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THE SOURCES OF TURBULENCE IN THE FOREIGN BUSINESS ENVIRONMENT OF THE POST-INDUSTRIAL ECONOMY

Summary. The article deals with the special nature of the business environment variability, which more often becomes vortex-like turbulent and becomes riskier. It is proved that in order to succeed in a post-industrial society, modern business needs to resolve the dialectical contradiction between the material and the “digital” world since informational and energy competitiveness of technologies and business systems becomes the priority of economic development. It is determined that Ukraine is still in the “timeless” space between the era of the “economy of the past” and the era of the “economy of the future”. Such results can be explained by the rhythm of the economy, that is, the variations in the activity (agitation) of the functioning system on the information signal coming from the internal-organizational and external-organizational environment.

Key words: post-industrial economy, turbulence, information logistics, business, economic systems, models of economic development.

Introduction. The uneven economic development of the countries, regions, and territories is often associated with a change in the sectoral structure of business (economy), while

the variability of interests and trends of the business process is explained by changing conditions of resource support for the development of enterprises and industries and the influence of

technological and entrepreneurial innovations. Such sources of volatility are the basis of the gradual evolution of business and the economy. But in the 21st century, the global business environment has acquired qualitatively new signs of turbulence due to the emergence of new sources of volatility in the business systems' content. Under modern conditions, the nature of the environment volatility has changed: it increasingly acquires voracious turbulent forms and becomes riskier. It manifests itself both in changing the frequency, nature of the economic, financial, technological, social crises, and in the possibilities of forming prospects. There occurs a qualitative complication of the conditions for making the forecast of business development horizons. Such circumstances in the countries catching up with modernization, make it difficult for the firms to face the conditions of competition and the conditions of economic equilibrium because without a successful and timely chosen strategic plan of business development it is impossible to achieve the planned level of competitiveness, to compete for markets and consumers. The high volatility of the business environment is often associated with the complexity of modern markets and technologies used in the business environment for the production of competitive goods; the instability of the global financial situation; the waves of business conditions and changes in technological levels.

The problem under research was studied in the following publications. The complexity of markets was investigated in the works by M. Allais (1985); the cyclic nature of business dynamics was covered in the works by Kydland, F., Edward, C. & Prescott, E. (1982). The role of innovation as a source of economic change and the determinant factor of competitiveness was studied in classical papers by Schumpeter J. (1989). The signs of the post-industrial era and the origins of its complexity are highlighted in the works by D. Bell (1999), T. Sakaya (1999), A. Toynbee (2006), E. Toffler (2004), V. Inozemtsev (2000), V. Savchuk (Sakayya T., 1999), A. Chukhno (2008). However, it should be noted that all these studies consider the listed areas of the business process from a certain perspective, separate from economic life, that is, without taking into account the inverse influence of the information space, the complexity of the external environment impact on the operational development of the entrepreneurial process and its innovations.

The urgent problem to be solved today is to develop rational options of the firms' behaviour in the new economic conditions, that is, post-industrial ones. It is worth paying attention to searching for new models of understanding the nature of the "new business", to defining generators, the complex nature of the business external environment. It is of utmost importance to consider the opportunities of using new forms and mechanisms of economic complexity, which are conditioned by the current development of information systems, information technologies, and in business processes. It is of practical significance to respond the questions: what should the focus be made on, and what should the firms of the catching-up countries be prepared to adapt to in the post-industrial era?

The purpose of the article is to identify the features and origins of the "new economy" complexities, its impact on the nature, changes, and specific features of doing business regarding the possibility of choosing the vectors of the domestic business development.

Results of the research. Economy, society, ecology, business processes, civilization and nature co-exist in certain formats of interaction and competition. Information and information systems are the basis for the civilization process to organize itself. Nature provides resources for creating man-made information systems. In the most general sense, information systems are certain combinations of complex

components of natural and/or technical signalling systems. The simplest are the signal transmission systems. They are fundamentally identified in the works by Shannon, Hartley, and Ashby as an activity (functional) triad: the source of the signal – the channel of transmission – the signal detector. Signal information, under certain conditions of self-organization of a new complexity mode, can be transformed into semantic information. Complex interactions between the triads of signal and semantic information formed by individuals and teams as carriers of information and signals in the network with cybernetically motivated re-entry can organize themselves into social information systems. At the same time, in a new self-organization mode, the level of the system's complexity increases again. Information systems of social nature are the domain of knowledge existences, channels, communications, communicators, and the area of media carriers' interaction. And in this sense, the economic system as a whole is simply a special information system.

