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M. G. Chumachenko,
Dr.Hab (Economics), Prof.,
O. I. Amosha,
Dr.Hab (Economics), Prof.,
V. I. Lyashenko,
Dr.Hab (Economics),
Institute of Industrial Economics (NAS of Ukraine), Donetsk

NEOINDUSTRIAL WAYS OF NATIONAL UKRAINIAN AND DONBASS REGIONAL ECONOMIC DEVELOPMENT

PART TWO

Innovation cyclicality problem

With innovations the scientist also connected the problem of cyclicality: innovations of one business entity lead to introduction of innovations by others, and this in turn leads to boost of investment and beginning of growth phase; after the exhaustion of the innovation potential and reduction of profits, a phase of decline comes. At the same time, on the "long" waves the short-wave oscillations of economic activity are possible. When new ideas are appeared, all repeats again. But the "creative destruction" of cyclic motion is an integral regularity of the economic growth.

According to the assessment of S.V. Mochernyi [6], a model of post-industrial society (Daniel Bell, Raymond Aron [17]) provides the most important structural elements of post-industrial society with the participation of universities, scientific institutions and research organizations, and the material productive forces don't play any longer a decisive role. **Power is concentrated in the hands of scientists.** Methodological flaws of this theory are, firstly, the characteristic of a society only from one of the elements of the productive forces, that is science; and secondly, ignoring of property as a determining criterion of society classification and reducing it to a legal fiction, to property rights, and thirdly, a large detachment from the realities of practice, even in the developed countries, which are far ahead for several decades from Ukraine on economic potential.

The modern Russian scientist, Academician S.Y. Glaziev in his book "Theory of Long-term Techno-economic Development" gives the following (Table 1 and 2) detailed characteristic of technological structures. In general, the post-industrial economy has features that distinguish it from the industrial one: 1) enhancing of decision-making efficiency; 2) increasing of competition in the information service market; 3) increased role of intellectual labor; 4) equality in information capabilities of large, medium and small enterprises; 5) the usage of new forms of payments and electronic payment systems; 6) the transition to information transmission through telecommunication networks; 7) overwhelming dependence of productivity on science application and technology achievements, as well as the quality of information and management; 8) shifting of producer's and consumer's focus from material production sphere to information activities; 9) global character of the economy in which capital, labor, production, management, markets, information and technologies overcome borders.

Especially acute opposition of the industrial and postindustrial civilization is acquired in conditions of economic systems transformation. Politics of technological structures is a conductor of contemporary processes of postindustrial society. Economic technological structure of each country can be represented by the distribution of technologies, goods and services within a complete technological cycle, enveloping the entire process from transition from exploration and extraction of primary resources to final consumption technologies of end-products [21].

Differences in technologies, production quality levels, types of energy resources (coal, oil, gas, electricity, etc.), controlling mechanisms in international practice are distributed in the so-called structures — a uniform set of technologies. The evolution of the global industrial community since the end of the XVIII-th c. allows to identify five technological structures, the latter of which, formed on the achievements of microelectronics, information science and biotechnology, new materials and unconventional energy resources, becomes dominant since the early 90-ies of the XX-th c. in some leading countries (Japan, USA, certain countries of Western Europe and Southeast Asia). The next step is the mastery of technologies of the next, the 6-th structure.

The first wave (1770-1830 years) has formed a lifestyle that was based on new technologies in the textile industry and usage of hydroelectric power. This period is distinguished by the widespread usage of steam engines and by mechanical engineering development. The second wave (1830-1880 years) reflected the mechanization of production of almost all types of products, creating a railway network and shipping

routes. Economic symbols of this period were coal and transport infrastructure. The third wave (1880-1930 years) was based on the usage of industrial production of electricity, the development of heavy engineering and electrical engineering, based on steel products, new discoveries in the field of chemistry, the formation of the chemical industry. It was the oil boom in the U.S.A., creating a powerful military-industrial complex in Europe, the widespread introduction of radio and telecommunications. Automobile and aircraft production begins to develop, as well as nonferrous metals, aluminum, plastics, and durable consumer goods production. Large companies, cartels and trusts appear. Small companies are absorbed by large ones, there is a concentration of banking and financial capitals.

The fourth wave (1930-1980 years) is characterized by formation of structure, which is based on the subsequent development of energy with the usage of petroleum, petroleum products and gas, as well as communications, new synthetic materials. This is the era of mass production of automobiles, tractors, aircrafts, various types of weapons, durable consumer goods, construction of highways, airports. Computers and software appear and are distributed rapidly. Atom, firstly, is used for war, and later for peaceful purposes. In the market oligopolistic competition dominates, transnational corporations are formed.

The fifth wave, which began in the mid-80"s of the XX-th c., is based on achievements in the field of microelectronics, computer science, biotechnology, genetic engineering, development of new types of energy, space and satellite communications. There is transition from isolated firms or even transnational corporations to a single network of companies, connected with electronic means of communication, which cooperate in the fields of technology, production quality control, investment planning.

