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Evaluation of Economic Potential and Level of Concentration of the Regions of Kazakhstan*

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Abstract

This research is devoted to the development of methods general and standard methodological approaches and approbation those for the evaluation of economic potential and level of concentration of the regions of Kazakhstan. This paper presents the results of development of the authors on the selection and justification of the methodological approaches for quantitative evaluation of the economic potential (the degree of territorial differentiation of the profile) and concentration of regions. In this study, we used scientific methods: method of analysis the main trends of economic development, and method of evaluation of concentration of the region. Based on the analysis of foreign techniques developed and tested methodical approaches to the assessment of the economic potential (index and coefficient methods). Proposed methodological approaches to the assessment profile of the territory and developed a system of indicators, which includes an aggregated index of spatial concentration, which accurately reflects the concentration of production in the region. This study shows the results of the analysis of the potential regional disparities and trends of economic development of Kazakhstan. By using, the proposed methodology shows the possibility of their use; we calculated the indicators of integrated assessment of the economic potential and indicators of spatial concentration.

Keywords: Region, Spatial Development, Economic Potential, Concentration, Kazakhstan.

JEL Classification Code: O31, R11, R12.

1. Introduction

In the modern conditions of unstable development of the global economic system, the spatial factor becomes increasingly important in the evaluation of the phenomena and trends of economic development at the global level and within a country, and its regions. In addition, this requires a clear methodological framework that provides methods and tools for assessing spatial relationships and their changes.

Research in the field of spatial development have fragmentary, were not integrated and not supported methodologically until recently. Methodological tools in domestic practice used to analyze the state and dynamics of socio-economic development of regions far from perfect. The consequence of this was lack of clear understanding of the real situation and tendencies of development of the national economy in a modern space, especially in light of the current transformations within the country and in the world. Meanwhile, a drastic change in recent years has been so multifaceted and dynamic that escalated the need for scientific understanding of the conditions and prospects of spatial development of Kazakhstan's economy. There is also the need to study the empirical material in the evaluation of adaptive possibilities of application of foreign models and methods in the area of spatial development.

Thus, for the development of effective policy of spatial development of the country required a new methodological approach to the study of problems of the analysis and increase of efficiency of use of the economic potential of the

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region. Because of which it is possible to conduct a comprehensive assessment of the socio-economic situation of regions, to identify positive and negative factors influencing their development, to identify potentially untapped reserves. Obtained in the process evaluation results will determine the causes of disparities in regional development and to develop recommendations to reduce them.

Therefore, this study aims to study the disparities in development of regions and to provide specific recommendations. In this study in the course of the study obtained the following results: First, based on the analysis of foreign techniques developed and tested methodical approaches to the assessment of the economic potential of the region and its competitive advantages based on the use of the index and coefficient methods. Second, by modifying the foreign approaches to the assessment profile of the territory has developed a system of indicators, which includes an aggregated index of spatial concentration of Herfindale-Hirschman Index (HHI) and the modified Krugman Dissimilarity Index (KDI), which accurately reflects the concentration of production in the region. Third, this research shows the results of the analysis of trends and of the degree of differentiation of economic development of regions of Kazakhstan, their potential and competitive advantage for the period 2000-2015. We conclude that the growth of regional disparities remains a leading trend, and in the economy of the Kazakhstan are concentrated in a limited number of regions with special advantages.

The study divided into the following sections. The Section 2 proposes to consider the theoretical aspects of the spatial development. Section 3 sets the methods of evaluation of the level of economic potential and concentration of the regions of Kazakhstan. Section 4 is conclusion.

2. Theoretical Background and Literature Review

A study of the basic theory of spatial development should base on the analysis of theoretical ideas and schools of thought that have played a significant role in the formation of a system of ideas about the object of study. It should note that the theory of spatial development has a rich scientific heritage in a sufficiently large time interval. Initial theoretical studies of spatial development associated with the description of the economy of the territory consolidation of information on economic systems. Therefore, all the initial economic study carried out within a particular geographical space, i.e. the object of study was the economics of a particular geographical area or locality (Pred, 1966; Saushkin, 1973; Krugman, 1991). Then, concepts of the regional economy expanded due to several new aspects of research of economic space, but it retains its value and the issues that have been characteristic of the economy of regions. The emphasis was on modeling the economic linkages at different spatial levels. Thus, scientists estimated spatial development in economics went through three stages, which differed as to the condition of the object of study – the economy and the content of the economic science (Pchelincev, 2004; Minakir, 2011).

