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PECULIARITIES OF SUSTAINABLE DEVELOPMENT OF ENTERPRISES IN THE CONTEXT OF DIGITAL TRANSFORMATION

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Received 12 August 2019; accepted 24 December 2019; published 30 March 2020

Abstract. The key elements that contribute to the digital transformation of the enterprise in the context of the cross-industrial paradigm are outlined. On the basis of the proposed elements (development factor, rate of development, quality change density, multiplication factor), and by means of mathematical modelling, the effect of capturing the digital transformation of the enterprise in the bifurcation points is calculated. The totality of the presented developments allows us to predict the development and minimization of risks associated with digital transformation in the enterprise with all the ensuing consequences (stability, dynamics, transformation and forecast of its development vectors) and conclude that with the improvement of the quality of digital transformation, the efficiency of functioning of any production increases, i.e. an increase in quality by digital transformation by n times accompanies an increase in production efficiency by at least n times. This allows to minimize risks and predict enterprise activity taking into account the vector of its development — digital transformation. Under conditions of uncertainty, the use of the model will ensure the quality of the digital transformation of the enterprise from any level of development of companies.

Keywords: digital transformation of the enterprise; sustainable development; reduction of risks of transfusion; bifurcation points; digital technologies; cross-industrial paradigm; Internet of Things

Reference to this paper should be made as follows: Andriushchenko, K., Buriachenko, A., Rozhko, O., Lavruk, O., Skok, P., Hlushchenko, Y., Muzychka, Y., Slavina, N., Buchynska, O., Kondarevych, V. (2020). Peculiarities of sustainable development of enterprises in the context of digital transformation. *Entrepreneurship and Sustainability Issues*, 7(3), 2255-2270. [http://doi.org/10.9770/jesi.2020.7.3\(53\)](http://doi.org/10.9770/jesi.2020.7.3(53))

JEL Classifications: M11, M12, O32

1. Introduction

The survey of general executives and top managers (only 825 respondents) conducted by company “Protiviti” in the fall of 2018 showed that their main task in 2019 would be to reduce the risks associated with the transformation of the enterprise in digital (Executive perspectives on Top risks, 2019). The report also highlighted the fact that 70% of enterprises involved in digitalization achieved their goals. The study found that in 2018, enterprises are investing \$ 1.3 trillion in digital transformation initiatives. Tragically, research tells us that 70% of these initiatives will not reach their stated goals. That equates to over \$900 billion worth of spend that will miss the mark. This is mismanagement on a colossal scale (Goodness et al., 2019).

Digitalization of processes is relevant not only at the level of individual enterprises: entire industries choose for themselves this way of development as the only opportunity to meet the conditions of the rapidly changing world. Due to this, the digital transformation of industry, retail, public sector and other areas today is changing the lives of every person and every company.

The positive effect of the introduction of IIoT (Industrial Internet of Things) is observed in the industry. The most obvious evidence of this is the increase in the number of devices connected to it. According to Verizon (in 2014, 1.2 billion devices were connected to the IIoT, and this figure is expected to increase to 5.4 billion by 2020 (Industrial Internet of Things (IIoT), 2019). Also, some financial assessments of the development of the IIoT (Columbus, 2018):

- Global Market Insights: world market IIoT (equipment, software, services) in 2015 was \$113.71 billion, in 2017 — \$312.79 billion; in the period from 2017 to 2023, this market will grow with an average annual rate of 14.36% and by 2023 it will amount to \$700.38 billion.
- Machina Research: By 2025, the world market for IIoT will reach 484 billion euros.
- Accenture: By 2030, the contribution of IIoT to the world economy in the monetary equivalent will be more than \$14 trillion, including up to \$6 trillion in the US and more than \$ 70bn in Germany.
- According to Business Insider, by the year 2025 there will be more than 55 billion gadgets connected to the Industrial Internet of Things (IIoT), while the population of the Earth will reach only 7.6 billion people, and total investment in the IoT from 2017 to 2025 will be more than \$15 trillion — for comparison, the US budget is \$3 trillion.

2. Literature survey

The theoretical and statistical studies of many scientists became the basis of this study. For the formation of the hypothesis of scientific knowledge at the methodological level, research and scientific publications in the field of enterprise digitalization were used.

The significance of the constant volatility of business conditions on an ongoing basis was relevant in any society and in any time (Jensen, 2000; Collins, 2001). In 19 century revolutionary innovations (such as cars and aircraft) have radically changed the entire industries. Within these innovative transformations, new companies were created, some were able to transform quickly and adopt new challenges that proved to be successful (Rouse, 1996).

