

Adaptation to Digitalization in Supply Chain Management

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Abstract- The purpose of the study was to find out the possibilities of adapting states to global trends in the digital transformation of the main spheres of life for survival and development in an emerging multi-polar world. The work was done as part of a grant from the Russian Foundation for Basic Research and discloses the results of the initial stage of its implementation. Our task was to develop a conceptual vision for solving the problems of adapting states to global trends in digital transformation and to justify the mechanisms for its implementation in practice. Information for the study was compiled from scientific literature, the Internet, statistical reports, and other open sources available for use. In the theoretical part of the study, we needed to clarify such concepts as "digitalization in supply chain management" and "adaptation", justify the manifestation of their basic functions, identify and describe such new global trends in digitalization in supply chain management that affect adaptation, as the dominant role of states in this issue over other participants in digital transformations; their massive, comprehensive nature, high speed and irreversibility of digital transformation; recognition of intellectual capital as the undivided dominant power of digital transformation and the displacement of cultural and spiritual factors of human development into the background. Contrary to expectations, we came to the conclusion that the adaptation of states to the global trends of digital transformation in the main areas of life is facilitated by the timely identification, understanding of global changes and the implementation of strategies for adapting institutions, business entities, the population and society to future changes using special rules, mechanisms and decisions set out in the paper. The recommendations arising from this study can be applied at the state and interstate levels of government when developing strategies, programs, regulatory documents, regulations and standards governing adaptation to digitalization in supply chain management. They are useful for business corporations and public organizations which professional interests extend to solving the problems of socialization and adaptation of people, taking into account the diversity of cultures and national identity of citizens.

Keywords: digitalization, supply chain management; irreversibility of digital transformation; adaptation; buffer adaptation function; conversion function of adaptation; communicative space; new trends in the survival of states; sustainability of a multipolar world; human cultural and spiritual development

1. Introduction

The modern world is moving towards a special form of existence, in which high information digital technologies

supported by a multipolar world order, dominate. Under the influence of a new form of existence and global development trends, people, markets and main areas of life are rapidly changing. This is facilitated by the development of virtual space and the transfer of a significant part of the relationship into the electronic environment. 82% of organizations get broadband Internet access, 23% use cloud services, 19% use ERP systems, 12% use electronic sales, and 6% use RFID technologies [1].

New opportunities allow for a large-scale transformation of organizations, global companies, industrial enterprises and almost all areas of life support. This transformation is not limited, as before, only to the introduction of modern equipment or software, but includes a change in technology, external and internal communications, corporate culture, all management, as well as cardinal changes of a human as a person, individuality and professional requiring adaptation.

The transformation is directly related to digitalization in supply chain management, which significantly affects the current stage of world economic development [2] and, in our opinion, is the activity of the government, business, interstate, public structures and persons themselves to introduce digital technologies and their use in various spheres of life. Together with adaptation, it contributes to the global reorganization of the world in the direction of multipolarity with the help of systemic digital changes on a planetary scale in all spheres of life. The hierarchy of these changes permeates all levels, reaching the consumer of a specific material product or service to increase their level of satisfaction, as well as to increase employee productivity, and to gain a reputation for modern and progressive structure.

Studies show that the economic basis for multipolarity and the formation of new centers of power is the diversity of economic development models and the cultures on which they are built. In other words, the creation of a multipolar world model involves not only economic, but also essentially inseparable ethnocultural factors [3], since each global economic zone constitutes its own ethnocultural community. This stimulates the desire of many states to actively return to their own ethnocultural civilizational roots, which is very important to consider when adapting, so that adaptation to external digitalization in supply chain management conditions could not destroy the value orientations of states.

From an economic point of view, digitalization in supply chain management is aimed at developing innovative business models [4], long-term competitive advantages, increasing profits and income, and obtaining additional resources to solve social problems. From a

geopolitical point of view, this is perceived as maintaining the global trend in the development of multipolarity, consolidating its components and establishing the stable position of this phenomenon.

