

ЛАЙКО О.І.

д-р екон. наук, с.н.с.

заст. директора з наукової роботи

Інститут проблем ринку та економіко-екологічних досліджень НАНУ

Французький бульвар, 29, м. Одеса, Україна, 65044

E-mail: alexlayko@gmail.com

ORCID: 0000-0001-7082-0862

КОВАЛЕНКО С.І.

канд. екон. наук, доц.

Національний університет «Одеська морська академія», Дунайський інститут

вул. Фанагорійська, 9, м. Ізмаїл, Україна

E-mail: econ69@mail.ru

ORCID: 0000-0001-7430-9412

Публікація виконана в рамках наукового проекту «Розробка стратегій інноваційного розвитку для регіонів України на засадах глокалізації (на прикладі Одеської області)» за рахунок коштів бюджетної програми «Підтримка розвитку пріоритетних напрямів наукових досліджень» (КПКВК 6541230)

## ПРОЕКТУВАННЯ ЄВРОРЕГІОНАЛЬНОЇ ІННОВАЦІЙНОЇ СИСТЕМИ - "ПОЛЮСА ЗРОСТАННЯ" ПЕРИФЕРІЙНОГО ЕКОНОМІЧНОГО ПРОСТОРУ

**Актуальність.** Реформування системи управління регіональним розвитком передбачає запровадження нової якості регіональної політики, що покликана поєднати завдання модернізації економіки країни із завданнями забезпечення комплексного збалансованого розвитку периферійних (прикордонних) регіонів.

**Мета та завдання.** Метою статті є розробка теоретичних, методичних положень та практично-прикладних пропозицій, які мають обґрунтувати інструменти вдосконалення проектування єврорегіональних інноваційних систем за участю України в умовах розширення ЄС, шляхом створення транскордонних кластерних систем – інститутів мережевої промислової інтеграції, які стають полюсами економічного зростання і конкурентоспроможності периферійного економічного простору

**Результати.** Як об'єктів стратегічного планування пропонується розглядати транскордонні кластерні системи (ТКС), під якими розуміються територіально - локалізовані соціально - економічні системи, утворені групою незалежних економічних суб'єктів по обидві сторони кордону, організаціями органів виконавчої влади країн - акторів євро регіону та громадянського суспільства, стабільно взаємодіють один з одним шляхом обміну інформацією, послугами, людьми і капіталами і забезпечує більш високу ефективність у порівнянні з іншими, не системно організованими об'єктами. Обґрунтовано, що для підвищення рівня інноваційності економіки периферійного регіону необхідна інтеграція освітньої та наукової інфраструктури з владними структурами і з підприємницьким середовищем в цілях підвищення рівня розробок на інноваційних підприємствах. Університетам необхідно розвивати співпрацю з промисловістю, використовувати нові засоби для зміцнення науково-дослідної діяльності, що відображає потреби регіональних фірм і такою, що сприяє підвищенню їх суттєвої ролі у розвитку єврорегіональної інноваційної системи.

**Висновки.** Формування єврорегіональної інноваційної системи трансформує пріоритет основних факторів розміщення, що змінює функції периферійної території: з фізичного базису - місця розміщення матеріальних (ресурсних) факторів виробництва вона все більше перетворюється на просторову середовище для розвитку людського капіталу, інновацій і забезпечення саморозвитку Євро регіону. Нова, постмодерністська реальність полягає в поєднанні постіндустріального виробництва з мережевим будовою периферійного економічного простору, що передбачає трансплантацію інститутів за допомогою самоорганізації гібридних мережевих кластерів "поверх" адміністративних кордонів, які стають "полюсами росту", фактором згуртування і вільної циркуляції капіталів в євро регіонах.

**Ключові слова:** інновації, інтеграція, периферійний регіон, транскордонна кластерна система, конкурентоспроможність, кластерна стратегія.

LAIKO O.I.

Dr. Econ. Sciences, senior researcher

vice-director for scientific work of the Institute

Institute of market problems and economic & ecological research of the National Academy of Sciences of Ukraine,

Frantsuzkyi boulevard, 29, Odesa, Ukraine, 65044

E-mail: alexlayko@gmail.com

ORCID: 0000-0001-7082-0862

SERGIY I. KOVALENKO

PhD (Economics), Associate Professor

Danube Institute of National University "Odessa Maritime Academy"

9, Fanagoriyskaya str., Izmail, Ukraine

E-mail: econ69@mail.ru

ORCID: 0000-0001-7430-9412

## DESIGN OF EUROREGIONAL INNOVATION SYSTEM - "GROWTH POLE" OF PERIPHERAL ECONOMIC AREA

**Topicality.** The topicality of the research is determined by the important role of innovative forms of cross-border cooperation in improving competitiveness of peripheral boundary regions, reducing of regional differentiation between cross border and internal regions, on one hand, and immaturity of theoretical and methodological aspects of studying the cross-border cooperation mechanisms, on the other. The reforming of the system controlling of the regional development involves the implementation of new quality of the regional strategy the aim of which is both to ensure the modernization of the country's economy and to carry out complex and balanced development of peripheral (boundary) regions.

**Aim and tasks.** The aim of the article under consideration is to offer theoretical and methodological provisions and practical propositions to justify the improvement tools of project planning of the European regional innovative systems with Ukraine as a participant of cross-border cooperation under the conditions of EU enlargement by means of creating transnational cluster systems – network industrial integration institutions – which have become the poles of economical growth and competitiveness of peripheral economic area. The task is to work out the theoretical provisions and methodological principles of strategic planning to create and develop cross-border cluster systems in different sectors of economy taking into consideration their potential role as the systems that are able to fulfil purposes and to tackle problems with a focus on solving the task of modernization of Ukrainian peripheral regions' economic system.

**Research results.** The objects of strategic planning are cross-border cluster systems looked upon as territorially located socially economic systems formed by a group of independent economic agents from the both sides of the border, by the organizations of bodies of executive power of the countries-actors of the European region and civil society. They consistently interact with each other by means of information, service, human and funds exchange and provide extra efficiency as compared with other, not systematically organized objects. Cross-border cluster systems can become the centers of regional development: investments promotion, diffusion of innovations, creation of human capital of new quality, standard of business relations, development of adequate institutions geared to address the task of the country's economy modernization. For good reason, to raise the level of innovative economy of a peripheral region it is necessary to integrate educational and scientific infrastructure with power structures and with business environment to increase the layer of development on innovative enterprises. Universities should develop cooperation with the industry, use new approaches in academic research reflecting the needs of regional firms and assisting in strengthening their central role in EU regional innovative system development.

**Conclusion.** Formation of EU regional innovative system considerably transforms the priority of the main siting factors which changes the functions of periphery territory. The latter is transforming from physical basis – the material (resource) production factors siting – into the environment to develop human capital, innovations and providing self-development of EU region. The new postmodern reality includes postindustrial manufacturing together with network building of periphery economic area suggesting the transplantation of the institutions by means of self-organization of hybrid network clusters over the administrative boundaries which become the "growth poles", factors of uniting and free circulation of funds in European regions. On the way towards the entry into the European Union it is necessary to generalize experience of cross-border cooperation as the previous and complementary phase of integration in regional terms. To form the complete and effective development policy of cross-border cooperation with the active participation of Ukrainian peripheral regions it is necessary to work out theoretical and methodological background of the quasi-integration of economic agents within the boundary of European regions and to justify new forms and mechanisms of its deepening with the benefit of cross-border cluster systems concept.

**Keywords:** innovations, integration, peripheral region, cross-border cluster system, competitiveness, cluster

**Problem statement and its connection with important scientific and practical tasks.** Demand for development and implementation of scientifically grounded regional economic policy relevant to borderlands of Ukraine is particularly obvious in a context of processes of international economic integration.

