INNOVATIVE DISCOURSE OF HIGHER AND PROFESSIONAL EDUCATION IN THE EXPONENTIONAL TECHNOLOGIES AND THE NEW BUSINESS ENVIRONMENT

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Abstract. *On the basis of the system analysis of the implementation in the Concept for the development of the national innovation system, developed and approved by the Cabinet of Ministers of Ukraine in 2009, it is stated that its efficiency is rather low. It is established that the main reason for this is inconsistent and low effectiveness of state, educational, scientific and innovation policy. It is proved that Ukraine needs today a new systemic innovation development strategy that should combine the efforts of power, business, education, science and become a guarantor of dialogue between them. The place and role of the educational-scientific subsystem in the national strategy of innovation development are outlined and the main problems of higher education and vocational education in the context of the training of innovative-oriented specialists are identified. It is substantiated that domestic education, in particular, higher education, can become the most important indicator of the quality of life in society, react effectively to exponential technologies and*

promote technological change in the business environment by making five radical steps. Realizing them, Ukrainian society has a chance in the medium term to ensure the introduction of the latest innovative technologies and to become significantly closer to the level and way of organizing the life of developed countries.

***Key words*:** *business environment; dual education; educational-industrial group; education throughout life; exponential technology; gig economy; higher and vocational education; national innovation system; science; socio-educational determinism.*

INTRODUCTION. PROBLEM STATEMENT

Today, the world is on the brink of a new technological revolution that will radically change our entire lives and the functioning of the world economy. "The old world is doomed. A new world is inevitable "states the report of the Club of Rome" Come on!" 2017 (von Weizsaecker & Wijkman, 2018). This is a serious challenge and at the same times a promising opportunity for developing countries, including Ukraine. Building a new economy, the formation of a new business environment today requires the formation of a holistic system of effective transformation of modern knowledge into the latest technologies, products, services that find their real consumers in national or global markets. Of course, this requires an appropriate Concept for the development of the national innovation system, which would provide a set of legislative, structural and functional institutions involved in the creation and application of scientific knowledge and technology and determine the legal, economic, organizational and social conditions for innovation. Its purpose should be to create conditions for increasing productivity and competitiveness of domestic manufacturers through technological modernization of the national economy, increasing the level of their innovative activity, manufacture of innovative products, application of advanced technologies, methods of organization and management to improve human welfare and ensure economic growth. The implementation of this goal should provide for the effective functioning and harmonious development of several major subsystems (government regulation, higher education, knowledge generation, innovation infrastructure, production), which determine the effectiveness of the innovation system. In Ukraine, such a system was developed in 2009 and approved by the Cabinet of Ministers (Cabinet of Ministers of Ukraine, 2009). One of the five most important subsystems of the national innovation system was the higher education subsystem, the main purpose of which should be the formation of a competitive, highly qualified professional with career and life skills that meet the needs of modern national economy of the fourth "digital" revolution (industry 4.0).

MAIN RESULTS

The main aims of this subsystem development could be: *firstly*, ensuring the innovative orientation of the education system based on large-scale computerization and intensification of scientific, technical and innovative activities of higher education institutions, taking into account European standards and preserving cultural and intellectual national traditions. *Secondly,* increasing the effectiveness of the university sector of research and development in order to strengthen its role in ensuring the innovative development of the national economy. Modern high technologies depend on the level of scientific research, efficiency and effectiveness of their implementation in production. It is important to note, that the quality of scientific and technological developments depends on the qualifications of scientists and engineers, and they, in turn, are the total effect of this system of education, especially higher. *Thirdly,* ensuring expanded reproduction of knowledge through the integration of higher education

institutions, academic and sectoral institutions by increasing the level of capital of the public sector of research and development; concentration of resources on priority areas of science and technology development and innovation; stimulating lifelong learning, fostering a culture of innovative thinking.

