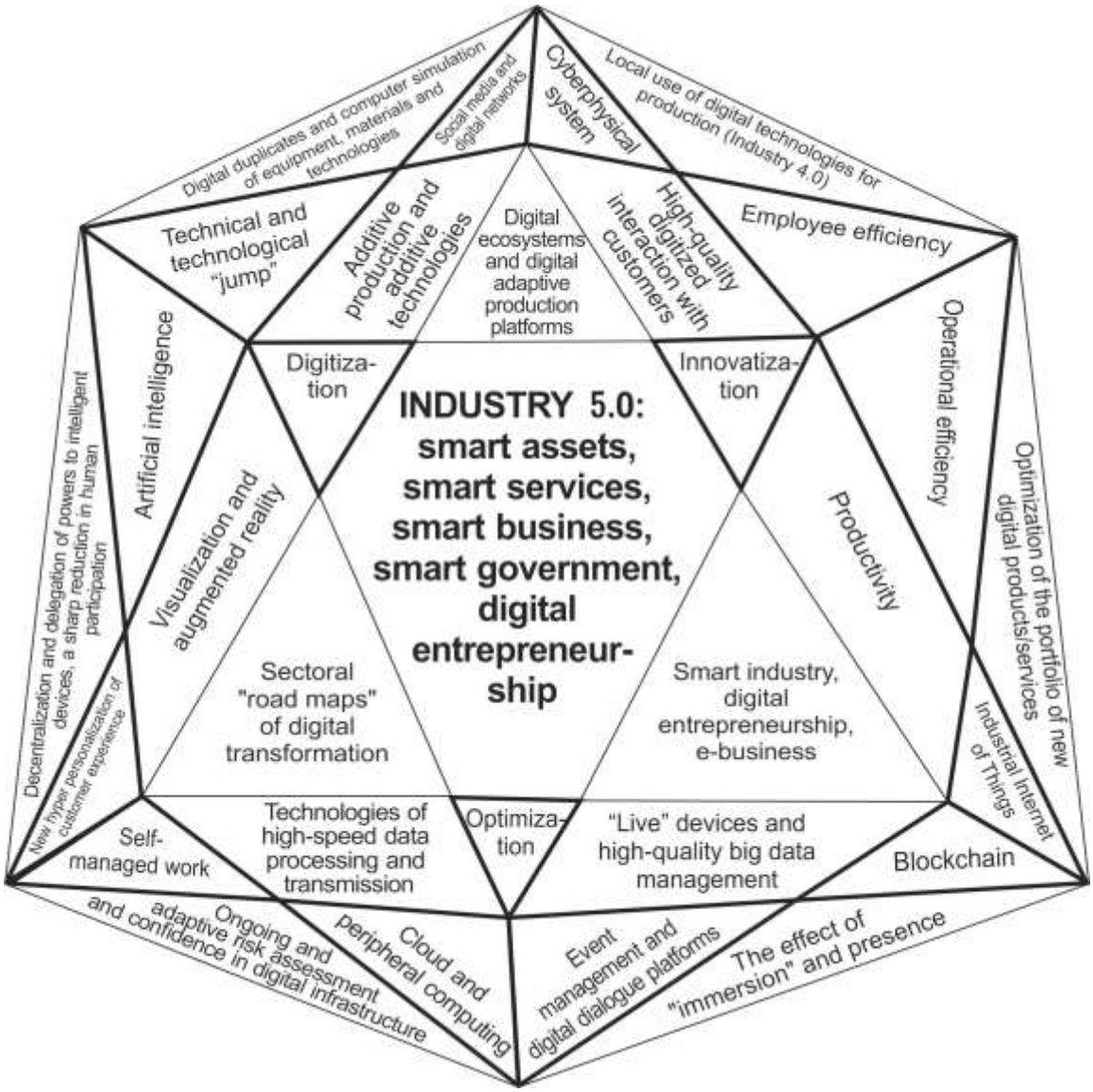

Fig. 1: Visual section of the structural elements of the concept of the Industry 5.0
Source: Author's development

The gig-economy and those economic relations that are inherent in it, is a modern form of existence of the information economy on the technological and ideological basis of the Fourth Industrial Revolution, [32; 23]. In our opinion, the philosophical meaning of the Industry 5.0 is extremely important, which is that its potential, results and impact are reduced to people and their values. Inadequate awareness of business entities about the effectiveness of the implementation of the Industry 5.0 concept, the dignity and complexity of its implementation and the novelty of technologies to fill it, become an obstacle to the rapid formation of the digital economy. In addition, there are no appropriate institutional conditions for creating a favorable investment climate for the introduction of digital technologies. There is no full funding for the development of the infrastructure of the platform economy and the preparation of appropriate human resources for the implementation of the digitization process itself.