More visible become signs of the next — the sixth and seventh — technological structures. The sixth gives impetus to a new stage in the development of medicine, nano- (10^{-9}) and biotehnology, the seventh — to creation of picotehnologies (10^{-12}), technologies of "cold thermonuclear synthesis", which should drastically change the energy potential of Earth's civilization. The economic structure according to technological structures characterizes quite objectively the degree of existing technological base progressivity of the country. To analyze the structural aspects of the economic development of Ukraine in the context of technological structures in international statistics, the approach of grouping of the relevant industries is used, that, in principle, provides certain economic technology type (technological structures). Obviously, such a classification is quite relative, but according to many experts, it can be an effective tool for analytical economic evaluation of the technological evolution of industrial modernization of investment activities in the concept of technological determinism with respect to innovative development of Ukraine.

"We believe that the neoindustrial form already has an important influence on the economy, and that this influence is continuing to grow. The question is whether this trend can be verified empirically. There is no simple answer to this. Most indicators have been constructed to support another view of industrial activities. There are, however, a great number of direct as well as indirect indicators showing thai the traditional way of organising is changing. What will come instead is perhaps not quite clear. In addition, such comprehensive conversions arc often so slow to develop and long-term that (hey are seldom captured by general statistics. What is apparent, however, is that traditional industrial work is decreasing, and that service production is increasing — not least the industry-related part of it. There arc also indications that industries or businesses that arc dominated by project organisation arc growing in number, and that the flow process in traditional organisations is being replaced by project organisation, or at least is being supplemented by projects" [29, p. 4].

The Russian President Dmitry Medvedev personally is engaged in innovations. He is the first of the country's leaders who actively writes about this in his blog in Internet. He requires from the officials to develop a worldwide network: assessment of work of his subordinates includes this characteristic too. The foreign experience in advanced technology implementation is intently studied. During his visit to the U.S.A., the Russian leader visited the famous Silicon Valley in California — a place of the highest concentration of innovative companies and productions. Considering that the problem of modernization is very acute for Ukraine as well, there are reasons to look attentively at the actions of neighbors, to assess what has been already done, to borrow new and advanced experience in accordance with our terms. In this case, to look at the experience of neighbors is necessary without the "blinkers" — then it will be possible to avoid many mistakes and miscalculations.

Now, the most popular theme in the Russian press is the small innovative town in Skolkovo, a kind of analogue of the aforesaid American Silicon Valley. Range of views on this subject is very broad: from the ecstatic to the categorical disbelief in achieving the end result. Despite the promises of considerable financial injections in the "Skolkovo", many of the doubters pay attention to the ways of implementing of the new: the apical and bureaucratic establishment of the small innovative town, the fundamental nature of government funding and the corresponding influence of bureaucrats on business management. The presence of foreign participation in this process makes little difference.

The draft law "On the Innovation Center "Skolkovo" involves pooling efforts of the government and private business to accelerate the emergence of new innovations

Table 1

Chronology and characteristics of technological structures [20]

Characteristics of structure	Number of technological structure				
	1	**2**	**3**	**4**	**5**
Period of dominance	1770-1830	1830-1880	1880-1930	1930-1970	From year 1970 - to 2010
Technology leaders	Britain, France, Belgium	Britain, France, Belgium, Germany, USA	Germany, USA, UK, France, Belgium, Switzerland, The Netherlands	USA, Western Europe, Japan	USA, Japan
Developed countries	German States, Netherlands	Italy, Netherlands, Switzerland, Austria-Hungary	Italy, Denmark, Austria-Hungary, Canada, Japan, Spain, Russia, Sweden	USSR, Newly industrialized countries (NICs)	NICs, Brazil, Russia
Kernel of technological structure	Textile industry, textile engineering, iron smelting, iron processing, canal laying, water engine	Steam engine, railroad construction, transport, engineering, ship-building, coalmining, tool-making industry, ferrous metal industry	Electrical and heavy engineering, stell production and steel rolling, electric power lines, inorganic chemistry	Automobile industry, tractor construction, non-ferrous metallurgy, durable manufacture, synthetic materials, organic chemistry, petroleum production and refining	Electronic industry, computer engineering, fiber-optic equipment, software, telecommunications, robot industry, gas production and processing, information services
Key factor	Textile machinery	Steam engine	Electromotor, steel	Internal combustion engine, petroleum chemistry	Microelectronic components
Centre of new forming structure	Steam engines, engineering	Steel, electric-power industry", heavy engineering, inorganic chemistry	Automobile industry, organic chemistry, petroleum production and refining, nonferrous metallurgy, road construction	Radars, pipe installation, aviation industry, gas production and processing	Nanotechnologies, molecular biology
The advantages of this technological structure compared with the previous one	Production mechanization and concentration in factories	The growth of production scales and concentration through the use of steam engine	Increase of production flexibility through the use of electric motor, production standardization, urbanization	Mass and serial production	Production individualization and consumption, increasing production flexibility, overcomings of the environmental constraints on energy and material consumption, based on CALS-technologies

Table 2

Institutional structure of technological modes [20]