The next stage of development of the regional economy due to phenomenon of globalization, i.e. integration of the national subsystems in the common economic space. Therefore, there is a need for long-term forecasting of economic development and accounting of external effects leads to obvious practical needs of spatial organization as a function of spatial development. In many cases, economic space from the point of view of the regional economy is the territory, which is a set of objects and relations between them. Granberg (2010) explores the structural features of the organization of the regional space and offers different models of regional development. Kolomak (2010) showed that the interaction occurs in the development of various kinds of spatial structures. Therefore, he explored the external effects of the organization of the regional space.

The modern theory of spatial analysis explores regional characteristics of subsystems and involves the analysis of resources of the region (Kireyeva & Nurlanova, 2013; Dezhina, 2013). Therefore, it is possible to build an optimization model of the spatial organization and shaping the strategic directions of development of these systems. In addition, the economic science will create new concepts based on developing a new strategy for spatial development. That is why special importance given to research involving new territorial aspects of the organization of life and spatial differentiation. In this case, particular attention is to form regional policy studies as an independent direction of spatial development economy (Leontiev, 1997; Maslakov, Zubkov, & Plenkin, 2000; Anokhin & Schulze, 2009). Thus, summarizing the analysis of existing theories and concepts, we conclude that important subject in spatial economics is part of studies that cover the problems of concentration and specialization of production. The space may not be confined to one country or region; problems of complex development; heterogeneity of socio-economic development and polarization; the problem of relations and interactions between “center” and “periphery”; problems of urbanization and agglomeration and others.

In addition, in studies of contemporary authors used a new model of spatial development, such as “theory of proximity” or “traceability”, which is associated with the problems of sustainable development of economy and

society with local development of individual areas (Boschma, 2005; Courlet & Pecqueur, 2013). It seems to us that the methodology of modern spatial analysis should integrated with the cluster approach to the organization of space (Kireyeva, 2016). For some countries, especially for the newly industrialized economies of East Asia (Taiwan, South Korea, Singapore), such approach have become important tool. Such approaches through enhanced national economic model based on the transition from an export-oriented policy to a new policy of spatial development.

However, in Kazakhstan since the beginning of the 21st century is finding new ways of divergence from dependence on raw materials. An important tool for establishing knowledge-based policy, which aimed at ensuring of territories base on “theory of proximity”. Further, determines the need to develop a general and standard of methodological approaches, and approbation them for the evaluation of level economic potential and concentration of the regions of Kazakhstan. Therefore, it is need to proceed to the next section of this research.

3. Methodology of Research

The initial methodological basis of this project will serve as scientific developments of foreign and domestic scientists in the field of economic, regional and innovation developments, as well as some aspects of the assessment of economic potential and concentration. The study of foreign experience of evaluation of profiling regions has led to the conclusion that all existing in regional economic science methodological approaches are not mutually exclusive, but complement each other. In essence, they applied in parallel in various combinations that depend on the peculiarities of spatial development. For example, the number of social and economic resources (factors of production) is a key component of spatial development. The prospects for economic and social progress in the region depend on not only resources, but also the specifics of their placement.

One of the main objectives in the development of methodological approaches to the assessment of the economic profile of the region is the justification of methods, criteria and indicators for the analysis of dynamics of development of economic space, assessment of the level of concentration of industrial production in the country. In other words, it is necessary to develop accurate, objective and comprehensive methods for the assessment of the economic profile of the area capable to be a convenient tool for mapping of existing resources and definition of reserves of economic growth and implementation of many aspects of regional policy.

Under the methodological approaches to the analysis of spatial development of the national economy is a set of tools in location analysis and development of regional economic systems, the most important of which are the following:

1) Index method – based on relative indicators expressing the ratio of level of the analyzed index for any period, or the ratio of level of the analyzed indicator in different regions among themselves or with the average value of this indicator.
2) Coefficient method – based on the calculation of certain relative indicators (ratios) whose values can be compared for various periods of time on various activities, as well as with the accepted regulatory values.

The proposed new approach based on the classification of methods to assess the potential and economic profile of the territory. According to this approach, these methods can be classified into the following two groups:

1) method of analysis the main trends of economic development;
2) method of evaluation of concentration and industry specialization of the region.