Among the obstacles on the way to the accelerated formation of the Industry 5.0, the following ones should be named: problems with the general positioning of Ukraine in the field of world the Industry 4.0 and 5.0; vague or no positioning of Ukrainian developers in terms of individual segments; there is no consolidated, export program of action with the support of the government. Digital transformation is not only about technology, but also about the business strategy towards the formation of the Industry 5.0. The transition to the Industry 4.0 and the gradual transition to the Industry 5.0 (the Industry 5.0 is the next stage of development of the "start" factory / "smart industry", i.e. it follows the Industry 4.0) is a

complete change of the existing business model, and hence what products, to which customers, through which sales channels and at what price the company will make an offer. Ukrainian companies need to reconsider their approaches to what markets they operate in, what customer problems they want to solve, and what roles they play in the value chain formation.

3.4 Experience of Ukrainian Companies in Implementing the Concept of the Industry 4.0

The secret of business success through e-commerce lies in the constant work on logistics, payment systems and Internet quality. Today, the signs of the Industry 4.0 available in the Ukrainian industry can be traced in various sectors of the economy. Successful examples have been presented in Table 4.

Table 4. Ukrainian Companies which Have Signs of the Industry 4.0, as of March 1 2020

Name of a company	*City, region*	*General characteristics of the content of the company's work, its product or service*
1	*2*	*3*
Distributed Data Systems	Dnipro	the leader of the Ukrainian segment of manufacturers of human-machine interface tools, known for its WebHMI product successfully exported to the EU.
eLaks	Kharkiv	one of the leaders in industrial automation and power engineering in Ukraine. Offers innovative technical solutions for control systems of technological and production processes, as well as electric drives in Ukraine and for export.
Infocom Ltd	Zaporizhzhia	the company with the largest portfolio of industrial high-tech, innovator in the field of solar energy, electric transport and robotics technology, automated transport technologies.
IT-Enterprise	Kyiv	leader in the category of Ukrainian IT developers for the Industry 4.0. Development of R&D services (CableDesigner), personnel and equipment integration (Industrial IoT), optimal production planning (AI, APS, MES), predictive maintenance of equipment (RCM).
QRSmarty	Zaporizhzhia	development of an accounting system of inventory items in production using laser marking methods.
Lemberg Solutions	Lviv	a service company that helps companies in the EU, the USA and Ukraine create innovative solutions based on the Industrial Internet of Things (IoT) and Machine Learning.
Oueedo Robotics	Odesa	a startup specializing in the implementation of solutions for collaborative robots (cobots). It is a representative of the 4.0 Centers network in Ukraine, based on the country's leading technical universities.
RWA	Kharkiv	the leader in the automation of railway transport in Ukraine, which specializes in a number of modern solutions for the automation of railway traffic, which is of interest to international partners, including proposals in the Mobility 4.0 segment.
Virgil Security Inc.	Kyiv	a company specializing in cybersecurity, including for industry, namely in data protection solutions in complex infrastructure facilities of the energy and industrial sectors.
S-engineering	Odesa	one of the leaders in industrial automation in Ukraine and the production of electrical equipment. Offers patented innovative solutions for transport production lines. EPC contractor in the field of automation and electric power supply.
SMARTICO	Dnipro	one of the leaders of the Ukrainian market in the segment of telemetry and the industrial Internet of things. Complete automation solutions based on SMARTICO cloud technologies are implemented today in the segments of industry, energy, as well as in urban infrastructure.

Source: Grouped by authors on the basis of [49]

To organize and efficiently manage a business, both in the real and digital world, you need metrics. For traditional businesses, there are a number of proven metrics and KPIs that can help you understand how successful your business is. But the virtual-real space has not yet developed such many number of necessary protocol options for high-quality organization and effective management of digital business, platform economy. This is how traditional business creates values that consumers receive along the chain, conveyor belt at the end.