Such business transformations are primarily due to fundamental changes (Rouse, 2005), to perform the same job, but in a different way or perform other types of work (Safrudin, Recker, 2013; Wang et al., 2020). These

transformations can be described as “orchestrated redesign of the genetic architecture of the cooperation” (Morgan, Page, 2008). It must also be taken into account that any changes and transformations in business involve a high degree of risk and often have a certain degree of damage (Safrudin, Recker, 2013; Tvaronavičienė, 2018; Murashbekov, 2019; Korauš et al., 2019; Makedon et al., 2019; Orynbasarova et al., 2019).

Different stakeholders are involved in the transformation of the enterprise, and as a rule, they affect a number of hierarchies of companies (Röglinger et al., 2016). Assuming the existence of such abilities as “dynamic abilities” that are associated with the integration, creation and development of company resources have the ability to change (Teece et al., 1997). The article (Bhattacharya, Seddon, 2009) raises four aspects: reframing (corporate vision), constraints (high productivity), regeneration (linking the corporation's governing body with the environment) and revival (employees). The disadvantages of this campaign are that the reason for the transformational processes in an enterprise is rapidly changing conditions (Someh et al., 2016), for example, the development of IT technologies. In the study (Downes, Nunes, 2013), particular attention is paid to innovations that contribute to the digital transformation of the enterprise, emphasizing that this applies to virtually all sectors of activity.

Digital technologies are described in the paper (Bharadwaj et al., 2013) as a combination of information, communication, computing and communication technologies that transform into other forms of product, product or service, business model and organizational forms (Fichman et al., 2014). That is why digital technologies are closely linked to innovation, contributing to the development of competition and the development of competitive environment both inside and outside the company (Downes, Nunes, 2013; Porter, Heppelmann, 2014). In the article “A Theory of Enterprise Transformation” (Rouse, 2005) attention is paid to the fact that technological discoveries have a great influence on the digital transformation of the enterprise. The researches (Morton, 1991; Petrenko et al., 2019; Prodani et al., 2019) discuss innovative technologies that affect the organization of work of enterprises and accelerate the digital transformation.

However, to date, we have no direction in the sustainable development of the digital transformation of enterprises in the context of the cross-industrial paradigm. Only a small amount of research is aimed at structuring and refining the concept of the digital transformation of the enterprise. In the article for 2015 (Henriette et al., 2015) author analyzed literary sources and focused on specific aspects of digital transformation, did not focus on identifying key elements for the sustainable development of enterprises' digital transformation in the context of the cross-industrial paradigm. Gerster (2017) analyzed views of various authors on the definition and classification of digital transformation in the field of information technology implementation. Unfortunately, not sufficient attention was paid to the studies of the risks associated with the formation of sustainable development of enterprises' digital transformation in the context of the cross-industrial paradigm.

A digital transformation in the context of a cross-industrial paradigm is the convergence of industrial technologies based on digitalization, which is a radically new stage of scientific and technological progress, which has no historical analogues in terms of its impact on human civilization, including primary information and communication digitalization; electronic data exchange with external partners; use of special software; own production of information and communication technologies and equipment; production and use of industrial robots and sensors. New industrial technologies, possessing tremendous potential to change the direction of technological development, at the same time have mixed social and environmental consequences. This is another challenge that requires the development of risk management mechanisms for digital transformation in the enterprise. The introduction of digital transformation in industry requires the use of tools for preliminary forecasting, explaining uncertainties, and making the most informed decisions.

That is why in this research we seek to combine the existing views of scientists in order to reduce the risks and identify the key elements that contribute to the digital transformation of enterprises in the context of the interdisciplinary paradigm.

3. Methods

The probability of achieving a high digital transformation from the components N_i , called hypotheses, which influence the quality of digital transformation, calculated according to the formulas for full probability, where $i = 1-9$ are health-related hypotheses; morality, creativity, activity, organization and assertiveness, education, professionalism; use of working time; competency and reassessment of hypotheses using the Bice formula showed that high digital transformation depends primarily on the professionalism, competence, creativity, rational use of working time of all participants who are involved in this process, as well as not losing sight of all other factors. By introducing into the composition of the components that determine the quality of digital transformation, intellectual potential, as the core basis of digital transformation. Considering the options when employees have one or another quality, they came to the conclusion that the digitalization of labor simultaneously with creativity enhances the result by 2 times. This technique allows you to increase the efficiency of using digital transformation and make the right decisions based on the reassessment of components and reduce the risks of digital transformation.

The results of the studies allowed us to consider the risks of digital transformation as an object of mathematical modeling. Noting: A - entering in a unit of time, B - leaving in a unit of time and C available in the considered system of flows C. The ratio of the ratio of the output stream to the digital system under consideration is the

digital transformation (DT) flows and $k = \frac{B}{A}$.