Socio-economic characteristics of modes	Number of technological mode				
	1	2	3	4	5
Modes of economic regulation in the leading countries	The destruction of feudal monopolies, restrictions on trade unions, free trade	Freedom of trade, restriction of government intervention, the emergence of sectoral trade unions. Formation of social legislation	Expansion of the institutions of state regulation. State ownership of natural monopolies, basic infrastructure, in particular, social	Development of public social security institutions, military-industrial complex. Keynesian state regulation of economy	Government regulation of strategic types of information and communication infrastructures, changes in the regulation of financial institutions and capital markets, while reducing the state's role in the economy. The decline of unionism. Possible emergence of participatory centralized state
International regimes of economic regulation	British dominance in international trade, finances	Political, financial and commercial dominance of the UK. Freedom of international trade	Imperialism and colonialization. End of British rule	Economic and military dominance of U.S. and USSR	Polycentricity of world economic system. Regional blocs. Formation of institutions of global regulation of economic activity
Major economic institutions	Competition between individual entrepreneurs and small firms, their associations in the partnership, which provide cooperatives of individual capital	Production concentration in large organizations. Development of joint stock companies, which provide a capital concentration on the principles of limited liability	Consolidation firms, production concentration in cartels and trusts. Dominance of monopolies and oligopolies. Concentration of financial capital in the banking system. Separation of management from ownership	Transnational corporation, oligopolies on international markets. Vertical integration and production concentration. Divisional hierarchical control and domination of technostructure in organizations	International integration of small and medium-sized firms on the basis of information technologies, production and marketing integration. Supply "just in time"
Innovative activity organization in the leading countries	Organization of scientific research in national academies and scientific societies, local scientific and engineering societies. Individual engineering and inventive enterprise and partnership. Professional training of personnel with or without discontinuing work	The formation of research institutions. Accelerated professional development, its education and its internationalization. Formation of national and international systems of security, intellectual property	Creating in-house research departments. The use in production of scientists and engineers with university education. National institutions and laboratories. The total primary education	Specialized research departments in most of firms. State subsidy assistance of military research and development activities. Involvement of the state to the field of civil research and development. The development of secondary, higher and vocational education. Transfer of technology through licensing and investment by transnational corporations	Horizontal integration of R & D, production design of learning based on Cals-technologies. Computer networks and compatible research. State support for new technologies, and university-industry collaboration. New modes of ownership for software and biotechnology

and their commercialization. This should be a stimulus for the innovation sphere development in general and the formation in Russia qualitatively new competitive research teams. Judging by what was presented in the hall of Congress recently, passed the St. Petersburg International Economic Forum, the authors of the bill and those who will lead the Skolkovo, do not understand very clearly the difference between innovations, technologies, and prospective projects for which it will be required other technological priorities. Mobile phone, replacing a ticket in the transport, device in real-time mode, carrying out medical scans of the body and putting the diagnosis, and other wonders, from which some people's jaw dropped in amazement, actually represented technologies and innovations of the end of the last century. They do not carry anything new today, advanced edge of science and perspective technologies are completely on other side.

Criteria of Skolkovo under which you can get the benefits and government support, include a prerequisite: the project must be implemented with the participation of foreign experts and institutions of higher education, as well as comply with presidential priorities of modernization development. The latter ones include: energy efficiency and energy conservation, including

innovative energy technologies; nuclear technologies; space technologies, especially in the field of communications and navigation systems; medical technologies: equipment, medicines; strategic computer technologies and software. With this a particular project participant may not be in Skolkovo at that moment. In principle, there is nothing special. Taking into account modern communications, geographical dispersion is not an insurmountable obstacle. Nevertheless, the purely technologically concentration in a certain place has significant advantages. It is no mere chance that not many people leave Silicon Valley — on the contrary, people are eager to get there.

Next comes the most interesting. According to the Russian federal law the research activity is strictly regulated by the management company, authorized at its discretion even not to recognize the research as such in the case of disorders of "the mechanism of interaction of persons involved in the project realization". With regard for the fact that the invitation to co-operation has been already adopted by the Finnish Nokia, the German concern Siemens, the U.S.A. software giant Microsoft, the participation in Technopolis of the research units of aviation company Boeing may by possible, and when non-admission to the preferences of the Russian industry the prospect of transferring the Russian economy in the regime of intellectual outsourcing is very real (from the English outsourcing, outer-source-using: usage of an external source or resource). In our practice, the most often such functions are transmitted to outsourcing as accounting, support of operations of office, transport services, support of computer network and information infrastructure, advertising services, security, etc. These are important, but ancillary functions, and in the case of implementation of innovations the outsourcing can lead to long-term subordinate position, when specialists in Skolkovo will work to provide service for Scientific Research and Experimental Design programs of foreign firms.

Example of a country, who actively implemented outsourcing in the advanced technologies, is India. Its specialists have become a major supplier of software for the U.S.A. But in general, this has led to a chronic backlog of Indian science and technologies from leading countries. In the country it is modified and improved what was invented and implemented by others a long time ago. All this is very reminiscent of Nikita Khrushchev's famous slogan "to overtake and surpass." Only our history and practice have shown that without real freedom (including economic one) it will not be a success even in overtaking, not to mention "to surpass". Individual achievements in the field of aviation and space technology in the Soviet times set off only vividly the constant lag and making no headway of most part of the science and industry. Even borrowing of the most advanced knowledge and technologies has not become a solid basis for the development of the USSR. The American company General Electric has built DnieproHPP (Hydro Power Plant) using the most advanced at that times technologies and scientific knowledge. Siemens engineers have come to look at this miracle. By the way, this company then refused to build such a power station, because it did not possess such technologies and did not produce the units of necessary power. Henry Ford built such Car Plant of Gorkov that he didn't even have there, in Detroit. And there are many such examples. And what comes next? General Electric, Siemens and Ford went further, and we have remained on the sidelines of the technological progress. Even the best Soviet refrigerators "Minsk", "ZIL" and "Oka" were only an imitation of the American fridges of mid-20-s years.

