UDC 332.133.44 : 334.75

EVALUATION OF THE EFFICIENCY OF CLUSTER FORMATIONS' ACTIVITY BASED ON THE SYNERGY'S PRINCIPLES

http://orcid.org/0000-0001-6952-4003

Andrey Melikhov, Doct. Of Science, Associate Professor, Head of The Chair of Economics of Enterprise, State Higher Educational Establishment "Priazovskiy State Technical University", Mariupol, melihov_a_a@pstu.edu, +380502938382

Maryna Kulaieva, student, State Higher Educational Establishment "Priazovskiy State Technical University", Mariupol, coolaeva.28@gmail.com, +380975126557

Melikhov A., Kulaieva M. Evaluation of the efficiency of cluster formations' activity based on synergy's principles. *The article substantiates the role of clusters in sustainable development of regions and in increasing effectiveness of regional economic relations. The possibility and expediency of the estimation the synergistic effect in clusters is determined. The views of leading economists on the factors generating the synergistic effect are considered. The concept of industrial cluster in modern conditions and its difference from other organization forms of integration is defined. The comparative analysis of quantitative methods for estimation the effectiveness of cluster formation was made. Among which there are three main methods (costly, analog, and profitable) and specific methods (calculating the coefficient of corporate development, estimating the integration effect on the matrix "management functions - structure of the integration effect – elements of enterprise's structure", estimating cost reductions in joint operations). It is shown that they have both advantages and disadvantages. Authors concluded that the profitable method is the most adapted to the conditions of modern Ukrainian economy. The structure of the repair cluster in the southeastern region of Ukraine is proposed and the synergistic effect is estimated on the basis of the profitable method relatively to the activity of this cluster. It is calculated that the size of the synergistic effect is about 678 million UAH. In addition to direct effect, authors determines directions for obtaining indirect effects of a synergistic nature for different categories of participants and stakeholders of the repair cluster. Conclusions are drawn regarding the development prospects of the repair cluster.*

Меліхов А. А., Кулаєва М. О. Оцінка ефективності діяльності кластерних утворень на основі принципів синергії. *Обґрунтовано роль кластерів у стійкому розвитку регіонів та підвищенні ефективності регіональних економічних відносин. Визначено можливість і доцільність оцінки синергетичного ефекту у кластерах. Розглянуто точки зору провідних економістів на чинники, що генерують синергетичний ефект. Визначено розуміння промислового кластера у сучасних умовах та його відмінність від інших форм організації інтеграційних процесів. Виконано порівняльний аналіз кількісних методів оцінки ефективності кластерних утворень, серед яких виділено три основних підходи (витратний, ринкових порівнянь або аналоговий, прибутковий або дохідний) та специфічні методи (розрахунку коефіцієнту корпоративного розвитку, оцінки інтеграційного ефекту за матрицею «функції управління – структура інтеграційного ефекту – елементи структури підприємства», оцінки скорочення витрат при спільному веденні операцій). Виявлено їх переваги та недоліки і зроблено висновок, що найбільш адаптованим до умов сучасної української економіки є дохідний метод. Запропоновано структуру ремонтного кластера у південно-східному регіоні України та проведено оцінку синергетичного ефекту на основі дохідного підходу стосовно діяльності цього кластера. Розраховано оцінку розміру синергетичного ефекту (близько 678 млн. грн.).Окрім прямого ефекту визначено напрями отримання опосередкованих ефектів синергетичного характеру для різних категорій учасників та зацікавлених сторін ремонтного кластера. Зроблено висновки стосовно перспективи розвитку ремонтного кластера.*