When determining the coefficient of the relations of the outgoing DT stream per unit time to the incoming, we introduce the concept of $K(t)$ — coefficient of development of the DT company as the ratio of DT at a given time to the value of DT at the initial time:

$$k(t) = (1 + \frac{t}{2} (1 - k))^{\frac{K}{K-1}}$$

$K'(t)$ - the rate of change in the quality of the enterprise DT, that is, as a time-differentiable coefficient of development;

$$K'(t) = -\frac{k}{2} (1 + \frac{t}{2} (1 - k))^{\frac{K}{K-1}}$$

$p(t)$ - the density of the enterprise's digital transformation as the ratio of the digital component of the enterprise (DT) to the total (analogue) activity over a certain period:

$$p(t) = \frac{DT}{C + A \cdot t - B \cdot t}$$

$q(t)$ - the multiplier of the increase of the digital transformation of the enterprise as an integrated time factor of the development of the DT:

$$q(t) = \int_0^t K(t) dt$$

In the study of the DT, the data A, B, C, which determines the experimental values of the investigated object in a period of five years, are determined, and the magnitudes characterizing its development (coefficient of development of DT, rate of development of DT, density of DT, multiplier of increase of DT) According to the results of the analysis, we obtain the data presented in Table 1 and Figure 1.

It can be seen from the study that, according to a number of indicators (development coefficient, development rate, growth factor), the DT is developing continuously in the direction of increasing or decreasing the quality indicator, and there is a gap in density, i.e. density, allows you to uniquely determine the bifurcation points, and the level of digital transformation makes it possible to improve the quality of this process from any level of development by the effect of "entrainment" in bifurcation points, i.e. the points of intersection of the zero level of transformation with other levels of development, determined by degree $p = \frac{k_0}{k_0 - 1}$.

Table 1. Calculations of the characteristics of the investigated object in the proposed method for the case $k = 2$, $B = 2A$, $A = C / 2$, $T = C$

Indexes	Time, year					
	0	1	2	3	4	5
Coefficient of development of DT ; $K(t)$	1	0,25	0	0,25	1	2,25
The rate of development of the DT $K'(t)$	-1	-0,5	0	0,25	1	1,5
Density change of quality of DT; $DT p(t)$	1	2		-2	-1	-0,33
Multiplication factor of DT; $(q)t$	0	0,59	0,67	0,75	1,34	2,92

Source: Developed by the authors

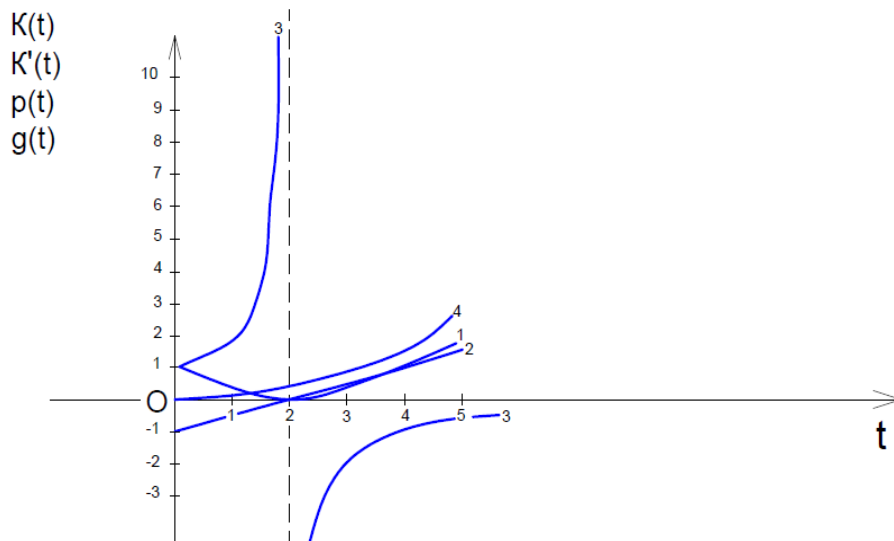


Figure 1. The level of transformation of the enterprise DT

Source: compiled by the authors

- 1- Coefficient of development of DT
- 2- The rate of development of the DT
- 3- Density change of quality of DT
- 4- Multiplication factor of DT

From the analysis of the obtained data, it follows, that according to a number of indicators (coefficient of development, the rate of development, density change of quality) the DT develops continuously in the direction of

increasing or decreasing the qualitative index, and the density is a gap, while $k > 1$ there is a scenario of digital transformation, and with a rupture 2nd kind in density at the point of bifurcation.

The larger k , that is, the more the exhilarating flow differs from the input per unit time, the faster the change, which is characterized by digital transformation, occurs.

Managing the process of digital transformation in time allows to eliminate the negative trends associated with the influence of the cross-industrial paradigm, and to bring the desired positive dynamics closer, and to obtain qualitative and efficient digital transformation.

Consequently, in the case of $B > A$, if $B > C$ is the transformation of the system with a displacement to the left of the bifurcation point $t_0 = \frac{C}{A(k-1)}$, $B < C$ - the transformation of the system with the displacement to the right of the bifurcation point $t_0 = \frac{C}{A(k-1)}$.

