2.6 "BUSINESS STRESS" AS A RESULT OF EVOLUTION OF SOCIAL AND ECONOMIC SYSTEMS AND STRENGTHENING INNOVATIVE MANAGEMENT

Civilization is transferred intensively to the post-industrial stage of development. In the pre-industrial stage, the main direction for competitiveness was aimed at effective use of natural (mainly land) and labor (mainly physical force) resources. At the industrial stage, the increase of competitiveness has been achieved, first of all, through the effective use of the equity capital and, above its active part (machinery and equipment). In today's post-industrial stage, the main factor in the competitiveness ensuring is informational and innovative resources. Such scientists as D. Bell, J. Galbraith, J. Martin, J. Massoud, F. Polak, O. Toffler, J. Fourastié, P. Drucker, G. Soros, F. Fukuyama, J. Thurow, M. Castells, T. Veblen, R. Dahrendorf, V. Menger, M. Polanyi et al. all have developed the theory of post-industrial society and made invaluable contribution.

Long periods of sustained development (original periods of "economic peace") are characteristics of pre-industrial and industrial stages of development of society. Qualitative leaps in the economy or so-called "economic stresses" appeared occasionally and rarely. Such economic situations occur in a significant number of cases after a certain period of time.

The qualitative leap is the level of development, when the same problem can be solved in a shorter period of time and much more effective in comparison with the previous stage of development. Moreover, qualitative leaps pervade almost all spheres of human activity. Their essence and significance are clearly visible in a few examples.

Period of substitution innovations by technique was as follows: up to the XX century it was up to 50 years and over; in the first half of the XX century it was 15-30 years; in the second half of XX century it was 5-10 years. Now it is measured by years; in some areas it is measured by months. Thus, 6 years of constructive development was invested in a car in 1990 and only 2 years was invested in a modern car. Now the key area of economic development — microelectronics — annually doubles the complexity and volume of integrated circuits production at lower cost and price of 30%. VLSI specifications are improved up to 4 times each two years. Modern computer, which costs 2000 US dollars many times more powerful than the computer, which has worth 10 million US dollars twenty years ago [121, p. 7; 118, p. 95; 123, p. 43; 124, p. 195]. I.e. a significant qualitative leap in the technique production has been done through the use of modern technologies (and, first of all, in software production). Moreover, it can be assumed that the use of expert systems and artificial intelligence systems, along with advanced software in the future will lead to a new qualitative leap, and, possibly, to a series of leaps.

Second example: Japan took 95 years to give the first million patents. And to give second million patents, it took only 15 years [125, p. 35].

There is also an example of a quantum leap which is over the closest scientists. If earlier to compile a bibliography for the dissertation it was required half a year minimum, but now this problem will be solved during hours or days with the help of modern software.

In today's global environment, qualitative leaps (economic bifurcation) have a permanent character; they are an integral part of economic life. Such increase in the bifurcation development is the result of the socio-economic systems' evolution. It follows from the dialectics of social progress; it has an objective nature and it is the result of combined effect of three factors: 1) acceleration the pace of public life and the economy, in particular; 2) emergence and inclusion of new productive factors and their combinations into the economic circulation; 3) significant increase in mutual influence and interdependence of the world.

1. The pace of social life and the economy in particular, is accelerated under the influence of accelerating scientific and technological progress and innovative development opportunities (as its result). If humanity needed 112 years to organize the extensive use of photography, 56 years to use telephony, then appropriate time for the use of radar, television, transistor and integrated circuit were respectively 15, 12, 5 and 3 years [120, p. 6].
At the same time, strengthening the innovative process with globalization accelerate
the pace of social and economic life much more. It is accompanied by the fact that new
technologies are much more economical than traditional.