Large-scale and cardinal changes in the direction of digitalization in supply chain management necessitate the constant adaptation of a person, organizations and the entire system of life to changes. It is necessary to adapt, because changes occur around them and independently of them [5]. However, not all states are ready for adaptation. The very nature of this phenomenon has not been fully studied, the dependence of adaptation on world digitalization in supply chain management trends has not been studied; there are no generally accepted rules for its implementation. Often, the digital transformation of states leads to the loss of their sovereignty depriving people of value orientations, and also to destroying the nature of the human reproductive basis.

The search for modern ways to adapt to digitalization in supply chain management is an urgent task, taking into account new trends in the survival of states in a changing world.

2. Literature Review

Considerable attention is paid in the scientific literature to the issues of adaptation to digitalization in supply chain management, and the range of those publications is quite wide. A number of researchers study the essence of digitalization in supply chain management [6-8], its global nature [9, 10], mobility [11], processes [12], impact on the economy, education [10], taking into account the activities of states [13], and also try to measure it in order to understand how to adapt to this phenomenon. Others consider the very essence, levels, technologies, and adaptation mechanisms [14-20]. However, adaptation to digitalization in supply chain management, from a systemic point of view and the mutually conditioned relationships of its participants, caused by the manifestation of new trends in the survival of states in a multipolar world, has not been practically considered and is only just beginning to be studied.

3. Materials and methods

Dynamic, structural and situational analysis based on statistical measurements of the phenomena studied and a detailed study of the documents regulating their manifestation were the leading methods that made it possible to investigate adaptation to digitalization in supply chain management, to explore new trends in the survival of states in a transformed world in time, space and in close interconnection with others phenomena. A systematic approach was used to assess the state of adaptation of the most successful states in this matter with the help of an indicator representing the amount of value added per 1 employee in the information and computer technology sector of the states that were able to best adapt to the conditions of digitalization in supply chain management and create an appropriate climate for this.

4. Results

The harbingers of adaptation are global digitalization in supply chain management trends, the identification and understanding of which allow us to timely develop strategies for upcoming changes, rules, mechanisms and

tools for its implementation. Among the new global trends that determine the fate of digitalization in supply chain management and the use of its capabilities, both globally and in the context of individual countries, as a result of the impact by which the world is forced to adapt differently to the ongoing changes, the following stand out:

- The dominant role of states in this matter over other participants in digital transformation;
- Large-scale and comprehensive nature, high speed and irreversibility of digital transformation;
- Recognition of intellectual capital as an undividedly dominant power of digital transformation and the crowding out of the human cultural and spiritual development accompanied by the replacement of the value orientations of a civilization.

Adaptation is a kind of filter for a state, society and business entities, having passed through which the subjects of relations are transformed within the framework of visible and invisible, but really existing laws before entering a new communicative space.

At the present stage of digitalization in supply chain management of the world economic system, two main types of adaptation dominate: buffer one which softens and weakens collision of economic systems, and adaptive collision implanting economic systems in new conditions.

Adaptation requires management representing a process of deliberate impact on its factors to achieve strategically important results. First of all, the states themselves must be able to adapt to the conditions of digitalization in supply chain management and have appropriate strategies for adapting institutions, business entities, the population, and society.

5. Discussion

By adaptation, we mean a person's interaction with the internal and surrounding external environment of the world of relations that allows it to survive, reaching the development goals in the most rational way, while preserving the living environment. It is advisable to consider adaptation as a kind of filter for society, the state and economic entities, through which they are transformed within the framework of visible and invisible, but really existing laws. It transforms the vital system before it enters a new space. The need to adapt human societies to the environment determines the development of special models of their behavior.

At the present stage of the world economic system digitalization in supply chain management, two main types of adaptation dominate. The first type is associated with adaptation buffer functions (buffer adaptation is mitigating and easing collision), and the second is associated with adaptive functions (adaptive adaptation). Relative to society as a whole, the buffer function of adaptation is performed by culture as a special phenomenon that contains the essential foundations of the people, and which acts as a connecting link between a person and his environment. The diversity of cultures predetermines the diversity of forms and levels [6] of adaptation and interaction of a person with his environment, making it possible for a variety of forms of managing and living in digitalization in supply chain management.