Thus, an increase in the quality of labour potential is observed when $t > \frac{C}{A(k-1)}$

The level of the digital transformation of an enterprise allows improving the quality of transformation from any level of development through the “capture effect” at bifurcation points (Figure 2). The main indicator characterizing the digital transformation is its density, which allows managing the security of transformation.

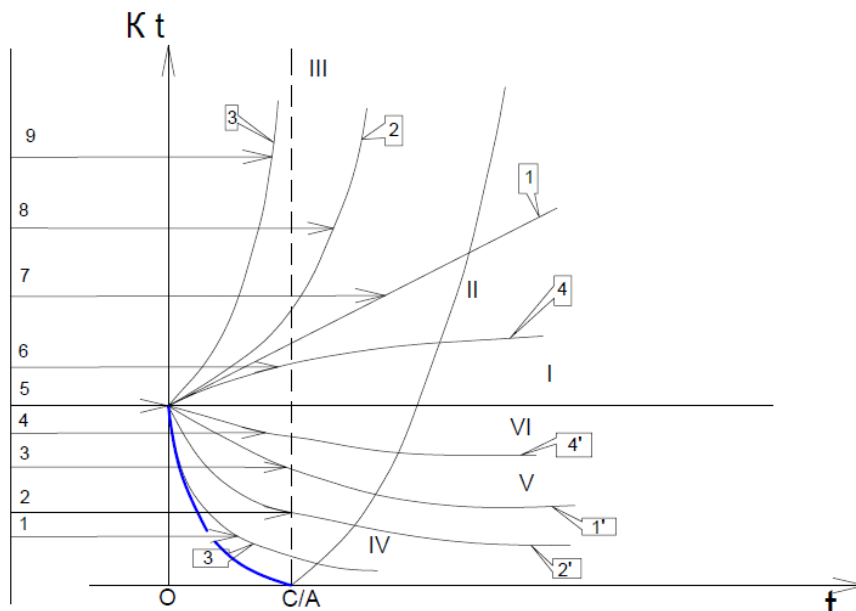


Figure 2. The effect of “capturing” the digital transformation of the enterprise at bifurcation points

Source: compiled by the authors

Thus, the introduction of a set of concepts: the density of the digital transformation of an enterprise, allows us to determine the bifurcation point of the investigated system, in which it is transformed, with continuous changes $K(t)$, $K'(t)$, $q(t)$ properties of the system itself.

The combination of the presented developments allows predicting the risks associated with the digital transformation of an enterprise in the context of a cross-industrial paradigm with all the ensuing consequences of

the sustainability, dynamics, transformation and forecast of its development vectors. And to conclude that with the digital transformation, the efficiency of any production increases, i.e. the digitalization process of the enterprise n times accompanies the increase in production efficiency not less than n times.

The completed studies aimed at studying the classification system, conceptual scheme, security density, digital transformation of an enterprise and allow us to draw the following conclusions:

1. The authors' economic and mathematical model is scientifically substantiated, based on indicators: the coefficient of development of DH, the speed of development of DH, the density of changes in the quality of DH, the growth factor of DH that allows you to predict the risks of digital transformation of an enterprise in the context of a cross-industrial paradigm.

2. It is advisable to develop measures aimed at improving such quality indicators, as: the process of training and internships, the development of programs, training reserve managers, taking into account the level of their training and ability to adapt, allowing not only to increase the efficiency of digital transformation of the enterprise, but also make the right decisions based on revaluation of components.

Theoretical and practical results obtained in the course of the work can be used to reduce the risks associated with the digital transformation of the enterprise in the context of the cross - industrial paradigm.

The totality of the presented developments allows us to predict the development and minimization of risks associated with digital transformation in the enterprise with all the ensuing consequences (stability, dynamics, transformation and forecasting of its development vectors) and conclude that with an increase in the quality of digital transformation, the efficiency of operation of any production increases, i.e. an increase in quality by digital transformation by n times accompanies an increase in production efficiency by at least n times.

4. Results

The current stage of world economic and social development is characterized by a significant impact on digitalization. As a new trend in world social development, which has replaced informatization and computerization, it is characterized by the following - based on a digital representation of information, which, on the scale of economic and social life of an individual enterprise and the whole world, leads to an increase in the efficiency of the economy and an improvement in the quality of life.

The main task of minimizing risks during the implementation of the digitalization process at the enterprise is to determine the key indicators that affect (the coefficient of development of digital transformation, the speed of development of digital transformation, the density of change in the quality of digital transformation, the multiplier of the increase in digital transformation). A comprehensive disclosure of the characteristics of digital transformation as a modern trend in world development includes the disclosure of the essence of digitalization, the features of the digital presentation of information, the prerequisites and possible positive consequences of digitalization of enterprises, the ratio of challenges, threats, possible negative consequences and risks of digitalization for an enterprise, methods of measuring the degree of digitalization coverage of a particular country, and also includes a description of the current state and objectives of enterprise digitalization.