Мелихов А. А., Кулаева М. А. Оценка эффективности деятельности кластерных образований на основе принципов синергии. *Обоснована роль кластеров в устойчивом развитии регионов и повышении эффективности региональных экономических отношений. Определена возможность и целесообразность оценки синергического эффекта в кластерах. Рассмотрены точки зрения ведущих экономистов на факторы, которые генерируют синергический эффект. Определено понятие промышленного кластера в современных условиях и его отличие от других форм организации интеграционных процессов. Выполнен сравнительный анализ количественных методов оценки эффективности кластерных образований, среди которых выделены три основных подхода (затратный, рыночных сравнений или аналоговый, прибыльный или доходный) и специфические методы (расчета коэффициента корпоративного развития, оценки интеграционного эффекта по матрице "функции управления - структура интеграционного эффекта - элементы структуры предприятия", оценки сокращения расходов при совместном ведении операций). Выявлены их преимущества и недостатки и сделан вывод, что наиболее адаптированным к условиям современной украинской экономики является доходный метод. Предложена структура ремонтного кластера в юго-восточном регионе Украины и проведена оценка синергического эффекта на основе доходного подхода относительно деятельности этого кластера. Рассчитана оценка размера синергического эффекта (около 678 млн. грн.). Кроме прямого эффекта определены направления получения опосредованных эффектов синергического характера для разных категорий участников и заинтересованных сторон ремонтного кластера. Сделаны выводы относительно перспективы развития ремонтного кластера.*

Formulation of the problem. The beginning of the 21st century is characterized by the intensification of the processes of internationalization, globalization and integration, due to the development and commercialization of partnerships in network structures. Amount of various forms of

cooperation in different integrated structures. This cooperation generates a special form of economic effect, which should be regarded as a synergistic effect.

It is not surprising that the synergy effect associated with the cooperation of enterprises is widely considered in the works of both native and foreign authors (Ansoff I., Bergman E., Vissema H., Voynarenko M., Dlugopolsky A., Eggerson R., Enright M., Porter M., Sokolenko S., Semenov G., Feser E., Khasanov R., Chevganova V., etc.) [1-8]. Scientists came to the conclusion that the basis of the synergistic effect is the optimal combination of elements that make up the system, the effectiveness of their interaction, as well as their quality. A necessary condition for achieving the synergistic effect is the purposeful management of the system as a result of combining the elements of the system on the basis of its internal orderliness. Therefore, the search for new forms of integration of business entities and their management is an important task of economic development.

There are many forms of integration of business entities - from hard ones (association of enterprises, concerns, holdings, industrial and financial groups) to soft ones (strategic alliances, networks, etc.).

At the regional level, integration is predominantly achieved through the cluster formations, including firms and organizations, linked together by the production output and the geographical location. Clustered enterprises are an essential element of sustainable development of regions and increasing the effectiveness of relationships at the local level. At the same time, the region, within which they are located, should be regarded as the place of "critical mass" accumulation of social and human capital, scientific, innovative and productive potentials. Clusters are stable, systematically emergent and competitive only in the presence of such a combination. Thus clustering acts as a new vector in the development of the world economic system.

In the general economic sense, clustered enterprises contribute to achieving a competitive economic effect and enhancing the competitive advantages of both individual enterprises and the cluster as a whole. The synergistic effect in clusters at the regional level has its own features of emergence and manifestation, but these features have not been paid much attention until recently.

Analysis of the latest research and publications. At the present time, there is no common understanding of how a synergistic effect in clusters occurs. M. Voynarenko, E. Bergman and E. Feser consider that the main factor generating a synergistic effect in the cluster is "competitiveness of own products" [2, p. 31] or "individual competitiveness of each member of the group" [1]. M. Porter, A. Silvestry note the leading role of the "system of market and other links" [9, p. 107] or "connectivity with the technological chain" [10]. V. Chevganova, N. Boldyrev pay more attention to the social aspects of the cluster - "mutual support and coordination" [8, p. 35] or "community self-organization" [11].

So, the holistic phenomenon of the cluster, its complex socio-economic integral significance in modern competition practice and in the development of individual regions of one country or another is still not clearly formed, which makes it necessary for the theoretical development of this problem by economic science and the practice of state management of the economy. Insufficient elaboration of methods for assessing the economic effect in industrial clusters appears especially acute in practice.

Thus, the purpose of this article is analysis and synthesis of the views of different authors on methods of identification of the synergistic effect from cluster activities and evaluation of the direct and indirect components of this effect.

Statement of the main material. The cluster is a vivid example of the synergistic interaction of subsystems. In the general understanding, the cluster can be regarded as structural formation, the components of which are companies and other forms of management entities corresponding to the following principles: community of interests, competition, complementarity, interaction, concentration, specialization, orientation on the final product.

