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POTENTIAL OPPORTUNITIES OF CREATING A SECTORAL CLUSTER IN AN AGRO-INDUSTRIAL REGION

The authors present a methodological approach to support the hypothesis of the role of a cluster as a point of growth. The methodological approach is based on the comparison of economic competitiveness of a region and industrial production in it by the key components of competitiveness: economic potential, efficiency, competitive advantage and innovation potential. The integrated assessment of the four modules of indicators is carried out. Creation of a cluster as a point of economic growth in a region is expedient under circumstances when competitiveness of industrial production in a region exceeds the competitiveness of regional economy as a whole.

Keywords: cluster; agro-industrial production; region; industrial cluster; Kazakhstan.

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ПОТЕНЦІЙНІ МОЖЛИВОСТІ СТВОРЕННЯ ГАЛУЗЕВОГО КЛАСТЕРА В АГРОПРОМИСЛОВОМУ РЕГІОНІ

У статті представлено методичний підхід до обґрунтування гіпотези щодо ролі кластера як точки зростання. Цей підхід базується на співрозмірному порівнянні конкурентоспроможності економіки регіону і галузевого виробництва в регіоні за основними складовими конкурентоспроможності: економічним потенціалом, ефективністю, конкурентними перевагами, інноваційним потенціалом. Порівняння проведено на базі інтегрованого оцінювання по чотирьох модулях показників, що характеризують складові конкурентоспроможності. Доведено, що створення кластера як точки зростання економіки регіону доцільне в умовах, коли конкурентоспроможність галузевого виробництва в регіоні перевищує конкурентоспроможність економіки регіону в цілому.

Ключові слова: кластер; агропромисловість; регіон; промисловий кластер; Казахстан.

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ПОТЕНЦИАЛЬНЫЕ ВОЗМОЖНОСТИ СОЗДАНИЯ ОТРАСЛЕВОГО КЛАСТЕРА В АГРОПРОМЫШЛЕННОМ РЕГИОНЕ

В статье представлен методический подход к обоснованию гипотезы о роли кластера в качестве точки роста. Данный методический подход базируется на сопоставимом сравнении конкурентоспособности экономики региона и отраслевого производства в регионе по основным составляющим конкурентоспособности: экономическому потенциалу, эффективности, конкурентным преимуществам, инновационному потенциалу. Сравнение проведено на базе интегрированной оценки по четырем модулям показателей, которые характеризуют основные составляющие конкурентоспособности. Обосновано, что создание кластера как точки роста экономики региона целесообразно в условиях, когда конкурентоспособность отраслевого производства в регионе превышает конкурентоспособность экономики региона в целом.

Ключевые слова: кластер; агропромышленность; регион; промышленный кластер; Казахстан.

Problem setting. One of the first tasks in increasing region's competitiveness is the identification of potential clustering opportunities in it. The presence of favorable environmental factors, powerful scientific and educational basis, developed infrastructure, convenient geographical location can give impetus to cluster development.

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In transitional economies, competitive industries are scattered throughout the country. They communicate with each other through vertical (buyer-seller) or horizontal (common technologies, distribution channels etc.) channels of communication. These already established connections between individual economic entities or industries may be a prerequisite for cluster creation.

Recent research and publication analysis. Contemporary methods of clusters identification can be divided into 3 groups:

- 1) qualitative assessment;
- 2) quantitative assessment;
- 3) combined assessment.

The first group is represented by the method offered by M. Porter (2000) who for many years have identified clusters in Europe. Using techniques developed by him a qualitative analysis of prerequisites for cluster formation can be conducted. This method has got its wide use in sectors and regions, and helps understanding the clusters' development.

The second group includes the methods based on the use of direct analysis of linkages in value chains and the analysis of the structure of these correlations, in which the object of attention is the structure of inputs and outputs. This group of methods is suitable only for industrial clusters, since they take into account only the movement of material resources and financial flows, and information on labor force and innovations remain outside the research (Porter, 2000).

The third group of methods allows making qualitative and quantitative analysis of cluster structures. These include the method of estimating the potential clustering by A.V. Ermishina (2005). In this approach, cluster is considered as a group of related industries located in one place and forming a unified market.

The research objective is to study the methodological approaches to clusters development in the agricultural sector of Kazakhstan.

Key research findings. We assess the clustering potential on the example of the grain industry of the Northern region of Kazakhstan using Ermishina's method (Ermishina, 2005).

The presence of strengths and weaknesses in the establishment and development of a grain cluster is most clearly shown by the SWOT-analysis (Table 1).

The SWOT-analysis demonstrates the presence of specific threats, but in general, the situation for a grain cluster formation in Kazakhstan can be considered favorable. Background for cluster formation can be divided into the following types: economic, organizational and resource-based. In more detail they are discussed in Table 2.