The importance of enterprises' digitalization processes is widely covered in research by modern scientists, so it is advisable to go directly to the definition of conditions conducive to the digitization of the enterprise. At the current stage, five key elements can be distinguished (Burke et al., 2017):

1. *Definition of a business strategy* should be made before the beginning of the investment. Often, enterprise executives want to improve efficiency by introducing digital technologies. However, they do not fulfill the main task, which is to change the strategy of the entire company, and not just the introduction of several tools.

No existing technology provides the speed of product development and its implementation. It is a combination of business strategy tools and determines the company's digitalization performance. For example, one of the major

trading companies of the Fung Brands Limited Group has developed a three-year enterprise digitization strategy, the main purpose of which is the definition of company services through a mobile application. The focus was on the following areas: speed, digitalization and innovation. The main tasks of the management determined the reduction of the production cycle, the growth of the speed of delivery of products to markets, as well as the establishment of efficiency of data use in the global supply chain. Next, it was necessary to decide what specific digital tools should be used. The company introduced the technology of online design. This helped to deliver goods more quickly to markets, as well as reduce design time by 50%. Thanks to digitization, the suppliers of this company had the opportunity, through their own systems, to track data in online mode to increase operational performance. An online platform, Total Sourcing, was created, focusing on both the company's customers and suppliers. The financial department also used this approach, which reduced the closing time of the period by more than 30%. It also made it possible to increase the efficiency of use of working capital by \$ 200 million. As a conclusion, such a single technology that generates "speed" and "innovation" simply does not exist. And for each enterprise, a set of tools for digitization will vary depending on the vision of their leadership.

2. *Engaging insiders.* Most companies in the business of digitization tend to attract external consultants, who often use the universal approaches that are already formed on the basis of best practices. However, it is worth attracting internal staff, because they are perfectly aware of all the shortcomings in the company's work and possible ways to eliminate them.

3. *Customer focus.* In order to increase the degree of customer satisfaction and increase their attraction it is necessary to begin to diagnose the needs of key clients of the company taking into account the strengths and weaknesses of the company. It is impossible to achieve these goals by attracting one tool. The most effective way to find out the customer's desire is to determine the reason for the loss of customers. And software that identifies a client-locked application helps software. Next, the company's employees should determine the reason for such a block.

4. *Recognition of workers' experiences before changes.* Typically, the company's digitization involves optimizing the number of employees. And when employees understand this, it's natural that they can resist unconsciously, or deliberately, such a transformation. When such changes are carried out inefficiently, company management often refuses to introduce further changes and this does not affect the number of staff. Therefore, in order to avoid sabotage of the team, it is important to conduct an information campaign within the enterprise and emphasize that the digitalization of business processes enables to improve the knowledge and skills of the same workers and adapt them to changes in the labor market.

5. *Implement the Silicon Valley Management System at the enterprise.* Silicon Valley startups are known for operational decision-making, high-speed prototyping, and mobile organizational structures. The Silicon Valley control system can be characterized by several elements:

- changes need to be made quickly, and later corrected;
- managerial decisions should be made quickly;
- the employees of the organization should be involved in the process.

The consumer, the state, as well as the business environment, are in the process of digitization. This transformation is associated, first of all, with the development of scientific and technological progress, which caused the need for the emergence of new business models (Table 2). Highly productive enterprises in which digitalization has already taken place, to improve business models, spent in 2017 34% of its IT budget for digital modernization; according to forecasts in 2018, this figure will increase to 44% (Da Silva Freitas Junior, Gastaud Macada, Brinkhues, 2017).

Table 2. Comparative characteristics of IoT (Internet of Things) and traditional automation

Sign	IoT	Telemetry of automated control system of technological processes
Object of management	A cross-industry cross-industrial value added process that covers all its participants	Separate production area, functional part, set of processes of one enterprise
Result	Significant growth in labor productivity of all participants in the value-added chain due to ten times (as a rule) growth in resource utilization and corresponding cost reductions	Growth of labor productivity at selected sites, insignificant (per unit of percentage) increase of efficiency of an individual enterprise
Transformational influence	The cardinal transformation of production and business processes, the type of products / services, the nature of socio-economic relations	Absent
The ideology of the management system	Open	Proprietary
Affiliation management system	Cross-industrial ecosystem	An enterprise or group of companies with a common ownership structure
Terms of implementation	Weeks and months (connection, not implementation)	Years
Variability of the control system	Absent (algorithms are optimized independently)	Discrete, with a step in a few years

Source: Developed by the authors

The advantages of digitization of business processes in the enterprise:

1. Improvement of client experience. Customers are one of the key drivers of digitalization. Each day they interact with commercial and public companies, many of which have already begun to transform their activities. In such cases, the client sees that modern technology makes processes faster and easier, and therefore expects such changes from other enterprises as well. Digitalization technologies allow you to create the most personalized interaction that most customers prefer. Digital communication channels, multichannel retailing, artificial intelligence, robotics - with all this we are already faced in our daily lives. For example, the digital transformation of banks could not do without chat rooms, and pharmaceuticals are actively using modern mobile devices. Under client experience, we understand not only the interaction with the company of external customers, but also internal customers. The digital transformation of processes optimizes the work of the company's employees, which increases the productivity of each individual member of the team. For example, automating routine operations provides more time for solving really important and complex tasks.