The present challenge lies in development of theoretical provisions and methodology principles for strategy of planning to create and upgrade cross-border cluster systems encompassing various sectors of economy taking into account their potential role as aim-implementing and problem-solving systems, oriented towards targets involving modernization of economy of peripheral regions of Ukraine.

Referring to experience of states involved into international integration processes, such conditions bring radical changes into status and role of regions adjacent to borders in development of national economy in general. They lose their “peripheral” status and their “barrier” functions, becoming now not only unique transit corridors for innovations, goods and services, but also regional “poles” for integration and interaction for global and national economic spaces.

Urgency of the topic of proposed research is caused by an important part played by innovative forms of cross-border cooperation in improving competitiveness of peripheral regions adjacent to borders, mitigation of пространственной differentiation between areas adjacent to borders and inland sub-regions and low level of development of theoretical and methodological aspects in studying mechanism of cross-border cooperation. In order to improve cooperation efficiency and eliminate negative effect of available borders’ effect achieving full-scale integrated space modern EU policy regarding cross-border regions’ development stimulates search for newer forms of cross-border cooperation [1].

Cross-border cooperation becomes the key factor of European integration enhancement under those circumstances, when in political and scientific discourse the concept “boundary” is perceived not as “boundary line”, but is transformed into “relationship factor” being understood “not as a line, but a functional space”, where “various communities and groups” interact.

Active formation of network forms of cross-border economic area self-organization corresponds to the impulse of establishing of the new economic reality of postmodernism that denies “total ideology”, but accepts the variety and freedom of economic choice. Network clusters become a new source of competitive advantages of the European regions involving Ukraine and change not only the local factors system, but also the structure of economic area itself. In large measure the implementation of cluster form of business organization in cross-border dimension makes it possible to develop the network structure of economic area, to enhance its unity and entity [2, p. 4].

Nowadays the most efficient direction of innovative policy is the formation and development of cross-border clusters which become more popular in the world society on the international, national and regional levels. Usage of cluster approach is an effective way of competitive recovery and of the small and medium business in regional economy. In this respect the task of formation of united innovative infrastructure, providing effective use of scientific and technological potential of cross-border regions, creating the conditions for modernization of the industry and the acceleration of development of its most successful and competitive segment, becomes the most significant one. The necessity of development and realization of scientifically grounded regional economic policy concerning border regions and territories of Ukraine is evident within the framework of the processes of international economic integrity. As the experience of the countries involved in the processes of international integrity shows, under such conditions the status and role of the border regions in the development of national economy, are sufficiently changed. The latter lose their “periphery” status and their “barrier” functions, being not only the transit corridor for innovations, goods and services, but also as regional “poles” of integrity and interplay of global and national economic areas.

The unified concept of European economic integration is not yet formed taking into account development methodology for international industrial and innovative clusters. This problem statement may be described as a meso-economical synthesis of development strategies of international manufacturing and innovative clusters and international integration formations and, to the author’s opinion, it enables to draw up both practical mechanism as well, as scientific idea of development for modern integration systems.

The relevance of our investigation on one hand is determined by the important role of cross-border cooperation to enhance the competitiveness of periphery border regions, to decrease spatial differentiation between border and internal sub-regions and on the other, buy not adequate investigation of theoretical and methodological aspects of the study of the mechanisms of cross-border cooperation. To make the cooperation more effective, to cancel the negative influence of the borders and to achieve full scale integral area, the modern regional policy of European Union motivated the search of new forms of cross-border

cooperation [2, p. 10].

Reformation of regional development management system provides for implementation of updated regional policy quality which is supposed to unify tasks aimed to upgrade national economy of a state in general and, at the same time achieve harmonized complex development of peripheral (adjacent to borders) regions.

**Analysis of recent publications on the problem.** Cluster approach in economy structuring, elaboration regional economic strategy and competitiveness improvement is commonly recognized among the advanced states. Since 1980s multiple researches were carried on, and substantial number of works were published rising the questions of business entities' competitiveness in view of regional business climate and environment. An idea stating that national economy success depends, finally, on locally concentrated specialized branches' (industrial districts) development level was noted more than a century ago in works by Alfhred Marshall (1890). He was the first who explored synergy effect gained with business entities' merging and specialization improvement. Alfhred Marshall was one of the first who described advantages and proved feasibility of cluster theory as far back, as in the end of the 19<sup>th</sup> century [3, p. 127].

Michael Porter in his work "Nations Competitive Advantages" has drawn to a conclusion, as below, "... transition economy developing the investment policy should strive to develop mutually dependent industrial clusters encompassing basic and supporting branches" [4]. The approach to regional competitiveness evaluation may be defined basing on the concept of total national competitiveness concept, as proposed by Michael Porter [5, 6].

Researches carried on by J. Schumpeter, C. Erroy, P. Nelson and S. Winter consider problems rising with market structure modernization and competitive development as factors contributing to economic systems innovative activities improvement. They explore market participants integration mechanisms, newer innovative structures formation aimed to generate innovations in manufacturing, technology and organization. Essential contribution into solution of this problem was made by institutionalism representatives, such as O. Williamson [7], R. Coase [8], W. Nordhause, F. Heieck, in their works, describing following aspects,

1) Attention drawn to information drawbacks preventing mutually beneficial activities, discrepancies between "obvious" (coded) i "latent" (tacit) knowledge;

2) Focusing on transaction expenditures influencing advantages of individual organizational forms.

Modern literature defines territorial forms network industrial integration as including industrial districts, holdings, clusters, territorial manufacturing complexes, which, in their turn, encompass regions, technological platforms, etc. The "industrial district" term evolved, as the time ran, towards enhanced notable features transformation review carried on by A. Marshall, G. Becattini, O. Williamson [7, p. 211].

Works by national economists, such as B.V. Burkynskyi, V. M. Heyets, M. I. Dolishniy, V. S. Kravtsiv, M. P. Voynarenko [9], Yu. V. Makogon [10], V. M. Osipov [11], S. V. Filippova [12], V. I. Zakharchenko, N. A. Mikula [13], etc., are dedicated to cross-border regionalism forms and instruments development problems on the basis of quasi-integration in newer technological paradigm developing conditions and newer challenges imposed by global instability. They review various aspects of innovative form of networked cooperation, including substantiated strategies of economic growth in view of European integration of Ukraine. Scientific works by the abovementioned persons outline theoretical and methodical aspects of competitive cluster development. Nevertheless, it should be noted that mechanism of cross-border clusters formation is still practically unexplored in Ukraine and requires to be researched.

Yet, so necessary theoretical foundation enabling to adapt Porter's cluster concept to domestic application was formed by researches in cross-border regional competition carried on in the Market Problems and Economic - Ecological Research Institute incorporated with National Academy of Sciences of Ukraine.

**Allocation of previously unsolved parts of the general problem.** Referring to creation of united Europe (without segregating borders) the problem of cross-border cooperation gets newer forms. Regions adjacent to borders are territories populated with communities tightly linked by various relations but segregated by borders. Whatever political systems might exist in states populated by such communities, they meet similar, or even identical social, economic, cultural, political and legal problems. Thus, the essential principle of international cross-border cooperation consists in generating links and contractual relations in areas adjacent to borders capable to facilitate solution of common problems.

Rising global instability problems early in XXI-th century demand developing newer forms of cross-border cooperation along with euroregions. Among them they are «cross-border clusters», «cross-border industrial zones», «cross-border partnerships», «cross-border innovation projects», too. Global experience of

developed countries evidences both efficiency and imminent consequent generation of cross-border cluster system (CCS), which become centers of innovative advance for peripheral regions and, consequently “safe zones” in view of general globalization tendencies.