Previously, a letter from Australia went by regular postal service approximately 1.5
months in the Ukraine. Now e-mail from any place in the world to another place will come for
a maximum of two hours. For example, the cost of document transmission by 40 pages from
Chile to Kenya by means of e-mail is less than 40 cents, by means of faxing about 10 US
dollars and by means of courier 50 US dollars [126, p. 30]. Thus, the efficiency of new
technologies increases significantly. The efficiency of traditional technologies increases
significantly in conjunction with the new technologies. The cost of a 3-minute telephone
conversation New York – London was as follows: 245 US dollars in 1920, 9 US dollars in
1950 and 0.78 US dollars in 1999 [124, p. 195]. Thus, the speed of information dissemination
and their accessibility are increased revolutionary. Ultimately, this is one of the main reasons
for increasing the economic systems speed development in a common.

2. The rapid acceleration of the innovative process led to the emergence and
integration into the economy a significant number of new production factors (labor objects,
technologies and new labor forces) and their combinations. Oil is not considered an economic
resource before the advent of the internal combustion engine. Penicillin fungus was only one
species of fungi before the antibiotics discovery. A few decades ago stem cells, which now
cost over thousands dollars (or even hundreds of thousands dollars) were subject to disposal.

The process of new productive factors involving in the economic circulation grew
significantly in the last decades of the XX century and continues nowadays. The revolutionary
discoveries in biology have generated a number of new professions: genetic engineering,
cellular medicine et al. Recent discoveries related to the decoding of the human genome,
expanded horizons even more, allowing to produce goods or to do certain medical operations
taking into account genetic characteristics of individuals.

3. Interaction of factors and processes regardless of their territorial action scope is
significantly enhanced in the context of globalization. Factors that could not previously affect
certain processes in terms of increasing interdependence have this capability nowadays. As a
result, the number of influencing factors significantly increases and therefore the number of
development options significantly increase as well. In fact, virtual-intellectual environment is
formed, where space and time factors are largely lose their limiting value [127].

Now the situation is possible, which was impossible a few decades ago. For example,
a leading surgeon can watch the operations process on Skype occurring at the other continent
and can give invaluable advice online that could save the patient's life.

As a result of complex influence of the three abovementioned processes, qualitative
leaps in the economy (a kind of "economic stresses" or bifurcations) acquire a permanent
nature and cause of the bifurcation development.

Strengthening of the bifurcation leads to the emergence of adequate system of patterns,
which are specific to the current stage of development. These patterns may occur with
unequal force in different regions and in different periods. But in general, such system of
patterns characterizes current stage of development.

Pattern 1: Further gradual acceleration of public life pace, including the economy. As
a result of the bifurcation strengthening, further acceleration increases the number of options
in different sectors of the economy; the best of them are selected for practical use.
Accordingly, they increase the productivity of tools. Using those individuals can affect
quickly the labor subjects and can achieve the desired results. It creates a fundamental
condition for the further acceleration of social life and, first of all, economic processes. That
is, we can state that the "economic stress" creates a new "economic stress".

Pattern 2: Significant increasing of business entities competition especially for the
right of use of the informational and intellectual resources. As the pace of economic life in the
future will rise, finding the quickest and the most effective options to solve current problems
of economic development will be actual more and more. It will raise competition for the right to use all kinds of resources, especially informational and innovation resources, since they will become the main tool for survival in conditions of "economic stress", as it will be shown later.

**Pattern 3: Acceleration of knowledge generations changes.** As the number of qualitative leaps will increase, it will lead to a more rapid aging of the accumulated knowledge. The period of time for the relevant knowledge inevitably reduces and the new knowledge change old ones. The consequence of this situation is to reduce the "life cycle" of knowledge, i.e. the period from its inception to practical use.

**Pattern 4: Acceleration of changing equipment generation and reducing its "life cycle" is a significant acceleration of knowledge transfer from one generation to another leads to an acceleration of equipment generation change and reduction of cycle "research – developing and constructive works - testing of new equipment – implementation of new technologies".

**Pattern 5: Increasing the labor productivity and capital goods.** Given the fact that the new productive means will be established on the basis of new, more advanced generation of knowledge that can significantly deeper and more fully take into account the use of laws, forces and objects of nature, then they (means) will be much more productive than the previous ones. At the same time the productivity of the productive means will increase from generation to generation. It will determine the progressive increase in labor productivity.

