

Education Clusters: The Ukrainian Context

The study aims at theoretical and methodological grounding of the role of education clusters in economic development and analysis of their impact on competitiveness enhancement of national education systems, with emphasis on Ukraine. A review of theoretical approaches to interpretation and definition of the notion "education cluster" is made. Information about entities that may be incorporated in education cluster, objectives and expected results of education clusters is given; their advantages compared with traditional education system and their significance in the regional context are shown. Examples of education clusters and research and education clusters currently operating in Ukraine are given.

Keywords: *education cluster, professional education, education system, education institution, research and education cluster, research and development.*

Introduction. Deeply controversial processes of economic internationalization, unprecedented in scale, shock waves of globalization and regional integration require new national and regional strategies and models of future development. Many countries have used the cluster approach to building and implementing national innovation programs. Clusters have proved to be solid background for building national competitive advantages by optimizing the use of economic capacities. The clustered businesses can benefit from collaborative activities aimed at increasing the output of existing products and developing new ones that are in demand.

Modern education requires searching for and implementing innovative approaches to building a new regional policy on education and modernization of its management system. A principal difference between the modern education system and the previous ones is in special conditions created for combining public and private forms for management of education system. The cluster system of education is a significant part of the innovations designed to intensify regional development. After all, education must be regarded as part of the regional socio-economic entity, which covers various functional

elements where services of many entities of the regional infrastructure are involved: education, culture, health care, sports, environment, technology etc.

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Discussion. Foreign and domestic scholars E. Bergman, E. Fezer have developed the theoretical assumptions concerning the formation and development of clusters, their studies are devoted to the identification and evaluation of clusters; M. Enright, S. Rosenfeld has developed the theory of industrial organization and integration of productive forces; B. Milner, A. Toffler worked on the theory of regional science and technology policy. Bresson, L. Kemeni, J.-L. Pozhe, G. Postlt, W. Price, L. Pullol, T. Roelant, M. Steiner, M. Todaro, J. Tolendo, P. Fischer, M. Feldman, John Hertoh, P. den Hertah, J. Horvath, H. Shrepler, V. Shroyder, Schumpeter and others justified the formation of clusters by practical experiences. S. Rosenfeld studied the role of size and employment in clusters, the differences between clusters and networks.

Cluster building processes were also studied by Ukrainian theorists and practices such as Y. Bazhal, E. Bezvushko, I. Brizhan, S. Bushuev, V. Verhun, M. Voynarovsky, V. Nikolaev, V. Vorotin, S. Doroguntsov, M. Dudchenko, R. Zablotska, N. Kanischenko, A. Kanischenko, L. Kistersky, A. Kredisov, S. Kunitsyn, S. Lutsyshyn, S. Moskvyn, S. Mocherny, M. Petrushenko, V. Saw, K. Poychenko, A. Rogach, A. Rummyantsev, C. Sokolenko, D. Stechenko, S. Sutyryn, A. Filippenko, V. Chevhanov, V. Chuzhykov, A. Chmyr, S. Tsyganov, A. Shnyrkov, A. Yudanov and others. The attention of those studies was focused on the specifics of industrial clusters and creating their efficiency in services.

Education cluster is a set of professional education institutions connected with each other on industry basis and partnerships with industry. Education cluster is a system of training, mutual training and learning tools in the innovation chain "technology – science – business", based mainly on horizontal relations within the chain. Research and education cluster (SEC) means the "cluster" of collaborative projects, R&D and publications. This is "connection of employers and education institutions through a set of programs". The cluster system can incorporate institutions of pre-school, school and professional training, including university and post-university training. In addition to development of education system, there are other tasks facing the cluster such as the need to strengthen the links of professional training to labor market. Examples of successful operation abroad are buffet education cluster in Sweden, based at the University of Uppsala, and the cluster "Research Triangle" in North Carolina (USA).

