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## IT-CLUSTER – MODERN COMPONENT OF REGIONAL ECONOMY DEVELOPMENT

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*Журан О.А., Глава М.Г. IT-кластер – сучасна складова розвитку економіки регіону.*

Зростаюча роль конкурентоспроможності підприємств зумовила актуальність вивчення проблеми кластеризації в регіонах України. Сучасні дослідження виділяють велику кількість видів кластерів. Зачатки кластерів виникли в кінці 1990-х, які створювалися, виходячи із специфіки регіонів. В даний час спостерігається зростання інтересу до IT-кластерів, їх кількість постійно зростає. IT-кластер – асоціація компаній, зайнятих у сфері інформаційних технологій, які сприяють розширенню ринку. Україна налічує близько 10 регіональних IT-кластерів, які концентруються на освітній функції, на об'єднанні IT-спільнот міст. Але є ряд факторів, що обмежують розвиток галузі: недоліки законодавства, слабкість деяких секторів системи освіти, рівень володіння англійською мовою.

*Ключові слова:* кластер, IT, інформаційні технології, економіка, регіон

*Журан Е.А., Глава М.Г. IT-кластер – современная составляющая развития экономики региона.*

Возрастающая роль конкурентоспособности предприятий обусловила актуальность изучения проблемы кластеризации в регионах Украины. Современные исследования выделяют большое количество видов кластеров. Зачатки кластеров возникли в конце 1990-х, которые создавались, исходя из специфики регионов. В настоящее время наблюдается рост интереса к IT-кластерам, их количество постоянно растет. IT-кластер – ассоциация компаний, занятых в сфере информационных технологий и способствующих расширению рынка. Украина насчитывает порядка 10 региональных IT-кластеров, которые концентрируются на образовательной функции, на объединении IT-сообществ городов. Но есть ряд факторов, ограничивающих развитие отрасли: недостатки законодательства, слабость некоторых секторов системы образования, уровень владения английским языком.

*Ключевые слова:* кластер, IT, информационные технологии, экономика, регион

*Zhuran O.A., Glava M.G. IT-Cluster – modern component of regional economy development.*

The growing role of the enterprises competitiveness has led to the relevance study of the clustering problems in the regions of Ukraine. The modern research has isolated a large number of the clusters types. The beginnings of the clusters emerged in the late 1990s. It was they created based on the regions specifics. There is a growing interest in IT-cluster. Their number is constantly growing. IT-Cluster – companies association that are engaged in the field of the information technologies, which contribute to the market expansion. Ukraine has about 10 regional IT-clusters. They focus on the education function, on the combining IT-urban communities. However, the several factors limit the development of the industry: legislative shortcomings, the weakness of some sectors of the education system, English language proficiency.

*Keywords:* cluster, IT, information technology, economy, region

One of the modern tools of economic development advocates clustering. Since the main setting of the Ukrainian economy and enhance its competitive status is determined by the scope of the development of the EU strategy in terms of ensuring a high level of cooperation and integrated solutions to many common problems of the economy, ecology, politics, science and technology, the authors examine the possibility of the formation and use of new types of systems – cross-border cluster model, which is seen as a tool for cluster economization, effectively use unique resources received e new analytical information, knowledge, valuation methodologies and predictive strategic directions.

Since the competitiveness of enterprises directly depends on the competitiveness of the country as a whole, more and more attention is paid to studying the issues of increasing the competitiveness of individual enterprises and regions. This, in turn, determined the urgency of considering the problem and the prospects for clustering in the regions of Ukraine.

### Analysis of recent researches and publications

The founder of the cluster theory is Michael Porter (1990). According to M. Porter, the cluster is a group of geographically neighboring interconnected companies (suppliers, producers, etc.) and related organizations (educational institutions, government bodies, infrastructure companies) operating in a certain sphere and complementing each other [1]. After giving a clear definition of clusters, M. Porter went on to a qualitative theoretical analysis, for example, definitions of cluster boundaries (localization), factors of competitiveness, innovation, the role of government, social aspects in a cluster, etc. In his works, M. Porter notes that the cluster can be located both in the redistribution of one region or city, and in the territory of neighboring countries.

Among economists of the former CIS, who dealt with clustering issues, it should be noted M.P. Voinarenko, O.M. Odintsov, O.M. Petuhova, S.I. Sokolenko, M.P. Khmara, T.B. Tsihan and others.

