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## SWOT-ANALYSIS OF AN INNOVATION CLUSTER CREATION IN EAST KAZAKHSTAN

***The article considers the problem of establishing an innovation cluster in the East Kazakhstan Province. SWOT-analysis of the East Kazakhstan regional innovation system was conducted with regard to the possibility of establishing a regional innovation cluster.***

***Keywords:*** *innovation cluster; regional innovation system; technopark; SWOT-analysis; East Kazakhstan.*

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## SWOT-АНАЛІЗ МОЖЛИВОСТІ СТВОРЕННЯ ІННОВАЦІЙНОГО КЛАСТЕРА У СХІДНОМУ КАЗАХСТАНІ

***У статті розглянуто проблему формування в Східно-Казахстанській області інноваційного кластеру. Проведено SWOT-аналіз регіональної інноваційної системи Східного Казахстану з точки зору можливості створення в регіоні інноваційного кластеру.***

***Ключові слова:*** *інноваційний кластер; регіональна інноваційна система; технопарк; SWOT-аналіз; Східний Казахстан.*

***Табл. 1. Літ. 23.***

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## SWOT-АНАЛИЗ ВОЗМОЖНОСТИ СОЗДАНИЯ ИННОВАЦИОННОГО КЛАСТЕРА В ВОСТОЧНОМ КАЗАХСТАНЕ

***В статье рассмотрена проблема формирования в Восточно-Казахстанской области инновационного кластера. Проведен SWOT-анализ региональной инновационной системы Восточного Казахстана с точки зрения возможности создания в регионе инновационного кластера.***

***Ключевые слова:*** *инновационный кластер; региональная инновационная система; технопарк; SWOT-анализ; Восточный Казахстан.*

### Problem statement

While speaking at Nazarbayev University, the President of Kazakhstan N.A. Nazarbayev noted that "one of the main priorities for improving the efficiency and competitiveness of the national economy is the implementation of the State Program of Forced Industrial and Innovative Development of the Republic of Kazakhstan for 2010–2014", which, among other activities, provides the creation of an innovation clusters network (Nazarbayev, 2012).

Clusters are the driving force of social development and a long-term source of economic growth. This is firstly because clusters are characterized by dynamism, ability to expand, deepen and permanently attach new elements, and secondly, productions within a cluster support each other, thus creating synergies and ensuring continuous development.

Originally, Kazakhstan clusters were created on the production principle. 7 clusters were chosen as pilot ones: metallurgical, transport and logistics, textile, building materials, food, tourism, oil & gas engineering. Currently, the priority is given to inno-

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vative clusters, because, as international experience shows, the most successful clusters are the ones formed in the places with an ongoing or expected breakthrough in the fields of engineering and technology, followed by access to a new "niche market".

**Recent research and publications analysis**

Such prominent scientists as Alfred Marshall (1961), Michael Porter (1990), Michael Enright (2000) and others were at the origins of the cluster theory.

Significant contribution to the solution of problems in functioning and development of clusters, including the innovation ones, was made by overseas scholars: G.A. Vlaskin (2010), M. Granovetter (2010), S.R. Dreving (2008), K. Ketels (2003), A. Cornett and P. Cook (2002), E.B. Lenchuk (2010), G. Lindqvist (2003), I. Lukinov (07.11.2013), V.S. Fateev (2012) and others.

Among the domestic authors who have studied clustering as an economic category, it is necessary to acknowledge the contributions of S.B. Akhmetzhanova (2001), Z. Dyusenbekov (2013), A. Shnitkovski (2013).

**Unresolved issues**

Economists have neglected the systemic aspects of the cluster-innovative economic development. First of all, there is a need to align the interests of macro-, meso- and microeconomics in the field of industrial innovation, since there are contradictions in the consistency of the whole and its parts, national economy and regional business.

**The purpose of the study**

The purpose of this paper is to study the mechanism of cluster operation and the development of regional innovation systems as well as to justify the possibility of the East Kazakhstan innovation cluster formation.

**Key research findings**

Innovation cluster is a union of subjects of scientific and (or) scientific and technical activities, elements of industrial and innovation infrastructure aimed at stimulation of industrial innovation through collaboration and sharing of the existing capacity, knowledge and experience, the effective transfer of technology, establishing lasting partnerships and information distribution (Law of the Republic of Kazakhstan, 2012).

Unlike traditional industrial clusters, innovation clusters represent a system of close relationships not only between member companies, their suppliers and customers, but also between major research centers and universities, which provide high level of education in a region as the generators of new knowledge and innovations. This makes it possible to coordinate efforts and financial resources to develop new products and technologies, and release them to market. As a result, a closed process chain is built within a cluster – from the creation of an innovative product to its production and market launch.