In this type of conveyor business, products are produced with the lowest cost of resources, then delivered to consumers through well-organized logistics systems, marketing policy, and advertising. Having received income, the business covers its costs, and at the expense of profits pays rewards to investors and supports future growth, expands production. The system of indicators of the conveyor business is designed to assess the efficiency with which the flow of values moves through this traditional conveyor. In simplified form, these are key indicators such as cash flow, inventory turnover, net profit, gross profit, overhead and profit aimed at business expansion, and so on. These indicators allow managers to identify problems, obstacles and breakdowns in this chain, increasing the efficiency of the process, which, in turn, provides a rapid passage of more profitable flow of values.

But today's realities of the digital space require the development of a new logic of platform business. This is triggered by a number of factors:

- Digital platforms create value due to the impact of network effects, and platform management should focus on the positive network effects and actions of the digital platform that generate them. An indicator of the level of success of interactions that create value and the factors that affect it is a key measure of the functioning of the platform. Therefore, it is important to maintain constant repetition to create the value of interaction. The end result of the analysis should be positive network effects and value creation for all participants, including users of the platform, its sponsors, and managers;
- In the platform business, companies pursue a goal in terms of creating, sharing and delivering value within the ecosystem, and part of this activity takes place on the platform, and part – outside. The goal of the platform business is to create value for all users;
- A number of indicators used in traditional business do not apply to digital business, which operates on an innovative basis, sometimes some of them can be dangerous if they are used in the wrong life cycle of digital business. Innovative business that is implemented on digital platforms goes through several stages, such as launch or startup, growth and maturity. Each stage has its own system of indicators and protocol for their application. For example, it can be a user base, active producers and consumers, the critical point of the size and volume of the platform, liquidity of the platform, conversion of active users, solvent customers, depth of involvement of users and producers, user-to-manufacturer conversion rate and vice versa, [8].

It is worth noting that the Industry 4.0 is essentially designed to digitize and integrate processes vertically throughout the organization through all functions, from product development / acquisition through production, DIEM logistics and after-sales service capabilities. It is vertical integration that defines intelligent integration and digitization at different hierarchical levels of the value chain. This makes it possible to use order digitization processes and products, taking into account customer characteristics, when automatic data transmission in integrated planning and production systems can be guaranteed. It is within the framework of vertical integration that flexible and reconfigurable production structures become possible, which can be adaptable to each specific customer order and market changes. These functions are the main tools for manufacturers to remain competitive in the markets, [45].

3.5 Step-by-step Breakdown of the Formation of the Industry 4.0

Digitization of the horizontal value chain integrates and optimizes the flow of information and the flow of goods from the customer throughout the corporation to the level of the supplier and vice versa. Within this approach, all internal mechanisms (for example, procurement, logistics, production) will be interconnected with all external partners, [16]. In horizontal integration, the concept of Industry 4.0 will allow all businesses to adapt to new circumstances at all times (to the volume of orders or availability of materials). Under such conditions, automatic optimization of production processes becomes possible due to the integration of customers and suppliers into the value chain, [29]. The content of the step-by-step protocol of formation of Industry 5.0 through the prism of innovations, technologies in the management of the industry and business has been revealed in Table 5.

Table 5. Protocol of the Industry 5.0 formation through the prism of Innovations, Technologies in Industry and Business Management