The system of business management, in a sense, is also an information system supplemented and coordinated by managers (as populations) and resources (as a reservoir). The carriers of information in the economy and business are people, objects of labour, products of labour, means and communications, products of communication (Luhmann N., 1991).

Economic activity is a special kind of communication and information. We can talk about the information environment of economic activity, information mechanisms of coordination, spontaneous mechanisms to produce market information. In all these systems, the role of sources, channels, and detectors of information before the 21st century was performed, as a rule, by analogue models of information transformation and recognition. With each stage of economic development as a whole, improving the quality of the attributes of analogue information media has led to improving the power and complexity of the economic system.

The process of information systems' development in the 1950-1980s resulted in the emergence of cultural, institutional, technological, and social changes in industrialized countries. To a large extent, these changes were prepared and induced by the global political competition of the two groups of industrial countries. The countries of one group functioned on the basis of the capitalist market system of power and management, and those of the second operated on the basis of the communist party, state-bureaucratic system of power and management. From the standpoint of the democratic nature of the sources and media functioning, these groups belonged to two different classes of information systems and different classes of organizational and information meta-technologies, that is, to two different classes of contingency (the term proposed by N. Luhmann) (Luhmann N., 1991).

The power and prosperity of the industrial era of mass production in the industrialized countries were symbolized by the nuclear power plants as a powerful source of "inexhaustible" and "cheap" energy obtained in a high-tech way. This industrial era has actually started in connection with the access of the economy to a new energy source – oil. Such "resource circumstances" gave impetus to the emergence of new types of shipment, transport; formed the basic challenges of optimizing transportation, production operations. In this epoch, in order to be effective, several countries also managed to open up an even more powerful technological energy source in the framework of the inter-country competition paradigm and the similarity of the country's special function. It is a nuclear energy that was "vitality" necessary for the growth of industrial economies.

Thus, in industrialized countries in the 20th century, there can be observed a positive influence of the information and

economic systems' development, on the basis of business subjects' self-organization. However, one should remind Ukraine an example, where the Chernobyl technological catastrophe demonstrated the inadequacy of mechanisms for forming the "parallel" complexity of economic and information systems.

The 1986 Chernobyl disaster contingently and logically dampened the results of an entire era of economic, technological, and information development of the USSR. This disaster had certain specific sectoral informational and technological causes: the low efficiency of the reactor control and protection system was 18 seconds (while at other reactors it was 2-4 seconds), which prevented the control and protection system from coping with the fast-moving processes; inefficient, on the profile of the information response, field of energy allocation, which, together with the disadvantages of the reactor control and protection system, created the prerequisites for the formation of the temporarily uncontrolled active zone in the lower half of the reactor with an unacceptably high rate of power growth in the event of the reactor emergency protection.

From the viewpoint of the general development of modern information technologies and information logistics, the critical role in the possibility of the accident emergence and development was played by the fact that the developers of the Chernobyl Reactor RVPK-1000, knowing about its structural flaws, did not notify the operational personnel about this and did not instruct them how to act in order to prevent them. They did not inform the society about the operational risks. In the end, there were no laws regulating the handling of nuclear energy technologies. From the viewpoint of industrial logistics, the absolute disadvantage was that the project and operating norms did not provide for monitoring devices and informing operators about the operational reserve of reactivity as the basic risk parameter. No automatic protection of the reactor was envisaged, provided that the risk parameters went beyond the set limits. But the worst thing was that the society and the management bodies were not made aware of the need and possibility of public control over the safety of such complicated economic and technological systems as nuclear power.

Thus, it was the Chernobyl catastrophe itself that can be considered an indicator of the bifurcation zone of industrial development in Ukraine and a change in the bedrock of its "economy of the future based on information resources."

In fact, it was this bifurcation of the evolution of economic and technological environments that made it possible, during the period of 1986–1996, to form two types of alternatives: progressive and regressive. The type was determined by the choice of how the technological challenges are to be solved: the need to construct shelters by means of robotics (i.e., the development of cyber systems); creation of new information systems monitoring the safety of reactors and production facilities (based on cyber systems' sets); creation of new powerful construction machines; search for innovative developments of alternative energy sources; the development of territorial production and information logistics in the exclusion zone and not only there; development of new innovative materials; development of new telemonitoring devices.

A progressive alternative should be that in response to the new technological challenges in Ukraine, new creative projects and teams could be formed in such a way as listed above. But such decisions were not taken. As a result, a "passive" regression alternative was chosen, in which the country's own manufacturing and technological potential and that of domestic business did not increase.