2. Flexibility and acceleration of business processes. There is a saying: "Companies are fast or dead." In a digital economy, this phrase is more than relevant: if an enterprise does not use the capabilities of modern technology, it does not adapt to the pace and peculiarities of doing business, it will not be able to compete with those who already do it. To be successful, you need to be fast and flexible: not when it is possible, but when there is a need. The digital transformation of business processes is aimed at ensuring that companies quickly make decisions, quickly adapt work to the requirements of the current moment and satisfy the needs of customers.

3. Innovative opportunities for business development. Digitalization of business opens the way to innovative ways of enterprise development:

- cloud technologies allow one project to work on several teams simultaneously and effectively use the resources of the company;
- using the Mobile First strategy, the company receives and monetizes mobile traffic, which has already caught up with traffic from stationary devices;
- ready solutions allow you to save time on solving problems: various programs, extensions and connectors optimize the company's work and require minimal time spent on their implementation and adaptation.

All these and other technologies of digital transformation have made the entry threshold lower in many spheres of the economy. Starting your own business and developing it has become easier due to the huge number of tools that provide digitalization of industries and enterprises.

4. Use of modern technologies for working with data. Information is a key resource in the modern world. Fierce humanity generates enormous arrays of digital data, which not only occupy a place in the vaults but also help companies to conduct business. To take full advantage of the information available, you need to accumulate structure and analyze it. The digital transformation of the enterprise contributes to this through advanced technologies such as Big Data (Large Data) or Artificial Intelligence (AI, Artificial Intelligence). They are aimed at processing information flows, on the basis of which it is possible to make decisions, adapt proposals to specific clients and predict their behavior.

5. Partnership and cooperation. It is difficult to imagine a successful modern business without partners. Digitization opens up new opportunities for collaboration with other companies - and these opportunities are really amazing. For example, thanks to state-of-the-art technologies, geography is no longer an impediment to work: doing business and looking for partners can be anywhere in the world. Open API makes collaboration even easier and more convenient. For example, in the digitalization of finance, including banking, software interfaces have been used for several years. It is also worth remembering that without digitalization it's impossible to become better or to work with the best. Leading companies are already implementing digital transformation strategies and want to collaborate with those who are in line with their level of development and share their values. To the disadvantages, we can attribute such a sign, as the level of production depends on the used digital technologies. As the automation and rotation of production, production personnel are increasingly eliminated from making corrective solutions, reducing its ability to operationalize production processes (Andriushchenko et al., 2019a).

Therefore, the damage from the failure of digital systems can be more significant than with the traditional model of management of production processes. This puts forward increased requirements for digital technology. They become a decisive factor in production, which depends not only on the efficiency of processes in an enterprise but also on the possibility of their implementation, which depends on reliability and stability. In Germany, the methodology and practice of digital transformation are quite successful. In 2011, under the "High-tech Strategy 2020" plan, the German Government initiated the "Industry 4.0" project, which is based on the creation of cyber-physical systems capable of solving any production tasks, where monotonous work is currently used workers (Andriushchenko et al, 2019c).

That is, in the program of "digital economy in German" in the first place is still not a "figure", but "economy", "production". Digitization of the same production and management is only an auxiliary (albeit very important) instrument. In the future, the key driver of growth will be the continued decline in the cost of sensors and equipment, communications services, data processing and system integration (Yoo et al., 2012). The total number of connected devices in the world by 2019 will reach about 530 million units. At the same time, the largest number of such devices will be in the energy and housing and communal services sectors, in transport, industry, health and trade (Figure 3).