When an enlarged education-innovation cluster is being built, it should interact with large corporations – innovations customers, government agencies, financial and public organizations. Venture financing has particular importance in building up education cluster. Education clusters also use the so-called "vowel" resource – specifics of local history, culture, traditions and values that form the so-called "implicit knowledge", while the symbiosis of seemingly "incompatible" concepts – competition and cooperation – is born in clusters. Education cluster

allows for using comprehensive approach to the problem of motivation, and helps attract young people to R&D, education and innovative entrepreneurship. An important advantage of the cluster is that everyone has the opportunity to fully realize their abilities and skills. A specialist can simultaneously work in research laboratories, teach, work in a corporation or create his own innovative small company, meaning that he has complete freedom of choice. The current comprehensive reform of education in Ukraine involves transition to the European education system, with replacing unitary education by education based on student's choice, changing the structure of school and pre-school education institutions, extending the network of colleges, high schools, universities, postgraduate courses, corporate and vocational education, education organizations with the level and profile differentiation of training, private education institutions with novel training models and technologies, improving education programs and facilities.

Integration of education institutions in education cluster will provide a new level of training for R&D and lecturing staff, enhance the performance of R&D and innovation to meet the needs of a particular region; it will allow for training of students with high culture of thinking and broad-mindedness, for turning education institutions into centers of progress and stability, moral and cultural elevation of the regions.

Education cluster is bound to change the entire character of academic environment. Education clusters are required by the Ukrainian education system for very pragmatic reasons. Lively and fruitful academic environment requires close communication. The fundamental mission of every university is to break all the barriers. Every university exists in communication format. Fragmentation of disciplines, differentiation and profound specialization of disciplinary fields has caused the communication barriers and for scientists and misunderstandings within universities. Moreover, misunderstandings between universities also exist. The worse thing is the absence of the academic environment in Ukraine, which shares common values and principles.

Creation of education clusters in Ukraine will help improve the education quality and make education institutions more competitive. With the appropriate amendments in the mechanisms of public funding for higher education, made in the new legislation, Ukrainian universities will have to compete for excellent students.

T. U. Krasikova believes that education clusters should be considered as the system of institutions of professional education, linked by industry and partnership relations with businesses operating in the industry [1].

According to N. V. Vasylyeva, regional educational cluster should be defined as a system of education institutions of different levels, R&D organizations, private companies, organizations of regional innovative infrastructure and business support infrastructure that are associated with government agencies and regional components of economic system. She also argues that a higher education institution can be center of a cluster (core cluster), take responsibility for education and R&D support of this cluster, and also act as the information and methodological center, the communication platform [2, p. 8–10].

According to N. A. Korchagina, education cluster is a group of education institutions, which have partnership relations with business enterprises operating in industries located on the same area, which end product is education service [3, p. 81]. The core cluster in this case is higher education institution or other educational institution.

O. V. Smirnov interprets education cluster as a system of education, mutual training and tools for self-education in the innovation chain "science – technology – business", which is based primarily on horizontal relations inside the chain [4, p. 75]. The basis of an education cluster is education process. Thus, education cluster can be viewed from two perspectives: as a system and as a process.

V. I. Kutsenko defines education cluster as a system of connected education institutions, educational organizations, which, taken as a whole, have higher importance than when taken separately. Education cluster is, therefore, more capacious in the education market context, than various forms

of cross-sectoral integration like vertically integrated holdings, associations, strategic alliances, network association, joint ventures, technology parks, industrial parks, special economic zones etc. [5]. A cluster is a more complex phenomenon than an association of institutions, organizations and enterprises, as education institutions are involved in the process of cooperation more and more intensively and continue to compete with each other.

A. P. Zhuk and L. O. Drozdovskii believe that education cluster is an integrated system of continuous education from school (pre-school) to job in the industry [6, p. 152].

A. M. Staryeva defines socio-cultural education innovation cluster as a voluntary association of geographically close interacting entities: education institutions, government agencies, banks, private industrial companies, innovative enterprises (organizations), infrastructures; this association is characterized by the produced competitive education, cultural and social services, by the existence of an agreed development strategy, which aim is to benefit each cluster participant and each territory of cluster localization, and by considerable socio-economic significance for the region. The purpose of cluster building is in attaining the combined and intensified effort and capacities of entities forming the innovation structure, in order to ensure coordinated action aimed at improving domestic and global quality and competitiveness of regional education system [7].

E. R. Chernyshova justifies the necessity of forming clusters as innovative way of developing postgraduate education, by considering education cluster as a set of social entities whose activity is based on principles of synergy and transparency [8].

M. S. Chvanova [9], V. M. Yuriyev [10] define education cluster as an association of education institutions and enterprises on industry basis, for professional training in conducting applied research. A. E. Gavrilova, F. T. Shaheyeva, L. L. Nikitin define education cluster as a system of professional education institutions that are connected with each other on industry basis and have partnership relations with businesses operating in relevant industries [11].