Problem of filling the gap between cluster theoretical model construction and demands, imposed by administrative bodies and business entities to put scientific foundation of adopted strategic decisions at meso-level, remains still unsolved. It means the urgent necessity to develop methodological instrumentation of the model application at stage of cross-border industrial policy trends and ways identification, working out development strategies and programs for the Black Sea euroregions, and corporate competitive strategies. Furthermore, cluster theory is also being associated with corporation theory, innovative development theory, economic growth theory, etc. however, with all the available rather multiple researches dedicated to networked clusters, these structures still remain insufficiently studied both in terminology and contents aspects [14].

Nowadays, to the Author’s opinion development, implementation and improvement of such unified mechanisms is of utmost importance. Therefore, implementation of regional economy modernization vector basing on cross-border clusters generation demands development of newer strategy involving detailed mechanism of formation and governmental support of clusters situated at both sides of state borders relatively to current conditions in Ukraine. Implementation of newer market mechanisms enabling to improve competitiveness of regions at the European market alongside development of newer technological formation is possible if flexible forms of cross-border cooperation, coordination and integration of joint efforts applied by business entities in regions are achieved. Problem of improving competitiveness at the global market is of critical importance for Ukraine.

**Formulation of research objectives (problem statement).** This work is aimed to research essence, potential and priorities in developing euroregional innovations systems involving Ukraine in terms of the EU expansion by means of generating transnational clusters systems – network institutions of industrial integration, representing focuses of economic growth and competitiveness of peripheral economic space.

**An outline of the main results and their justification.** One of the most important priorities of regional economic policy in Ukraine is implementation of opportunities for each region adjacent to borders in overcoming crisis by means of improving quality of its economic space. Such an approach is completely valid for regions, adjacent to borders, where globalization and eurointegration processes bring factors of international economic cooperation to the first place. The latter affects transformation in regional economy causing structural changes, search of newer forms of organization for economic space and competitiveness improvement.

Nowadays there are a number of problems preventing to implement modernization of social and economic state, which display varying features differing from region to region and from one branch of economy to another, varying in urgency and priority. The most essential among them may be specified as technological lag in a great number of macro-manufacturing; human potential mismatching with modern trends in social and economic development (knowledge, post-industrial social transformation, innovative development ways); low level of investments and innovative activeness in a majority of branches of economy and regions adjacent to borders; insufficient infrastructure development relevant to marketing, manufacturing, transport and social aspects); increased differentiation in levels of social and economic development of peripheral regions; presence of regions classified as depressed, problematic or exposed to crisis within a studied state; disintegration of social and economic space displayed as insufficient level of cross-border social and economic contacts, insufficient population mobility, difficulties in financial, personnel and goods exchange.

Peripherality may be considered as an essential feature within a framework of management task due to a presence of a number of restrictions. In particular, periphery management system takes solutions basing upon unclear and incomplete information about surrounding conditions and is incapable to guarantee smooth innovation process “from knowledge to practice”.

Peripheral region may be defined as a territorial organization capable to self-determination within certain external and internal contexts. It features certain subjectivity of management, though substantially restricted, increased economic risks accompanied with institutional risks and insufficient resources to solve general and particular regional problems.

From the point of view of system approach to solution of problems of social and economic development of Ukrainian peripheral regions, it should be mentioned, that one of the prospective directions to implement modernization scenario may be specified as stimulation and supporting creation of

“development centers”. Cluster Industrial Systems (CIS) may become an efficient implementation of such centers focused upon newer ideas, technologies and human potential accumulation.

Researches in the sphere of innovative euroregional development launched about two decades ago focused on case study of innovatively advanced regions, hi-tech areas, specialized clusters based on knowledge and regions spreading such knowledge [12].

Common elements for such regions are, as follows:

- Concentration on hi-tech branches, based on knowledge;
- Powerful research base;
- Available cooperation links with international corporations and stimulation of innovative corporations' generation.

However, the above researches don't take into account regional features, which may be described as relatively low technological development, weak links with regional economic and cultural environment, practical aspects of its integration into national and global economy.

Available empirical researches of regions with unfavorable for innovative development conditions enable to reveal certain disadvantages, such as lack of innovative environment capable to support development of innovative organizations; weakly developed networks of cooperation between main partners within regional innovation space facilitating its dynamic development [15]. Such a situation is typical for states with (“emerging market economics”), described by criteria, as follows: average income (10-75% EU average income level per capita); catching-up growth (income gap reduction within the last decade in comparison with advanced states); economic openness and institutional transformation implementation.

Promotion of innovative development within such territories is rather difficult due to a number of unfavorable factors, including *inter alia* lack of high-tech economic sector, institutional restrictions, and environment capable to encourage innovations and technological progress, weakly developed cooperation network between innovation environment subjects and lack of their critical mass [16].

Research work by Isaksen, Wintjes reveals closeness, fragmentation and spontaneous generation of regional innovative systems' subjects as specific problems of development. These problems correspond to regions' classification proposed by Tödting and Tripple [17]:

- “peripheral regions” with prevailing smaller business entities' ratio in traditional industrial branches and insufficiently represented innovative infrastructure subjects;
- “old industrial regions” with clusters prevailing within individual branches and relevant infrastructure;
- “metropolitan regions”, possessing all the chances to become innovations centers due to high concentration of scientific and educational institution and manufactures, failing, however, to achieve expected level of development due to lack of interaction between sporadically generated “hotbeds of innovations”.

Further summarizing of researches in Regional Innovation Systems (RIS) enables to identify such types, as “industrial regions” (Kaufmann and Tödting), “rural regions” (Wigg), “peripheral regions” (Doloreux) and regions “with transient economy» (Quevit and van Doren). In general, activity enabling “innovation partners” to communicate interactively is a kind of “regional social capital resource” encouraging diffusion processes, transferring better practices and reducing costs required for innovations search and implementation for private business entities.

It goes without saying, that states forming market-type economy require special mechanism for development of innovation systems focused on business initiatives development. The concept of innovations as an important factor for economic progress was declared by J. Schumpeter as far back, as 1939. Business within smaller region is more focused on manufacturing and technological innovations. This is caused, firstly, by differences in regional specialization and global trends in innovations; and secondly, by empirically proved geographical restrictions imposed on knowledge spreading processes, being advantageous since they enable to transfer implicit (latent) knowledge by means of personal contacts.

The “Growth Pole” term was introduced into scientific terminology by F. Perrou, French economist in early 1950s. [18]. According to ideas expressed by the above Author economic growth does not run everywhere, but has a focal nature. According to his definition “Growth Poles” are enterprises concentrated in certain locations with the highest intensity of economic progress, business activeness and innovations processes. F. Perrou and his successors, such as I. Walerstain, T. Hagerstrand, and J. Boudville noted, that regional centers, where enterprises of leading branches are located attract manufacturing factors, leading to development of regional progress spots [19].

Thus, the RIS progress should be concentrated in major directions, as shown in Fig. 1.