The founder of the modern concept of clusters and of their impact on the competitive advantages is American economist M. Porter, who considered cluster as "a group of interconnected companies that are neighbors geographically and related organizations operating in certain areas, such as characterized by common activities and mutually complementary" [4]. M. Porter put determinant system of competitive advantage as a basis of operation of the cluster system ('Porter Diamond').

At present, the industrial cluster is defined as a geographically localized group of industrial enterprises and other economic structures, interconnected by technological chain, thanks to which competitive advantages are created in domestic and foreign markets of commodity resources and needs. With the development of market principles and institutions industrial clusters are getting more adequate form of efficient organization of industrial production in which interdependence and interrelation of different businesses and industries are implemented by forming stable vertical and horizontal links, due to

this, cost reduction, activation of innovation, enhancing competitiveness are provided. The main difference between cluster and others forms of integration processes in the industry is the presence of domestic competitive environment and strong competitive positions in the market [12]. Precisely because of this characteristic cluster is unlike various interdisciplinary territorial formations, such as, e.g., territorial-production complex, financial-industrial group, holding, etc.

Clusters are extremely favorable environment for the development of the synergetic effect, because it usually arises in systems with a sufficient degree of integration of individual elements. The basis for the synergetic effect in such cases is the optimal combination of elements in the system, the effectiveness of their interaction and the quality of the system.

Quantitative methods for evaluating the effectiveness of the integrated structures are quite varied, among them there are three basic approaches: cost, analog, and profitable [13].

The basis of the cost approach to assess the synergistic effect from the cluster activity is the criterion of net assets value of enterprise in the cluster that determined by differences of companies' assets (at prices of realization or recovery) and the amount of their liabilities. The essence of the cost approach to estimation of the value of participating companies of the cluster is that the market value of each of them is determined by amount of property price of its assets.

By using the cost approach, the synergistic effect of the cluster can be calculated as an increase in the total value of companies - participants of the cluster during its operation [13].

$$Ef = \Sigma Em2 - \Sigma Em1 \quad (1)$$

Ef - quantification of the synergistic effect of cluster;

ΣEm2- the total market value of companies' equity before their joining the cluster, adjusted to the appropriate rate of inflation;

ΣEm1 - the total market value of companies' equity, which are in cluster.

The participation of enterprises in cluster allows them to earn additional income due to factors such as business reputation of the enterprise, efficiency of business connections in the cluster, level of management, and others. This surplus is defined as the difference between the actual net profit of the company and the value of profits received company before participation in the cluster. Surplus capitalization could significantly increase the real value of total assets.

Assessment of the synergistic effect of the cluster may be based on the analog method. This method has two varieties: the evaluated shares of this company and the analogue value [13].

The basis of the first approach is the average market price of one share. Obviously, the effective interaction between participants of the cluster should affect the growth shares' quotation - members of the cluster. From this perspective, the efficiency of the cluster work can be calculated in this way:

$$Ef = \Sigma NAm2 - \Sigma NAm1 \quad (2)$$

ΣNAm2 - the total market value of net assets of of companies before their joining the cluster, adjusted to the appropriate rate of inflation;

ΣNAm1 - the total market value of net assets of companies operating within the cluster.

This method of valuation is widespread in countries with a high degree of the stock market's development. It is appropriate only when members of the cluster are joint stock companies. At the same time, this method is inappropriate because of immaturity and imperfection of Ukrainian stock market.

The analogue approach envisages the presence of the objects - analogues, which have an equal value to the consumer with characteristics of quite close economic activity and financial position. Nevertheless, the application of this approach requires a large information base.

However, we believe that the most accurate quantitative assessment of the synergistic effect of the cluster can be obtained using the profitable approach to valuation, as the total profit of the cluster is the result of diffusion of innovation within the cluster, development of related companies, stimulation of competition between companies of the innovative cluster, etc.

