

## INNOVATION CLUSTERS AS A FORM OF DEVELOPMENT OF INFRASTRUCTURAL SUPPORT OF INNOVATION ACTIVITY

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### ABSTRACT

The article deals with analysis of the nature of innovation clusters as a form of development of infrastructural support of innovation activity of light industry enterprises. A multiplicative influence of cluster's innovation potential on a light industry enterprise's capabilities under conditions of the development of international economic integration has been analyzed.

**Keywords:** innovation clusters, light industry, innovation activity, infrastructural support.

### INTRODUCTION

For successful realization of industrial and innovation activity in Ukraine, there is no extensive market experience in providing consulting services, especially a technological component, therefore, as the first step, the function of technological consulting in the sphere of development and realization of new innovation-based products should be assigned to a special body that will provide respective consultations and organize respective businesses that can later be successfully privatized. It should also include formation of a broad network of engineering centers as institutions of development that support innovation activity. This will reduce expenses and minimize expenses risks of unsuccessfully organized innovation-character businesses. Naturally, such institutions of their formation development comprise incubatorization of innovation activity that should be done by a special government body. Previous attempts of clusterization and incubatorization in Ukraine were not successful, while our neighboring countries have it in the form of development institutions supported by the state. Thus, the state guarantees these institutions possibility to function under conditions of so-called free-enterprise markets that are widely used not only in the rapidly developing countries (for instance, China) but also in highly-developed countries [1, p. 20-21].

### METHODOLOGY

When doing the research, methods of economic-statistics as well as comparative analysis have been used to analyze dynamics and reveal tendencies in light industry enterprises functioning (participants of innovation clusters in Ukraine); graphic method has been used to visualize results of the research; method of generalization – to substantiate principles of development of region's innovation clusters; abstract-logical method – to make theoretical generalizations and conclusion.

### REFERENCES

Present-day interest to cluster concept is primarily related to works by M. Porter [2] who defines a cluster as a group of interrelated companies that are neighbors geographically and organizations related to them acting in a certain sphere that are characterized by common activity and mutually complement one another. M. Delgado, M. Porter, and S. Stern [3] view country's competitiveness through the lens of international competitiveness of not a specific company, but clusters, while the ability of these clusters to efficiently use internal resources is crucial. A. M. Asaul [4] notes that the core aspect in the formation of clusters is not territorial approximation of several enterprises of various-types economic activity, between which synergy and mutual functional relations are possible, but creation of a platform that provides mutual organization of practice-oriented fundamental science and engineering-design developments, innovation industry, and authority that cooperate within the framework of a single unit (cluster), due to which they perform their primary role successfully and efficiently.

### RESULTS OF THE RESEARCH

Formation of innovation infrastructure envisages intensification of integration processes of its elements with light industry enterprises as well as formation of preconditions for cluster cooperation of subjects of economic activity in region's industrial complex. Accordingly, creation of innovation clusters on the level of a region, i.e. unification of scientific research, design developments, and enterprise into a single innovation complex is one of perspective forms of development of infrastructural support of innovation activity.

Cluster approach envisages creation of highly-efficient complex units in a respective area that integrate into a single complex the majority of region's system-forming enterprises, research and development centers, higher educational

establishments, and other organizations that mutually complement one another to achieve systematic general economic, budget, and social effects.

Innovation cluster is the core of an object of light industry innovation infrastructure. At the most complete account for field and territorial peculiarities of light industry enterprise activity, formation of innovation clusters provides monitoring of present-day research in this field, possibility to attract investments on the best terms, increase of production ecological parameters etc.

One of the creators of the theory of clusters, M. Porter, professor of Harvard school of business, defines a cluster as “a network of providers, manufacturers, elements of industrial infrastructure, research institutes that are interrelated in the process of generating added value. This approach is based on taking into account positive synergetic effects of regional agglomerations, i.e. proximity of a consumer and a manufacturer, effects of networks and diffusion of skills and knowledge due to personnel migration and business separation. There are no boundaries between sectors and types of activity; they are all viewed within interrelation” [2]. Ability of enterprises that are part of a cluster to implement innovations and achieve competitive advantages is stipulated by the availability of conditions in the region as formulated by M. E. Porter in the “Rhombus” model (fig. 1)