There is one more very important, but almost non-mentioned aspect of this innovation. We are talking about the defence capability of a country. For many people, it became self-evident that our MIC (military-industrial complex) remains at the forefront, and that we are able to produce virtually the entire range of modern weapons. Unfortunately, this is not true. And the latest achievements of the Ukrainian armourers inspire not so much pride in them as a growing concern for our army. Not only because of its funding, but because of the ability of our MIC to equip it in a real way. And this is directly related to implementation of innovations. Does anyone seriously think that our neighbors will be shared with the most advanced knowledge and technologies that have military applications? In the U.S.A. there is a famous agency DARPA — Defense Advanced Research Projects Agency. Without his permission no knowledge and technologies are transmitted to other countries. As a result, India supplies the U.S.A. with the programmers, but is unable to build its own nuclear submarine, manufactures the tanks and aircraft on Russian licenses. And Russia itself buys the ship-helicopter-Mistral-typed, although France stopped building such ships two years ago.

All the aforesaid make us think that the well-publicized innovation in Russia is no more than an imitation. For what purpose — we may express different assumptions, the Russians know better. But in view of this we should pay attention to another detail of this advanced technology pursuit. It has become fashionable to ask people what they are willing to sacrifice for progress. In Russia they don't ask, but they tighten the screws. And they explain with one thing: the mobilization of society for a great purpose. And all nonbelievers, the protesters and those who have their own opinions should keep silence and keep out of the way in the hike on the high road of progress.

We have not even borrowed an imitation of innovation, but in the second aspect we already actively use that should not be used. But we should remember how the possibilities of Skolkovo were assessed by the Russian specialists, working in Silicon Valley, at a meeting with Medvedev. They said frankly to the Russian

Table 3

Ukraine's potential by technological structures [21, p. 44]

Technological structure (TS) (production research intensity,%)	Industrial production	Financing of technological developments	Innovation expenses	Investment of capital	Investment of capital in modernization and technical extension
III TS (0,16)	57,59	6,86	29,55	74,67	82,51
IV TS (2,41)	38,18	69,47	61,16	20,38	10,88
V TS (7,43)	4,19	23,55	8,64	4,52	6,56
VI TS (4,36)	0,04	0,12	0,64	0,43	0,04

president that they don't believe in the project, and suggested to move the final implementation of projects into California for a very simple and very important reason — because of the lack of economic freedom and bureaucratic control. After all, Silicon Valley was not appeared by decree of the American president, or someone else, and at the request of the heads of leading companies, as well as for reasons of technological and financial feasibility. And if not, we will never have the technical and scientific progress.

If we are going to follow Russia's example, it is necessary to determine the following: we simulate innovations — or are involved in them seriously. It seems we are still deteriora sequor — follow the worst. It's not even arrest of the head of the representation of the Adenauer Foundation in Ukraine, it is the polls in the first reading of the Tax Code: otherwise, it may be called solely as the onset of the reaction. So, are we going to reform the Ukraine?..

According to expert estimates of scientists [22], reproductive structure of the existing industrial potential of Ukraine in the perspective of technological structures has the form presented in the table 3. From the given table it is clear that now in Ukraine in the majority of industries the 3-rd and the 4-th technological structures dominate — together they exceed 95 percent of industrial production, in contrast to the developed countries, where the 5-th structure has become ruling and we see the rapid formation of the 6-th technical structure. The tendency of attraction to the 3-rd and 4-th relic structures reflects a simple reproduction of the technology base state, which was formed in the past.

Technologies of the 5-th structure, which are based on extensive usage of computer technology in technical systems, in Ukraine are involved in a miniscule scale (4,19%), and it can't see the priority of investment flows to this group: only 4.52% compared with almost 75%, which are sent to businesses of the 3-d structure. Reorientation of the Ukrainian economy to the 5-th structure was established very tardily, which further increased much more during the hasty, comprehensive privatization, which destroyed the unity of many unique technological systems. Results of the analysis convincingly indicate that medium and large domestic enterprises, where a single technological chain did not break and which were not artificially disaggregated and sold for a pittance, did not lose their innovative capacity. According to the information of Ministry of Economy, every third company with the number of 500-1000 working persons carries out activities, aimed at scientific and technological and innovation production development, new technologies, modernization and renewal of production assortment. Such activities are carried out at half of the enterprises with 1000-5000 working people, and 3/4 of enterprises with the number of employees over than 5000 workers, engineers and technical workers. Unlike other countries, where small businesses display innovative activity and offer new products on the market, in Ukraine quite the opposite situation is observed, unfortunately. So, in particular, only one of 17 companies with the number of workers up to 50 people shows innovative activity, every tenth and every fifth company, according to statistics, provides innovative development of its production, funding for R & D, acquiring licenses on intellectual property and related to them "know-how", machinery, appliances and manufacturing equipment, carrying out technological preparation of production or other innovative activities. These mentioned phenomena became a serious factor in preserving the country's dilapidated technological structures.