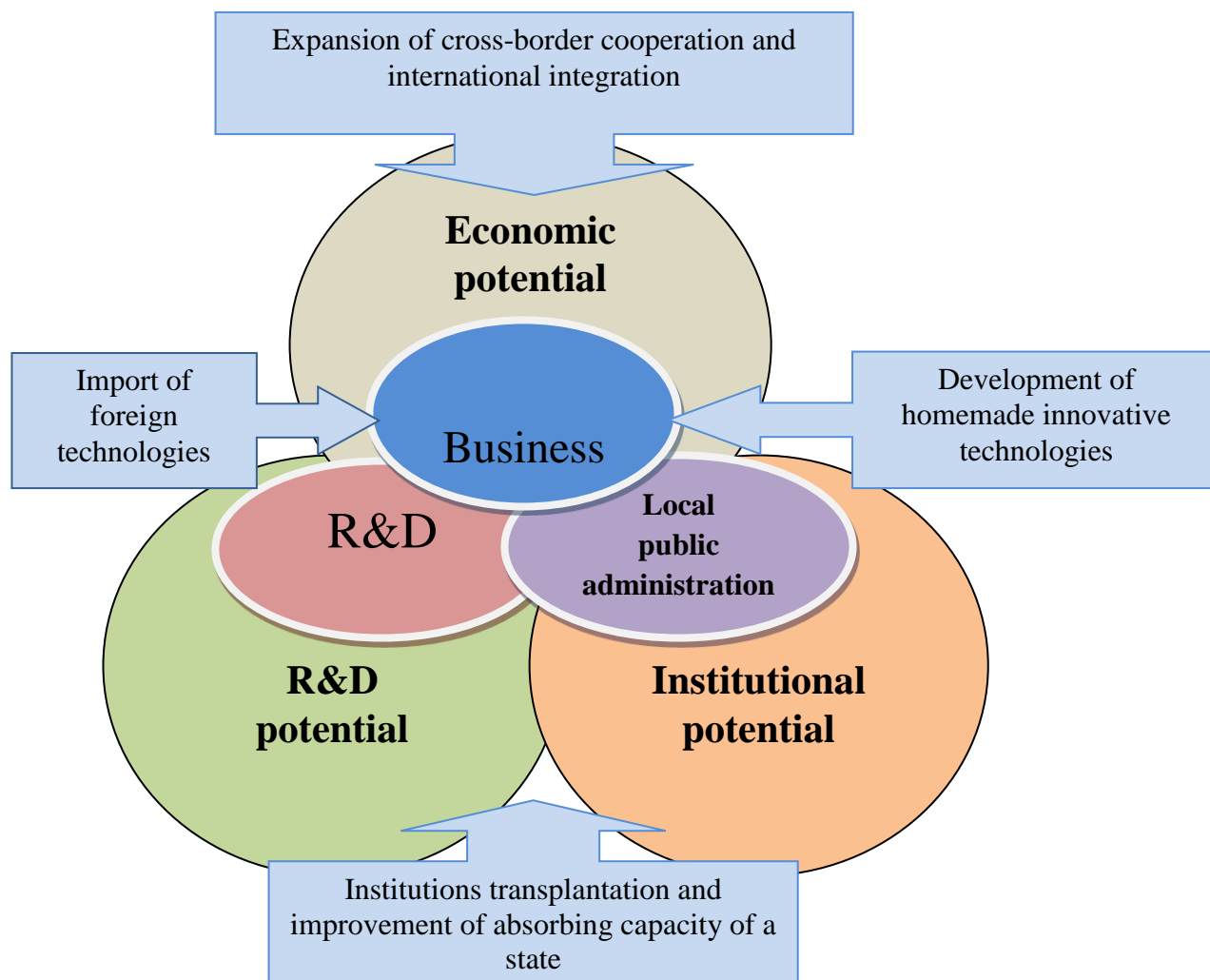


Fig. 1. Institutional platform of cross-border cluster system development based on innovative potential improvement

Institutions of power may facilitate such processes pursuing aims of their own, e.g. to revive economic development of lagging regions. H. Richardson, G. Freedman, P. Potier, H. Lasouenne, H. Girsch belong to a group of the most prominent theoreticians of regional economic growth. Models proposed by the enlisted scientists include such cornerstone provisions, as growth centers emergence, channels of their expansion, agglomerations formation, innovations diffusion processes, prevention of uneven growth in free competition environment in regional economic sphere.

Innovation potential of peripheral region represents a complex dynamically developing and spatially organized system of interpenetrating balanced potentials (economic, institutional, scientific researching and experimental implementations), driven by cooperation and attaining synergic effect.

Strategic priority in social and economic development of any state lies in supporting scientific researches and encouraging of innovations implementation. Nevertheless, business practical experience in Ukraine for the last two decades does not permit to draw optimistic conclusions. Lack of matured competitive environment, high monopolization level in a number of branches, lack of opportunities to attract venture financial resources bewilders modernization processes in business. Also, certain factors undermining innovative progress should be marked, as below,

- Weak link between science and business, lack of joint research practical experience;
- Missing mechanism of financing and tax encouragement for innovations in business;
- Reluctant innovation response of real economy sector, mainly due to lack of own financial resources



and deficit of qualified personnel.

The above factors as well, as lack of clear understanding of priorities in innovative policy on regional levels makes it necessary to concentrate efforts and resources on “self-development mechanism” activation. It means, first of all, formation of euroregional innovative infrastructure involving resources from private business and, at the same time, maintaining balance between national and individual interests.

Innovative development acceleration requires creation and development of newer cooperation structures for economic entities on euroregional level. Efficiency of economy is determined by extent of innovative processes development. Obtaining newer knowledge and its transfer to manufacturing sectors and social sphere are important components for such progress. Nowadays, science, education and business develop along tracks which are often parallel to each of them. Therefore, universities situated in peripheral regions (Odessa Region, areas adjacent to the Danube river) may represent, to the Author’s opinion, auxiliary tools of implementation of innovative development policy as “growth gravity centers” (Fig.2).