At present, there is a growing interest in IT clusters, their number is constantly growing. The issues of creation and features of the functioning of IT

clusters in Ukraine are dealt with by V.V. Lyubchenko, E.A. Minich, Yu.E. Sulimova, S.V. Veselovsky and others.

*The aim of the article is to analyze IT-clustering in Ukraine and its impact on the development of the region's economy.*

### **The main part**

A clustered union is a triangle. This is the union of three global market participants – business, power (infrastructure) and education. A similar triangle is the development of the economy in any industry (Y. Sulimova).

At present, when researching clustering issues, the importance of having the relevant infrastructure in the territory under consideration is emphasized. It is a well-developed system of interaction of all cluster participants, contributes to combining the competitive advantages of each participant in the process and, ultimately, the implementation of a unified strategy for the development of the economy as a whole and enhancing the competitiveness of individual enterprises.

Let's pay attention to the fact that the term "networking" has entered into the system of concepts of logistic management, which is understood as the network formation of logistic links, interconnections and clusters, through which structural elements (objects, units, etc.) "connecting" one to another. Create business associations aimed at supporting joint activities within the framework of cooperation [2]. All the structural components of networking are related to each other by the functions of logistic interaction. Therefore, their activities, while maintaining their "independence", depend on the activities of other structural units that created networking, providing internal and external integration of all types of business processes – production, innovation, investment, information science and education and service (business association → science → education) accompaniment.

A fundamentally important feature in this format of relations, the authors emphasize the process-system approach, the use of which is aimed at optimizing integration of the functioning of not the individual elements, but the whole system as a whole. This shows that there is an urgent need to build new types of economic systems. Formation of new types of systems for cross-border integration is possible on the basis of cluster economization. As such a type of economic system can act as a cluster model.

Modern research identifies a large number of types of clusters. The first to appear and the most popular in foreign practice are industrial clusters. Today, for example, in the US there are 380 largest clusters in the spheres of high technology, household products, service industry, and extraction of natural resources. The share of US GDP produced in clusters is almost 61%, employing about 57% of the total labour potential of the country. A striking example of the cluster is Silicon Valley, where the average salary of specialists is \$ 125,000 per year, employs 2.5

million people, venture capital investments amount to almost \$ 70 billion. In the states, commissions are formed to initiate the creation of clusters, analytical work is carried out by centres and universities [3].

Key industrial clusters in Germany (chemistry, engineering) and France (food, cosmetics) were formed in the 50-60s of the last century. As a result, interaction of whole groups of industries within clusters promoted employment growth, investment and accelerated the spread of advanced technologies in the national economy [4].

In 2002, there were 167 clusters in the United Kingdom, 152 in the United States, 95 in France. In Italy, there are 260 "industrial districts", in which more than 80.000 enterprises take part, which employs over 800.000 people. And service industries, it can be argued that in these clusters there are more than 1.2 million small and medium-sized enterprises, and the number of employees at these enterprises varies from 4 to 6 million people.

More than 30 megaclusters have been created in Austria, including on the production of automobiles, biotechnology and molecular medicine, software products, multimedia, etc.

In Hungary, active work is underway, 100 production parks have already been established, which number 656 companies with 60.000 employees. The total production area is 4400 hectares.

In China, Shanghai is the flagship of China's economy – a huge mega cluster, which includes 9 clusters, including automobile, a number of high-tech, as well as steel.

In the countries of northern Europe, the number of enterprises covered by clusters reaches 90%.

The Russian Federation adopted the "Concept of long-term socio-economic development of the Russian Federation until 2020", one of which is the transition to a new model for the development of the Russian economy, including the formation of new centres of social and economic development, based on the development of energy and transport infrastructure, the creation of a system of territorial clusters that realize the competitive potential of the territory.

In the Republic of Belarus, in support of the development of cluster models, the "Concept of the National Innovation System of NIS" was adopted.

In Kazakhstan, the state pays much attention to the development of clusters. The Government of Kazakhstan allocated 5.6 million dollars USA for the construction of infrastructure facilities for light industry in the South-Kazakhstan region.

In October 2008, the European Union adopted the European Cluster Memorandum as a Policy Implementation Plan to support innovation in Europe through the use of clusters [5].