For adaptation to be successful, it is necessary to develop suitable concepts, rules, mechanisms and tools for its implementation. To begin with, we will try to

comprehend the global trends in the development of high information technologies which are strategic harbingers of change and adaptation, in order to understand what the changes will be and what the ordinary person, staff of organizations, society and the state will have to adapt to in a rather complicated world.

One of the global trends that determine the fate of digitalization in supply chain management and the use of its development opportunities, both globally and in the context of individual countries, is the dominant role of states in this issue over all other participants, confirming the correctness of the idea by a Nobel Prize winner J. M. Keynes [7] about the usefulness and necessity of pursuing macroeconomic policies for long-term growth, but in modern conditions, through the use of new tools and communication space.

The digital economy formation is provided by state authorities [8]; states make decisions on launching large-scale system programs for the development of information and communication technologies and the economy of a new technological generation accompanying them with financial and managerial support within the framework of the identified priorities. The legal basis for such decisions is the Constitutions of countries, specially adopted laws and Development Programs, and other regulatory and legal acts [9] which regulate the sphere of information and communication technologies in relation to the formation of a new technological basis for a digital economy, and public-private cooperation in the field of digital innovations. With such cooperation, it is easier to balance the interests of business and the state, since their capabilities and risks may be in equilibrium [10]. The role of business in this regard is very significant, because, following the strategic plans of the state and driven by competitive principles, it seeks to create its own technological, managerial and other advantages over rivals.

Consequently, it is the states that should first of all be able to adapt to the conditions of digitalization in supply chain management, having shown this using the example of digital government [11] and have appropriate strategies for adapting institutions, business entities and citizens. States can either facilitate or hinder countries from adapting to digitalization in supply chain management.

Competition can also streamline adaptation, but in combination with state regulation this process will be more successful, since it requires the implementation of strategic approaches to changes on a state and interstate scale, which is not entirely characteristic of business. States also determine the rules for adapting the economy, involving business and society in this process. It is one thing to adapt to the digitalization in supply chain management of the economy according to in-country standards, and another according to international ones. To make such a choice, first of all, each state needs not only to get an answer to the question of how and in what area the country's economy is able to maintain international standards in terms of ensuring the growth and sustainability of macroeconomic indicators, but also to decide what values it will be guided. The priority in adaptation should not be in relation to the economy, engineering or technology, but to nature, since man is a natural phenomenon.

Establishing the priority of society's adaptation to nature, the state proceeds from the fact that it is due to the need to preserve nature as a human reproductive basis. This

allows us to save both man and nature, to adapt man to nature through his own changes, and then to the economy, engineering and technology. Thus, the choice of digitalization in supply chain management values in the implementation of its strategy remains with the state which strengthens its dominant role in the development of digitalization in supply chain management in comparison with other participants.

And finally, in addition to the mobilizing role, states perform the functions of monitoring their decisions and adjusting strategic priorities coordinating the relations between government, business and society subject to digitalization in supply chain management.

Another global trend of digitalization in supply chain management on a global scale is its large-scale and comprehensive nature, high speed and irreversibility of transformations, as a result of which the whole world is forced to adapt to the changes that are taking place.

For example, by the end of 2018, 5.1 billion people worldwide have signed up for mobile services, which is 67% of the global population and it is expected that between 2018 and 2025 their average annual growth rate will be 1.4% [12]. The rapid flows of data and information are now becoming so massive that they create greater economic value than the entire global trade in goods [13]. The speed of digital transformation is so high that, compared with the industrial revolution, the changes it causes are ten times faster, 300 times larger, and have 3,000 times greater impact on production processes and related relationships than the industrial revolution's scale. In addition, the use of a number of digital technologies, psychological management technologies, personality socialization, and changes in corporate culture can change a person so much that they can make the processes of digital transformation in the main spheres of life largely irreversible.

Now it is almost impossible to find any area of activity in which adaptation would not occur. If we are talking about an organization, then all aspects of its activities: [14] cultural, technological, organizational and managerial, are forced to adapt. If we talk about an ordinary person or staff, then its socio-cultural, personal, individual and professional components are adapted.