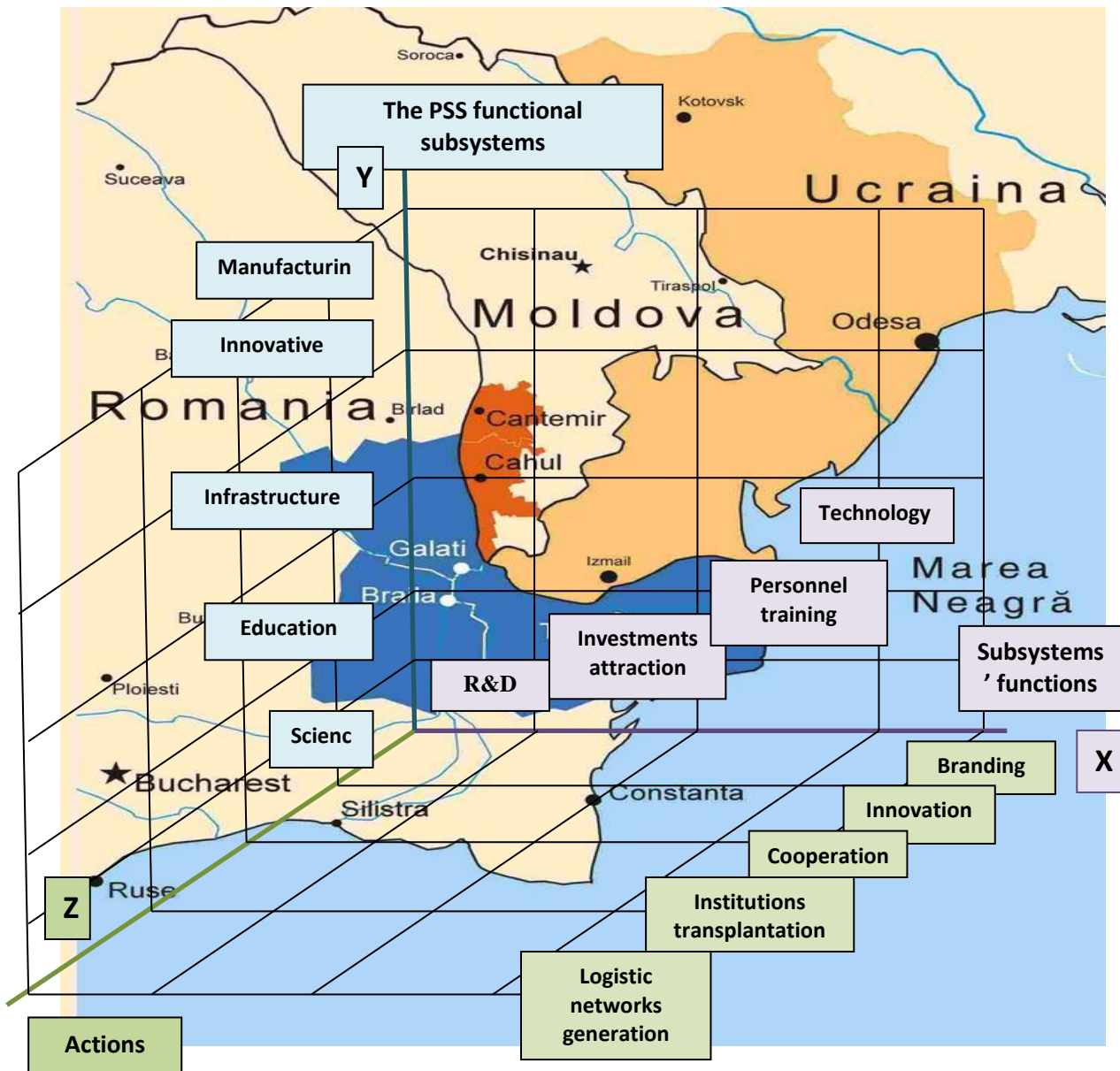


Fig. 2. Cross-border space of innovative development strategic trends formation in aspect of PSS (problem solving system)

Technological policy should be directed towards overcoming lack of resources in peripheral regions. In other words, national policy should be formed so as not to prevent, but rather to encourage regional initiatives towards innovative development basing on international cooperation, development of own



innovative technologies and importing foreign innovations.

At the initial stages of “grow centers” development residents of Free Economic Zones may perform as base elements, innovations hubs. For instance, «Lower Danube growth ring» represents a cross-border Innovative and Educational Cluster, capable to unite following entities: scientific and research centers in universities, business hub, technopark, CCI branches and a number of venture corporations within FEZ, which may be simultaneously customers and basic elements within the platform of innovations transfer in maritime economy complex of the Danube/Black Sea euroregion involving Ukrainian, Romanian and Moldavian corporations (Fig. 3).

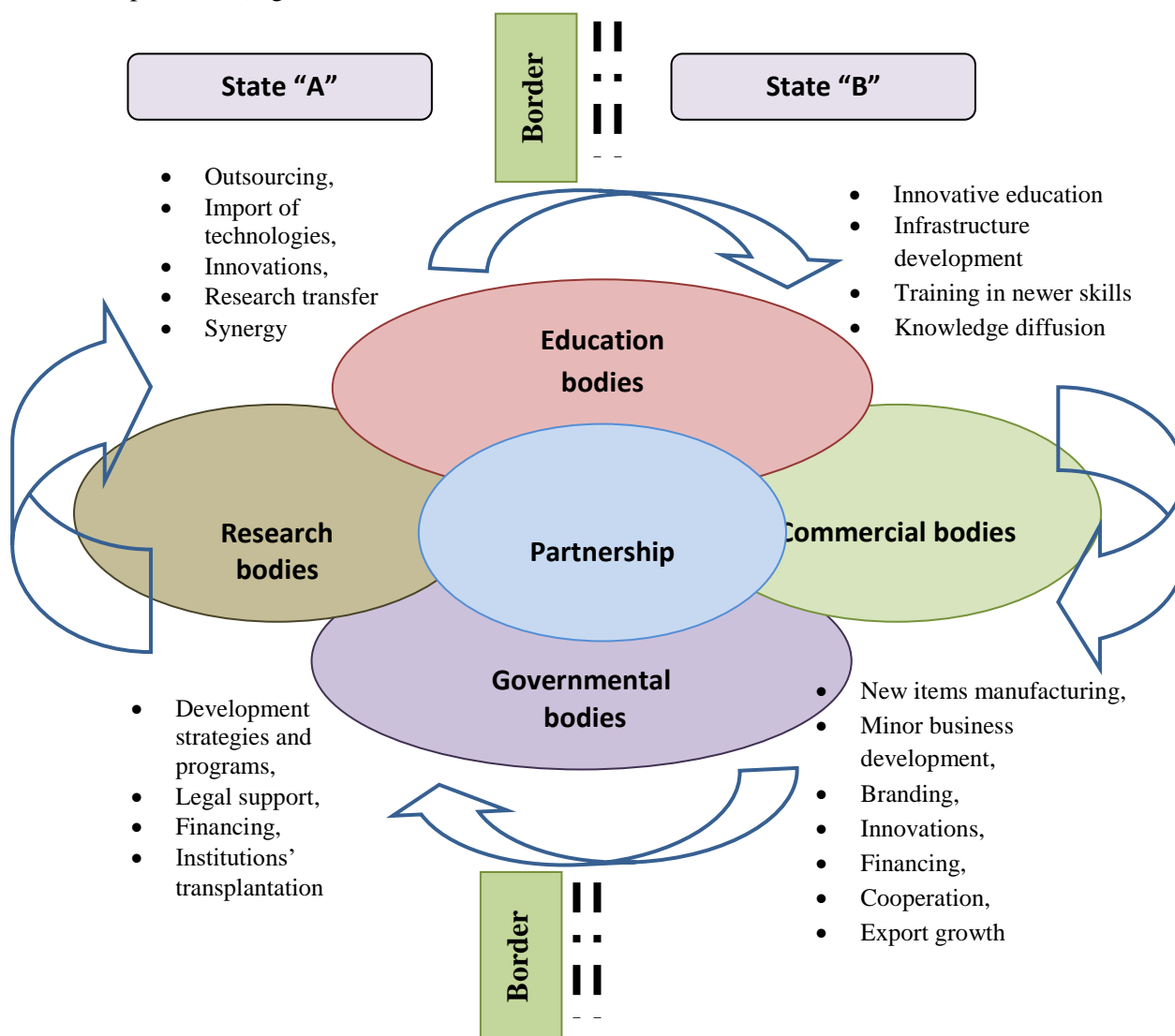


Fig. 3. Mechanism of partnership cooperation within cross-border cluster system

Establishing of cross-border clusters in Ukraine, both industrial and innovative and educational, is at an initial stage. Mechanisms of their formations, such as development concept outline, essential management elements and instruments, efficiency assessment - are insufficiently worked over.

Concept of industrial clusters development is based on international experience in cluster initiatives, which represent a main component of development for industrial, regional and innovative policies of advances economies. Therefore, the matter of adapting these methods in states with developing economy in the course of peripheral regions reviving and supporting industrial sectors based on newer efficient economic mechanism, remains opened.

In view of a national law, *Scientific and Technological Cluster* is a group of legal entities and individuals formed on the basis of agreement signed between authorized scientific and innovative organizations or licensed educational establishment, other non-commercial organizations, on the one side, and business entities, local administrative bodies, fostering associations or professional unions, individuals,

finance bodies, international organizations, home and/or foreign investors, on another side, to perform their activities in such spheres, as scientific research, education, and technological transfer of scientific results and innovations and their implementation by means of economic activities.

It should be noted, that universal regional clusters development policy is impossible. Each region should work out cluster development criteria and supporting mechanisms at their own, such as tax exempt for researching, low-rate credits, grants for researching and personnel training, etc. There is a demand for complex support in a form of inter-branch clusters development support from government authorities involving a number of bodies. For instance, the USA Minor Business Association works in cooperation with the USA Defense Department since 2009 to launch robotics cluster involving territories of Michigan State, Virginia State and the Hawaii.