By using this method, the synergistic effect of the cluster can be estimated as the total net income and amortization derived as a result from the implementation investment projects of innovation clusters.

$$Ef = \Sigma(NI + AD)i,\ 0 < i < m, \quad (3)$$

Ef - economic effect (the synergistic effect) of the cluster from the implementation of investment projects;

m - number of investment projects for the period of the cluster;

Σ(NI + AD)i - the total net income and accumulated amortization as a result of the i-th investment project of the cluster;

$$\Sigma(NI + AD)_i = \frac{\Sigma(NI+AD)p_i}{(1+d)^n}, \quad 1 < j < n, \qquad (4)$$

Σ(NI + AD)pi - expected value of net income and amortization generated by the investment project of the cluster in j-th year;

n - estimated number of years of the investment project;

d - adopted discount rate of net income [13].

There are also specific methods of the evaluation the synergetic effect:

The method of calculating the coefficient of Corporate Development

The coefficient of synergetic efficiency of corporate (cluster) development was asked to assess the efficiency of investment in terms of systematic and synergetic approach to the development of enterprises - members of the cluster. It is characterized by the ratio of the quantitative evaluation the manifestation of the synergistic effect to the costs for achieving it.

The indicator shows the percentage of increasing efficiency by changing the relevant factors by 1% at constant meaning other performance factors.

The method of evaluation of the integration effect on matrix "management functions - the structure of the integration effect - elements of the structure of the enterprise."

The method involves the gradual settlements: ongoing monitoring of potential sources of manifestation of the effects of integration, the results of which are recorded in a three-dimensional matrix with the following coordinates: management component, structure component of the integration effect, elements of the enterprises' structure, which are involved in the integration process [14].

The method of evaluation of cost cutting in the joint conduct of operations.

According to this method, G. Semenov and A. Bohma provide to determine the synergistic effect in the cluster as an integrated system that includes all the elements of the system (companies, their suppliers and consumers, research centers, educational institutions that train future staff, etc.).

A characteristic feature of the proposed method is the high flexibility of modification, i.e. the possibility of application in any industry. The flexibility of the formula's calculated parameters allows to take into account the very areas of the company, where the expression of the synergetic effect is expected, and to adapt to the specific goal. The disadvantage of this approach is that it does not solve the problems about the complexity of quantitative expression of these effects [6].

Having examined the methodology to assess the synergetic effect, we estimate the effectiveness of the repair cluster in Azov region of South-Eastern Ukraine. This cluster is proposed to create on the basis of repair units of "Ilyich Iron and Steel Works of Mariupol", "Azovstal Iron and Steel Works" and "Mariupol Maintenance & Repair Plant" with the task of repair service for heavy industry not only in Donetsk, but in Zaporizhzhya, Dnipropetrovsk and other regions of Eastern Ukraine. The main purpose of the cluster is to increase the competitiveness of its members by comprehensive cooperation, implementation of research and innovation, development of education, training and measures of supporting policy. The repair cluster is a system of close relationships not only between mechanical repair units of aforementioned companies, their suppliers and customers, but also knowledge institutes, including State Higher Educational Institution "Priazovskiy State Technical University," and the town council of Mariupol. Creating the cluster can successfully combine the interests of business, government, science and education.

The structure of the proposed repair cluster is in Figure 1.