**Pattern 6: Increase the role of health as a competitive resource.** With the increasing of bifurcation in development, demands on the competitiveness of the individuality are significantly increased and especially to two of its most important components: 1) level of intellectual health (level of intellectual development) and 2) level of physical fitness. In the industrial epoch it was enough once to get higher education and every 10-15 years only a bit correct and supplement their knowledge. In the post-industrial era, knowledge is updated so rapidly that every 10-15 years it is necessary to replace them completely (or largely). To survive and compete effectively under conditions of "economic stress", withstand great physical and mental stress, it is necessary to be healthy. Health level (mental and physical) is turned into the most important competitive resource of personality. Accordingly, the average level of the nation's health (mental and physical) becomes an important competitive resource of the state.

**Pattern 7: Accelerating development, implementation of macro- and micro-technologies, as well as the acceleration of their synthesis and mutations.** The second half of XX - beginning of XXI century presented outstanding discoveries, which became the foundation for the new macro-technologies (i.e. technology-based innovations), in particular: 1) development of computer technologies; 2) development of nano-processes; 3) decoding of the human genome et al. However, the interaction of different scientific fields will occur under the influence of "economic stress", as well as the synthesis of technology and mutation.

We suggest considering the synthesis of technologies as the integration of different technologies into a single system, resulting in a fundamentally new integrated macro-technology. Integral macro-technologies may arise as a result of synthesis of two or more macro-technologies. There is another option, when the integral macro-technology is the result of a synthesis of macro-technologies and micro-technologies as from both own and other areas of science. Micro-technology is a technology that is based on improving innovation.

Mutation of macro-technologies we understand as their change as a result of interaction with other macro and micro-technologies. What gives the reason to believe that the synthesis and mutation of technologies will increase under the influence of "economic stress"? Firstly, "at the intersection" of the two technologies (in particular of different scientific spheres) it is possible to find non-traditional solutions of the problem and to obtain significantly better results than when they have used alone. Secondly, "at the intersection" of the two technologies it is possible to develop integral technology that will solve the problems, which is impossible to solve by means of "maternal" technologies. Thirdly, using integrated technologies it is possible accelerate significantly problem solving. Fourthly, integrated technologies may be much more efficient than their "maternal" technologies.
Pattern 8: The increase of the "price" of conflict in "stress economy". Always economy was a system that was composed of heterogeneous elements (business organizations; institutions of market infrastructure; state, whose interests represented by regional and central governmental authorities; non-governmental institutions, etc.), which operate at different levels (micro-level, regional, sectoral and inter-sectoral levels, macro-level and international level). Except of national interests, each of these elements has its inherent system of interests, which is generated by its nature and specific place in the common economic system. Systems of interests of different elements can be the same, but it is possible and quite often there are situations when these systems (or individual interests) completely or partially in conflict with each other. This situation is an objective basis for the emergence of conflicts in the economy. Anti-conflict function has always been one of the main functions of the state. But in many cases it was enough to eliminate the conflict consequences in the non-globalized world before bifurcation stage, as "price" of a certain part of them was accepted by society.

Ceteris paribus "price conflict" (a set of socio-economic consequences of the conflict) in terms of "stress economy" increases. It means that the socio-economic consequences of similar conflicts in the conditions of the "stress economy", as a rule, are growing in comparison with relative economic calm.

This situation is caused by a number of laws: 1) lag for making anti-conflict decisions under conditions of "stress economy" reduces; 2) the number of options for anti-conflict solutions significantly increases; 3) lag for implementation of anti-conflict solutions reduces; at the same time it means that, ceteris paribus, implementing cost increases; 4) the number of possible options for the conflict consequences increases due to the number of variants of development a particular process. It greatly complicates the ability to predict the conflict consequences; 5) probability of a "conflict chain reaction" is increasing, when one conflict creates next ones and so on. This circumstance is due to the fact that when there is a conflict in a limited number of options, then the number of options of conflict development is limited. When conflict arises in a large and constantly increasing number of variants, then the number of options for the conflict development accordingly increases proportionally with increasing the total number of development options.