Table 1 shows the results of the authors' SWOT-analysis of the regional innovation systems of the East Kazakhstan Province in the context of the East Kazakhstan innovation cluster formation.

East Kazakhstan Province has a favorable geopolitical location (close proximity to two huge markets – Russia and China). There has been an increase in regional production, including in the industries new to the region (e.g., motor car construction).

East Kazakhstan has a number of major mining and metallurgical complexes, advanced scientific and technological potential, with products in demand at the world markets.

JSC Ulba Metallurgical Plant has conducted a research in the field of materials ultragrinding nanotechnology, which resulted in the creation of unique mill-mechanoactivators and products in the form of nanosized and nanostructured powders (Ulba Metallurgical Plant website, 2013).

*Table 1.* **Results of the SWOT-analysis of the regional innovation of the East Kazakhstan Province**

| Strong points | Weak points |
|---|---|
| 1. Large number of major international companies.<br>2. There are companies linked to the region (mining and metallurgical complex).<br>3. The availability of innovation-active universities.<br>4. Favorable geopolitical location (close proximity to the markets of Russian Federation and China).<br>5. The increase in production, including in the industries that are new to the region (e.g., automotive).<br>6. The availability of scientific and research organizations at the national level (for example, the intersectoral laboratory of nuclear technology).<br>7. Improving laboratory testing.<br>8. Business development interest among students.<br>9. Universities are technically equipped (for example, with computers). | 1. Lack of organizations involved in innovative development.<br>2. Price-oriented tenders.<br>3. Lack of effective demand in many states of Central Asia.<br>4. Language barrier.<br>5. Poor infrastructure hinders access to key markets.<br>6. High level of production infrastructure physical deterioration.<br>7. Lack of financial resources for the development due to the region's remoteness from the centers of decision-making.<br>8. Brain drain in the region.<br>9. Lack of coordination between various participants of innovative infrastructure.<br>10. Companies aim at regional or national levels rather than international one.<br>11. Limited growth opportunities due to small size of local markets.<br>12. High logistics costs.<br>13. Low level of technology in logistics. |
| **Opportunities** | **Threats** |
| 1. Development of cross-border cooperation.<br>2. Opportunities offered by the reforms at the national level in the field of innovative development support, support for innovative companies and making regions more significant in the national innovation system.<br>3. Economic leadership of Kazakhstan in Central Asia.<br>4. The ability to attract investments from international financial institutions.<br>5. Additional opportunities for field development.<br>6. The increase in raw material processing.<br>7. The increase in exports to China and Russia. | 1. Product quality problems, especially at large enterprises.<br>2. The lack of own technologies.<br>3. The complexity of domestic enterprises integration into foreign technological processes.<br>4. The high and ever-increasing costs of maintenance.<br>5. Price competition with Chinese manufacturers.<br>6. Insufficient level of geological exploration technology constrains the development of mineral resources.<br>7. Environmental, occupational safety and healthcare issues. |

*Source:* Compiled by the authors.

Ultragrinding nanotechnology has no analogues in the world. It can be used in various industries.

"SB: Bashkirtsev Ultragrinding" nanotechnology makes it possible to process whole grains (wheat, rye, corn etc.) into nanostructured wholegrain flour of instant preparation with medicinal properties. In ultra-ground whole-shell grains, the starch is entirely transformed into a soluble form, whereas the robust set of dietary fibers, minerals (such as phosphorus, potassium, magnesium, calcium, iron, copper, zinc and others), and vitamins (B, C, PR E groups, B-carotene, provitamin A) is preserved. With the ultragrinding processing technology, a product gets immediately 100% absorbed by human body without any additional preparation (Bashkirtsev, Orynbasarov, 2006).

At present, the share of powder and composite materials is continuously increasing. This industry has a solid groundwork in the technologies for producing new nanocomposite coatings to extend the life of structural materials, alloy powder steels and alloys with nanostructured high-strength and heat-resistant machinery parts, high pure powders of non-ferrous and rare metals, the production of semiconductor materials for solar energy and electronic equipment (Abdymomunov, Bekturganov, 2006).

Altrade enterprise has set up a production line of technical ceramics based on rare metals. New products are export-oriented and are shipped to Belarus, Israel, India, Poland, Russia and Ukraine.