For example, in Germany, China, Japan, and in the USA, which have achieved success in introducing digital technologies into the non-productive sphere of the national economy, attention has long been paid to mass retraining and adaptation of personnel to the digital economy [15]. The issues of adaptation of the managerial personnel working across the interests of various departments forced to interact due to the need for joint solution of tasks in the context of the development of digitalization in supply chain management and large-scale transformation do not remain without attention. Similar issues are being studied in Russia. In particular, attention is paid to the adaptation of managerial personnel, ensuring interdepartmental interaction between various organizations working on large-scale projects of national importance.

Thus, adaptation to digitalization in supply chain management is an urgent need to adapt an average person, management personnel and organizations to a constantly changing environment. The better the adaptability of these entities, the higher the efficiency of their activities.

The success of adaptation of one or another country of the world community to digitalization in supply chain management can be indirectly characterized by the indicator of the amount of value added achieved per 1 employee in the IT sector, who were able to best adapt to its conditions and create an appropriate climate for this [16]. We will divide the 15 most successful European countries in terms of value added per 1 employee in the IT sector in 2017, into three equal groups of countries, with values from 172 to 41 thousand US dollars.

The first group, with values from 172 to 132 thousand US dollars, included the following countries: Norway (172), United Kingdom (163), Belgium (156), Sweden (142), and Germany (132). Here are the highest values of this indicator. On average, it is 153 thousand US dollars in the group. In the second group, with values from 128 to 59 thousand US dollars, countries such as France (128), Finland (119), Italy (105), Russia (75), and Czech Republic (59) were included. Here are the mean values of the indicator we are studying. They are equal to 97 thousand US dollars per one country in the group. The third group, with values from 54 to 41 thousand US dollars, included the following countries: Estonia (54), Hungary (48), Poland (46), Lithuania (41), and Latvia (41). Here are the lowest values of this indicator. On average, it is 46 thousand US dollars in the group.

If we compare the minimum and maximum values of this indicator in each group, then in the first of them the difference is 40 thousand US dollars, while in the second it is equal to 69 and in the third it is only 13 thousand US dollars, which indicates the available reserves of growth of the considered indicators in all groups of countries. Moreover, in the second group of countries they are the highest, in the first they are less high, and in the third are the lowest, although in comparison with countries of other groups there have most of all reserves for growth.

Thus, the adaptation results in the countries under consideration have reserves for improvement, and each country has its own capabilities.

A more in-depth analysis [17] of the studied countries shows that the development potential of states from various groups is quite asymmetric. This leads to the likelihood of a widening of the emerging digital gaps between them; in order to avoid this, it is necessary to especially motivate business entities so that they can fully realize their capabilities as a key driving force of the digitalization in supply chain management process.

In most cases, adaptation performs a transformative function, since it modifies all processes, constantly adapting them to the changing conditions of the internal and external living environment. In fact, it supports and develops the diversity of cultures, traditions, and ways of life, natural, economic, business and political systems, making the multipolar world diverse, harmonious and sustainable, and creates the conditions in which a person is in a state of dynamic equilibrium.

Adaptation is also important because it acts as a "filter" before an organization enters a new environment and another communicative space. Having passed through this "filter", the organization is transformed and fits into its unusual environment, without violating its integrity, configuration, internal and external relations, and contributing to mutual development. The role of the "filter" is performed by the corresponding systems of institutions,

laws, norms, rules, regulations, traditions and values. Transforming the organization, adaptation develops its corresponding immunity in relation to the internal and external environmental influences that do not fit the institutional canons. If everything goes according to institutional rules, then organizations that adapt, for example, to digital management tools, get the maximum benefit from their use. With the full adaptation of management to the changes occurring as a result of the transformation of an organization, the investments made in its transformation bring business community the results it has expected.

Adaptation of an organization requires management that represents a process of targeted impact on adaptation factors to achieve the expected results. The need to manage adaptation is associated with minimizing the likely damage to the organization caused by future changes. The success of an organization's adaptation is largely determined by its property such as adaptability, i.e. the ability to transform their intellectual, managerial and other components in the process of change, while maintaining basic stability and ensuring the growth of performance. By the way, management must also be adaptive in the face of change. This is one of the main requirements for change management. It should have the ability to quickly and flexibly respond to any changes in the environment and develop adequate management teams to minimize the effect of factors disturbing the system.