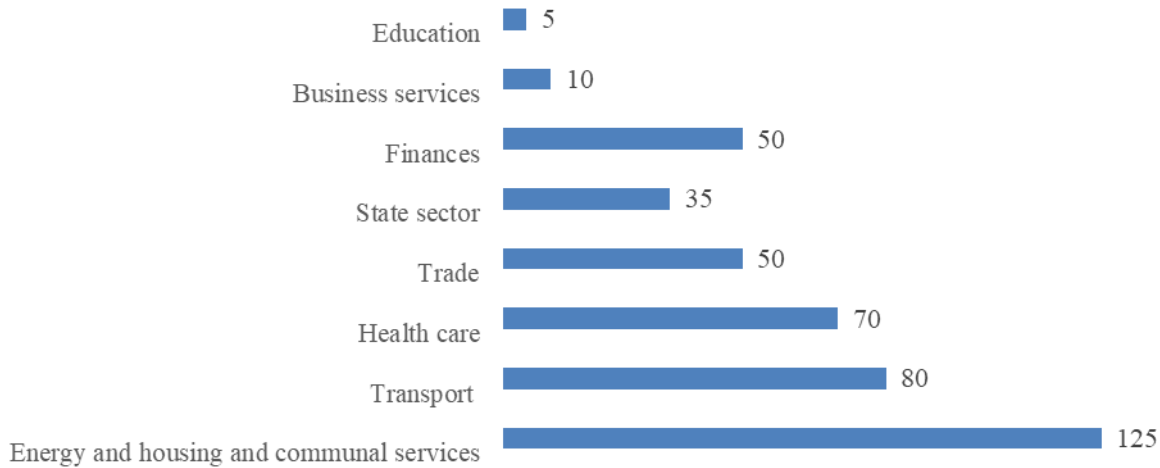


Figure 3. Number of interconnection devices in the main sectors of the world economy in 2019, million pcs.

Source: compiled by the authors on the basis of (Goodness et al., 2019)

The revenues of the global industrial market IIoT (Industrial Internet of Things) will reach 484 billion Euros in 2025, and the main sectors where this concept will be implemented will be transport, industry, utilities, and health (Figure 4).

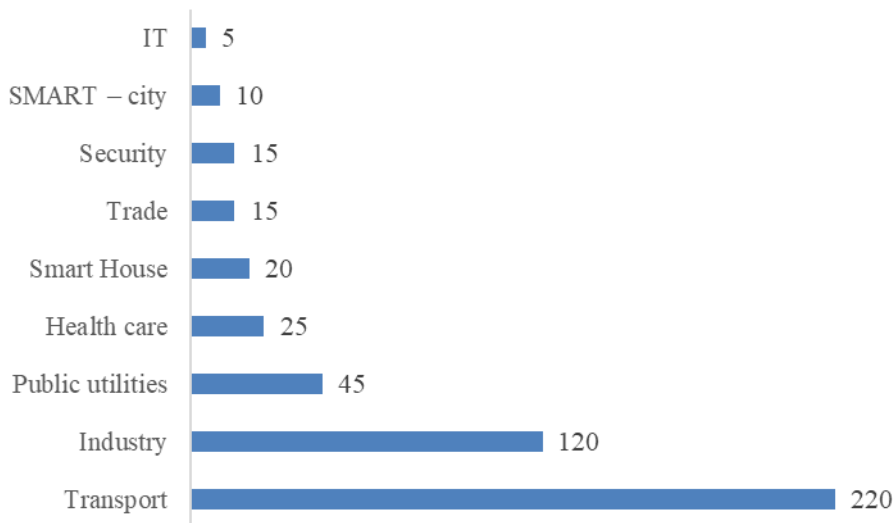


Figure 4. Revenues of the Internet market in the main sectors of the world economy in 2025, billion Euros.

Source: compiled by the authors on the basis of (Goodness et al., 2019)

An economic strategy aimed at increasing the competitiveness of companies, increasing the share of products in the domestic and foreign markets, growth of their income and, ultimately, GDP growth of the country, may be based on initiatives on the development of Internet tools, as an instrument for increasing the competitiveness of existing business, increasing the effectiveness of the management of state-owned objects, the creation of new

products and solutions in the field of Internet technologies and related industries, as well as the creation of new markets and products but based on these solutions.

5. Discussion

When developing strategic initiatives related to the development of technologies and products of IIoT (Industrial Internet of Things), it is necessary to take into account that in order to improve the efficiency and create the technological basis for standardization and automation of new markets, they must horizontally cross all vertical sectoral markets of countries, new promising market segments and technological strategies. The programs for the development of new markets and technologies are being developed in various developed countries at the state level and private companies (Figure 5). In addition, various sectoral strategies are developed at the state and sectoral associations level for the short and medium term. This is the development of both industry, electronics and information technology, and others that will be closely linked to the development of technologies IIoT (Industrial Internet of Things).