Name of the stage	*General characteristics of the stage*	*Step-by-step content of the stage and its possible substages*
1	*2*	*3*
Defining the innovation basis of a "technological breakthrough" in a particular industry, forming the Industry 5.0	Not every innovation will become a great thing in the future, and not every new technology will redefine the rules of the game. Disruptive innovation depends on the sector and in fact can only work effectively for individual enterprises. Companies must constantly scan the horizon for potential game changers, that is, events or changes that fundamentally change the situation.	*Potential industry trends.* Studying industry trends can reveal potential investments by competitive or adjacent participants in the value chain, as well as threats to sector convergence. In addition, it can help to predict potential areas for future changes in the industry. By critically examining the value chain, one can identify problem areas that a disruptive innovation initiator can try to eliminate or losses that can be prevented by a new or different approach. Evaluating changes, one can determine where there are likely reputational issues or potential loss of trust. This is where new competitors can "play" to gain market share.
		Disruptive technologies. The latest technologies provide opportunities that can significantly change the business environment. Every potentially disruptive technology must be examined for its possible application in a particular sector. To assess the situation, it is most important to review the activities of startups in the field. It is also necessary to analyze the use cases of recognized disruptive technologies from other sectors and assess which of these technologies or their combinations may be key in the further development of activities.
		Strategic technologies. Analyzing and assessing disruptive changes, it is worth paying attention to the value of disruptive technologies. An analysis of the values of revolutionary technologies will allow determining priority technologies for further study and a clear delineation of investments.
Threat Assessments	Assessment of the impact of disruptive innovation, changes on business. It is important to understand that ongoing disruptive innovation can have different implications for different enterprises, even within the same sector, that is, a differentiated approach must be applied. To assess the impact of the most promising disruptive changes, one should study the business models, operations and financial performance of enterprises. Studying the above areas of the enterprise's work in a complex will create a holistic picture, determine where the impact will be felt in the first place and what are its cascading consequences.	*Business model.* Each element of the business model must be considered to identify potential weaknesses that could be used by a disruptive change initiator. Market participants must explore new opportunities to tailor unique value propositions to customer needs, increase costs and improve coverage. New market entrants can disrupt the value chain, take it to a qualitatively new level or change markets, affecting the area and challenging the fundamental principles of its development. Disruptive innovators can play the game to get rid of intermediaries and "take over the customer".
		Financial model. This model covers income, expenses, profits, investment models and taxation. The influence on the financial model can be carried out in several directions, namely: new models for generating income; increased volatility and the emergence of new competitors can reduce investment; profitability may be jeopardized by declining revenues, customers, price pressures and increased costs; threats to the long-term competitiveness of a business can directly affect the ability to raise capital. The potential impact of the initiators of the technological breakthrough on the financial model can be assessed by developing and running scenarios that involve stress testing the main assumptions in the model, checking its robustness and identifying vulnerabilities.
		Operating model. Development in technology accelerates changes in operating models. For example, "artificial intelligence" and "machine learning" allow you to consider certain cases of payment of insurance compensation in a matter of seconds, instantly destroying the traditional model of considering an issue, assessing and making decisions by a person.
Determination of	A wide scale technological breakthrough can radically change the main components of an organization's current	*Defense.* Sometimes, potential disruptive innovation can be countered by creating barriers or other similar defensive actions. However, this becomes, as a rule, a short-term strategy.
		Innovation adoption. Attempt to integrate disruptive technologies

a course for further development and route plan. The four main approaches organizations can take are: defense, innovation adoption, disruptive innovation initiation, retreat	strategy and cause the need for its revision. Therefore, it remains important to assess the relevance of the existing portfolio of strategic initiatives. Significant sources of value should be identified, assessment criteria agreed, priorities reconsidered and investment areas redefined. It is advisable to consider important disruptive changes and determine where the innovator gains advantage, where the defensive play is required, and where it is more profitable to copy quickly the innovation of others.	into a company's business or operating model
		Retreat. Admission of failure and trying to keep the maximum profit, focusing on the development of other areas of activity
		Disruptive innovation initiation. Companies can decide to innovate and disrupt the market. Such a move inevitably leads to total dominance of the current business model, but can also provide an invaluable advantage for the innovator.
Implementation of structural changes at the level of the organization's DNA	Change of culture, as the successful choice of an approach to technological breakthrough, depends on it. Employees of the organization must become open to change and be encouraged and stimulate innovation in every possible way in order to break stereotypes.	Culture change must start from the "top". The organization's management should consider disruptive innovation as a priority. This issue should be regularly discussed by senior management, and it should form the main part of the current strategy. To move beyond modernization and develop a truly innovative approach to disruptive change, organizations must find solutions to incubate innovative ideas and effective ways to integrate innovation from startups back into the business. Classic linear approaches of phased planning and 2–3-year implementation programs should be replaced by adaptive approaches and traditions of constant experimentation and quick decision-making that break stereotypes.