According to the European Cluster Observatory, there are about 69 educational clusters (Oxford, Amsterdam, London, Warsaw, Paris, etc.) on the EU territory, with different levels of innovation performance, salaries, exports of educational services, etc. [12].

Formation of education clusters as an organizational form for linking intellectual, financial and material resources to ensure competitive advantages is an important part of official policy in many countries. Because education cluster leads to diffusion of innovation activity from one cluster entity to another one, clusters may become the basis for building up national education system.

Innovation socio-cultural education cluster is a voluntary association to integrate geographically close interacting entities (educational, social, cultural institutions, government agencies, banking, private sector, innovative enterprises / organizations, infrastructure), which is characterized by the producing of competitive education, cultural, social services, the availability of the agreed development strategy, which aim is to benefit each cluster participant and each territory of localization of the cluster, and has considerable socio-economic significance for the region.

Clustered entities may be enterprises, institutions, organizations, regardless of ownership category and subordination, and individuals: pre-school education institutions; general education institutions; out-of-school education institutions; technical and vocational education institutions; higher education institutions; cultural institutions (libraries, museums, cultural centers, etc.); enterprises; institutions of physical culture and sports; investors; grantors; philanthropic organizations (including religious); local authorities; banking organizations; media.

Cluster is created with the aim of:

- equating the proportions of separate subjects' efforts to address the problem of qualitative equal education;
- optimizing the network of education institutions in view of demographic and economic situation;
- intensifying cooperative links between the various education, cultural, economic administrative entities in the region, to improve the quality of education.

Operation of education cluster in Ukraine is subject to the Constitution of Ukraine, Laws of Ukraine "On Education", "On Pre-School Education," "On General Secondary Education", "On Higher Education", "On Professional Education".

Decision on creating the cluster requires a series of the following steps to be taken: analyze the network of education, culture and healthcare institutions, private companies, philanthropic organizations; study economic, social, scientific, technical, cultural relations between the actors; questioning and testing of participants of education process, interviews with the heads of agencies, organizations and investors; estimating the costs for strengthening the facilities of education institutions, rational use of funds allocated for maintenance of education, cultural and healthcare institutions; conducting public awareness campaign with education process participants.

A good example of creating education clusters in Ukraine is numerous education and research centers. The Research and Training Center of Cardiovascular Engineering at the Ukrainian National Technical University of Ukraine "Kyiv Polytechnic Institute" (NTU "KPI") have been created following joint decision of the National Academy of Sciences (NAS) of Ukraine and the National Academy of Medical Sciences (NAMS) of Ukraine. The main objectives of the new institute, which consolidated the efforts of NTU "KPI", Amosov Institute of Cardiovascular Surgery of the NAMS of Ukraine and Paton Institute for Electric Welding of the NAS of Ukraine, are improvement of existing and creation of new biomaterials and biotechnology, creation of materials and products with brand new capacities, development of modified biological objects and technical means for their preservation, development of artificial organs and their components.

To ensure two-way communication process between practical healthcare and scientific developments, five regional research centers were created: East Center (the city of Donetsk), created on the basis of the Gusak Institute of Emergency and Reconstructive Surgery of NAMS of Ukraine

(director Dr. Grin, the academician of NAMS of Ukraine); Northeast Center (the city of Kharkiv), created on the basis of the L. T. Mala Therapy Institute of NAMS of Ukraine (director Bilovol O. M., the academician of NAMS of Ukraine); South Center (the city of Odessa), created on the basis of the Odessa National Medical University (director V. Kresyun, the Corresponding Member of NAMS of Ukraine); West Center (the city of Lviv), created on the basis of the Daniel Galician Lviv National Medical University (director Zimenkovsky B. S., the Corresponding Member of NAMS of Ukraine); Pridneprovsky Center (the city of Dnepropetrovsk), created on the basis of the Institute of Gastroenterology of NAMS of Ukraine (director G. V. Dzyak, the academician of NAMS of Ukraine). These research centers can become the basis for research and education clusters of medical science in Ukraine.