Ukraine is still wandering in search of the ways towards the "economy of the future." Of course, the foreign experience of creating the economy of the future is valuable. But under new conditions of economic turbulence, it cannot be

used on the principle of similarity (copying) as it worked in the industrial economy. However, as an exception, one can cite the experience of China, which managed to be successful in the period from 1990 to 2015. Although they also used not only the copying strategy but also powerful special organizational technologies for the parallel strengthening of their own industrial potential.

Scientists call the modern stage of economic change in the leading capitalist countries using quite diverse categories: post-industrial economy, information economy, knowledge economy, new economy, creative economy, digital economy. And in reality, these concepts identify one or more content features of economic change. However, the features of the post-industrial economy may vary depending on the country. For example, they will be significantly different in such leading countries as Germany, the USA, and Ukraine. Differences in the features of the "new economy" will be determined by cybernetic systems in information technologies, the development level of management, logistics, consumer behaviour, and the effectiveness of state policy and the level of development of the society as a whole. A huge role in this is played by software industry and digital space. We want to emphasize that the economy of the future in Ukraine cannot be built only as a virtual reality in the digital space. The real "economy of the future" all over the country cannot exist without step-by-step materialization, that is, without the material production of a new technological quality. The new economy should be able to create technologically new products needed by all segments of the country's consumers; to exist, to function, and to be reproduced as a holistic synergistic information system without interruptions in communication channels.

Of course, digital technology is the source of new business solutions. The exponential growth rate of complexity began when certain information management, business and economic information systems became to be grounded on digital technologies. Digital information systems at the present moment exist in the global, national, regional, micro-level, branch, local, collective, and individual dimensions. They are usually based on digital information technology. Information technologies themselves can be interpreted in terms of the degree of interaction with the economic system and country-wide, and on the level of a firm as: a new auxiliary functional component of the operating system; a basic component of the operating system; the technological basis for the production of goods or services; a base for expanded reproduction of the technological structure of a certain mode of production.

In Ukraine today, there has developed such a powerful separate segment of making the information technology product as software development and operational preparation. But there is no its application in the country, that is, economic materialization in the chain of values' creation-reproduction in domestic business. Therefore, it is not worth hoping that this only digital segment of the modern economy will become the growth zone of the "economy of the future" without the system of additional efforts.

The main causes are the gap in such a process, when the information turns into knowledge, then knowledge contingently materializes in technology and projects, then technologies and projects reproduce the economy transformed into the material and informational basis, and accordingly, there exists a space of quasi-open cycles of self-organization "knowledge – information production – technology – material production – knowledge". Such an induction-cybernetic cycle of producing value almost "directly" accelerates economic and technological processes and causes the unevenness and turbulence of the global economic system. As a result, a new level of the economic system's complexity is formed, and it

becomes a set of economic and technological components of various fractal dimensions. Such a new economic area is created by the interaction of subjects of a different fractal nature, which complement and reveal the content of each subject's functioning in a number of operating chains. If during the era of mass industrialization in the processes of modernization there operated the principle of similarity and gradual alignment of quality based on copying industrialization, under the new conditions there operates a paradigm of fractal algorithmic similarity with the content of creating models of a technological format.

Still, for the sake of success in modern business, it is necessary to resolve the dialectical contradiction between the material and the "digital" world. Indeed, in the new "economy of the future", unlike the industrialized mass production economy, where energy and resource power were a priority, it is information and energy competitiveness of technologies and business systems that has become a priority.

To form the basis and pre-requisites for obtaining a set of rational alternatives to the firms' behaviour in the new economic conditions, it is necessary to understand the nature and the generators' complexity, the nature and content of the economic complexity development. It is necessary to rethink the possibilities of using its new forms and mechanisms created by the modern development of information systems and information technologies in business activities. As a result, it should be emphasized that digital technology itself is not a self-organizing source of economic growth but just a tool for solving operational problems.

At the present stage, for economic growth, relatively new categories have become important tools for business: logistics and information logistics. Information logistics in a very simplified form will be treated here as follows: necessary information and necessary information technology in the right place at the right time in the right amount. Global Paradigm of Information Logistics Forecasting System: definition-development of a channel, which ensures the synergy of the factors of productivity, competitiveness, and rational use of resources, is necessary both for business and for the government. The analysis of foreign and domestic scientific literature allows us to conclude that it is information logistics that can solve the problem of the information overload of the society and business. In addition, foreign authors significantly expand the scope of this phenomenon's application and see it as an effective tool for managing human knowledge, which helps to maximize the people's potential and forms an added value for business and society as a whole.