Yet, unique examples of cooperation do exist in Ukraine. Scientific and educational cluster “Liceum-University-Graduate School-Doctoral Study” operates within Academy of Science of Ukraine being the best way to train scientific personnel of the highest qualification. Innovative educational cluster «InnoCluster» is being formed within the Danube Region centered in the Danube Institute of National University “Odessa Maritime Academy”.

In view of marine education modernization higher school faces a challenge not only to develop a newer system of higher education meeting the Bologna Declaration provisions, but to follow strategy of national social and economic development based on innovations processes launching and deployment in maritime branch.

Modern situation in economy demands for innovative technological development to become a decisive factor to improve competitiveness of maritime educational establishments, shipping companies, the Black Sea Region and national economy in general. Nowadays scientific and technological parks and innovative hubs operate successfully, including a few innovative arrays, encompassing various manufacturing enterprises. Interactive nature of innovation process with knowledge flow playing a key part determines an advanced competence levels of personnel. Innovative system is reviewed as a system producing a positive influence on commercialization and advanced knowledge implementation to innovative products, such as technologies, goods and services [18].

*Maritime higher education establishment innovative system* is a complex of institutions which participate commonly and separately in newer knowledge generation or transfer and adapting of relevant already available knowledge to requirements of maritime economic complex. Under existing conditions only universities located in Ukrainian regions adjacent to borders are capable to act as «growth poles centers» of maritime branch. Implementation of such a concept means transfer of activities by business entities, civil society, science and culture from capital district to periphery. At the initial stage of development a network of innovatively active enterprises being residents of free economic zones (FEZ) may be formed around the universities.

The “growth ring” of this kind may be an Innovative educational cluster, which may unite innovative hub of the Danube Institute of National University “Odessa Maritime Academy”, Chamber of Commerce and Industry branch office and a number of venture corporations being both customers and innovations transferring platform.

As a prospect, it may be proposed to launch a project of *InnoCenter* Danube Institute of National University “Odessa Maritime Academy”. Presence of innovative educational cluster as a “growth ring” enables to form innovative chains «chair – scientific and research center – technological park - enterprise», encouraging joint work of Danube Institute scientific personnel and business entities operating in maritime economy complex, to improve access to information about projects in the course of implementation for potential investors, and to improve competitiveness of both Institute and business as well, as regional economy in general.

Generating Innovations Center on the basis of Danube Institute of National University “Odessa Maritime Academy” is of vital importance for stable innovative development of both maritime higher educational establishment, and entire Danube Region, in general.

“InnoCenter” has a mission “To encourage development of innovative business and commercialization of high technologies and progress in maritime branch.”

The “InnoCenter” is expected to have lines of activities, as follows:

1. Development agent of maritime economic complex within the region adjacent to border.
2. Center of commercialization and exchange of maritime technologies.
3. Consulting support of innovative projects (potential and existing residents) in development of maritime transport.

Cooperation within the framework of innovative educational cluster is supposed to include:

- Implementation of joint scientific and researching programs in technologies development and mastering;
- Formation of joint provisional scientific groups, laboratories and innovative corporations and organizations to master newer technical aids and technologies;
- Development and agreement of personnel training programs in management and innovations promotion;
- Holding joint seminars, scientific conferences and other operative meetings in innovations sphere; attracting investments for joint projects;
- Improvement of qualification and proficiency of scientists and experts.

Existing innovative educational cluster as a “growth ring” basis may enable to form innovative chains «Chair – Scientific Research Center – Technological Park - Enterprise», to attract scientific personnel of the Danube Institute and regional business entities to cooperation, improve access to data about processes in progress for probable investors and competitiveness of the Institute, business and regional economy in general. Yet it is still necessary to generate a regulating legal base to support formation of such clusters on regional and national levels and to develop innovative infrastructure elements, such as technological parks, business hubs, technologies’ transfer centers within notable growth centers.

Choice of priorities for innovative regional development is possible only with existing alliance between science, business and administrative bodies taking into account unique features, traditions, resources and demands of the Black Sea Region. InnoCenter may provide expert, consulting, promotion, IT, marketing, analytic and other services.

Main lines of activities of the InnoCenter:

- Analytical, informational, and consultative support of business entities and public authorities in innovation development of maritime economic branch, holding exhibitions, conferences, seminars, etc.;
- assistance in development of business activities in scientific and technological areas, innovative activities within the higher educational establishment, working over innovative projects aimed to development and implementation of advanced competitive technologies for enterprises of maritime complex;
- Innovation projects assessment;
- Organizational and informational support rendered to implementation of newer technologies and production items applying patenting;
- Attracting business entities, home and foreign investors to implementation of innovative programs on a competitive basis to support activities of organizational and informational support aimed to generate regional venture fund. Coordination of events to attract extra-budgetary resources for its generation;
- Rendering assistance to municipal administration in organization and implementation of territorial events to develop innovative minor and medium business;
- Monitoring status and trends in development of corporations, researching activities and analysis of proceedings in problems within the sphere of maritime innovations.

*InnoCenter Danube Institute of National University “Odessa Maritime Academy”* might unite innovative hub and the Lower Danube industrial park and might compose an important part of innovative structure within the Black Sea coastal region on the basis of innovative educational cluster.

The activity of innovations center may be aimed towards general activation of innovative processes in maritime branch and overcoming effects of existing tendencies of crisis prevailing in innovative and investment sphere

Government of Ukraine approved “The Concept of Cluster Development of Industrial Sector in Ukraine”. This document refers to experience gained by EU member states and China being an important component of industrial, regional and innovative policies of advanced economies.

Cluster identification problem in the EU member states is solved applying two approaches. The first is statistic approach applied by means of identification via principles of geographical proximity of enterprises linked by common activities. The other approach is so-called “Cluster Initiatives”, i.e. clusters’ generation initiation process. The first approach is aimed towards support of enterprises, regional leaders. Normally they are exporters. The second approach bears higher strategic component aimed to draw individual regions out from crisis. Regional specialization index illustrates main trends of cluster network development from branch to branch in Ukraine.

Experts in innovations highlight certain priority branches for innovation. They include nanotechnologies, new materials, biotechnologies, medicine, IT, manufacturing of ecologically pure

foodstuffs, agriculture, maritime and river transport, infrastructure, etc. IT sector seems the most prospective for Ukraine. Dozens of outsourcing corporation operate in Ukraine and are integrated into international systems of developing and spreading software products.

National policy implementation mechanism aimed to render support to clusters formation and operation bases on essential elements, as follows:

1. Generation of a legal basis for clusters' creation and development.
2. Scientific and methodological support of cluster policy development and implementation.
3. Promotion of clustering concept and training key personnel at the stage of clusters' formation.
4. Financing of cluster policy.
5. Identification of the essential bodies involved into cluster policy implementation.

Thus, innovative business only starts its development in Ukraine. To date it does not possess necessary legal and financial basis and does not enjoy substantial support from the part of state.

The state has only just set to solve these problems by means of improving legacy and develop units of innovative infrastructure, i.e. developing technological parks network, innovative clusters, business hubs, scientific centers, attracting private financial resources into innovations sphere. There is a necessity to keep to existing cluster initiatives with available links and contacts and follow examples of efficient cooperation between organizations.

Research in the area of innovative regional development, which started actively about two decades ago focused mainly on branch clusters in advanced region based on advanced knowledge and knowledge spreading processes [20]. However, these explorations don't take into note individual approaches to development for each particular case. They also miss relation of such a development with regional economic and cultural environment and specifics of its integration into national and global economy.

Innovative development advance in states with formed market economy is rather difficult due to a number of factors – lack of hi-tech economy sector, institutional framework and environment encouraging innovations and technological progress, weakly developing cooperation between innovative entities and their low total ratio.