The mechanism of cluster development, in our opinion, should be implemented in three stages: preparation, organization and final.

Cluster initiatives fundamentally alter the contents of regional policy: government efforts are directed not to support individual enterprises and on the development of relations between business entities and state institutions. Interaction of business and government in the framework of regional clusters creates significant advantages for both sides. For the territory – increase of its financial stability as a result of growth in the number of taxpayers, strengthening independence and reputation. For business – expansion of opportunities for technological upgrade and improving products competitiveness (Lavrikova, 2008).

Table 1. SWOT-analysis the potential of creating a grain cluster in Kazakhstan, compiled by the authors

Strengths	Weaknesses
1. Large volumes of arable lands soils favorable for growing high-quality wheat. 2. Great demand for Kazakh wheat in the world, as an ecologically clean product. 3. The presence of high educational and scientific potential in this area. 4. Strong government support for cluster development in the grain industry. 5. Energy independence of Kazakhstan. 6. Great investment potential. 7. High business activity of population.	1. Distance from the world's ports and poor quality of roads. 2. Poorly developed infrastructure in the region. 3. Poor quality of harvesting and processing of grain.
Opportunities	Threats
1. Introduction of advanced agro-technology policies that increase the grain yield. 2. Reconstruction of railways and roads. 3. Development of processing and pre-sale preparation subsectors.	1. Water scarcity. 2. Degradation and salinization of land.

Table 2. The main prerequisites for cluster development in the grain industry in Northern Kazakhstan, compiled by the authors

Economic	Organizational	Resources
Concentration of enterprises in the region producing, processing, preparing and storing grain	Stratification of the grain industry (JSC, LLP, PFE, holdings, agricultural firms)	Large areas of arable lands
There is a demand at the world market for Kazakh grain as an ecologically clean product	Institutions of professional education, related to agriculture	Skilled workforce
Integration processes in grain business	The presence of cluster initiative on the part of business ("Grain Union")	A large supply of energy resources and availability of capital stock of the grain industry in Kazakhstan
Prime location in the center of the Eurasian continent near the countries exporting grain and its products	Research organization related to industry	Financial state support for cluster development in the grain industry to ensure food security of the country
Competition within the cluster: 1. For the domestic market grain sale. 2. In the field of grain processing (manufacturers of flour, bakery, pastry)	Professional non-profit organizations (associations, unions)	Credit system of the grain business: 1. Lending from the National Bank of Kazakhstan and second-tier banks. 2. Secured purchases of grain by JSC "Food Corporation". 3. Rural credit unions on the basis of "Agricultural Credit Corporation". 4. Implementation of grain receipts of "Guarantee Fund obligations under grain receipts".

For economic diversification and development of other industries baseline is also the cluster approach. Kazakhstan in its development came to the turn when there is

an urgent needs to diversify production at the expense of accumulated potential (Bekturganov and Pivovarov, 2005).

A significant threat to the Republic is water resources shortage. It solving this problem Israel's experience might be interesting. Agriculture in this country is one of the strongest sectors of the economy. Israel is almost completely self-sufficient in food and exports some types of agricultural products (e.g., tomatoes) abroad. This is despite the fact that the climate in this country is extremely unfavorable for agriculture and many neighboring with it states have poor harvests. In Israel, there is an even greater shortage of water resources, than in Kazakhstan. This problem can be solved in several ways. The first one is the use of economic methods of irrigation (drip irrigation). The second one is wastewater treatment. The third is the desalination of sea water. Kazakhstan also uses seawater desalination, but the methods of irrigation and wastewater treatment leave much to be desired. Water resources are needed not only for grain production, but for all aspects of human life, so water conservation strategy should become the leading one in the economy of Kazakhstan (Gelmle, 2012).

With regard to soil degradation, the problem is global. Here we can consider the negative experience of Western countries (USA and Canada). In these countries in order to increase yields and improve soil quality, they use huge amounts of chemical fertilizers, which led to soil chemicalization. Grain grown on this soil can only be used for technical purposes. Kazakhstan needs to take a cautious approach to the issues of using chemicals and fertilizers.

Research on competitiveness includes, first of all, the stability analysis of competitive companies in the region, which is understood as rooted economic entities in the environment, their ability to maintain long-term competitiveness by using the external environment (Belokilova et al., 2009).

Key indicators for the analysis of competitive sustainability of the region are localization ratio and per capita production. It is important to identify the clustering potential of a particular region (Ermishina, 2005). If we consider the volume of grain production in Kazakhstan in terms of regions, the main grain producing areas are Akmola, Kostanay and North Kazakhstan. They account for over 75% of the gross grain harvest. The total sown area in these 3 regions of Kazakhstan is 10,332.5 ha. Thus, we can say that in Kazakhstan there is a "grain belt", joining the Akmola, Kostanay and North-Kazakhstan region (Alshanov and Ashimbaeva, 2011).