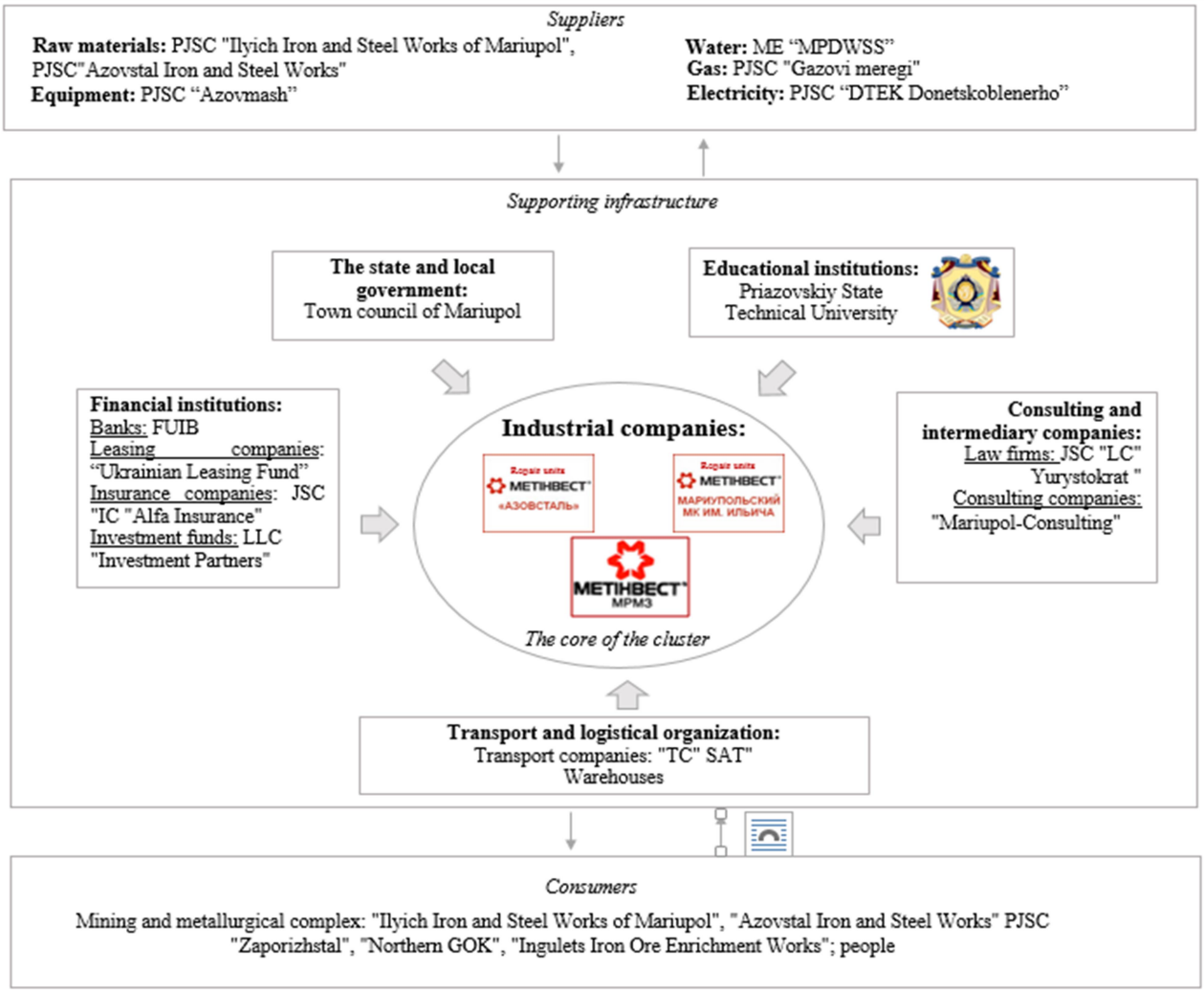

Fig. 1. The structure of the repair cluster in Azov region of South-Eastern Ukraine

The main indicators of repair activity of the enterprises that can make the core of the cluster in 2015 are given in Table 1. We see that the amount of net income from maintenance activities slightly exceeded 6 million UAH.

Table 1. Main indicators of activity of the future members of the cluster in 2015 [15].

Indicator	Repair units "Ilyich Iron and Steel Works of Mariupol"	Repair units of "Azovstal Iron and Steel Works"	"Mariupol Maintenance & Repair Plant"	In total (before cluster's creation)
1. The annual output, thous. UAH.	463 690.3	282 402.0	1 255 458.9	2 001 551.2
2. The cost of repair services, thous. UAH.	316 319.1	169 298.4	986 305.1	1 398 326.47
3. The average value of technological equipment, thous. UAH.	670 933.6	320 485.1	1 208 012.7	2 199 431.4
4. The average value of MCM's assets, thous. UAH.	1 239 873.5	684 123.0	2 153 320.3	4 077 316.8
5. The number of units installed technological equipment, units.	766	352	1 256	2374
6. Depreciation of MCM's technological equipment, thous. UAH.	242 948.1	133 316.2	573 848.2	950 112.5
7. Amortization, thous. UAH.	34 562.0	20 368.1	40 532.0	95 462.1
8. The expenses for the emergency repairs	3 322.6	948.3	6 814.7	11 085.6

of technological equipment, thous. UAH.				
9. The number of maintenance personnel, people.	3 181	1 258	5 024	8 517
10. The number of all workers in the unit, people.	3 444	1 571	5 840	9 227
11. Wages fund, thous. UAH.	105 155.2	91 342.5	218 806.6	415 304.3
12. Profit, thous. UAH.	4 331.4	444.7	3 000.5	7 776.6
13. Net profit, thous. UAH.	3 551.75	364.65	2 460.41	6 376.81