Cross-border clusters' generation, whether industrial or innovative educational is at an initial stage in Ukraine. Mechanisms of their formation are insufficiently outlined, such as development concept, main components and management tools, efficiency assessment.

Industrial cluster development is based on international practice of cluster initiatives in advanced states. Therefore, the matters of adapting such methods in states with reviving regional economy and industrial sectors preferable support based on application of newer efficient economic mechanisms, remains still opened.

Multiple versions of definitions enables to encircle innovative system definition to following Author's concept, *«Euroregional innovative system is a complex of institutions which are involved commonly and separately in the process of new knowledge generation or transfer and adapting available relevant knowledge to euroregional economy demands»*.

Institutions-regulations include federal laws and informal rules regulating innovative activities implementation. Institutions-entities include public administration bodies, institutions generating and spreading knowledge, business entities, innovative infrastructure bodies.

Researching structures may represent a synthesis of public bodies and education establishment. Their part lies in transforming fundamental researches into applicable ones with their consequent commercialization. Part played by education bodies lies in active implementation of innovations into training process and newer knowledge transfer into business environment via «life-long learning» schemes [21].

As the cluster approach evolves, updating and modifications of the “triple spiral” elements take place. Now we turn to a problem of coordinated interaction of all the European cluster participants and to matter of noting factors affecting clusters development [21, p. 49].

Referring to results of the above review and proposed factors structure improving regional innovative potential the Author developed a typological model of regional innovative system. The proposed model reflects territorial specifics with maximum precision and corrects indentified restrictions. The most important procedures of implementation of this process lie in functions and liabilities distribution, identifying clear correlative links, development of mechanisms for coordination and interaction of essential structures responsible for regional innovative development.

Organizations declaring innovations and knowledge, Chamber of Commerce and Industry, scientific and researching centers, business associations should enter into agreements upon development of local economy. It corresponds with ideas expressed by Ennals and Gustavsen, calling to generate “regional

coalitions” as starting points for developing regions of “knowledge”. Referring to researches mentioned previously the Author proposes to develop already implemented mechanism of one of knowledge cluster types – innovative educational cluster (IEC), which is essential for states with developing market economy.

Danube Institute of National University “Odessa Maritime Academy” seems to play a leading part in development of such a structure implementing educational programs, innovative projects, bringing together business entities involved in manufacturing, innovation promoters and research groups and scientific institutions. This structural type solves problems of regional innovative development by means of encouraging new ideas, hubbing newer enterprises, improving education by means of close cooperation between researchers, tutors, commercial partners and public figures.

*Euroregional (cross-border) innovative educational cluster may be defined as researching, innovative, educational organizations geographically concentrated at both sides of state border acting as a driving force of regional innovative specialization by means of active cooperation.* Such a cooperation will encourage and improve innovative culture of the entire regional economic system. Furthermore, practical experience shows that a corporation located in proximity to knowledge source encourages the increasing of its innovative activity (Boschma, 2005).

Cross-border cluster systems are proposed to be reviewed as strategic planning objects. They may be described as geographically localized social and economic systems formed by a group of independent business entities at both side of the states’ border involving executive authorities of states and civil society. They steady interact with each other by means of data exchange, services exchange, personnel exchange, assets exchange and gaining higher efficiency comparatively with other entities not systematically organized. CCS may become regional development centers attracting investments, expanding innovations, generating human resource of newer quality, improving business relations culture, developing adequate institutes to solve economic modernization problems of the state in general.

Concept of industrial innovative network efficient development within the EU framework elaborated a certain unspoken formula: combination of ability to evolve and constructiveness, determinism and voluntarism. It means that these networks develop naturally, but enjoy support from the part of a state and the EU, in general, having an individual development vision yet facilitating to implement essential EU priorities. Only balance of all the four forces provides balanced industrial innovative development.

Thus, «invisible hand» of business sector combines with particular states and the EU in general cluster policy “visible hand”. Such an approach is completely highlighted in research carried on by Swedish consulting corporation “Ivory Tower”. It deals with problems of business initiatives and governmental support combination in the course of efficient clusters formation in Europe on national and regional levels. The said research proposed a graphical “Funnel” model, close, in essence, to competitive advantage determinant model described by M. Porter [22].

The RIS model may vary from state to state, from region to region depending on parts played by government and business, their functioning and “innovative vortex” general dynamics [22, p.27]. However, RIS measurement tools are standard.

They are results of innovative activities represented by a number of patented ideas, scientific publications, quantity and extent of cooperation between innovative process participants, volumes of financial, personnel and material resources construing the RIS subsystems. A number of problems may be observed at each interaction stage preventing the efficient running of processes. Part assigned to state lies in development of legal field in standardization, infrastructure, institutional climate and researches and development financing instruments.

The model clearly illustrates group of factors (forces) affecting development of competitive innovative industrial clusters and, consequently, competitiveness of individual corporations within euroregions (Fig. 4).

Part played by business sector consists in joint technologies generation based on adapting and commercialization of researches and inventions proposed by scientific environment.

Efficient cluster activity supposed presence of links between four key groups of partners – tutors, researchers, businessmen and public figures. Each of them brings its own unique advantages into the common network. Newer subjects and tutorial technologies may be approbated involving interested parties as well, as students and tutors. Such innovative scientific schools may unite not only participants in cluster, but also regional secondary schools, libraries, social and researching centers. They may enable to promptly elaborate, test and collect data about newer approaches and education products, promote fundamental and applicable researches [23].