Grain production in Kazakhstan is characterized by monoculture farming. Currently, the dominant share (about 80%) of the gross grain harvest belongs to wheat (Table 3). Over 10% accounts for barley. The remaining volume belongs to other types of crops.

In recent years, there has been observed the tendency of increase in production of flour, bread and pasta. This suggests the need to study and incorporate world experience in enhancing the competitiveness of the grain industry. Akmola, Kostanay and North Kazakhstan region have the largest number of grain farms, as well as food and grain producing enterprises.

The coefficient of production localization in the region. C_l is the ratio of the share of this sector in the structure of production (S_{ssp}) to the specific gravity of the same industry in the country (S_{sic}).

$$S_{ssp} = \frac{\text{The volume of grain production in the northern regions of KZ}}{\text{The volume of agricultural production in the northern regions of KZ}} = \frac{292477 \text{ mln KZT}}{309136 \text{ mln KZT}} = 0.946;$$

$$S_{sic} = \frac{\text{The volume of grain production in the northern regions of KZ}}{\text{The volume of agricultural production in the northern regions of KZ}} = \frac{382523.3 \text{ mln KZT}}{443103.5 \text{ mln KZT}} = 0.86;$$

$$C_i = \frac{S_{ssp}}{S_{sic}} = \frac{0.946}{0.86} = 1.1. \quad (3)$$

The per capita production (C_{pc}) ratio is calculated as the share of industry in the region corresponding to the structure of the industry of the country (S_{ir}) to the specific gravity of the region's population in the country's population (S_{rp}).

$$S_{ir} = \frac{\text{The volume of grain production in the northern regions of KZ}}{\text{The volume of grain production in KZ}} = \frac{292477 \text{ mln KZT}}{382523.3 \text{ mln KZT}} = 0.76; \quad (4)$$

$$S_{rp} = \frac{\text{Population in the northern regions of KZ}}{\text{Population in KZ}} = \frac{2267596 \text{ ths per}}{16036075 \text{ ths per}} = 0.141; \quad (5)$$

$$C_{pc} = \frac{S_{ir}}{S_{rp}} = \frac{0.76}{0.141} = 5.3. \quad (6)$$

Coefficient of region's specialization in this industry (C_s) is defined as the ratio of the share of the region in the country in a given field (S_{ir}) to specific gravity of the region in country's GDP to (S_{rc}).

$$S_{ir} = \frac{\text{The volume of grain production of the northern regions of KZ}}{\text{The volume of grain production in KZ}} = \frac{292477 \text{ mln KZT}}{382523.3 \text{ mln KZT}} = 0.76; \quad (7)$$

$$S_{rp} = \frac{\text{GRP of the northern regions of KZ}}{\text{GRP of KZ}} = \frac{1652617 \text{ mln KZT}}{17007647 \text{ mln KZT}} = 0.097; \quad (8)$$

$$C_s = \frac{S_{ir}}{S_{rc}} = \frac{0.76}{0.097} = 7.88. \quad (9)$$

According to the method of A. Ermishina (2005), if the estimate is greater than 1, then the researched industry (in this case the grain industry in Kazakhstan) may be the basis for cluster formation. Indicators for the grain industry in Kazakhstan, namely: the localization coefficient, the coefficient of per capita production and specialization coefficient all have the values greater than 1. Thus, it is possible to make a preliminary statement about the prospect of a grain cluster in the Northern region of Kazakhstan: Akmola, Kostanay and North Kazakhstan regions.

Quantitative analysis of grain cluster potential is complemented by the qualitative one. The results of qualitative analysis determine the presence and the composition of the resource base needed to ensure region's competitiveness in certain sectors of the economy. These results are generated based on a complex analysis of conditions, each of which individually and collectively, constitutes the basis for competitive stability (Belokrolova et al., 2009).

Among the main factors influencing the development and formation of cluster, are the following:

- geographic location and agroclimatic conditions (natural factor);
- provision of human resources and availability of highly qualified personnel;
- innovative technologies use;
- positive role of the state.

We can say that geographical location of a region and agroclimatic conditions have significant influence on the formation and development of clusters. For example, clusters located on the border of different countries contribute to the development of foreign economic relations in a region. Clusters with external orientation, located in a certain geographical area, are primarily a source of long-term economic growth and prosperity in a region. Such clusters grow, exceeding the size of a local market, absorbing workers from less productive firms and industries. Of course, for the development of grain clusters favorable agroclimatic conditions are most important (Duzelbaeva, 2008).