The development of clusterization in Ukraine has been celebrated since 1998. It was an industrial cluster based in the Khmelnytsky region on the basis of the garment industry, the local construction industry and agro-industrial enterprises. Then development of tourist clusters in Rivne, Ivano-

Frankivsk and Kherson regions is marked. And where the international transport corridors (Odessa, Kharkiv, Transcarpathian regions), are formed, transboundary logistics clusters.

Thus, we note that in Ukraine clusterization has a regional focus. But, despite the fact that in many regions, which are not yet covered by the clustering process, there are unique opportunities for this, the process is hampered by the absence of normative acts developed by the state in this sphere. Currently, both in the economy as a whole and in the process of clustering, the emphasis is placed on innovation as one of the driving forces. And this was noted by the majority of regional state administrations, which since

2013 have prescribed the need for the formation of innovative clusters in their development strategies until 2020. Namely, innovations require legislative protection in the form of protection of intellectual capital and support in the form of preferential taxation.

In Ukraine there was a difficult economic situation – a high level of inflation, an increase in unemployment. Meanwhile, the IT-industry in Ukraine suffered from the crisis less than the rest.

According to the DOU.ua website for 2016, the IT-industry grew by 12% compared to the previous year (fig. 1, 2).

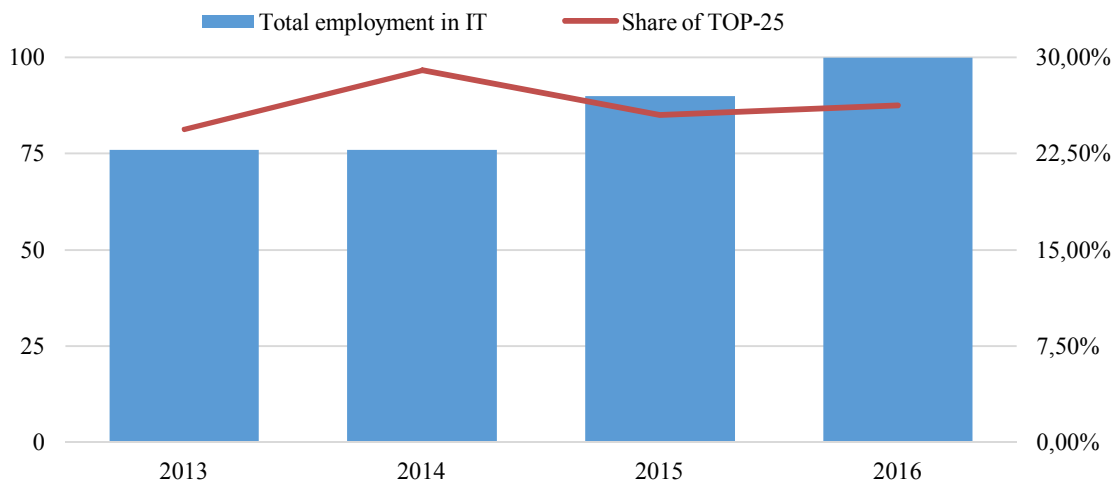


Fig. 1. IT-market growth and share of TOP-25 [19]