Backlog of Ukraine in modernization of its technological base from the leading countries may lead to the transformation of the domestic economy in raw-material addition and to loss of competitiveness in developed markets. Such a threat is growing in conditions of transition of developed countries to the most advanced — to 6-th technological structure, which is based on the continuous renewal of all the product life cycle, taking into account the changing of market situation. As a result of realization of standards of "electronic description" of production, the integrated computer technology of improvement is formed not only of production technology, but also of patterns of production realization, after-sale service, and on the basis of a paperless, lightning exchange of information between interconnected subjects of the market, even on different continents. The most large-scale manifestations of this "ultrastructure" there are in Japan.

Prior to the spread of the 6-th technological structure, the fundamental science, R&D, production and consumption of products functioned separately. But the

6-th technological structure is improbable without software integration of connected processes and in this sense it, certainly, is the most knowledge-intensive. In this regard, there is an urgent need in a complex analysis of the totality of conditions of a technological "breakthrough" in Ukraine to the stage of the 6-th structure, perhaps — bypassing the stage of development of the 5-th technological structure. In our opinion, to make such a breakthrough is real even taking into account the existing maximum depreciation of technological equipment in the leading sectors of the country's economy. But this requires a substantial correction of the entire state scientific and technical policy. It should be oriented to maximum centralization of investment resources, ensurance of priorities of funding of basic scientific researches, R&D and to development of industries of the 6-th technological structure.

The subsequent increase of GDP on the basis of structurally depressed industries, as well as of increasing of output of non-competitive production is inappropriate. With the resumption of purchasing demand, the businesses and citizens can give the advantage of buying more high-quality imported goods, equipment and machinery. This may cause overstocking of domestic products, the decline in production, as well as the devaluation of the hryvnia, exchange rate inflation. The problem of demand for domestic goods, including industrial purposes, will persist even when renewing the domestic aggregate demand. Till the quality of Ukrainian goods are improved significantly on the basis of technical reequipment of the enterprises, mainly by means of competitive production, to prevent the decline in production the National Bank of Ukraine will have to maintain artificially a high rate of devaluation of the hryvnia to make import uncompetitive. And this is not the best way with a significant amount of negative side effects.

The development of each structure favours the ascent of civilization on a new, higher level, which creates the next in the historical process and significantly increases the economic opportunities of society. Complicating significantly the economic inter-linkages and enhancing their nonlinear nature, technological structures form an appropriate industrial structure, which has a decisive influence on the process of production of goods and services. The transitional processes from one technological structure to another one are characterized by favorable market conditions and high rates of economic growth. The transition from one technology to another is not a gradual and continuous thing. According to the American researcher G. Foster, the new technologies is the suddenness, not predicted process, it is a gap, not a gradualness. R. Foster introduces the concept of technological discontinuity, which marks the transition from one technology to another, and the development of each technology is characterized by the logistic S-shaped curve, which serves as the primary analytical tool. S-shaped curve shows the relationship between the costs, associated with the development of new technology or new product, and the results, obtained from invested money.

As the predictions of scientists say, in the fifth technological structure, the beginning of which fell on the 90-s of the XX-th century, and the core of which, as was already mentioned, is the electronic industry, fiber-optic technology, biotechnology, genetic engineering, space technology, the individualization of production is provided, as well as meeting the needs and desires of both the individual and society as a whole, a full understanding of the phenomenon of spiritual life, which will be controlled on the basis of the so-called psychonetics. This all will open the doors to a new era to "real, natural" uncontrolled society, where on the political nano-level the struggle for survival and dominance disappears forever.

Analysis of the state of modern innovative development indicates the acceleration of neoindustrial changes in the global industry — technology, structure, scope, territorial distribution and organization of production, as well as in cooperation of the countries of the world, the general form of which becomes an international technology transfer. Countries share innovations with each other in the process of holding international conferences, seminars and exhibitions. During the discussion and exchange of views, experience between scientists, the innovations acquire a new content, more strength and weight in society, covering large areas and branches of science. There are conditions for creating a single global market of research and technical knowledge and advanced technologies (thanks to the Internet) as a new economic resource. It should be noted that in these conditions principled reassessment of the role of "human factor" took place. It is modern innovative changes which are associated with creativity, intelligence, knowledge, innovation of man as the main carrier of innovative ideas.

In Ukraine, by such parameter as output the higher technological structures — the fifth and sixth — form about 4%, and the sixth technological structure, which determines the prospects of high-tech development of the country in the future, in our country is almost absent (less than 0.1%). About 58% of manufactured products is fallen on the lowest — the third technological structure (technologies of materials building industry, ferrous metallurgy, shipbuilding, metal processing, light industry, woodworking, pulp and paper industry) and 38% — on the fourth. In terms of financing of scientific and technological developments such situation is: almost 70% of funds is consumed by the fourth and only 23% — by the fifth technological structures. Innovation expenditures are allocated in following way: 60% — the fourth technological way and 30% — the third (total — 90%), while the fifth is only 8,6%. Concerning investments, which actually determine the future for the next 10-15

years, we have these proportions: 75% are sent to the third technological way, and only 20 and 4.5% — the fourth and fifth, respectively, technological ways. In the technological part of capital investments (technical re-equipment and modernization) 83% are accounted for the third technological way, and only 10% — for the fourth.