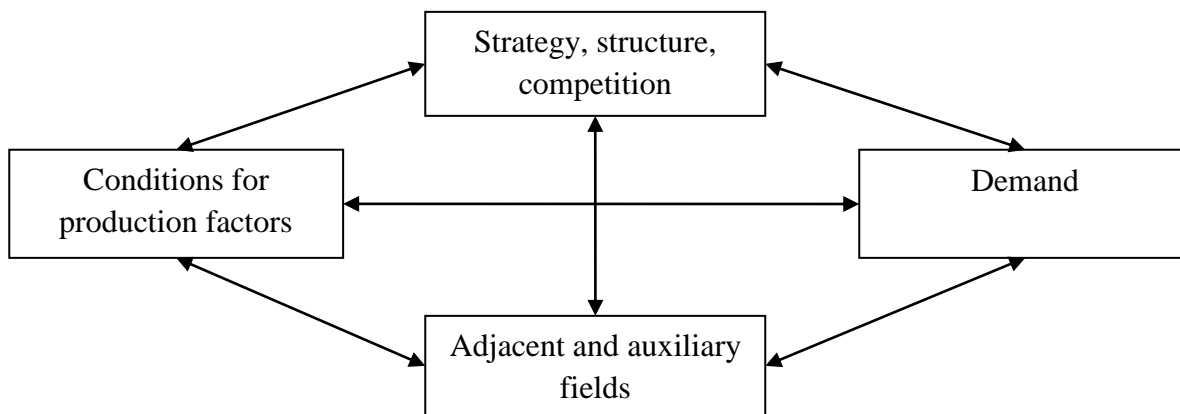


Fig. 1. The “Rhombus” model [2]

It is the availability in the region of respective conditions for factors of production (qualified workforce, production and scientific infrastructure), appropriate demand (significant demand on the field product, available customers with new demands), fields of providers available in the region, conditions for enterprise creation, organization and management, and character of inner competitiveness that stipulate development of innovation cluster structures in light industry and their competitiveness. Adjacent and supplementary fields provide implementation of innovations related to technological equipment, and provide distribution of innovations throughout the entire chain of value generation.

Figures 2 and 3 show the scheme of outer and inner profiles of an innovation cluster and their correlation.

K. Yu. Sirenko analyzes preconditions of creation of cluster structures in light industry as:

- light industry has significant potential for development;
- due to difficult financial position and work under conditions of give-away raw materials, many enterprises have shut down marketing departments that are aimed at researching the market for innovations implementations;
- available regions with tight technological ties on the basis of regional specialization, qualified workforce, available demand for products, and respective research organizations;
- over 80 % of enterprises in light industry are small ones, for which cluster form of organization is a chance to survive under conditions of open markets;
- available problems in financing innovation activity of light industry enterprises that can be solved within a cluster;
- development of international economic integration has led to intensification of competitiveness and integration relations; application of cluster approach will promote better mutual understanding with world business leaders [5].

Participation in an innovation cluster of light industry enterprises promotes the following:

- extension of informational support for making effective management decisions in the sphere of innovation activity;