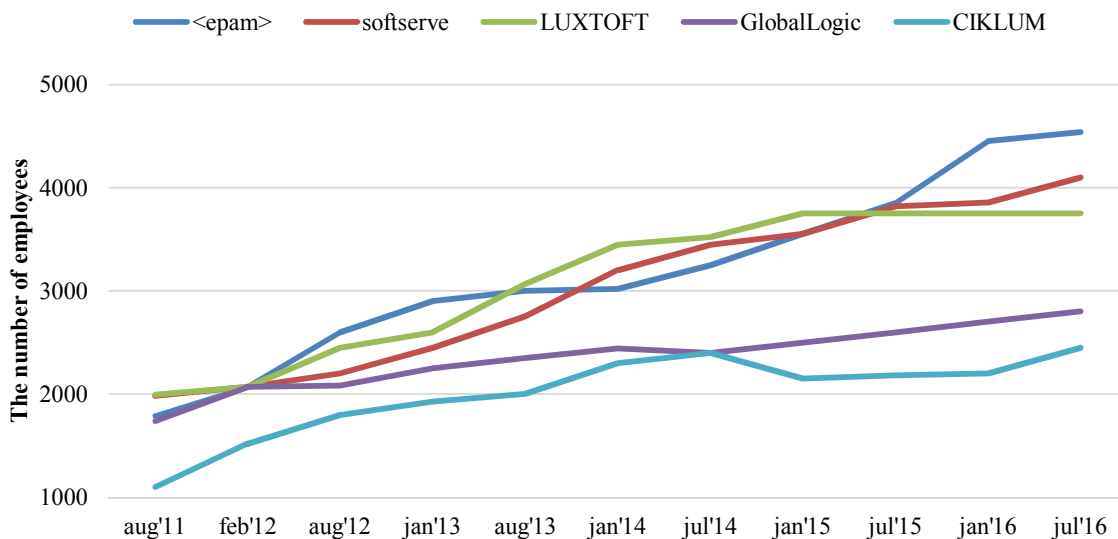


Fig. 2. Growth of the Big Five companies [19]

Employed in the IT-sector, thus, indirectly, but significantly positively affect the development of the economy of the regions. As IT-sphere guarantees the

inflow of investments, improvement of the business climate in the city and the creation of jobs, local

authorities should also be interested in the development of the IT-industry in Ukraine.

Currently, the Ukrainians involved in the IT-sphere are forming an investment-attractive image of our country. Firstly, it is a young, able-bodied population with an average age of about 30 years. They possess modern tools in this field and are ready for self-development and raising their professional level. Secondly, these specialists already have work experience and successfully work with leading international companies and thus promote investment and economic consolidation.

IT-Cluster is an association of companies engaged in information technologies, which initiate changes in the business environment of the city and the region and contribute to the expansion of the information technology market.

At the moment, there are about 10 regional IT-clusters in Ukraine. Often, these associations concentrate on helping local companies and interact with municipal authorities. Proceeding from this, it can be said that each such IT-cluster is aimed primarily at increasing the competitiveness of its region.

Let's analyze IT-clusters by regions of Ukraine.

The Lviv IT-cluster was established in 2009 and is by far the largest and most successful IT-cluster in the country.

IT-cluster conducts its activities in a variety of areas: from the usual networking to the initiation of the construction of apartment buildings specifically for IT-professionals [6].

Along with almost 200 IT-companies, there are eight more co-workers in the city (from English co-working, "joint work"). The cooperation between the leading companies is being established by Lviv IT-cluster, which now has 45 organizations with more than 8000 specialists. Unique cluster projects contribute to the development of a professional network and the establishment of contacts between IT-experts. In particular, the cluster organizes a large-scale IT-Arena conference, one of the biggest events for IT professionals, and other cluster initiatives, for example, IT-House and IT-Club, improve the cooperation between IT specialists in the city.

The development of the industry shows positive dynamics. According to IT-Research, the annual projected growth in the IT sector is 20%, and the size of the IT-market in the city has tripled in five years. The dynamics of the industry development in 2010-2015 is presented in Fig. 3. Experts predict further improvement of the business environment in Lviv and accelerate the pace of development of the IT industry.

The main field of activity is outsourcing.

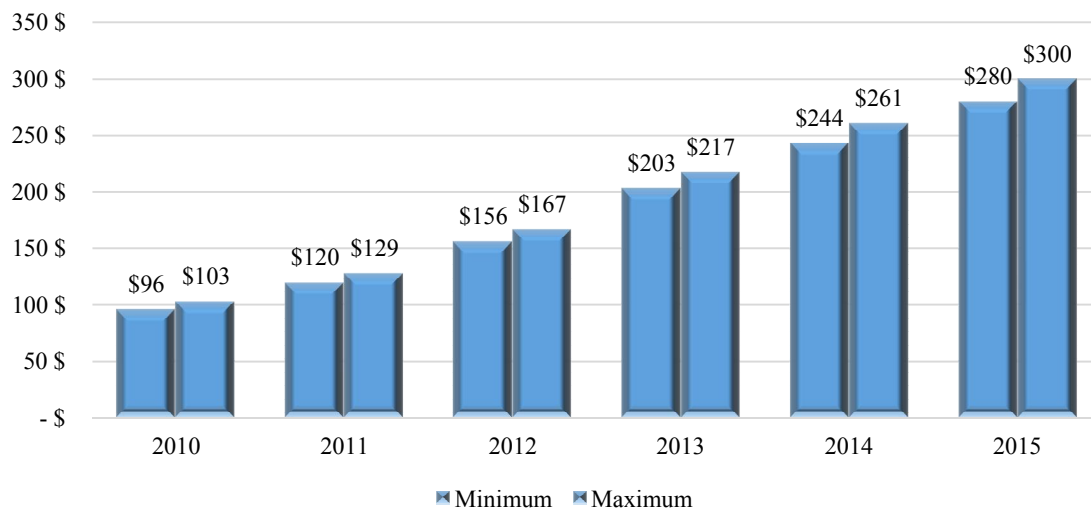


Fig. 3. Dynamics of the industry in 2010-2015 [6]

The Lutsk IT-cluster was established in 2015. The main field of activity is also outsourcing.