Pattern 9: Increasing role of the creative potential in modern production. At the present stage, when "economic stresses" have a permanent character, the most important task of economic science and practice is the development of effective mechanisms for generating, accumulation and use of new knowledge. Moreover, this knowledge should use after its transformation technical, technological, organizational, social, environmental and other wide-range innovations. Any new knowledge is a derivative of individual intelligence (intelligence an individuality) or collective intelligence, i.e. the total intelligence of structured in a certain way group of individuals. Therefore, it is extremely important to stimulate individual and collective intellectual activity of the company's employees.

To solve this problem, first of all, it is necessary to involve and to use maximally the creative potential of employees. Creative potential always has been the engine of progress. All intellectual ups of civilization were connected with the creative potential of an individual or group of individuals somehow. Where there was no such enormous acceleration of economic life, which takes place in recent decades, when "economic stresses" were rare for the sustainable competitive advantages of business entities, it was enough to use the creative potential of their leaders or group of leading experts. In current conditions of rapid development of the economic environment it is not enough. Nowadays, to get long-term competitive advantages, it is necessary to use creative potential all of employees, and ideally all employees.

Pattern 10: Strengthening the systems of economic life and growing role of the individual information of employees. Two principles are important: the principle of the spoken word by enterprise employees (hereinafter – the principle of the spoken word) and the principle of unspeakable word by enterprise employees (hereinafter – the principle of unspeakable word)
for increasing "stress economy". The principle of the spoken word means that any information (any knowledge), provided by the company top-management from the side of any employee can be invaluable and bring huge profits to the enterprise. It is very difficult to determine which information can be the basis of effective development in the context of "economic stresses". Therefore, it is advisable to save, analyze and use the information provided by any employee of the company. The principle of unspeakable word means that any information (any knowledge), not provided by the company top-management or provided, but ignored, could harm the company both in short-term and long-term. This circumstance is due to the fact that modern production (especially high-tech) presented by hundreds, thousands or sometimes millions of system-forming connections. Moreover, systems of production enhances with the increasing of "economic stresses", i.e. the number of system-forming connections in the production increases.

Underestimation at least one or more of system-forming connections can cause significant impact on the enterprise competitiveness. The company's top-management sees the system as a whole; they cannot count all systemically important communication at all levels, because they do not know and do not see them. Only employee of the company sees and knows a particular communication. Therefore, it is important to accumulate, analyze and save any new knowledge. Said word by employee (especially said at the time) can bring significant profits. Unspeakable word by employee (or said, but ignored) can cause damage.

Pattern 11: Strengthening the role of the innovator and the formation of informational and innovative vector for competitiveness. Vanguard civilization went through pre-industrial and industrial stages, and now it moves mostly in the post-industrial stage of development, where the main factor is the competitiveness maintenance of the intellectual and innovative resources. As it was shown earlier, the value of these resources increased in "stress economy". However, intellectual and innovative resources do not arise by themselves. They are the derivative of intelligence of separate or associated individuals. Separate individual is a human being. Associate individual is a system of individuals, which functioning is explained by the same goal and which acts under certain conditions, like an individual acts. Moreover, we can speak about both a separate intelligence (individual intelligence) and an associated intelligence, i.e. a certain intelligences system of individuals who are part of the associated individual.

In post-industrial society, when "economic stress" acquires a permanent character, come to the fore, individuals and their structured aggregate. But it is not just individuals, but individuals and their combination, which are appropriate creative ability to generate new knowledge and on the basis of their innovation, in other words, individuals who can actively participate in the innovation process and become "engines". The whole innovation process is a very complex, multi-pronged and multi-stage phenomenon. It is associated with the creation, deployment and diffusion of innovation [128, p. 5]. But his primary link is the process of innovation, which was attended by a large number of different actors: individual innovators and inventors; research teams; individual scientists; enterprises, organizations and their employees; autonomous units of enterprises and organizations that are on commercial considerations; various cooperative structures (industrial parks, techno, business incubators, and science and technology centres).