In the north of Kazakhstan, there are more than 10 companies and 17 enterprises, which can serve as the basis for such a cluster. These include large enterprises such as LLP "Concern "Tsesna Astyk", LLP Agro Invest Trading, RSE "RPC processing industry", RSE "RPC A.Barayev Grain Farming", JSC "Mamlyutskiy" and JSC "Kyzyltuskiy" etc. (Table 3).

Table 3. Qualitative analysis of cluster potential of the grain industry in Kazakhstan, compiled by the authors on the basis of (Ermishina, 2005)

Indicator	Organization	Assessment
Presence and activity of professional non-profit organizations in the given industry (associations, unions)	Grain Union of Kazakhstan	A small number of non-profit organizations in the grain industry cannot properly implement the mechanism of their impact on the development of grain business in Kazakhstan
Presence and activity of research organizations related to this industry	1. Institute of Botany (BPH), the Center for Biological Research. 2. Institute of Microbiology and Virology. 3. Institute of Molecular Biology and Biochemistry named after M. Aitkhozhina. 4. Institute of Industrial Biotechnology. 5. Institute of Physiology, Genetics and Bioengineering. 6. National Center for Biotechnology of the Republic of Kazakhstan. 7. KazAgroInnovation.	Good scientific basis. Research in the following areas: 1. Microbiological protection of crops. 2. Selection of microorganisms for the pharmaceutical, food, microbiology, veterinary and other industries. 3. Creating fundamentally new forms of plants with useful features.

Continuation of Table 3

Indicator	Organization	Assessment
Level of vocational training institutions related to the industry	1. Kazakh National Agrarian University. 2. S. Seifullin Kazakh Agrarian University. 3. Zhangir Khan West Kazakhstan Agrarian Technical University. 4. Karaganda Economic University of Kazpotreboyz.	Great potential for preparation of highly qualified specialists for the grain industry in Kazakhstan
Presence and activity of non-profit organizations that promote the industry	National Economic Chamber "Union "Atameken"	Low degree of promotion of non-profit organizations in the grain industry
Interest and facilitation of public institutions to enterprises in the sector	National Holding "KazAgro", consisting of the following: - JSC "Food Contract Corporation"; - JSC "Corporation of Animal Products"; - "KazAgroFinance"; - JSC "Agrarian Credit Corporation"; - JSC "Fund for Financial Support of Agriculture"; - JSC "KazAgroGarant"; - "Kazagromarketing".	Significant public interest. National holding "KazAgro" has the following strategic objectives: 1. Concentration and directing investments on the solution of priority tasks of the agriculture complex. 2. Improving the efficiency of public investments in agriculture. 3. Development of agricultural production and the related service infrastructure. 4. Promote the formation and development of clusters in the agricultural sector. 5. Development of agricultural export. 6. Regulation and stabilization of the domestic food market. 7. Improving the efficiency of corporate governance.
The existence and extent of media organizations to promote the industry	"The National Economy of Kazakhstan" (since 1926), "Agriculture of Kazakhstan" (since 1936), "Cooperator of Kazakhstan" (since 1958), "Business Week" etc.	Kazakh media objectively cover the issues and problems of the grain industry development. We should also take into account here the WEB-activities, in particular, activities of the Information Web-portal of the Ministry of Agriculture, which conducts analytical studies in this area and forecasts. In general, media activity in this area can be considered satisfactory

As can be seen from Table 3, Kazakhstan has enough advantages to create a cluster in the grain industry. These include:

1. A large number of educational centers needed to prepare qualified professionals.

2. Powerful R&D base.
3. Positive role of government in promoting cluster development.

At the same time insufficient role of NGOs in the process of improving the competitiveness of the grain industry should be noted.

Leading companies around the world themselves create special factors of production, such as human resources and scientific knowledge. Kazakhstan has great potential for the introduction of innovative projects in the grain industry, because it has a strong research base and developed specialized education. We should also note here the government's efforts to create favorable conditions for cluster development. The National Holding Company "KazAgro" was created with this aim.

Centralized management of subsidiaries within the National Holding is aimed at increasing the efficiency of their operations by achieving synergies and strengthening interaction for further development of the agroindustrial complex of the Republic of Kazakhstan. For example, "Kazagromarketing", a part of the National Holding offers a wide range of services, at no charge or commercial basis:

- price monitoring;
- market analysis;
- advice on agrobusiness;
- providing information on the basic directions of agriculture development;
- development and examination of business plans and projects;
- training seminars and specialized training; exhibitions and fairs;
- development, implementation and support of information technologies development in agriculture.

Conclusion. Quantitative and qualitative analyses showed that in Kazakhstan there is the so-called "potential grain cluster". It is possible to allocate some weaknesses, but there are fundamental factors that can have positive impact on further development of such a cluster.

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