The goal of the cluster is to popularize IT, to unite IT professionals in Lutsk, to promote IT-events and activities, and to improve the quality of IT education in schools and universities in the region [7].

First of all, the activity of this IT-cluster is aimed at raising the level of IT-education. To implement this goal, such projects as EDUUP are aimed at coordinating university programs with modern requirements of the IT-market and Workup – a

number of activities and training on employment for students, unemployed and schoolchildren.

The Kharkov IT-cluster was also established in 2015. The main field of activity is outsourcing and e-government.

Cluster of information and communication technologies "Kharkiv IT-Cluster" was formed to solve problems of activation of information interaction, innovation and marketing activities of cluster participants to increase the competitiveness of Kharkov enterprises and the region as a whole [8].

From its main directions, the Kharkov IS IT-cluster stands for mutual assistance, provision of a platform for communication, networking and exchange of experience, as well as assistance to members of the association in the international arena.

Odessa IT-cluster also got its start in 2015. The main sphere is outsourcing, start-ups.

Now the IT-cluster of Odessa unites 18 companies, 4 universities and 2 private IT-schools. The cluster became the first of Ukrainian, which entered the largest cluster of clusters of the Balkan Peninsula and the Black Sea coast [9].

The IT-cluster of Odessa aims to establish communication between business, education and power.

The association includes such large companies as Ciklum, DataArt, Clickky, Netpeak, Luxoft, VertaMedia, WannaBiz, as well as start-ups Lookserly and Augmented Pixels.

Dnepropetrovsk IT-cluster was also born in 2015. The main sphere is outsourcing [10].

At the same time, in parallel with the IT cluster, "IT-rux Dnipro" was created. Both these organizations mainly focus their attention on education. In addition, they launched a major project for the purpose of legal protection of IT-companies.

Cherkassy IT-cluster is a public union, which was formed in early April 2015.

The co-founders of the cluster rely on educational projects, are going to popularize the industry, so that as many students and their parents as possible learn about the benefits of IT professions and give their children to study in the IT-industry. Local IT-specialists also plan to work on projects for the development of the city. Thus, the Cherkassky IT-cluster opened the first coworking in the city called TalentHub and signed a memorandum of cooperation with the local authorities [11].

Cherkasy IT-cluster currently unites 13 IT-companies from Cherkassy. The main field of activity is outsourcing.

Ivano-Frankivsk IT-cluster was established on July 1, 2015.

The purpose of the cluster: to promote the development of IT, as a priority industry in the region; Representation of interests of the IT industry of the region; Participation as an expert in IT-projects or in projects with the IT component; Development of the organization as a platform for communication between IT-companies among themselves and with other business entities and government agencies; Organization and holding of IT-conferences, trainings; Development of cooperation and integration of educational institutions to solve practical business problems; Creation of comfortable conditions and environment for IT-professionals (non-professional activities, convenient infrastructure, loyalty programs); Participation and assistance in the implementation of infrastructure projects (airport,

roads, buses); Enlightening activities for local business; Popularization of a healthy way of life and sport among the workers of the IT-industry of the region [12].

Konotop IT-cluster also began its work in 2015.

The purpose of creating an IT-cluster in enhancing the competitive ability of Mr. Konotop is to work in the IT field on a level with other cities of Ukraine and direct communication with direct customers or in the closest possible connection with them. The Konotop IT-cluster is being promoted as a separate autonomous cluster that will be able to conduct a full cycle of IT-services for the whole world [13].

Also in 2016 in Chernivtsi the IT-cluster of Bukovynian innovative technologies was organized by him. J. Schumpeter – "Cluster bit", which united 16 largest and most promising companies and start-up projects of the city, which direct their joint activities to the development of Chernivtsi [14].

The idea of creating an IT-cluster in Chernivtsi is realized in cooperation with city authorities.