In the era of post-industrial society, business entities will seek to maximize the benefits of efficient use of information logistics. In our opinion, information logistics needs to be interpreted as a strategy, that is, a set of actions, methods,

and tools of timely receiving the requested information in the right format, in a specified time period with minimal costs at all levels of the subjectness of the economy and business. Information logistics should cover three classes of processes: environmental change – social change – economic change. If this fails, we are going to face a cascade of catastrophes that are as threatening as Chernobyl.

Conclusions. At the moment, there is no feedback in Ukraine between the complexity of the technogenic environment and the society, between the oligarchic network of business projects and the society, and there is no developed system of information logistics.

The complexity of the triad "activity – business – economy and economy – financial system – innovation, information system – information technologies – information logistics" generally changes the complexity of the economy and the corresponding civilization. The algorithmic complexity inherent in the corresponding society leads in business, in the economy, and in the civilization process of the country. Algorithmic complexity in economic activity is realized through functionally driven or functionally obsolete technologies, which are chosen by the business owner or manager. Therefore, the formed dynamic algorithmic complexity provokes competitive-coalition gaming situations in the economic activity of business entities in the market.

In general, economic systems get impulses (positive or negative) towards breakthrough changes under the influence of institutional, technological, social, and cultural shifts. Turbulent changes under the influence of negative impulses can lead economic systems into the depressive failure countries, or bring them to a new high-quality level of civilizational technological homeostasis. So far, Ukraine is in a "timeless" space between the era of the "economy of the past" and the era of the "economy of the future". Such results of the economic systems' condition can be explained by the rhythm of the economy, that is, the variations in the activity (sensitization) of the functioning system on the information signal coming from the internal organizational and external organizational environment. From the standpoint of the rhythm of functioning as the leading parameter of the functioning of the economic system, one can distinguish the following types of economic systems: advanced national economies, traditionally consistent stable economies, and depressed national economies. The complexity, as well as the advantage, of the rhythm of an advanced national economy is that the business systems' evolution rhythm in the country is organically coordinated with the rhythm of the economy. However, the perspective issue to be solved is to determine who acts as a "conductor" of the economy's rhythm in the country and how the actions of a conductor are harmonized with the sources of economic entities' self-organization.

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ДЖЕРЕЛА ТУРБУЛЕНТНОСТІ ЗОВНІШНЬОГО СЕРЕДОВИЩА БІЗНЕСУ В УМОВАХ ПОСТІНДУСТРІАЛЬНОЇ ЕКОНОМІКИ

Анотація. В статті розглянуто особливий характер мінливості оточення бізнесу, який частіше набуває вихороподібного турбулентного виду та стає більш ризиковим. Доведено що для успіху в постіндустріальному суспільстві сучасному бізнесу необхідно розв'язувати діалектичне протиріччя між матеріальним та «цифровим» світом, оскільки саме інформаційна та енергетична конкурентоспроможність технологій та бізнес-систем стає пріоритетом економічного розвитку. Визначено, що Україна поки що знаходиться в «позачасовому» просторі між епохою «економіки минулого» та епохою «економіки майбутнього». Такі результати, можна пояснити ритмом економіки, тобто варіаціями активності (збудження) системи функціонування на інформаційний сигнал, який поступає від внутрішньо-організаційного та зовнішньо-організаційного середовища.

Ключові слова: постіндустріальна економіка, турбулентність, інформаційна логістика, бізнес, економічні системи, моделі економічного розвитку.

ИСТОЧНИКИ ТУРБУЛЕНТНОСТИ ВНЕШНЕЙ СРЕДЫ БИЗНЕСА В ПОСТІНДУСТРІАЛЬНОЇ ЕКОНОМІКЕ

Аннотация. В статье рассмотрен особенный характер изменчивости окружения бизнеса, который чаще приобретает вихреобразный и турбулентный вид и становится рисковым. Доказано, что для успеха в постиндустриальном обществе современному бизнесу необходимо решать диалектическое противоречие между материальным и «цифровым» миром, поскольку именно информационная и энергетическая конкурентоспособность технологий и бизнес-систем становится приоритетом экономического развития. Определено, что Украина пока что находится в «вневременной» пространстве между эпохой «экономики прошлого» и эпохой «экономики будущего». Такие результаты можно объяснить ритмом экономики, то есть вариациями активности (возбуждения) системы функционирования на информационный сигнал, который поступает от внутренней и внешней организационной среды.

Ключевые слова: постиндустриальная экономика, турбулентность, информационная логистика, бизнес, экономические системы, модели экономического развития.