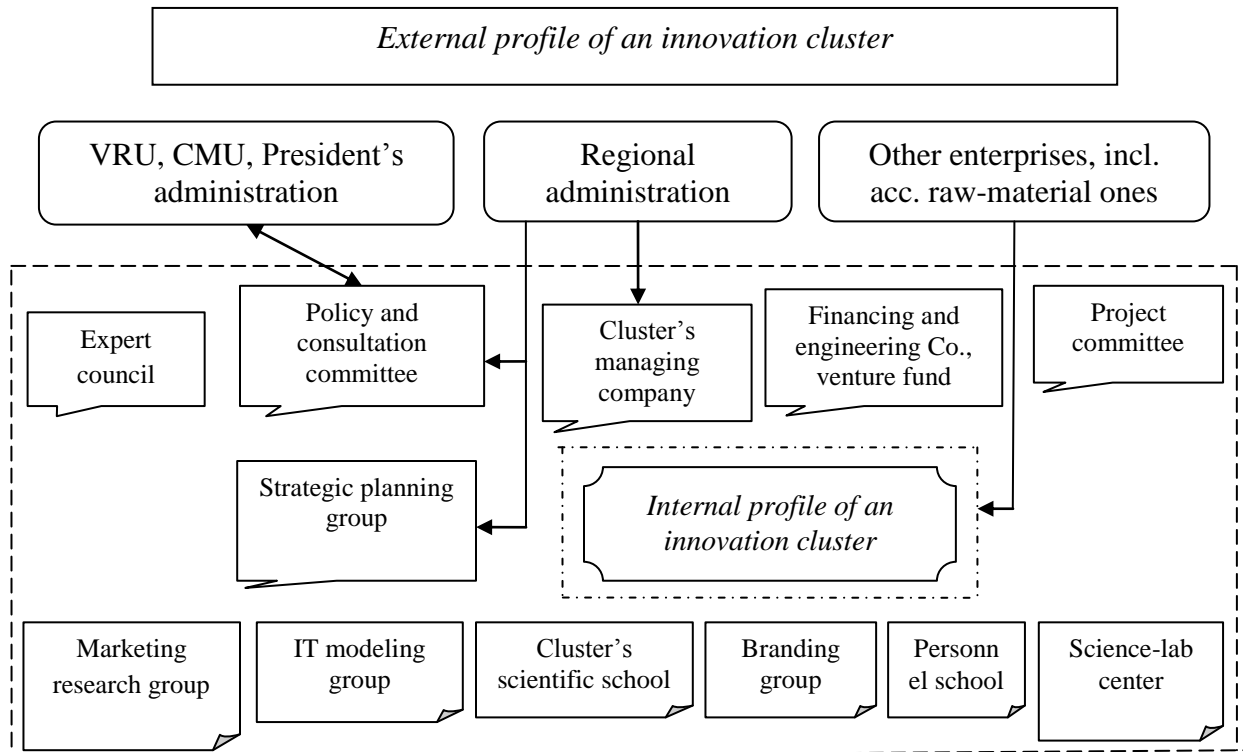


Fig. 2. External profile of an innovation cluster

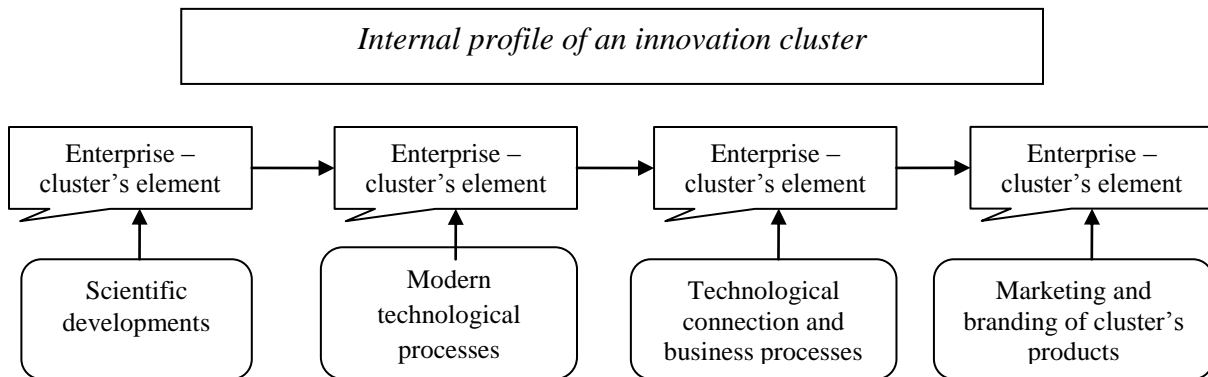


Fig. 3. Internal profile of an innovation cluster

- access to various sources of innovation development and trade areas financing;
- reduction of the period of implementation of innovation projects and technologies;
- increase of competitiveness of production in the field due to its innovation characteristics;
- updating of material and technical base of productions in the field by the innovation principle.

Multiplicative influence of cluster's innovation potential on light industry enterprise's abilities is explained by the law of synergy, which manifests itself in complex correlation of elements of cluster's innovation potential as well as their ability to generate added value.

Synergetic effect of using resources of various light industry enterprises, scientific organizations, educational institutions that correlate in an innovation cluster manifests itself in the increase of competitiveness of such enterprises due to the following:

- reduction of operating costs;
- use of general centers of design and processes based on CAD systems of 3D technologies;
- social use of modern production equipment designed to do laying-out and sew wide assortment of products;
- reduction of terms for search of practical application of innovation ideas and orders for developments.