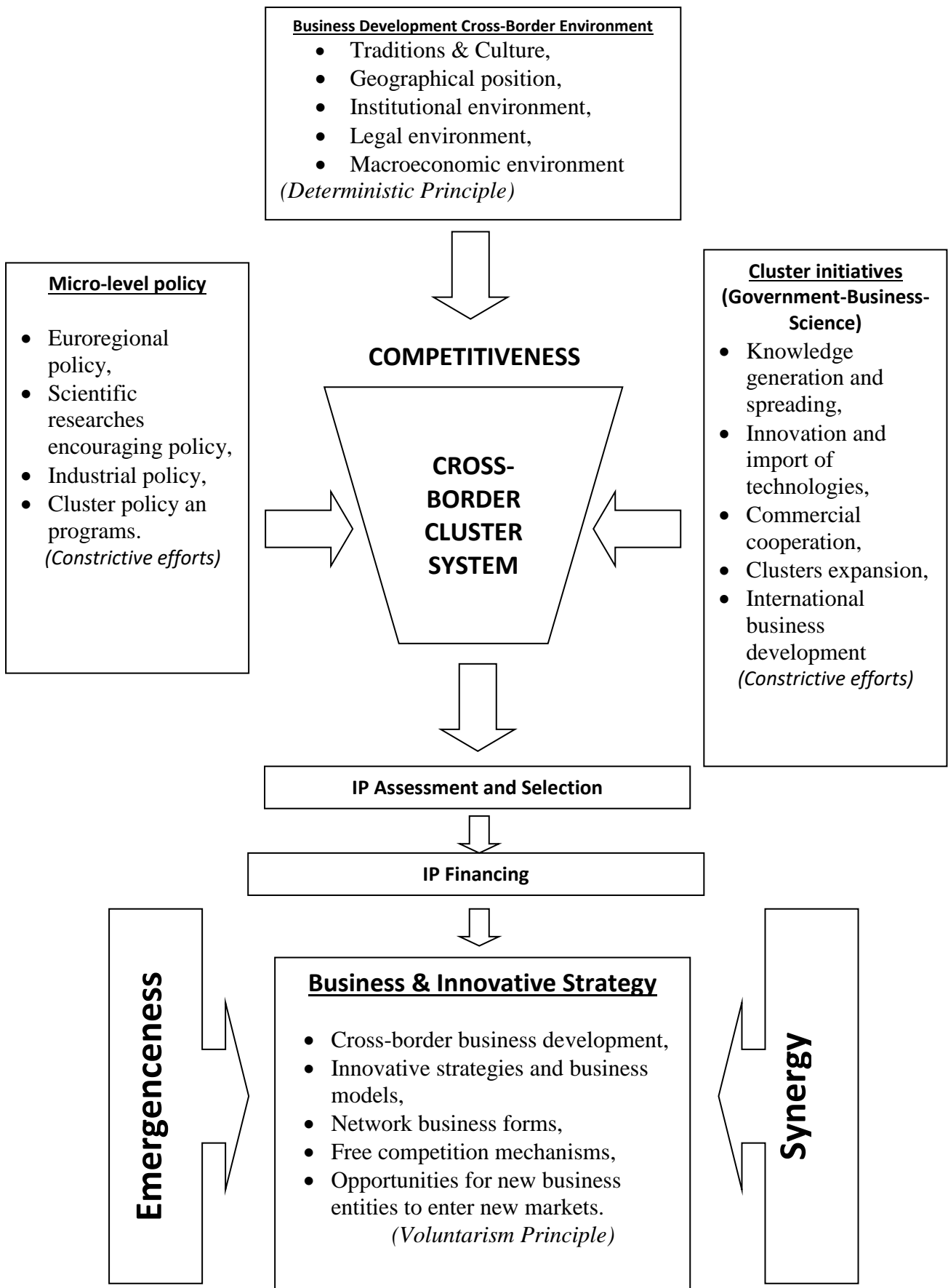


Fig. 4. “Funnel”-type model in innovative clusters development

Business entities providing investments may influence researching processes acceleration and commercialization of intellectual property, increase chance of success for newer enterprises being on knowledge and solutions generated within the cluster. However, appropriate attention should be paid not only to generating structures facilitating innovations, but also to their commercialization and spreading processes.

Essential lines of activities for such centers are implementation of technologies from scientific centers into the industry, investments attraction to develop innovative activity, assistance to international cooperation development, performing tasks placed by business entities within the framework of scientific researches [24].

Generation of cluster systems development network centers may be proposed as a key element for regional structure of cluster strategy implementation associated with regional Chambers of Commerce and Industry. They may apply such technologies, as leasing, outsourcing, subcontracting to coordinate actions of parties involved into regional cluster initiatives, to assist in attracting funding from outside as well, as recruiting new participants into regional cluster initiatives. They may also handle consultative support to projects and investors, coordinate cluster projects implementation with governmental bodies at all levels and foreign partners, assist in recruiting labor personnel and improve competence of participants in regional cluster initiatives [25].

Following trends may be highlighted as priority lines to improve competitiveness of high-tech cross-border clusters:

- exploration of possible application of special cooperation modes by means of euroregions forming;
- development of cooperation between commercial entities and educational establishments in training personnel of required qualification;
- expanding and deepening cooperation between participants of cross-border cluster (including science – business link) especially in scientific researches aspects and production promotion at the market, enabling local goods to expand to external markets and to attract more skilled competitors, suppliers and consumers to the region;
- application of adequate encouraging to various professional groups, improving quality of manufacturing and hi-tech production;
- creating manufacturing infrastructure meeting demands of minor and medium hi-tech business, including manufacturing areas and accessible funding);
- development of accompanying economic sectors of regions adjacent to borders, especially in components' manufacturing and rendering services to hi-tech industries;
- creation of joint innovative technological and marketing and logistics centers;
- institutional environment improvement (legal, licensing, improved standards system) with mandatory revealing of influence of public authorities upon efficiency of business activities in hi-tech branches.

Generation and development of an innovative cluster may enable to achieve certain strategic parameters, such as:

- Investments amount into cluster development projects from budget assets;
- Total volume of produced added value assessment taking into account all the multiplicative factors and effects;
- Value of additional taxes to budgets at all levels;
- Volume of additional products and services including associated branches provided in connection with cluster business activity;
- Indexes describing quantity and quality of job creation as a result of the program implementation.

Cluster development management includes aspects, as follows,

- communications arrays establishment;
- elaborating and implementation of development programs for minor and medium business;
- improvement of region's attractiveness for investors;
- development of partnership between state and private business;
- assistance in formation of adequate human potential (development of personnel training system, supporting personnel social development);
- development of innovation environment (fundamental and applicable researches, consulting, venture funds, technological parks, etc.).

Cluster strategy of cross-border cooperation supposes generation of geographically localized cluster formation within regions adjacent to borders about foreign innovative corporations. мереживі агенти яких



(manufacturers of innovative products and services, suppliers, infrastructural objects, scientific and research centers, higher educational establishment) cooperate on competition and cooperation basis generating thus a synergic effect mutually supplementing each other and improving competitive advantages of both individual corporations, in particular, and cluster, in general. Thus, a conclusion may be drawn stating, that *cluster strategy is a system approach to organization of peripheral (cross-border) economic space*.

Clusters are imminently associated with networks involving both formal and informal organizations simplifying data and technologies exchange and encourage cooperation and steps coordination between cluster participants.

**Conclusions and prospects of further research.** Results of research made by the Author enable to formulate clear well-aimed recommendations regarding ways and means stimulating innovation processes both in the form of direct support aimed towards business entities, and indirect support implemented by means of development of infrastructural elements supporting business development in the euroregion, such as:

1. Concentrated orientation to support innovations in organizational, marketing and financial aspects, emphasizing such stages of innovation processes as products upgrade, obtaining patents and promotion at market. Development of venture funding tools for innovative activity with accent upon creating and maintaining investment funds, venture structures to increase share of extra-budgetary funding sources.

2. Increasing of informational, scientific and methodological, and consulting support for business entities and associated infrastructure object. Initiation of endogenous processes of euroregional development involving regional universities is only possible being supported by essential innovations beneficiaries, involving innovative enterprises and their regional associations, higher educational establishments and scientific researching bodies capable to act as “growth poles” for innovative activities.

3. Increasing innovative level of peripheral region economy requires integration of educational and scientific infrastructure with administrative bodies and business environment to increase developments level at innovative enterprises. Universities need to develop cooperation with industry, use new tools to strengthen research activities that reflect the needs of regional firms and contribute to their central role in the development of RIS.

Modern post-industrial paradigm of regional development transforms substantially the priority of main factors of allocation altering peripheral territory functionality from physical basis (location of material factors of manufacturing) into spatial environment for human resources development, innovations and autonomous regional development.

Newer postmodern reality lies in combination of postindustrial manufacturing with network-like construction of peripheral economic space, which supposes institutions’ transplantation by means of hybrid network clusters’ self-generation “over” administrative borders, becoming factors for concentration and free funding circulation within euroregions. Competitiveness of newer style of production is determined by innovation rate and capability to continuous renewal.

Current situation demands development and implementation if cross-border strategy of euroregional development taking into account European practical experience in transregional strategy aimed to achieve steady social and economic development of euroregional system in unity of its human, natural resource and manufacturing potential and institutional environment. Ukraine, making its way to EU should summarize experience of cross-border cooperation as preliminary and supplementing stage of integration in regional scale. Ukraine should develop theoretical and methodological basis for business entities quasi-integration and find newer forms and mechanisms of its implementation in view of network cluster systems concept.

Thus, investigation and analysis of worldwide progressive experience in formation and development of cross-border clusters will make it possible to successfully realize the tasks of Strategy for Innovation Development of Ukraine under conditions of grand challenges, secure funds in the modernization of industry, to develop the national innovation system. The creation of cross-border innovation clusters system which provides for intensive exchange of resources, technologies and know-how is achieved by strengthening of competitive positions of home companies at European market and by the growth of innovation potential of Ukrainian economy in the process of European Union expansion.

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