Source: Author's development

In the context of the formation and development of the Industry 5.0, it should be considered as a high-tech and medium-tech industry. They are considered to be the driving force, the engine of economic growth of innovative developed countries. The focus should be on the practical implementation of the following steps:

- Focus on industrial high-tech, where the key advantage for the national economy is a talented and cheap labor force, which determines an efficient engine of industrial production. In addition, industrial high-tech traces the presence of cross-sectoral, technological areas, including artificial intelligence, cybersecurity;
- High-quality transmission through the chain of "segmentation-targeting-positioning" type, which allows achieving effective geographic segmentation, entering attractive markets and as a result of the desired positioning in new countries;
- Design (mechanical, electronic, electrical, technological, construction);
- Working out of startup projects in close cooperation with integrators and big brands;
- Development of real support of state stakeholders in the organization of target companies for industrial high-tech, adherence to coordination, integration, improvement of communication between all stakeholders during the implementation of the national innovation strategy;
- Development of easy scaling of successful startup projects to global markets through the implementation of not only the B2C model (business for consumers), but also B2B (business for business);
- Building up in terms of industrial automation and integrated engineering (including the commissioning of complex industrial facilities);
- Creation of real sectoral and regional innovation ecosystems, the participants of which must be IT companies and their customers, state and commercial institutions (including educational institutions, office lessors), IT entrepreneurs and full-time employees, suppliers of computer equipment. Since all actors in the innovation ecosystem influence each other, they must be flexible in order to develop the market quickly and compete with the global market;
- Collaboration with associations and innovation clusters, cooperation with leading industry and profile experts, marketing agencies, venture studios, creation and quality work of the site-marketplace;
- Establishment and effective development at all

stages of venture studio's performance: 1) *search for and verification of the idea* (the idea may belong to a startup or studio: market and target audience definition); 2) *creation of prototypes* (definition of the main feature, creation of design); 3) *hypothesis testing* (site, usability tests, funnel testing, change of project development direction); 4) *packaging* (creation of the final product model, design, presentation); 5) *project analysis* (determining success, creating reports, allocating resources).

3.6 The Procedure for Establishing the Industry 4.0 and the Industry 5.0, defined by European Institutions

European institutions have identified along with the formation and development of digital business with the characteristics of both the Industry 4.0 and the Industry 5.0. The procedure involves the following steps:

1. When you set up a website for your business, you should decide if you'll be opening an online shop in addition to your general information website. If your idea is to set up an online shop, you can either: do it yourself with your own resources, engage an online shop provider and develop it externally. In either case, there are specific things to keep in mind to offer your customers a transparent and user-friendly experience.
2. Setting up a business website (if you choose to use a third-party platform, which is any software developed externally to you or your core website provider, there are certain additional elements to consider).
3. Selling online using a third-party platform (if you choose to set up an online shop yourself, make sure that is compliant with rules and regulations).
4. Setting up your online shop (in all cases, be prepared to secure your website against any threats that could ultimately impact your business, such as data theft).
5. Securing your website (once you have completed a sale online, remember to also consider your obligations related to deliveries, fulfillment, and any type of customer service).
6. Deliveries and fulfillment for online sales.
7. Customer service for online businesses (promoting your business online is another important part of digitalization. Remember to adhere to specific rules related to business practices online to keep your promotional efforts fair and transparent to your customers).
8. Promoting a business online, [13].

Pursuing the goal of using all the power of existing information technologies, it is obvious that it would be worthwhile to abandon the old processes, rethink the content of work, radically restructure the processes and give businesses a new format of cooperation. These circumstances determine the need to ensure the variability, dynamism and adaptability of economic development processes, based on the digital context and innovation. The development of production processes in terms of their digitalization and innovation of the economy can be divided into the following stages: standardization, adaptability, and prediction. In the early twentieth century, automation laid the foundation for standardization, during which there was an improvement in efficiency, consistency and productivity. As the standardization progressed, the processes became automated, and this made it possible to reduce costs, increase speed and improve quality. Today, positive shifts can be expected for business by changing the content of the work itself. To achieve this, owners of all types of businesses need to attract investments in information technology as quickly and in such large volumes as possible, but not in the automation of the traditional methods of work.

Top management and time management should realize that it is impossible to obtain a positive effect by applying the methods of the past in the context of the digitalization of the economy. The reason for this is that many existing procedures, job descriptions, a number of work processes, control mechanisms and organizational structures are not compatible with the latest information technologies available. To use modern information and communication technologies to their full potential, it is necessary to abandon old processes, rethink the content of work, radically restructure the process and give businesses a new format of work, both with the external environment and within the organization.