Intensive development of innovation clusters in the field of light industry envisages realization of appropriate innovation projects, namely:

- 1) creation of a center of technological competences, in which information about manufacturers represented in the cluster, their products, information about organization of correlation, terms of shipment, coordination of batch size, production planning etc is concentrated;
- 2) human resources of a light industry enterprise represented in the cluster through training of highly-qualified staff with application of modern IT-technologies and carrying out fundamental and applied research;
- 3) adaptation of modern innovation technologies for light industry enterprises due to use of modern technological and analytical equipment and cooperation with higher educational establishments and R&D institutions;
- 4) marketing analysis aimed at obtaining information about market infrastructure (products, manufacturers, terms of shipment, other features), which promotes reduction of risks for manufacturers, wholesalers, suppliers, reduction of production cost of final products for all enterprises within a cluster and their partners.

In Ukraine, clusters were first created in Khmelnytska oblast. In 1998, “Podillya Pershyi” Association put forth a program of implementation of clusters concept in construction, garment, food, and travel sectors. In 2005, a garment cluster comprising 20 enterprises of garment sector was registered. Later, the idea of clusterization became popular in Dnipropetrovska, Ivano-Frankivska, Rivnenska, Poltavska, Sumska, Kharkivska, Khersonska, Odeska, Mykolayivska oblasts.

At present, garment cluster of Khmelnytska oblast comprises over 30 enterprises – manufacturers and service-oriented enterprises. Participants of the cluster tightly correlate with researchers from Khmelnytskyi National University. Moreover, 8 enterprises of the cluster cooperate with foreign companies.

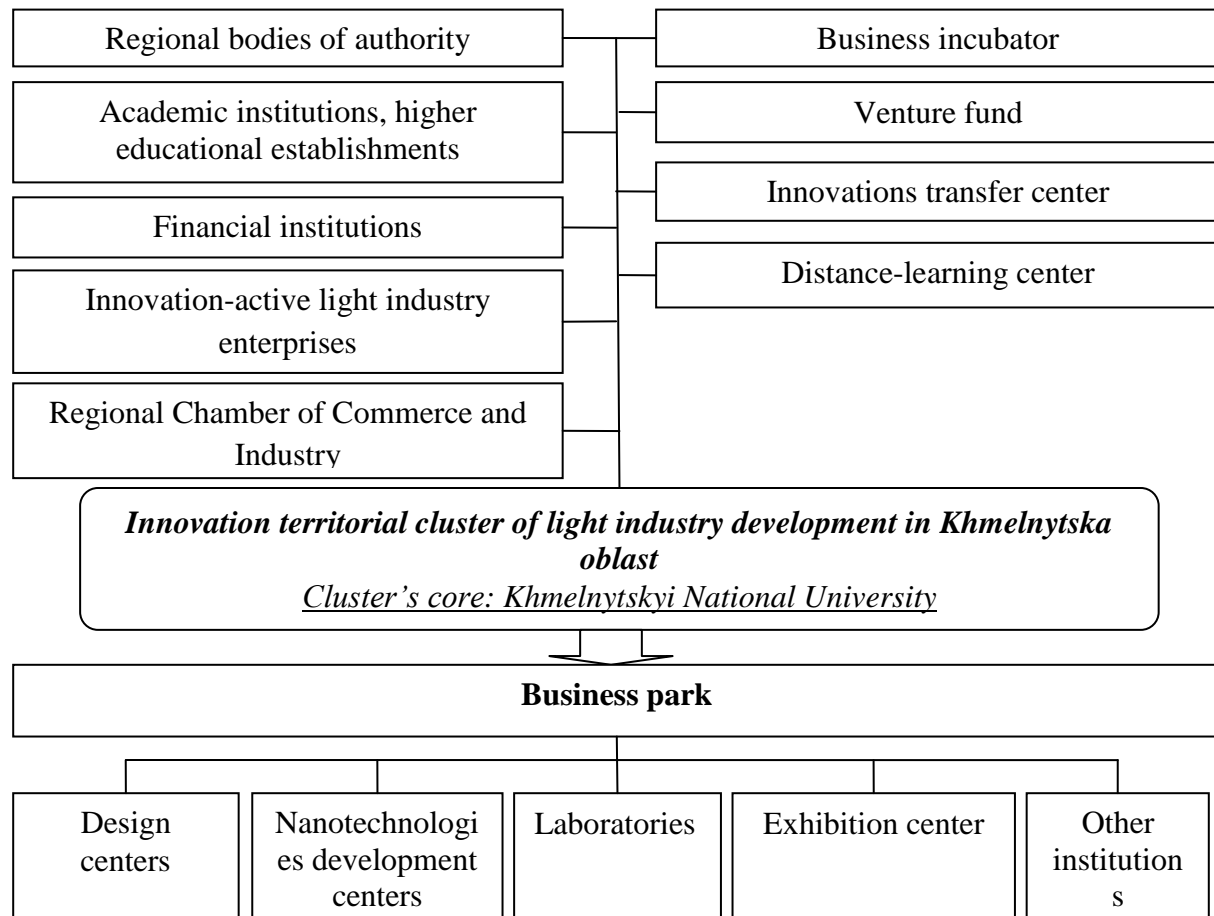
For over 10 years, the cluster has seen increase of production, its quality, and competitiveness. At the same time, a number of programs aimed at organization of new and improvement of currently active enterprises, carrying out researches, formation of logistics and marketing systems, training of highly-qualified specialists have been realized [6, 10]. Analyzing various models of cluster systems, M. Kropyvko [7] substantiates the model of an innovation cluster. Using this model and research of formation of efficient infrastructure support of innovation enterprising in agrarian sector of economy by O. Melnyk as the basis, we have proposed an organizational scheme of development of a light industry innovation territorial cluster for Khmelnytska oblast on the basis of Khmelnytskyi National University (fig. 4).