Research and education cluster on the basis of "University for Education Management" of the National Academy of Pedagogical Sciences (NAPS) of Ukraine has been built by way of involving management teams, research and teaching staff from various education, research and methodic institutions in research projects in form of virtual laboratory, developing and implementing a guideline model for interactions between institutions of postgraduate pedagogical education and other entities from education, R&D and industry within research and education cluster. This will facilitate creating the background for preparing legal framework for cluster mechanisms of interactions between entities from education, R&D and industry in rendering and consumption of educational services in the competitive environment.

Secondary education institutions are involved in education clusters with universities and employers creating the chain of continuous education, which is a correct way. Moreover, this measure will be implemented gradually and take effect no earlier than 2016.

Peculiarities of education cluster cause a set of projects of different kind that are implemented [13]. In addition to that, the distinctive feature of education cluster is its innovation focus. Competitive education clusters in Ukraine have well-developed

links with similar clusters in Ukraine beyond. Stimulation of such links is an essential element of cluster policy, consisting of creation and implementation of development programs and programs of cooperation [14].

Creation of education clusters should have positive impact on the technological level of the economy, and hence the growth of real incomes. Education cluster includes not only education but also research institutions, venture capital firms, which coordinated work allows for rational use of resources that they concentrate. The system of professional education is posed at the education markets with strong support of employers and sectoral ministries. Enterprises communicate data on the required staff to sectoral ministries, and applications are made up and sent to appropriate clusters through the public procurement system. In some regions industrial enterprises take on the responsibility to provide opportunity for professional probation for students from technical colleges and higher education institutions, and sometimes they can even provide paid probations on advanced equipment with the guaranteed job placement.

Education clusters, if created by the model of developed countries, should include all education and research institutions; it will help improve funding for all cluster components. In this cluster, students are engaged in practical work, including development of joint projects. It creates a new model of interaction between various education institutions to organize practically oriented training of young people. This, along with the economic tasks, helps increase socialization and professional orientation of students, while active and motivated students will prepare in this way to enter higher education institutions. However, this requires modernization of education, bringing it into compliance with new demands of society and taking into account its financial capacity.

Clustering opens up larger opportunities for education to be funded through the multi-channel system, i. e. from public budget (mainly) and off-budgetary funds (without lowering standards and absolute size of budget allocations).

Concluding remarks. The high competitiveness of education and R&D can be

provided by a set of cluster actors involved in education and linked to each other in addressing specific aspects of national education problems rather than by individual education institutions.

Education is considered today as not only an important factor for fostering high-quality living environment, but also as an effective tool for combating social inequality. Education cluster in Ukraine needs to develop by raising more funds from private sector, which will allow for enhancing edu-

cation quality, innovation activity and dissemination of new technologies. Transition from sector-based to cluster-based organization of production of educational services requires taking political decisions on education market and labor market, with cluster building being a problem requiring urgent solution. Because clustering supposes the symbiosis of education, R&D and industry, it is an important background for economic growth and welfare of the nation and bridging the technical and technological gap.

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Освітні кластери: український контекст

Метою дослідження є теоретико-методологічне обґрунтування ролі освітніх кластерів у розвитку економіки інноваційного типу, а також їх впливу на підвищення конкурентоспроможності національних систем освіти, зокрема в Україні. Виконано огляд теоретичних підходів до тлумачення та визначення поняття «освітній кластер», наведено інформацію про суб'єкти, які можуть бути учасниками освітнього кластеру, про цілі та очікувані результати діяльності освітніх кластерів, показано їх переваги порівняно з традиційною системою освіти, а також їх значення для розвитку регіонів. Наведено приклади освітніх та науково-освітніх кластерів, що нині діють в Україні.

Ключові слова: *освітній кластер, професійна освіта, система освіти, заклад освіти, науково-освітній кластер, дослідження та розробки.*

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Образовательные кластеры: украинский контекст

Целью исследования является теоретико-методологическое обоснование роли образовательных кластеров в развитии экономики инновационного типа, а также их влияния на повышение конкурентоспособности национальных систем образования, в частности в Украине. Выполнен обзор теоретических подходов к трактовке и определению понятия «образовательный кластер». Приведена информация о субъектах, которые могут быть участниками образовательного кластера, о целях и ожидаемых результатах деятельности образовательных кластеров, показаны их преимущества в сравнении с традиционной системой образования, а также их значение для развития регионов. Даны примеры образовательных и научно-образовательных кластеров, ныне действующих в Украине.

Ключевые слова: *образовательный кластер, профессиональное образование, система образования, образовательное учреждение, научно-образовательный кластер, исследования и разработки.*