As a result, organizations will have new opportunities to ensure variability (dynamism) and adaptability of processes based on the context. That is, constantly assimilating and processing new information taking into account the current business context is a chance for businesses to adapt processes during their implementation. This very stage is quite complicated and completely new methods of doing business are used on it. Transformation of processes enables companies to become more flexible and faster. In addition, at any time, it is easy to adapt to behavior, taking into account the tastes and needs of customers and employees. This ability to adapt is based on Big Data and an algorithm for enhanced digitization of processes.

New processes open up new opportunities for companies to adapt to the changing environment

and the "digital landscape". They meet the following requirements of digital time, namely: "innovation", "speed", "service", "individuality" and "quality". But there's a period coming when for business work in the system of "real-time changes", as they say "changes along the way", will be lagging behind. This is what will lead to the emergence of the next stage of development of processes – their prediction, both existing and new ones. An organization will need to identify information, make decisions, and proactively adapt its processes based on what may occur. With the development of algorithms, digitization and implementation of IoT, it will be possible to "extract" reality from big data, as a result of compiling a complete psychographic and behavioral map of any person, [9].

The ways and tools that will accelerate the formation of the Industry 5.0 are as follows:

- Developing of a roadmap for the implementation of special conditions for accelerated development and attraction of investments for all medium and high-tech sectors;
- Approval of new innovative and industrial strategies and their harmonization or, if necessary, transparent and direct correlation;
- Accelerated clustering based on innovation hubs in the 5.0 and 4.0 area at all levels of economic aggregation, internationalization and integration into the global innovation space 5.0;
- Implementation of sectoral strategies within the framework of the Export Strategy of Ukraine. So, if to take the IT sphere as an example, we realize that in the global space they have been talking for a long about specific digital sectors that have industry links – as FinTech (digital finance), MarTech (marketing), MilTech (defense), CleanTech (green technology) and alternative energy), AgriTech (precision agriculture), the Industry 4.0 (production processes in industry, energy, infrastructure). In the Ukrainian Digital Agenda, which was presented in 2018 by the Cabinet of Ministers, all these issues are presented quite reasonably, namely:
- launching of a digital platform, which is designed to facilitate the integration of the national startup ecosystem into the global space;
- Institutionalization of the development of industrial high-tech at all levels of economic aggregation, that is, complete synchronization of industrial, innovation and 5.0 strategies;
- Profiling and engaging in cooperation in government programs of both governmental and non-governmental institutions.

Digital technologies are needed to increase the efficiency of Ukrainian industry, and in some sectors, they are becoming the basis for product and production strategies. Their transformative power is changing traditional business models, value chains and driving new products and innovations. Digitalization for Ukraine is positive because it is focused on improving the quality of social welfare infrastructure and social services, organizing transparency and targeting social assistance, and thus reducing costs, [12].

The main characteristics that determine the formation of the smart industry, smart business, and smart services include:

- A comprehensive focus on services, where it is expected that not only the interaction between devices and systems will be traced, but also there will be deep coherence in terms of cooperation between ecosystem participants and individuals;
- Virtual reality, which in Industry 5.0 creates virtual copies of intelligent physical objects (scaling from a small device to a factory or factory);
- Launch and effective operation of various mechanisms of simulation, economic modeling, digital expert assessment of the real state of the economy;
- Decentralization, which in the Industry 5.0 allows in some cyber physical systems to make their own decisions and interact qualitatively with another more optimal way;
- Interoperability, which allows individuals to effectively connect cyber physical systems and smart lines of plants / factories;
- Modularity, which allows flexible adaptation of smart factories to external institutional changes through easily changeable individual modules of the management system;
- Temporal reality, as all data and their analysis can be obtained in real time.

4 Conclusion

Summing up the conducted study, it is worth noting that a focus on industrial innovation and investment, a special focus on digitalization and sustainable development, building global value chains, inclusiveness and prioritizing investment should, in our opinion, become key topics for further research. In addition, in practice, a broad coalition should be created with educators, officials, analysts, high-tech, economists, industrialists, scientists who will fully join the formation of the Industry 5.0 based on digitalization and innovation. In the course of our research, we came to the conclusion that Industry 5.0 represents a new approach to organizing production in a virtual reality environment, which is based on highly intelligent integrated newest products and digital ecosystems that form a

completely innovative digital value chain, adding new competence and implement deep cultural changes in the direction of the formation of a new virtual reality. "Living" devices, smart assets, smart services, data management are the foundation of the Industry 5.0 concept.