Creation of an innovation business-incubator on the basis of Khmelnytskyi National University will form favorable conditions for realization of business ideas and projects (including innovation ones) of young specialists and ensure practical realization of the results of their research.

Basic areas of an innovation territorial cluster’s activity for light industry development can be as follows:

- use of equipment, complexes, resource- and energy saving production technologies in light industry;
- use of nanotechnologies at light industry enterprises, development of intelligent textile, production of nanofibres, scented fabrics etc, use of nanoemulsions and nanodispersions at final processing of textiles to ensure their resistance to water and oil, reduced inflammability, resistance to dirt, softness, antistatic and antibacterial effects, thermal stability etc.;
- use of physical and chemical, biochemical and biophysical bases of ensuring systems of quality and safety control for light industry products;
- development of research and experimental-technical base of a light industry enterprise, innovation systems in the sphere of computer technologies and software to be used in research and education process;
- ensuring necessary conditions to leverage additional resources for research and educational activity.

Creation of flax cluster in Polissya region with climatic conditions specifically favorable for flax production and a big number of flax mills is perspective.



**Fig. 4. Organization scheme of the innovation territorial cluster of light industry development in Khmelnytska oblast**

Thus, in order to solve the problem with raw materials, Yemilchynskyi flax mill cooperates with agricultural enterprises by providing them with mineral fertilizers, flax seeds, carrying out planting activities etc. Moreover, two big flax processing businesses are located in this region (in Rivne and Kyiv). Their overall capacity is 100 mil. m<sup>2</sup> of fabrics for technical and everyday purposes. The region has production capacity that is enough to process all flax raw material in the country and has rather high scientific and technical potential of the field and higher educational science. Big market of flax products consumption is stipulated by the fact that it is used in textile, light, medical, machinery, construction fields as well as in trade and the sphere of services. In previous years, 80% of fibre produced in Ukraine was exported to Russia, the Baltic countries, Great Britain, Italy, Hungary. Nowadays, this market has been almost completely lost [8].

In order to regain lost ground, there is a possibility to use new technologies developed by native scientists. Namely, there exists national industrial technology of processing not only long, but also short cotton fibre based on modernization of spinning and weaving equipment. Extensive use of cotton flax in production enables to reduce purchase of wool and significantly reduces Ukraine's strategic and financial dependence from its import [9, p. 159].

## CONCLUSION

Thus, we assume that a perspective of light industry overcoming crisis in the sphere of innovation is creation of cluster structures and attraction of local authorities to support innovation projects with purpose of creation of new production systems. This would allow solution of the issue of employment, leverage of investments, intensification of innovation activity, and, as a result, promote replenishment of state and local budgets. The state needs to tackle the task of developing special legislative acts that would regulate activity of cluster structures; activation of research in higher

educational establishments that are important for the development of cluster structures and creation of informational databases needed for their normal functioning; giving state guarantees when leveraging foreign investments to cluster structures.

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