We can distinguish a number of fundamental principles of organization adaptation, or peculiar hierarchically built rules on the basis of which adaptation is carried out; preservation of historical, cultural and spiritual values of the people, not adaptable to the conditions of another civilization; the dominance of Russian laws over foreign ones during adaptation; human development on the basis of the principles laid down by nature and preserving in it.

The study shows that successfully adapting organizations have a number of special properties: the leader's conviction and willingness to go to the end of the organization's transformation process, as well as high personal responsibility for the results; quick training of personnel and management team expressed in willingness and ability to learn; low level of natural resistance of the team to changes; flexibility manifested in the ability to change its configuration and functions; focus on accelerated implementation of complex projects and integrated programs; the pursuit of large-scale solutions that bring success.

Organizations can adapt to external and internal changes through the creation and operation of special personnel adaptation services, the main tool of which is the formation and implementation of adaptation programs. Adaptation services can be both independent and be part of other functional units. In addition to the program, the functions of adaptation managers must necessarily include the formation of communications and the preparation of teams capable of generating creative adaptation ideas, with elements for ensuring their implementation.

Another global trend in global digitalization in supply chain management is the recognition of intellectual capital as an undisputed dominant force in digital transformation. Cultural and spiritual development of a person comes to the background and begins to lag noticeably, reducing the ability of civilization to adapt to ongoing changes without

losing value orientations. At the same time, the dominant force that saves states from death in the most difficult times of their existence has always been the strength of mind inherent in man by nature, for which no less resources were allocated than now for digitalization in supply chain management and informatization.

Now there is a significant advance in the pace and scale of informatization and digitalization in supply chain management compared with the speed of cultural and spiritual development of human potential, originally laid down in it by nature. As a result, it becomes increasingly difficult for a person to adequately respond to changes, and the risks of losing cultural and spiritual competencies of human resources are growing. In addition, the creative (demiurgic) capabilities of a person focused on the implementation of tasks and contributing to the transformation of ideas into real actions are significantly behind.

Digital transformation requires a wider use of all human capabilities. A role in this is played by education. There is a need to increase the volume and pace of continuous training and retraining of employees throughout their lives, since only a sufficient individual level of intellectual capital can allow an employee to master the necessary new knowledge at any age and ensure their effective use. This is also caused by the constant increase in the science-intensive production and the market of intellectual products and services, which leads to the dominance of personnel with a creative intellect, skills in effective innovation, and extraordinary ability to manage human resources using digital technologies.

60% -70% of the Russian population should possess digital skills [18]. It should be understood that the problems of youth retraining for new jobs created as a result of digitalization in supply chain management and automation of high-tech, knowledge-intensive production do not threaten Russia. The pace of digital transformation and the systematic nature of its implementation here is not so high that youth training does not match their growth. Now and in the long view, the problems of youth employment in well-paid jobs requiring knowledge of digitalization in supply chain management are more acute than the shortage of youth to work there, especially in the capital centers of the regions.

Youth are at risk of unemployment to a greater extent, due to the lack of high-tech and highly motivated jobs. In Russia, the territory is so large and the amount of its own resources is so huge that it was possible to engage in work in high-tech industries not only young people, but other categories of the population, if such industries were created in accordance with the existing needs for their products in the domestic and foreign markets. Digital production could significantly increase labor productivity and product quality [19].

Russian youth is extremely talented, is traditionally prone to education, and loves to study. It only needs the care of the state, motivation and the provision of opportunities to get relevant work. Most able-bodied Russians will be able to retrain, but it is important for the state to work out in advance the adaptation mechanisms for digital transformation of high-tech jobs, stimulating the creation of new enterprises, motivating business in this, and supporting entrepreneurial activity as an additional source of job creation.

6. Conclusion

The survival and development of states in an emerging multi-polar world largely depends on their ability to adapt to global trends in the digital transformation of life processes. This is facilitated by the timely identification and understanding of global changes and the implementation of strategies for adapting institutions, business entities, the population and society from various states to future changes, using special rules, mechanisms and decisions outlined in the paper, which allow developing the necessary economic policies and applying the most beneficial practices, and also global competitiveness [20].

Conflict of interests

The author confirms that the submitted materials do not contain a conflict of interest.

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