More than ten years have passed since the approval of the Concept for the Development of the National Innovation System. Unfortunately, as evidenced by the parliamentary hearings of the Verkhovna Rada of Ukraine on March 21, 2018, the extended meeting of the on Science and Education on January 16, 2019 and analysis of the state of affairs in higher education and science in 2020 by the expert group of the Social and Humanitarian Service Security Council of the National Security and Defence Council of Ukraine, in Ukraine, innovation in education, science and industry has not acquired a sufficient level of efficiency, which in our opinion is the result of inconsistency and low efficiency of state educational, scientific and innovation policy. This thesis is confirmed by the unpreparedness of the education and science system to respond to external threats, for example, in the context of the spread of acute respiratory disease COVID-19 caused by the coronavirus SARC-COV-2, which has been widely discussed in the media since March 2020 and until now. Scientific helplessness and educational confusion have become the norm.

As a result, socio-economic development in the country occurs without proper intellectual and innovative support. Ukrainian higher education, despite the search for new landmarks, continues to lean towards training users, rather than generators of new knowledge, new technologies, and specialists to meet the needs of innovative development of the state. The quality of national education, educational standards and norms do not always meet the needs, existing standards that are put forward to the content of education, to the training of teachers, their educational and methodological support. Innovative development of scientists, universities and scientific academic institutes that offer certain progressive changes are often not implemented due to lack of funds, inconsistency of administrative structures, irrational system of selection, testing and implementation of innovations in education, proper results, etc. The old landscape of higher education, which does not correspond to the general programme of innovative transformations remains unchanged and requires immediate diversification of the higher education system. A paradoxical indicator of the state of education and science is that, despite numerous declarations and slogans, they have not belonged to the sphere of state priorities in Ukraine during all the years of independence, and they do not belong today. There is a constant reduction in research funding. The obsolete park of laboratory equipment is in a catastrophic condition. The prestige of scientific and pedagogical work is rapidly declining. Talented young people do not go to science or leave it because of the inability to ensure a decent standard of living. The number of scientists has decreased almost 5 times during the years of independence. If in 1991 there were more than 4,000 people per 1 million population, today there are 1,254 people, which is 2.6 times less than in the European Union. At the same time, the reduction of the human resources potential of science in Ukraine continues, and its migration, primarily of young scientists, abroad is intensifying (Verkhovna Rada of Ukraine, 2019: pp. 1-2). According to the 2017 sociological group 'Rating', 64% of Ukrainian scientists surveyed said that the situation in domestic science has deteriorated, and every third scientist is ready to leave the country. There is a chronic misunderstanding in society about the role of education and science for the future of the country.

It is no coincidence that the intellectually capacious sectors of the domestic economy have almost completely surrendered their positions. Labour market demand has shifted mainly to the service sector, where complex intensive knowledge to create new types of equipment, high-tech products, nanomaterials, services and technologies have become redundant. Under such conditions, the field of advanced science, education and innovation began to 'hinder' the

primitive labour market, which deprives young people and the education system of motivation and incentives. And this leads to a syndrome of intensive knowledge unnecessary and highly skilled workers and the displacement of better human capital from the country. The degrading economy has resulted in a 40% reduction in the training of innovative, science-intensive models in favour of low-intelligence reproductive education.

Education is a complex synergetic system of human capital training, where higher education is 'the upper part of the iceberg, the essence of which is determined by its much more powerful underwater part (from preschool, secondary and vocational education)' (Saukh, 2012). Inconsistency of actions, inconsistency and isolation of changes in each of these levels of education do not determine its quality. In addition, the synergy of education is closely linked to modern tectonic shifts in post-classical science and neoliberal economics and involves a transition from a school of knowledge to a school of understanding, from paternalistic pedagogy to collaborative pedagogy, from basic training to exponential mobility in the digital age. The end product of this system should be not only a professional who is able to quickly adapt to any changes, able to work in more than one position, able to extrapolate ideas from one area to another, but also responsible for his actions.