In July 2016 a meeting of potential participants of the IT cluster Vinnitsa with the director of the Odessa IT-cluster Yulia Sulimova took place, thereby putting the organization of the IT-cluster Vinnitsa in the foreground.

IT-Cluster Vinnitsa is an association of companies working in the field of information technologies, which have related services and activities [15].

The Kiev IT-cluster is also created in 2016, so it only develops its strategy [16, 17].

In 2015 the mayor of the city of Nikolayiv became A. Senkevich, the director of the IT-company. In connection with this event, the creation of an IT-cluster was projected by Nikolayiv. The meeting of potential participants of the IT-cluster Nikolayev with the director of the IT-cluster Lviv S. Veselovsky was held with the goal of uniting the city IT-companies into a single IT-cluster and promoting Nikolayev as a favourable location for Ukrainian and foreign investors.

But there were some problems in the creation of the Nicholas IT-cluster. First of all, this is the lack of an initiative group among the Nikolayiv "IT-specialists". Another prerequisite is the presence of a person who is ambitious enough, has the qualities of a leader, but is not the director of any of the companies in the cluster, since then there may be a conflict of interest [18].

Most regional IT-clusters in Ukraine were created in 2015. This was facilitated by the rapid development of the IT-industry, as well as the need to establish contact of IT-companies with the state, the creation of legislation to support and develop this type of activity. The development of clustering continued in 2016, but such IT clusters are still developing and gaining the IT-market. Here are the statistics of the most developed IT-clusters of Ukraine by the number of companies of participants (fig. 4).

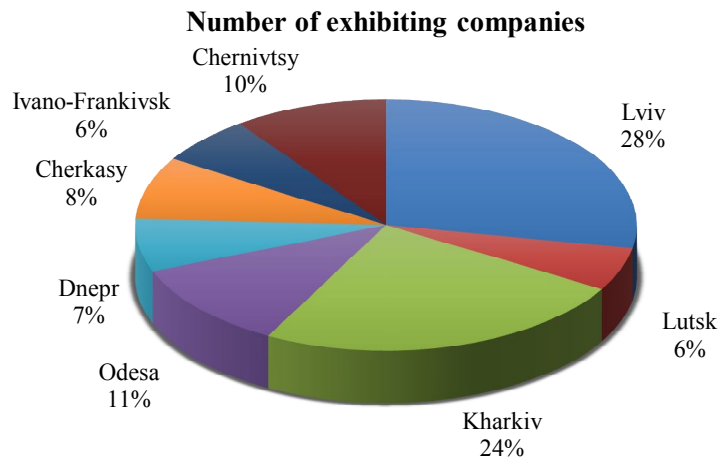


Fig. 4. Chart of companies participating in regional IT-clusters

*Source: Own elaboration*

In addition to those listed, there are several other associations in Ukraine directly or indirectly dealing with IT-problems. Among them are the Internet Association of Ukraine, the Association of Information Technology Partners of Ukraine, the Association "Information Technologies of Ukraine", the Ukrainian Association of Information Technology Experts, the Association of Electronic Business Participants of Ukraine, the EBA (European Business Association) IT-Committee, the Ukrainian Venture Capital and Direct Investment Association.

Currently, one of the main problems of the IT-industry is personnel. In this regard, the main emphasis in the activities of IT-associations is put on education and on the integration of IT communities of cities into a common community.

One of the features of Ukrainian clusters is their difference from each other. This is due to the fact that each of them was created to solve their local problems. So, in Kharkov, despite a large number of large firms, there is a problem with the customer base. Therefore, when creating an IT-cluster in Kharkov, the task was to find and attract customers for the companies participating in the cluster. And before the Odessa IT-cluster, the task is to provide the IT-industry with sufficient quality personnel. Therefore, intra-cluster projects are primarily designed to attract people who can work a lot, well and with full dedication.

Since it is representatives of the business that know the needs of their industry, the Lviv IT specialists started with the implementation of the educational project IT-Expert, which assumes the modernization of the curriculum at universities – a kind of reserve for the future. This was done because the interaction between employers and universities in Ukraine is not well established, because of this, the knowledge obtained by young people does not always correspond to the level required by the employer. Consequently, firms have to train specialists recruited, and then look for new ones, since the old prefer to look for prospects abroad or in another region. In

return, the cluster receives experts who help to improve the quality of profile education in universities, the active participation of IT-companies in the implementation of various projects, and, of course, membership fees, at the expense of which it exists [18].