By combining the repair cluster members, we can provide enhancing competitiveness. In coordination of their activities, they can take a better competitive position in the market. Combining enterprises into the cluster will free up funds by improving the organization renovations, specialization and cooperation, reducing the cost of details production for repair equipment. In addition, it will decrease the cost of information provision, implementation of innovation, service of management apparatus.

According to experts of repair services, all these measures will allow to reduce the cost of repair services approximately by 5% in the first year of its functioning that will certainly influence on the indicator of income. In addition, reduction of support staff with preservation of total payroll is planned, which will increase salaries for basic maintenance personnel. In future, it is planned to spread repair services to new market segments, particularly for small businesses and households. All of this will increase the volume of completed work by an average 3% annually with corresponding increase in profits. In addition, it is planned to purchase new repair equipment that will increase amortization by an average 2% per year. These forecasted indicators formed the basis for the calculation of the synergistic effect of the repair activity in the cluster, which is given in Table 2.

Table 2. Calculating the synergistic effect in the repair cluster

Indicator	Years of the project				
	1	2	3	4	5
1. Net profit, thous. UAH.	6376.8	45673.5	93710.71	157760.4	237822.4
2. Amortization, thous. UAH.	95462.1	95462.1	97371.3	99318.8	101305.1
3. Net profit + amortization, thous. UAH.	101838.9	141135.6	191082.1	257079.2	339127.5
4. The discount rate. (k=0,12)	1	0.89	0.8	0.71	0.64
5. Net present value, thus. UAH.	-	125610.7	152865.6	182526.2	217041.6
6. Net present value (cumulatively), thus. UAH.	-	125610.7	278476.3	461002.5	678044.1

For the most accurate determination of quantifying the synergetic effect, we use the profitable approach. By using this method, the synergistic effect of the cluster can be estimated as the total net income and amortization derived as a result of investment projects of innovative clusters [7].

According to this method, the discount rate must reflect the opportunity cost of capital sources weighted by the relative contribution of each units to the total capital. It reflects the weighted average cost of capital and it is calculated by the formula:

$$V = V_e \cdot \frac{S_e}{S} + E_l \cdot \frac{S_l}{S}, \qquad (5)$$

Ve, Vl - valuation of equity and loan capital;

Se, Sl - valuation of equity and debt;

S - the sum of equity and debt capital

We have chosen 0.12 as the discount rate.

Based on the above data we can predict the possible synergistic effect of the cluster formation. In this case, the minimum duration of the cluster formation will take 5 years. It is expected that the enterprises of the cluster will increase the volume of service provision and production annually during 5 years, including products with higher added value through the implementation of investment projects

aimed at building new and upgrading existing facilities. The result of the calculations, based on the profitable approach, is direct quantification of the synergistic effect from the repair cluster that will exceed 678 million UAH (See Table 2). In practice, the evaluation of the synergetic effect is quite complicated because there are difficulties with taking into account all the factors of influence. However, we see that the effect of the units' functioning of "Ilyich Iron and Steel Works of Mariupol", "Azovstal Iron and Steel Works" and "Mariupol Maintenance & Repair Plant" will be much higher than the effect of their separate activity.

In addition to the direct effect, the cluster provides numerous advantages for members that can also be considered as consequences of the synergetic effect:

On the one hand, the state considers the development of the cluster, as a resource for economic development of the territory, on the other - as a potential point of growth. For the region, it is the possibility of efficient use of resources, access to advanced technology, increasing the number of taxpayers and the tax base, empowering interaction between state and business.

For enterprises of the cluster positive economic effects, arise because of the cooperation and the use of partner opportunities in a long period in terms of the combination of competition and cooperation. Main effects of the cluster are: agglomeration effect or the effect of geographical proximity (this can be attributed to economies of scale, reducing transport and logistics costs, exchange of knowledge and ideas, access to unique assets); the effect of co-education, which increases the level of knowledge of the participants; the effect of inter-firm cooperation; innovative effect.