In post-industrial society, when "economic stresses" acquire a permanent character, individuals and their structured sets come beforehand, for example those individuals and their sets, which have a certain creative abilities to generate a new knowledge and innovations. In other words, there are individuals who can actively participate in the innovative process and become "engines". Thus, innovative process is a complicated, multi-pronged and multi-stage phenomenon. It is associated with the creation, deployment and diffusion of innovations [128, p. 5]. Its primary link is the creating process of innovations, which was attended by a large number of different participants, i.e.: individual innovators and inventors; research teams; individual scientists; enterprises, organizations and their employees; autonomous units of enterprises and organizations that act on commercial base; various cooperative structures (industrial parks, technopolis, business incubators, scientific and technological centres).
All abovementioned participants have a different economic character, which is determined by their immanent interests, scale and position in the economic system because of being part of, as well as genesis and development of the areas. But in spite of all diversity of their economic specifics they have a common function associated with the development of innovations. Therefore there is a particular need to develop a concept that would describe the totality of subjects that create innovations. "Innovator" fulfils this function most adequately.

The term "innovator" became in the scientific literature recently [129, p. 17]. Recently, it has appeared in the major encyclopaedias and reference books. Economic Encyclopaedia (Chairman of Editorial Board is G. Havrylyshyn) determines the innovator as the author of innovations [130, p. 656]. Handbook "Innovative Management" defines the innovator as the author of innovations (discoveries, inventions, utility models, project solution, technological innovation, "know-how", industrial property or other innovation) [131, p. 14]. Moreover, innovation is usually mediated through the creation of intellectual property.

The abovementioned definitions, in our view, are correct, since they adequately reflect the essence of the studied concepts. But is it very important to classify the subjects that are included in the set of innovators. All innovators can be divided into two main groups: individual and collective. Individual innovators are individuals-innovators, i.e. individuals who create innovations. Moreover, this group includes both employees who are hired by the company and create innovations because of their contract conditions (hired innovators) and individuals who are self-employed and create innovations at their own cost and in their free time (free innovators). Collective innovators consist of legal entities-innovators and independent innovators. Legal entities-innovators are legal entities that by own (or at the cooperative basis) create innovations. They primarily include companies and organizations, research institutions, which create innovation by own or in team. Independent innovators are divisions of enterprises and organizations, which have no legal status, but can act quite independent; they have a commercial nature and create innovations.

In essence, innovator is the main protagonist in a "stress economy", as he/she generates a new knowledge and innovation, which are the main competitive resource. A structured set of innovators at the enterprise becomes its main competitive resource. At the same time, a structured set of innovators of certain country is transformed into one of the main competitive resource of its economy and it creates an intellectual potential. It is possible to trace the role of the innovator under condition of in a permanent "economic stress", if to build a causal vector of influence its activity to ensure the competitiveness of both national economy and individual economic entities. This vector can be termed as informational and innovative vector to ensure competitiveness in a globally-post-industrial environment and it generally comes to:

1. Innovator generates a new knowledge using their creative skills and appropriate social and economic institutions.
2. Innovator transforms own creative results into a closed information (available to a certain users) and open information (available to all society) with the help of certain socio-economic institutions.
3. Innovator creates innovations based on the information.
4. Innovations make possible to improve and to create new post-industrial and industrial technologies. Post-industrial technologies are technologies related to the creation and transformation of post-industrial resources, i.e. production, processing, transformation and transfer of new knowledge and information, as well as activation of the innovative potential. Industrial technologies are technologies based on the use, creation and transformation of traditional material resources used in the production of goods.
5. Improvement of technologies leads to effective use of post-industrial and material resources.
6. The progressive increase in the competitiveness level is an integral result of causal abovementioned vector.

Thus, an individual's intelligence and its creativity are the basis of the informational
and innovative vectors to enhance the competitiveness of the economy and economic entities, i.e., in essence, the ability to create and to generate a new knowledge. Ability and motivation of individuals to the creativity are some of the main factors in ensuring the competitiveness of business entities.