Despite Ukraine's position as a formal leader in education (according to the Global Competitiveness Index, Ukraine ranked 40th in the category 'Higher Education and Vocational Training' compared to 144 countries in 2014-2015), the quality of education remains quite low (according to that rating, it ranks 75th and according to the criterion 'Availability of research and training services' – even lower – 84th place) (Schwab, 2014: pp. 372–373). There are many reasons for this. But the first, in this context, is the external independent evaluation of school graduates (ZNO), which, according to many experts, deprives them of a motivating factor. Without doubt, it is an effective safeguard against corruption in education and a mechanism for equal access to higher education for young people from different social groups, this system should be conceptually reformed. First of all, because it is not sensitive to the creative abilities of the young people being tested. In addition, this system focuses students and teaching staff not on analytical thinking, but on memorizing large amounts of data and facts, mostly mechanical, and on the temporary training of template tests. Young people trained according to this system do not acquire the skills of critical, analytical thinking and solving non-standard problems. The use of external evaluation with these features for a long time threatens to undermine the foundations of divergent thinking and lead to a decrease in the educational qualifications of the nation and the failure of progressive change in conditions of fierce competition in education. An equally important reason is the situation in professional higher education, which is subject to autonomous reform in the country without proper regulation. Since the adoption of the Law 'On Higher Education' of Ukraine (2015) (Sysoieva & Mospan, 2015: pp. 166–174), institutions of professional higher education are in a state of legal uncertainty. In addition, from January 1, 2018, their financing system was changed. There were a number of problems with the transfer of professional higher education institutions, which had the status of a legal entity, to funding from local budgets, and educational institutions, which are in the structure of universities and academies – to funding from the latter (Verkhovna Rada of Ukraine, 2018b: p.5). The situation with vocational education is not the best. During the years of independence, the annual output of highly qualified workers has tripled: from 338 000 in 1991 to 120 000 in 2018, the quality of training of this category of specialists has significantly decreased. Critical point for the vocational education system in 2015 was its funding transfer from the state to the local budget, which led to the deepening of the crisis in it. As a result, the entry into Ukraine of the corresponding category of workers from Turkey, Vietnam and Central Asia has increased. These migration processes became especially large during the introduction of new infrastructure facilities at large industrial enterprises, construction sites, etc. For example, on

the construction of the metro in the city of Dnipro, all highly skilled labour operations are performed today by Turkish citizens. Ukrainian workers are given low-skilled work-cleaning, 'black' work and more (Verkhovna Rada of Ukraine, 2018a: pp.19–21).

Therefore, it is unfortunate to state that the "European vector" declared by Ukraine (including the social ideal of the knowledge economy), unfortunately, often turns into a socio-political phantom that distorts the idea itself and in fact destroys it with its paradox, contradictions and inconsistencies, innovative potential of the domestic educational and scientific matrix.

Naturally, a fundamental question arises: with such a paradoxical baggage of Ukrainian education and science, ideological stereotypes and fantasies to fit into the resource of a new technological revolution, to make the domestic economy knowledge-intensive, innovative and competitive?

In order for our national education, in particular higher education, to become the most important indicator of the quality of life in society, to respond effectively to exponential technologies and to promote technological changes in the business environment, we believe that at least a few radical steps must be taken. *The first step.* One of the main socio-philosophical foundations of the strategy of modernization of Ukrainian society should be *socio-educational determinism*, which would not be a denial, but a new phase in the development of socio-economic determinism. Because it does not mean the refusal to recognize the decisive role of the economic factor in the development of society, but the recognition of the archival role of education and science in the development of the modern economy as a fundamental basis of social life. No doubt, this step involves serious changes in the course of socio-economic policy and domestic policy in general. But it can restore reverence for education and science in society, eliminate pragmatic and conformist distortions in the minds of young people, in still social optimism in educators and become a prerequisite for innovation and technology breakthrough in Ukraine.