These data indicate an extremely threatening situation, which is observed in the Ukrainian economy, since currently the future structure of production is being laid, where the third technological structure will dominate. At the same time, in the countries — the world leaders in the technological progress currently the following industries are being developed:

the industries of the sixth technological structure — biotechnologies, in particular, cell biology; aerospace industry; nanotechnologies; new materials; optoelectronics; artificial intelligence systems; microelectronics; photonics; microsystems mechanics; information superhighways; software and simulation tools; molecular electronics; human resource management systems;

the industries of the fifth technological structure — pharmaceutical, automotive, chemical and tool industry.

Consequently, it is clear that the priorities that have been actually formed in Ukraine in recent decades, do not respond to those prevalent in the world. The real strategy of the economic breakthrough of Ukraine may be based on accelerated development of those domestic industries that have proved to be competitive in domestic and foreign markets. Increasing tax revenues from such businesses will generate financial and budgetary base for the state support of science-intensive industries of the fifth and sixth technological structures.

In July, 2010, in the International Center for Electron Beam Technologies of the National Academy of Sciences of Ukraine the new company "Nanotechnologies in Medicine" was presented. Designed for industrial application of advanced developments of the Ukrainian scientists in the field of nanotechnology, this company is unique thanks to the fact that it has finally united the Ukrainian scientists and businessmen. The initiators of its creation became the President of NASU, Academician Boris Evgenievich Paton and a prominent businessman Sergey Alekseevich Taruta, who was an investor of this huge project. "The scientific potential of our country is huge, scientific developments are unique, but they will remain only on paper, or simply will flow abroad, if they are not be fed with the investment by the state or private capital — said Sergey Taruta at the presentation. — That's why it is important so much to establish a mutually beneficial partnership in the sphere of innovations, from which as a result everyone will win. Nanotechnology is, without exaggeration, the technology of the future, and we must think about the future. And the most important thing — these developments are directly designed to serve people and improve their quality of life. In this, I see a special social significance of our project, its humanitarian value"[25]. According to the words of Taruta, the interest in collaborating with scientists in a new direction clarifies the positive experience of using of nanodevelopment at the metallurgical enterprises of "Industrial Union of Donbass". However, when creating a "NanoMedTech", a profit was out of a question — Sergey Taruta confessed — that, fortunately for scientists, did not stop a businessman in the first stage to spend $1 million on a laboratory creation and purchase of special installation. "And the development will require much more money, it will be tens of millions of dollars", — added Taruta.

The first full-scale project, the implementation of which began "NanoMedTech" — is the industrial production of nanoparticles of metals, metal oxides and other materials on a unique method of electron-beam deposition in a vacuum. This technology, developed in the Institute of Electric Welding of Paton by academicians Boris Paton and Boris Movchan, has no analogues in the world and produces nanoparticles of various elements and their combinations — affecting the vital activity of organisms at the cellular level — from any material! "The main advantage of this technology is that it allows us to obtain very pure nanoparticles of virtually the entire periodic Table of Mendeleev. And advantage of the installation for production of nanomaterials is in its high productivity, what is very important for the industrial use. Moreover, it is protected by patents", — said General Director of "NanoMedTech" Igor Parneta. According to his words, all patents on this technology in the medical direction have been already purchased by the company itself, and the works are carried on with customers concerning many projects [25]. It will be possible to apply domestic nanoproducts not only in medicine, but in agriculture or veterinary medicine. However, medicine is the basic direction of the new company. Furthermore: as Boris Paton stated, already in 2011 it is planned to bring to market the medicines, based on nanoparticles. According to opinion of Paton, the first medicine will be created on the basis of silver nanoparticles, which, as the scientist noted, can help humanity to get rid of a number of diseases, including cancer. "Here, you can get and ointments too, as well as gels, based on silver powder" — he says. The company would develop more quickly, — adds General Director of "NanoMedTech" Igor Parneta, — if the State took upon itself the function of the integrator of projects... In the meantime, this work, as Parneta states, is carried out by the company itself, which takes considerable time and energy. And all this at a time when the developed countries have officially recognized that nanotechnology have the future is, and allocate record amounts of money for their development. In particular, total global investments in nanotechnology development annually exceed 15 billion dollars! The most

amounts of money on these investigations are spent by the U.S.A. and Japan...

"Innovative breakthrough is evident. And Ukraine has a unique chance to "jump into the last car of this train of innovation," — noted the chairman of the Ukrainian State Committee on Science, Innovation and Information Vladimir Seminozhenko, being present at the presentation. However, in order not only to "jump into the train, but go in it", Ukrainian nanotechnologies, according to opinion of the scientists and businessmen, need a state coordinating center. To make, it they propose to establish the research Institute of Nanotechnology in Ukraine. According to Boris Paton, a newly established Institute in the form of "coordinating council of scientists" will have to assume the function of the integrator of activity of the research institutions and private investors in a single process of development of specific knowledge-intensive products with high intellectual value. Vladimir Seminozhenko on behalf of the State undertook help to the national nanotechnology. According to him, with the time from nanotechnologies the state will receive a million times greater than is spending on their development now. Semynozhenko also promised that in the new Tax Code will provide substantial benefits for the nanotechnology industry. "Technology development of the sixth order, the core of which nanotechnologies are — is Ukraine's most direct and shortest route to the economic growth and leadership, — said Vladimir Seminozhenko. — Today, when business and government are united in the understanding of the importance of science for the future, we have a chance to help Ukraine out in leaders in the global science and economics. This is a very positive signal to the scientists, including future ones" [25].