Competition and geographical connectivity create pressure on other members of the regional economy. Economic benefits of the region are the effect of flowing knowledge; the effect of sharing of infrastructure facilities; the effect of stimulating demand; the effect of attracting investment.

Science and education institutions receive additional resources to fund researches and their further practical implementation and employment opportunities for the best graduates.

For the region's population, the cluster stimulates the multiplication and maintaining employment, the development of industrial and social infrastructure in the region, the creation of civil society, creates new standards of consumption and way of life.

Conclusions.

Thus, using a profitable approach to valuation we can get the most accurate quantitative assessment of the synergistic effect from its activity, because the total profit of the cluster is the result of diffusion of innovation within the cluster, development of related and supporting companies, stimulation of competition between companies in the innovative cluster, and a number of other conditions. If you use cost indicators for assessing the effectiveness of the cluster, you should be aware that their change can be influenced by factors not related to the integration of relations between members of the cluster. Therefore, the use of cost approach to evaluating the effectiveness of integration should be complemented by using a system of quantitative factors that characterize one or another degree of interaction of joint activities as subject and condition to the getting the synergistic effect in the integrated cluster group.

The positive effects for the region from the creation of the repair cluster are maintaining employment, growth of wages and profits, intensification of entrepreneurial activity, increase efficiency in other areas, economic stability, and positive image of the region. In addition to the direct synergistic effect, the cluster allows to receive more side effects that increase its synergy.

Список використаних джерел:

1. Bergman E. M., Feser E. J. Industrial and Regional Clusters : Concepts and Comparative Applications / E. M. Bergman, E. J. Feser. - Regional Research Institute, WVU, 1999. – 403 p.

2. Войнаренко, М. Концепція кластерів – шлях до відродження виробництва на регіональному рівні / М. Войнаренко // Економіст. – 2000. – № 1. – С. 29–33.

3. Enright, M. J. Regional clusters and economic development : a research agenda / M. J. Enright. - Boston: Harvard Business School, 1993. – 756 p.

4. Портер, М. Международная конкуренция : [пер. с англ. / под ред. В.Д. Щетинина] / М. Портер. – М. : Междунар. отношения, 1993. – 896 с.

5. Соколенко, С. І. Кластери в глобальній економіці / С. І. Соколенко. – К. : Логос, 2004. – 848 с.

6. Семенов, Г. А. Створення кластерних об'єднань в умовах нової економіки : монографія / Г. А. Семенов, О. С. Богма. – Запоріжжя : КПУ, 2008. – 242 с.

7. Хасанов, Р. Х. Синергетический эффект кластера / Р. Х. Хасанов // Проблемы современной экономики. - 2009. - № 3 (31). - [Электронный ресурс]. – Режим доступа : http://www.m-economy.ru/art.php?nArtId=2784

8. Чевганова, В. Кластери та їх економічне значення / В. Чевганова, І. Брижань // Економіка України. – 2002. – № 11. – С. 35–41.

9. Сільвестрі, А. Досвід Великої Британії з розвитку high-tech-кластерів / А. Сільвестрі // Проблеми інноваційного розвитку територій : матеріали міжнародних науково-практичних семінарів. – К. : НДІСЕП, 2005. – Вип. 1. – 228 с.

10. Cluster specialization patterns and innovation styles. - Den Haag, 1998.
11. Болдырев, Н. Откуда к нам придет экономический прорыв / Н. Болдырев // Российская газета [Электронный ресурс]. – Режим доступа : www.rg.ru/2004/02/26/kadannikov.html.
12. Меліхов, А. А. Стратегічне управління конкурентним розвитком промислових підприємств : дис. ... докт. екон. наук Спеціальність: 08.00.04 – економіка та управління підприємствами (за видами економічної діяльності) / А. А. Меліхов. – Маріуполь, 2015. – 499 с.
13. Авдонина, С. Г. Количественные методы оценки синергетического эффекта инновационного кластера / С. Г. Авдонина // Науч. вестн. Южного ин-та менеджмента. - 2013. - № 2. – Режим доступа : http:// cyberleninka.ru/article/
14. Осадчук, С. В. Нові технології управління регіональним економічним розвитком / С.В. Осадчук // Вісник економічної науки України. – 2005. – № 1. – С. 92–95.
15. Система розкриття інформації на фондовому ринку України. - [Електронний ресурс]. – Режим доступу : http://www.smida.gov.ua.