The second step is closely related to the first one. Development of a National Strategy for Technological Breakthrough, which would unite the efforts of all major forces of society: (a) the state, which should define a long-term strategy for overcoming the technological impasse and provide effective support for breakthrough science and technology and basic innovations; (b) entrepreneurs and owners of capital, who must direct their efforts and funds to technological renewal of production and products, decisively reducing the outflow of capital and excessive consumption; (c) scientists, designers, technologists, inventors, on whom ultimately depends the creation, development and development of fundamentally new ideas and technologies that ensure the growth of competitive products, the economy and society as a whole. 'Such a partnership would have a positive impact on improving communication and building ties between these forces, would deepen the understanding of the problems and needs of the domestic business environment, as well as facilitate the rapid dissemination of information in business circles about existing research and facilitate their implementation. domestic enterprises' (Kravets & Shvets, 2014: p.488). The lack of such cooperation negatively affects the process of communication and building ties between the parties, as well as prevents graduates of higher education, vocational education and academics to quickly and deeply focus on business issues.

Creating an atmosphere of priority in education, science and technology in the country will allow to form a critical mass of support for educational and innovative reforms in society. Innovative ideology, innovative culture, innovative incentives will be key in the national ideology of development. Moreover, education and science are associated with the search for a unifying idea for Ukraine that would help overcome the political and economic contradictions of the regions. We strongly believe that the idea of uniting everyone, mobilizing resources and

giving impetus to move forward is to achieve a breakthrough in society. It can be provided on the basis of qualitatively new knowledge, embodying advanced technical achievements in a competitive economy and ensuring high living standards.

The third step. Actually, transformation in the higher and vocational education system. The main factor in the formation of human capital as a strategic resource and the main factor of economic growth of the country is creating conditions for training innovation-oriented professionals, who can ensure the accelerated development of high-tech industries with high export potential. This, *first of all,* will force higher education institutions to look for effective ways of organizing the educational process, that increase their institutional flexibility, strengthen the adaptive potential of curricula, teaching methods, deepen the scientific component in the educational process. In the organizational context, all this requires the introduction of new disciplines in response to the emergence of new areas of science and technology, departure from the classical methods of knowledge formation, as well as erasing the demarcation between basic and applied research. Be much more active and agile in reorienting to the training of new, labour market demanded professionals. It should be borne in mind that over the past 100 years, almost 600 jobs have disappeared, and about 1,000 have been greatly transformed. It is estimated that by 2030 there will be about 200 new jobs, permeated by the system of competence of the future (comprehensive multi-level problem solving, critical thinking, creativity, emotional intelligence, etc.). Even today, it is very likely that in this context, the concept of 'profession' will disappear altogether (Saukh, 2018: p.48). *Second,* the organization of a large-scale relationship between higher and vocational education and the labour market requirements. Today, unfortunately, the educational and scientific potential of higher and vocational education institutions is practically excluded from the economic processes of the state. Education remains deaf to the needs of business, and business has no motivation to cooperate with it. Hence, the mismatch of graduates and their knowledge and skills to the needs of the labour market. Employers point to the fact that in order for a young professional to return profit at least 20-30%, his training in the company requires at least 8 months. As a result, the number of graduates of higher education institutions is constantly growing. 70% of graduates believe that they are denied work due to their lack of work experience (Saukh & Chumak, 2018: p.28). An important factor in solving this problem should be the dual form of education, which would involve the creation of educational-industrial groups (higher education institutions and enterprises), which combine their tangible and intangible assets to implement investment and other projects and programs, aimed at improving the quality of training and the material and technical base and infrastructure. The sectoral educational and industrial groups could include, in addition to higher education institutions, vocational and technical educational institutions, secondary schools, comprehensive retraining courses, etc. All this will undoubtedly contribute to the expansion of the practice of social partnership of higher education institutions with employers; involvement of the latter in the development of higher education curricula; development of students' soft skills through the creation of appropriate programmes in the art of communication, negotiation, critical thinking, etc.; involvement of company representatives in conducting classes (giving lectures, conducting master classes, etc.) (Sysoieva & Mospan, 2019: pp.78-83); introduction of internships for teachers in companies to gain (improve) practical experience.