We can talk as well about the prospects of the emerging cross-border nanotechnology cluster on the basis of divisions of Belgorod State University and Lugansk National University of Shevchenko, Donetsk Physico-Technical Institute of Galkin, and the Institute of Industrial Economics of NAS of Ukraine presented in Table 3. In this case, it should be noted that in the present time Belgorod State University from the Russian side and the Institute of Industrial Economics of NAS of Ukraine and Lugansk National Pedagogical University of Shevchenko have legally formalized their relations by making an agreement on the scientific and technical cooperation. The Institute of Industrial Economics of NAS of Ukraine and Donetsk Physico-Technical Institute NAS of Ukraine set up their branches in the respective departments of Luhansk Taras Shevchenko National University.

In the first approximation the basic stages of formation of a cross-border nanocluster,based on carried research, can be formulated:

1. Creation of head Affiliated Institution on the problem of the Institution of NAS of Ukraine in the appropriate department Ukrainian university — a partner.

2. Cooperation agreement with a foreign partner.

3. Ensuring the structural units, involved in nanotechnology research, mutually complementary equipment.

4. Support with personnel, training, scientific exchanges.

5. Funding support by involving money of regional and national programs, local oligarchs.

6. Elaboration of national and regional strategies of diversification of traditional industries of the specialization of regions and cities.

7. Business incubation of SE (Small Enterprises) support and replication of nanodevelopment.

Prospects for development of the global market of nanotechnologies are enormous. Thus, experts of the leading company on marketing research RNCOS forecast its total growth in 2010 to 18%. According to the report of "Nanotechnology Market Forecast to 2013" in March of this year, a niche, related to agricultural production will be particularly dynamic in development — within the next two years, this market will grow to 50% and in the total amount will form 1.6 trillion dollars.

Thus, the last decade of the XX-th and the beginning of the XXI-st centuries are characterized by significant changes in the global economy. A new phase of the scientific and technological revolution and the internationalization of capital flows has transformed the main models of economic development. Target model, which the most of the countries are trying to introduce, is the economy of growth. But at this time, such indicators as the dynamics of innovation, investment flows are, have been replaced in the ratings of economic estimates by the factors of technological speed and concentration, which determine the degree of high-tech growth in the modern economy. In the world it is not just a gradual evolutionary transition to the new economic structure which takes place, it is the global not so much neoeconomic, but primarily NEOINDUSTRIAL REVOLUTION, predetermined by technological, financial and environmental changes, the transition to the latest high-tech, highly productive and flexible forms of production, which indicates the dominance of humanity-orientation economy in the world.

For example, even at this moment, such countries as Norway, Canada, reoriented its economy to the creation and usage of modern knowledge, which in more than 50% ensures the growth of their national wealth. The most stable increase of scientific and technological potential the U.S.A. demonstrates: total expenditures on R&D in recent years make an average 220,0-225,0 billion dollars a year. According to the level of "internetization" the first place goes to Iceland (44,6%), Sweden (40,4 %), Norway (36,2 %) and the USA (21 %). Thus, one of the most motive factors of economic development of the leading part of the world economic commonwealth of the late XX-th — early XXI-st centuries became a new

Table 3

Structure of transboundary nanocluster

Organization-participant	Belgorod State University (Russia)	Lugansk National University of T. Shevchenko	Donetsk Physico-Technical Institute of National Academy of Sciences of Ukraine	Institute of Industrial Economics of National Academy of Sciences of Ukraine
Units	1. Department of Physics 2. Center for Nanostructured Materials and coatings 3. Business - incubator	1. Department of Physics. 2. Branch of Donetsk Physico-Technical Institute 3. Branch of Economy and Law Institute 4. Business-incubator (draft)	1. Departments: High Pressure Physics and Advanced Technologies; Physical materials science; magnetism and phase transition theories; Low-temperature magnetism and radio spectroscopy at high pressures	1. Department of Problems of Regulatory Policy and Entrepreneurship Development
Complementary Equipment	Electron scanning and atomic force microscopes, etc.	1. X-ray diffractometer DRON - 3.0 2. Ellipsometer	1. PPMS-9-Installing 2. Electron microscope - AM-200 3. Pilot line for production of nanomaterials, etc.	Org. Design
Results of the interaction within the cluster	Getting and the introduction of nanopowders, nanofilms and nanosensors of various modifications into the industry.			Scientific and methodological support

quality of the interconnection of science, technology and economic growth. Technological changes on the basis of innovation, reducing the duration of the research, followed by rapid implementation of their results in industry and other sectors of national economy, reducing life-cycle of products, enhancing the role of interactions between economic agents as a condition for obtaining the desired economic results — are the most obvious examples of the changing of nature of organizational economic and socio-economic processes, that led to persistent economic development and improvement of living standards of the leading countries in this period.

As the realities of the present show, exactly relying on such a relationship of scientific, technological and economic factors, the most developed countries are trying to overcome the negative effects of the current global financial crisis. Stimulation of further progressive structural changes of national economic systems in combination with anti-crisis measures aimed at regulating socio-economic processes in the global economy scale gradually yield some positive results.