We are convinced that the digital transformation opens fundamentally new horizons and opportunities for the formation of added value in virtually all areas of the economy. The digital transformation is not only about technology, but also about the business strategy towards the formation of the Industry 4.0 and 5.0. It is possible to accelerate the formation of the Industry 5.0 in the context of innovation and digitalization of economic relations in the gig-economy if the following mechanisms are implemented in practice and tools are applied, including: the formation of a list of public-private partnership projects for investments in digital infrastructure (among the priority areas should be energy, digital technologies, infrastructure); starting work in venture capital studios as platforms that provide startups with the necessary expertise and infrastructure for the purpose of innovative digital development, testing the viability of projects, attracting investments and creating "greenhouse" conditions that are best suited for turning a startup into an independent digital business.

The updated approach to the concept of the Industry 5.0, taking into account the digitalization of economic relations in various modifications, will be used in all sectors of the national economy and will transform the economic system, modernize production and digitize entrepreneurship, and thus have a positive effect on strategic socio-economic development and financial systems, achieving a high level of national security and financial independence of Ukraine. The presented ways and tools to accelerate the emergence of the Industry 5.0 in virtual reality can be used in the military sphere, in particular to identify gaps in the functioning and development of strategic facilities. This, in turn, will avoid the loss of economic potential and lay the foundations for financial stabilization in the future. The research results will be of practical significance for critical infrastructure, industry, medicine, agriculture, education, IT sector, financial system.

Given that the Industry 5.0 is a digital rethinking of all manufacturing, in which businesses use new digital technologies to digitally transform their core processes and functions, interact with customers and employees, and ultimately their business models, so it makes sense new systems and products, new approaches to processes, the ability to obtain data from sensors and sensors that are now everywhere, and innovative technologies such as artificial intelligence allow us to achieve new levels of efficiency in R&D, engineering, manufacturing and back office functions, thus requiring additional costs, research and proper scientific attention. In addition, hyper personalization, augmented reality and virtual mobility are fundamentally changing the way businesses interact with their customers and even their own employees. Smart products, services and entire production lines based on the new Industry 5.0 ecosystems open up previously unavailable business models and sources of profit through the quality of digital entrepreneurship.

As a result of the research conducted in the article, we came to the conclusion that design of technical and social conditions should be carried out so that technological efficiency and humanitarian aspects do not contradict each other. This fact is evidenced by the existing scientific approach of Sociotechnical systems (STS). After all, we are talking about the study of the interaction of infrastructural elements of society and the infrastructure of the Industry 5.0 and the Industry 4.0, the substantive realizations of society, on the one hand, and human behavior – on the other hand. In addition, the sociotechnical system is formed by such subsystems as: technical subsystem includes devices, tools and technologies that convert input into output, a way to improve the economic efficiency of the organization and a social subsystem that includes employees (knowledge, skills, mood, values, settings, attitudes to the functions performed), management structure, system of incentives.

We are convinced that in the near future, Ukraine will become high-tech and post-industrial and will be integrated into global technological value chains, producing unique engineering services and high-quality products in them. Further research and development are necessary to direct to find the ways to implement the operational objectives and strategic goals of the Government of Ukraine and, accordingly, the nature and content of socio-economic policy in the digital economy.

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-Kateryna Kraus, research innovative digital technologies of Industry 4.0 and Industry 5.0, visualization of the presented material, writing conclusion, writing methodology.

-Nataliia Kraus, formulation of the purpose and tasks of research, research the content of the Industry 5.0 concept and prerequisites for transition to it, present breakdown of the formation of the Industry 4.0.

-Oleksandr Manzhura, researched the experience of Ukrainian companies in implementing the concept of Industry 4.0.

-Inna Ishchenko, wrote an annotation of the article, research the latest technologies of modern society.

-Yuliia Radzikhovska, wrote introduction of the article, literature review, drawing up a list of references.

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