Third, all this determines not only the structural optimization of higher education institutions and the optimization of their network in Ukraine, but also economic relations in higher education, which are still non-market. Unfortunately, the amount of funding for higher education institutions today does not depend on the quality of educational services and their real cost in specialties (for example, training a lawyer is more expensive than an engineer). Therefore, there should be a new model of economic activity of higher and

vocational education institutions: from financing their 'maintenance' to payment by the state, corporations, directly to students of specific services at each level for a specific specialty at a price specified by the contract. In this regard, higher and vocational education institutions, in addition to academic and organizational, should gain financial autonomy while strengthening their responsibility for the results of educational and research activities. The result should be the creation of a healthy competitive environment for material incentives for higher education quality and strengthening the competitiveness of higher education in the international market of educational services, forming a group of higher education leaders capable to compete in Western markets of educational services.

The fourth step. An important problem of education in innovative discourse is the increasing implementation of the educational model 'lifelong learning', which allows a person to adapt and develop their competencies and professional skills in accordance with rapid changes in the economy, technology and labour market. This is explained by the fact that the period of 'half-life' of the competence of the professional (i.e., its reduction by 50%) in most jobs occurs at least 5 years. Research shows that in Ukraine, 50% of higher education graduates and up to 64% of vocational education graduates change their profession immediately after graduation (Mospan, 2016). It is clear that this requires the ability to learn and quickly relearn if necessary, necessitates the need to organize the avalanche of information, to navigate in new industries and types of business. That is, the constant change of employers, change of sphere of activity (re-profiling) becomes a trend at the labour market. Modern man is forced to operate in a new model of economic activity, in which particularly rapid growth is demonstrated by sharing-economy (joint consumption) (The McKinsey Global Institute, 2016) – a business competence that emphasizes the advantages of renting goods before purchasing goods and gig-economy (gig-economy – model which people work as freelancers) (Deloitte, 2016).

In order to solve this problem, Ukraine needs not only a well-thought-out and scientifically sound Concept and programme for the development of the lifelong learning system, which would provide training for lifelong learning, scientific and methodological support of the educational process and quality control, appropriate curricula. etc., but also the development and adoption of a special Law 'On Lifelong Learning' of Ukraine and the introduction of the relevant provision in the framework of Law 'On Education' of Ukraine that 'qualifications acquired through non-formal and informal education can be confirmed and recognized in formal education'. In other words, it is important that a universal learning culture is formed in the country, that education is valued and encouraged, and that it becomes an integral part of the employment relationship.

The Fifth Step. The training and education system of talented youth, its wide involvement in managerial activity and work in university megacities demands cardinal changes. The modern national education system lacks a National Programme for Support of Gifted Children, which would provide at the state level clear mechanisms for selection, financial support and their education in the country's leading university centres. The effectiveness of this approach has been proven by the international experience of the United States, Japan, Finland, China, South Korea and other countries. The transformation of individual schools into 'golden corset lyceums' and the 'national' universities identified above is an irrational use of scarce resources and does not solve the really difficult problems of education. Ukraine does not need 'intellectual' classes, schools, universities, but creative, talented students.

CONCLUSIONS

Only under these conditions Ukrainian education could become competitive in the European and world educational area, and people will be protected and mobile in the labour

market. Having taken these steps to transform the national policy and reform education, Ukrainian society has a chance in the medium term to ensure the introduction of new innovative technologies and significantly approach the level of developed countries. But all this will succeed when it becomes systemic, interconnected, creating a *holistic national policy in education*, which will provide a new content strategy for innovation and unite the efforts of government, business, education and science.

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