References:

1. Bergman, E. M. and Feser, E. J. (1999). Industrial and Regional Clusters : Concepts and Comparative Applications. L. : Regional Research Institute, WVU, 403 p.
2. Voynarenko, M. (2000). Conception of clusters is a way to the revival of production at regional level. [Kontseptsiya klasteriv – shlyakh do vidrodzhennya vyrobnytstva na rehional'nomu rivni]. Ekonomist, № 1, p. 29–33.
3. Enright, M. J. (1993). Regional clusters and economic development : a research agenda. Boston : Harvard Business School, 756 p.
4. Porter, M. (1993). International competition. [Mezhdunarodnaja konkurencija : per. s angl.]; ed. by V. Shhetinina. Moskva : Mezhdunar. otnoshenija, 896 p.
5. Sokolenko, S. I. (2004). Clusters in the global economy. [Klastery v hlobal'niy ekonomitsi]. Kyiv : Lohos, 848 p.
6. Semenov, H. A. and Bohma, O. S. (2008). Creation the cluster associations in the conditions of new economy : monograph. [Stvorennya klasternykh ob"yednan' v umovakh novoyi ekonomiky : monohrafiya]. Zaporizhzhya : KPU, 242 p.
7. Hasanov, R. H. (2009). The synergetics effect of cluster. [Sinergeticheskij jeffekt klastera]. Problemy sovremennoj jekonomiki, № 3 (31). [Electronic resource]. Access mode: http://www.m-economy.ru/art.php?nArtId=2784
8. Chevhanova, V. and Bryzhan', I. (2002). Clusters and their economic significance. [Klastery ta yikh ekonomichne znachennya]. Ekonomika Ukrayiny, № 11, p. 35–41.
9. Silvestry, A. (2005). Experience of UK development of high-tech clusters. [Dosvid Velykoyi Brytaniyi z rozvytku high-tech klasteriv]. Problems of innovation development areas : International scientific and practical workshops. Kyiv : NDISEP, Vol. 1, 228 p..
10. Cluster specialization patterns and innovation styles. (1998). Den Haag.
11. Boldyrev, N. (2004). Where does the economic breakthrough come from? [Otkuda k nam pridet jekonomicheskiy proryv?]. Rossiyskaya Gazeta. [Electronic resource]. Access mode: www.rg.ru/2004/02/26/kadannikov.html.
12. Melikhov, A. (2015). Strategic management of competitive development of industrial enterprises. [Stratehichne upravlinnya konkurentnym rozvytkom promyslovykh pidpryyemstv]. Thesis. ... doct. of econ. Sciences : 08.00.04. Mariupol, 499 p.
13. Avdonyna, S. H. (2013). Quantitative methods for assessing the synergistic effect of an innovative cluster. [Kolychestvennye metody otsenky synerhetycheskoho effekta innovatsyonnogo klastera]. Nauchnyj vestnik Juzhnogo Instituta Menedzhmenta, № 2. Access mode: http:// cyberleninka.ru/article/
14. Osadchuk, S. V. (2005). New technologies managing regional economic development. [Novyye tekhnologii upravleniya regionalnym ekonomicheskim razvitiyem]. Visnyk ekonomicheskoj nauki Ukrayiny, № 1, p. 92-95.
15. System of information opening on the Ukrainian stock market. [Systema rozkryttya informatsiyi na fondovomu rynku Ukrayiny]. [Electronic resource]. Access mode: http://www.smida.gov.ua.

Ключові слова: *синергія, синергетичний ефект, інтеграція, кластер, оцінка, витратний підхід, аналоговий підхід, прибутковий підхід, ремонтне обслуговування.*
Ключевые слова: *синергия, синергетический эффект, интеграция, кластер, оценка, затратный подход, аналоговый подход, доходный подход, ремонтное обслуживание.*
Keywords*: synergy, sinergistical effect, integration, cluster, evaluation, cost approach, analog approach, profitable approach, repair service.*