Unfortunately, Ukraine found itself among the countries, that most of all suffer from the global financial crisis. Among the range of economic, political, social and other reasons that led to the inability of the domestic economy to resist worthy the challenges of the current crisis, one of the defining, in our opinion, is precisely the lack of correspondence of quality of technological development in Ukraine in recent years to modern global trends. The general backwardness of the technological base of the national economic system, the weakness of mechanisms for its innovative renewal — all this greatly increased the negative impact of the global crisis on Ukraine and make difficulties in process of overcoming its negative effects. However, the current economic situation in Ukraine is an indication that this problem will continue to be one of the most pressing.

Technological difference in structures of domestic economy, the existence of different techno-economic sectors, market and industry segments — it is a feature of the transition phase of its development in the technological and structural dimensions. The results of implications of "catch-up" model to a large extent determined the mixed nature of techno-economic model of the Ukrainian

economy, where sectors of different competitiveness co-exist: some of them are characterized by low competitiveness of industries and technologies of mass use; others — by a significant potential of promising areas of fundamental and applied researches in a number of productions; the third — by the big export opportunities of traditionally industrial and resource-transit industries.

We can not stop disturbing about the question, whether to require from the government to implement just a part of the long-overdue reforms now — in the context of the global financial crisis? On the one hand, the decline and stagnation of the domestic economy, the transformation of the global economic system are precisely the moment when it should and can be reconstructed to become more competitive on the end of the global crisis. On the other — where is any guarantee that the reforms, initiated during the crisis, will not play against us, finally destroying the economy? To make serious reforms, money is needed. And, as it is known, there is always lack of them in our country. The progressive development of the international community as a major sociological regularity in the world history with the transition from one era to another, higher in its development, motivates the acceleration rate of changes as a technological basis — of equipment and technology generations, — and significant changes in socio-economic forms of self-organization and philosophy of social development. The forms and methods of manufacturing processes organization and industrial relations are altered perceptibly, and with it the systems and management mechanism change too.

Is it worthy to say about the current economic crisis as a kind of "time-break" for Ukraine to implement as much of the structural reforms as possible? This question arose before the humanity not today. As well it troubled M. Tugan — Baranovskiy, A. Bogdanov. This global crisis requires a global response, but unfortunately, the responsibility for the actions will remain at the national level. Each country has developed its own stimulus package of measures to maximize their impact on its own citizens, rather than a global impact. When assessing the size of stimulating activities, the countries balanced the cost relative to their own budgets with the benefits in form of more rapid growth in employment in their own economies. Precisely because of this it is necessary to adopt a coordinated global stimulus package of measures.

Economic stabilization of itself is a long-term process. To get pace, that Ukraine had until August 2008, will be problematic in the coming year or a year and a half, because there are factors that are not related to internal capacity of the country. And dependence on the world market still exists: in particular this applies to the global demand for the Ukrainian products (products of metallurgy, chemistry, engineering). Although currently the development policy of the domestic market and the reorientation of production to the domestic market are held, the question of resumption of positive dynamics of domestic production largely depends on changes in demand and prices on individual world commodity markets. Other factors may include those relating to the capabilities of our companies to produce competitive production. Therefore, at present Ukraine has to create not only the conditions to reach the pre-crisis economic results, but also to improve significantly the level of competitiveness of production.

We can not allow the political crises co-exist with economic ones in Ukraine. With all the conditions and processes that occur in the country, we need step by step to stabilize production and to ensure its progressive development. No political activities should lead to economic destabilization, because the whole country suffers from it. Distribution of recessionary processes in the world, falling demand and prices on world commodity markets found its echo in the internal processes of the country and negatively affected the situation of the real economy sector. Currently, however, there is stabilization of situation and gradual recovery of industrial activity in certain sectors of the economy. Thus, the situation in the Ukrainian economy has stabilized, the first signs of its gradual adjustment to external shocks have appeared.

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Chumachenko M. G., Amosha O. I., Lyashenko V. I. Neoindustrial Ways of National Ukrainian and Donbass Regional Economic Development

Priorities which have been actually formed in Ukraine in the last decades do not answer those which are widespread in the world. Strategy of economic breach of Ukraine is really can be based on speed-up of the development of those domestic productions which led to competitiveness on the internal and external markets.

Keywords: innovation, technology, postindustrialism, neoindustrialism.

Чумаченко М. Г., Амоша О. І., Ляшенко В. І. Неоіндустріальні шляхи розвитку національної економіки України та регіональної економіки Донбасу

Пріоритети, які фактично сформувалися в Україні в останні десятиліття, не відповідають тим, що поширені у світі. Реальна стратегія економічного прориву України може базуватися на прискореному розвитку тих вітчизняних виробництв, які довели конкурентоспроможність на внутрішньому і зовнішньому ринках.

Ключові слова: інновація, технологія, постіндустріалізм, неоіндустріалізм.

Чумаченко Н. Г., Амоша А. И., Ляшенко В. И. Неоиндустриальные пути развития национальной экономики Украины и региональной экономики Донбасса

Приоритеты, которые фактически сформировались в Украине в последние десятилетия, не отвечают тем, которые распространены в мире. Реальная стратегия экономического прорыва Украины может базироваться на ускоренном развитии тех отечественных производств, которые довели конкурентоспособность на внутреннем и внешнем рынках.

Ключевые слова: инновация, технология, постиндустриализм, неоиндустриализм.

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