Given all above-mentioned, it can be stated that in the previous stages fundamentally new economic situation were quite rare. In such circumstances, a manager at any level should provide a sustainable competitive advantage, in addition to the required knowledge, first of all, a great experience in dealing with typical situations. The need for innovative management (search for new ways to solve the non-standard situations) has been reduced to a minimum.

Opposite situation has been under constant "economic stress" (permanent bifurcations). Non-standard management situations arise constantly, as a result of the bifurcation, whereas the typical management situations become a rarity. In such circumstances, a manager, except for in-depth knowledge, should have innovativeness of management, i.e. constant ability to find new ways and methods of solution of non-standard management, economic and technical situations. Moreover, the management of innovativeness is needed at all levels, from the micro- up to the macro- level. It means that it is becoming one of the major factors for competitiveness at all levels of management. In the future, the need to improve the level of innovative management as a lever to ensure the competitive advantages will increase. It is due to the fact that "economic stress" is now increasingly become an inherent part of economic life. The number of "stress-inducing" factors and the level of "stress" under the influence of the innovative acceleration will continue to grow.

Innovations have double and dialectical role relatively economic bifurcations. On the one hand, innovations are one of the factors contributing to the bifurcation and even creating, i.e. one of the "stress-inducing" elements. On the other hand, innovations are the best and the most effective "medicine" by "economic stress", because they allow to find a new and non-standard solutions of a new situations that arise under the influence of qualitative leaps. Only those countries and economic entities will be able to provide the high competitiveness, who will reach the highest innovative management.

However, innovative management should be increased at both micro- and macro-levels. To ensure high competitiveness of business entities and the general economy under condition of increasing bifurcation, both central and local public authorities have to implement the following measures:

1. Progressively improve innovative governance at the national and local level to work mainly "ahead of the curve". It means that public authorities and control bodies should implement methods for rapid analysis and reaction to the different socio-economic events that occur in society, given that these events will continue. However, such a formulation of the problem it's just the minimum program. The maximum program is to predict the possible socio-economic bifurcation and to strengthen positions (if they are positive) or to liquidate negative situation (mitigate it) their destructive influence (if they have a negative potential).

2. To strengthen the consolidative (anti-conflict) function of the state. As we discussed earlier, under "stress economy" the price of most conflicts increase in hundreds of times. Therefore anti-conflict policy should aim, first of all, not to eliminate the consequences of conflicts but to their prediction, prevention and elimination of the causes that rise conflicts; in case that they occur to eliminate them with minimal impact.

Also, the main goal of economic policy should be consistent harmonization of interests of elements of the economic system with national interests, i.e. harmonization of divergent interests of economic entities with state interests. Moreover, it is necessary to remember that the system of national interests and the system of interests of individual economic entities both are not only static; they are characterized by a certain dynamics.

3. To expand extensive work among the top-management of companies to explain the ways of survival in a globally-bifurcation environment. Using special informational recourses and mass-media, specialized local authorities should establish regular giving the information
to the top-management of companies about the features of globally-bifurcation stage of development and how to survive it.

4. Constantly to implement measures aimed at medical prevention and improving health. Public authorities should develop, first of all, a broad outreach to different segments of the population about the necessity of personal prevention each individual's health, as well as to systematically to improve health care measures, the progressive increase of budget allocations for prevention and health protection. Moreover, one of the main priorities of the state should be the development of medical science and the innovative process in the medical field.

In summary of this work we can conclude, that the three most important process are characteristics of modern development: 1) accelerating the pace of social life and economy; 2) emergence and integration into the economy a significant number of new productive factors and their combinations; 3) significant increase in mutual influence and interdependence of the world. As a result of combined effect of these processes, qualitative leaps in the economy are enhanced (a kind of "economic stress" or bifurcation), which are permanent and inalienable, permeate the economic space and cause the bifurcation development. Strengthening the bifurcation is the basis for the emergence of a number of fundamentally important laws, e.g.: accelerating the change of knowledge generations; accelerating the change of equipment generations and reducing its "life cycle"; improving productivity and production means; increasing the role of health as a competitive resource. To survive and to ensure high competitive in a constant gain of bifurcation development is only possible due to the high innovativeness of economic activity.

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