In Ust-Kamenogorsk, under the state program "30 corporate leaders of Kazakhstan", a project to create high-capacity tantalum powders is implemented. They can be used in manufacturing of miniaturized capacitors, which not only meet the requirements of today's electronics, but also reduce the consumption of tantalum. The service life of an electrolytic capacitor exceeds 12 years. They are used while manufacture components for mobile phones, computers, audio and video equipment, in the automotive industry and the military-industrial complex. High-temperature strength, ductility and ultra-high resistance to corrosion makes them popular in the chemical industry, nuclear energy, aerospace engineering and medicine (Kaigorodtseva, 07.11.2013).

Another prerequisite for the establishment of innovation clusters in the region is the presence of such universities active in innovation as S.Amanzholov East Kazakhstan State University, D. Serikbaev East Kazakhstan State Technical University, Shakarim Semey State University and Kazakh-American Free University.

For example, scientists from D.Serikbaev East Kazakhstan State Technical University conduct various researches on natural nanominerals, natural carbon nanoparticles extraction technology, nano-dissection of non-ferrous and precious metals, nano-films and nano-coatings, nanotechnology for obtaining technical ceramics based on compounds of rare metals etc.

The National Science Laboratory of collective use in the field of "Nuclear technology and renewable energy technologies" under S. Amanzholov EKSU conducts fundamental and applied research in the following areas:

1) deep processing of raw materials and products:
   – development of technologies for recycling industrial waste;
   – research in the chemistry of natural and petrochemical compounds;
   – research in the field of materials science, nanostructuring and radiation technology;

– design of structures for mechanical engineering and machine tool industry;

2) energetics:

– wind power engineering (creation and study of wind turbines);

– fuel cells development;

– solar power and heat generators development.

Research in the following fields is conducted in Shakarim Semey State University:

– development and implementation of innovative equipment and technology in food-processing industry;

– development and implementation of innovative methods of disease treatment and prevention in farm animals;

– improvement of breeding and productive qualities of farm animals.

Altai Technology Park, located in East Kazakhstan, was designed for the consolidation of scientists, businessmen and industrialists of the region in solving the problems of innovative development of the region and the establishment of the Eastern Kazakhstan competitive regional industries producing goods with high added value. It should result in the association of minor innovative enterprises formed around the technology park.

Altai Technology Park's mission lies in the development of innovative activities in the region through the optimal use of intellectual and scientific potential of the leading regional research centers and industrial companies, effective integration of education, science and industry on the basis of a common strategy for the development and implementation of new technologies and scientific products (Batalov, Kolos, 2011).

The priority of Altai Technology Park is the development of logistics and innovative infrastructure, providing all stages of innovation processes, from the applied scientific research to production and sales of high-tech products.

The following needs are to be fulfilled for this purpose:

– integration of scientific and technological potential of the region;

– construction of own research and production center as well as other facilities for small-scale production;

– formation of small innovative companies network involved in the creation of products based on own inventions or technology transfer;

– attracting additional investment in the innovation sector;

– best practices in commercialization of innovative technologies in the region;

– personnel training for the industrial and financial sectors of the region.

Along with the strengths, the innovative system of the East Kazakhstan Province is characterized by a number of weaknesses hampering the creation of the regional innovation cluster:

1. Lack of organizations involved in the innovative development of the region.
2. Poor infrastructure hindering the access of innovative products to key markets.
3. High level of physical deterioration of production infrastructure.
4. Lack of financial resources for the development of enterprises in this field.
5. Limited growth opportunities due to small size of the local market.
6. Lack of coordination between various participants of the regional innovation infrastructure etc.

**Conclusions**

The analysis identified the following opportunities for the development of the East Kazakhstan regional innovation system and the creation of a well-functioning innovation cluster on this basis:

1. The development of cross-border cooperation with the Russian Federation and China creates additional opportunities to expand markets and, therefore, recoup innovative projects.

2. Socioeconomic modernization of Kazakhstan expands opportunities for innovative development support, support for innovative companies and making regions more significant in the national innovation system of the Republic of Kazakhstan.

3. Attraction of investments from international financial institutions expands the investment opportunities of innovation-oriented enterprises in the region etc.

However, the following external environment factors act as a threat to the innovation cluster generated in the region:

1. The complexity of integrating domestic enterprises into foreign technological processes.

2. Price competition with Chinese manufacturers.

3. Insufficient level of geological exploration technology constrains the development of mineral resources.

4. Environmental, occupational safety and healthcare issues etc.

Based on the above, we can conclude that there are prerequisites for the establishment of a regional innovation cluster in the East Kazakhstan.

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