The analysis showed a rapid growth of interest and development of IT-clustering in Ukraine. However, it is necessary to pay attention to a number of factors that hinder this process. The main ones are:

- imperfection, and somewhere lack, of the legislative and regulatory framework;
- the weakening of the education system, due to constant transformation and changes;
- low level of English in the older generation, which has experience in this area.

The studies carried out earlier by the authors of [2] revealed the following problems of development of clusters in general in Ukraine:

- the lack of a developed regulatory and legislative framework that would allow to some extent standardize different types of clusters, determine the prerequisites for the formation of a new type of economic systems;
- the lack of a generalized organizational and methodological material for the creation of a rational cluster architecture as a form of uniting individual elements and as a new type of economic system for cross-border integration;
- absence of methodological and methodological foundations of cluster analysis, structural diagnostics, quantitative evaluation of the choice of integration level criteria and structural composition of new type systems, quantitative and qualitative assessment of connectivity indexes, monitoring, analysis and risk accounting; Assessing competitive advantages and determining ratings in identifying the dependence and their influence on the formation and development of new cross-border economic relations;

- the lack of a practically state price policy and uniform rules for coordinating the interests of participants and managing them, ensuring effective cross-border integration and developing coordinated target programs for the formation of a corporate strategy based on a balanced system of indicators, and therefore clustering;
- the absence of a policy of cardinal structural changes in the Ukrainian economy, which makes it possible to determine priority directions in relation to all the accompanying and ensuring their balanced development to ensure cluster economicization (in the conditions of globalization, a global reference point is needed, that is, take into account the uniqueness of resources that, in the overall global process Allow for transboundary integration); Determination of indicators of their competitive level, export potential, the degree of influence on the formation and effective development of cross-border cluster systems;
- the principles of close interaction of business-science-education, participation of scientific institutions in the work of large enterprises and the private sector are not sufficiently used; The system of commercialization of research activity is insufficiently developed, there are practically no cross-border program projects of strategic development of close cooperation of enterprises and organizations in the field of science, production and education;
- one of the serious shortcomings is the unsatisfactory state of information support for all business processes, accounting, management and tax accounting systems that do not reflect the real processes in the management system, conditions for the organization of an integrated transmission

of information flows to ensure each structural block of the transregional and interregional systems A full set of information services and related costs for their support. Specialists in the field of management accounting, highlighting the shortcomings of management based on traditional accounting information illustrate this with examples of Western countries with a more developed market economy;

- insufficiently coordinated and methodically coordinated plans of state bodies and local authorities, an imperfect system of intraregional self-government, which naturally does not allow to formulate a policy for the development of cross-border integration, to implement systemic and integrated approaches for solving important interrelated problems of securing cluster economy.

### Conclusions

The nature of the processes of activity of any member of the cluster as a new type of system and relations allows us to see them in a three-dimensional view, that is, characterizes the consumption of a certain resource to achieve a result (according to the corporate strategy and goals) and in time.

However, today in Ukraine there are no uniform unified mechanisms for creating and stimulating clusters. The regulatory and legislative framework for the operation of clusters has not been developed. Clusters in Ukraine most often do not have sustainable state support.

Most likely, each cluster will require its own special approach and support, as it was formed on the basis of its unique opportunities for activities and directions to increase the competitiveness of its member organizations.

### Abstract

The growing role of the enterprises competitiveness has led to the relevance study of the clustering problems in the regions of Ukraine.

There is a growing interest in the IT-cluster.

The purpose of the article is the analysis of the IT-clusters in Ukraine.

The modern research has isolated a large number of the clusters types. The beginnings of the clusters emerged in the late 1990s. It was they created based on the regions specifics.

IT-Cluster – Companies associations that are engaged in the field of the information technologies, which contribute to the market expansion. Ukraine has about 10 regional IT-clusters. They focus on the education function, on the combining IT-urban communities.

Most of the regional IT-clusters been created in Ukraine in 2015. It was promoted the rapid development of the IT-industry and the need to establish the contact the IT-companies to the state, creation of the legislation support and the development of this activity type. The clustering development continued in 2016, but such IT-clusters are only the developing and the gaining the IT-market.

However, the single unified mechanisms for the creating and the stimulating of the clusters are absent in Ukraine. It was not developed the regulatory and legal framework of the functioning clusters. The clusters in Ukraine do not have a stable state support often.

*JEL Classification: I 25, M 15.*

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