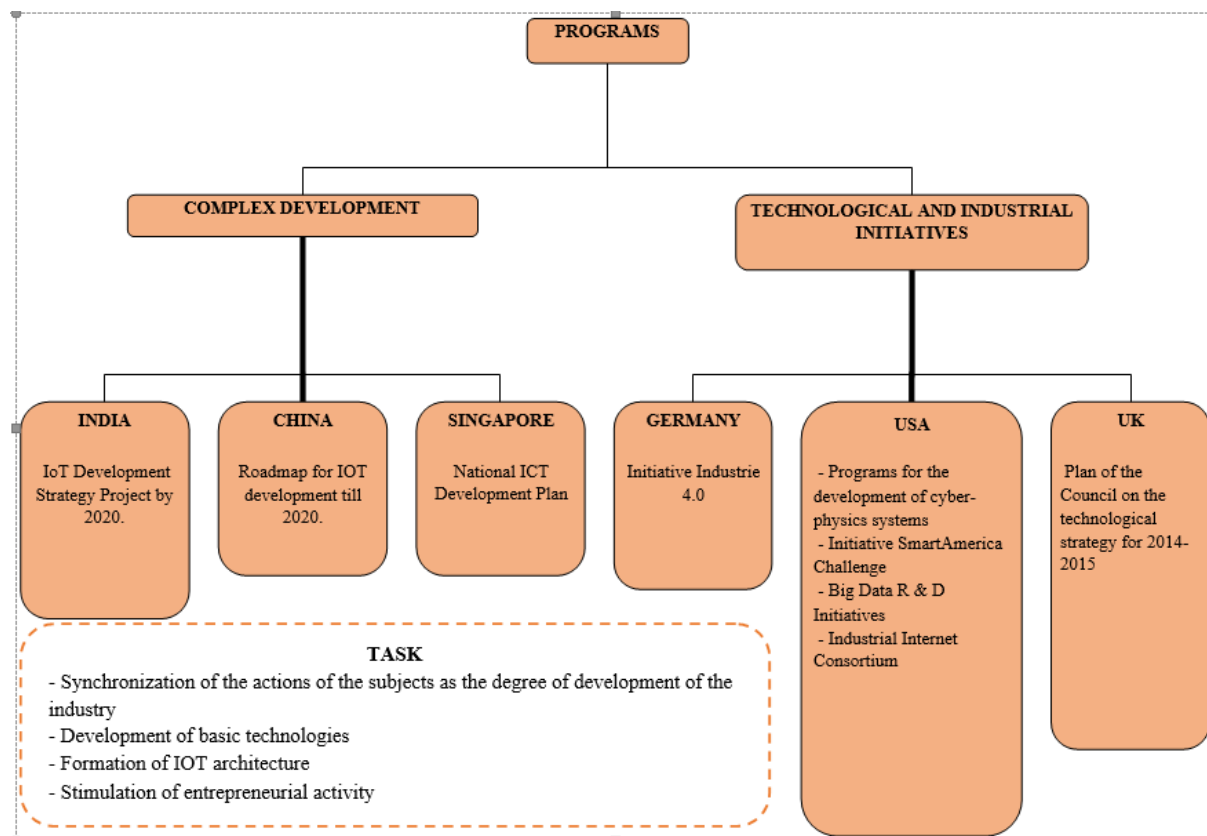


Figure 5. State Programs for Online Support, grouped by country

Source: compiled by the authors on the basis of (Alexander, D. and K. Lyytinen, 2017)

Thus, the digitization of an enterprise in German (and not only German) practice is aimed, first of all, at conducting "new industrialization". It is implemented not by expanding existing products and creating their analogues on the basis of modernization, but by creating new enterprises on a new technological basis, based on the "figure". This allows achieving the objectives of the German strategy, among which: "providing high quality

end-services or products with the least value in any quantity: both large and small; wide customization of products under the condition of flexible production; introduction of methods of self-optimization, self-adjustment and self-diagnosis" (Andriushchenko et al., 2018).

A similar view of digitalisation, as an instrument for improving the efficiency of economic, in particular - industrial, is also observed in other countries. In same Germany, the main emphasis is on optimizing production, developing technologies to increase the efficiency of industry and expansion into world markets. In the US, businesses focus on business models based on digital data processing, and on the implementation of IT-platforms management. Japan has taken a course on a combination of optimization of production and the introduction of new digital business models. China is trying to technically upgrade, modernize production with the use of modern digital equipment.

Conclusions

The digitalization of the enterprise is essential for today and offers great opportunities both for companies and for the society at the expense of new business models, or by creating new forms. In order to take advantage of these opportunities, companies and employees of the company must be able to change themselves. To a greater extent, the digitalization of the enterprise focuses on the business process (operational activities), which broadly includes: changes in products, processes, organizational structure and management concepts, thus transforming into a company strategy (Andriushchenko et al., 2019b).

The digital transformation of the enterprise is considered by us as the modern stage of the information revolution, the specificity of which is to expand the practice of using data in a discrete (digital) form. Digitization affects different aspects of social development, but the most significant transformations are expected in the industry, which has a qualitative upgrade, including the transition to cross-industrial digital production economical systems.

Due to the technical and organizational complexity of the formation of such economical systems, the high risks of their development and successful implementation, the state plays an important role in the work on the digitization of industry. The significance of state regulation and support of new digital technologies is confirmed by both domestic and foreign experience. As a result, measures to digitize the industry should be incorporated into the state industrial policy. This will allow at the expense of digitization to solve the urgent tasks of accelerating industrial growth, the creation of import-substituting industries, the increase of labour productivity in industry, and so on.

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