In this paper presents the developed methodological tools that will allow analyzing of economic potential and concentration of the regions of Kazakhstan. Two approaches suggested and reflected strong methodological positions with evident implication. These methods are not identical, but they are interlinked, that needs to clarified and expanded.

3.1. Analysis of Economic Potential of the Regions of Kazakhstan

One of the most important indicators to assess the economic potential of the territory and its competitiveness is the indicator of the gross regional product (GRP). GRP characterizes the level of economic development, peculiarities of its structure, and the efficiency of certain sectors of the economy. GRP, as the most general indicator aimed at homogenization social and economic trends provides a clear picture of regional differences and often requires a more detailed analysis of structural changes. The original statistical data of the state statistics sometimes raise doubts on completeness of reflection in the GRP socio-economic processes. However, such a generalized nature makes this indicator the most convenient for analysis of the most important economic contrast changes the dynamics in terms of regions.

<Table 1> Methodological approaches to the assessment of the economic potential of the region and its competitive advantages

No.	Indicator	Calculation formula	Shorthand notation
1	Coefficient of GRP (C_{GRP})	C_{GRP} = GRP/GDP	GRP – gross regional product GDP – gross domestic product
2	Coefficient of the volume of industrial production in the region (C_{VIP})	$C_{VIP} = VIP_R / VIP_C$	VIP_R – volume of industrial production in the region VIP_C – volume of industrial production of the country
3	Coefficient of the volume of investments into fixed capital of the region (C_{VIFC})	$C_{VIFC} = VIFC_P / VIFC_c$	$VIFC_R$ – volume of investments into fixed capital of the region $VIFC_C$ – volume of investments into fixed capital of the country
4	Coefficient of the volume of retail trade in the region (C_{VRT})	$C_{VRT} = VRT_R / VRT_C$	VRT_R – volume of retail trade in the region VRT_C – volume of retail trade in the country
5	Coefficient of the volume of exports of the region (C_{VE})	$C_{VE} = VE_R / VE_C$	VE_R – volume of exports of the region VE_C – volume of exports of the country
6	Coefficient of the percentage of the region's population with incomes below the subsistence minimum (C_P)	$1/C_P = P_R / P_c$	P_R – indicator of the percentages of the region's population with incomes below the subsistence minimum of the region P_C – indicator of the percentages of the region's population with incomes below the subsistence minimum of the country
7	Coefficient of the level of unemployment in the region (C_U)	$1/C_U = U_R / U_C$	U_R – indicator of the unemployment in the region U_C – indicator of the unemployment in the country
8	Coefficient of the average monthly wage in the region (C_{AMW})	$C_{AMW} = AMW_R / AMW_C$	AMW_R – indicator of the average monthly wage in the region AMW_C – indicator of the average monthly wage in the country

Note – compiled by the authors

In the European countries to calculate, the integral indicators in the regions proposed the classification of main regional indicators. For example, the economy GRP per capita (the level of purchasing power); employment by sectors of economic activity; the number of applications for the European patent for 1 million, etc. Based on the analysis of international practices in estimating capacity and economic profile of the territory by using the indexes and coefficients methods, we can distinguish formal and comprehensive system of indicators reflecting the contribution of the territory economic potential of the country (see Table 1).

Further, we proposed to calculate of the generalized of integrated index of economic potential of the region and its competitive advantages (I_{PCA}), which can be calculated by the following formula:

$$I_{PCA} = \sum C_{GRP} + C_{VIP} + C_{VIFC} + C_{VRT} + C_{VE} + \frac{1}{C_P} + \frac{1}{C_U} + C_{AMW} \quad (1)$$

In the end, it can be noted that the proposed methodical approach of estimation of economic potential of the territory and its competitive advantages takes into account regional specifics. At the same time, effective use of the results of evaluation of the potential of the territory gives the possibility of solving large complex practical problems related to the dynamics and ordering of factors of competitive advantages and alignment with the resource capabilities of the region.

Qualitative integrated assessment of the economic potential of the regions of Kazakhstan and its competitiveness based on source data of state statistics and economic indicators, as they contain a wide range of different economic aspects in the regions. The obtained results of integrated indicators, which characterized economic potential and competitive advantages of regions of Kazakhstan in 2010, are shown in Table 2.

The results of calculations of integrated indicators of economic potential and competitive advantages of regions of Kazakhstan in 2015 are presented in Table 3.

<Table 2> Indicators of integrated assessment of the economic potential and competitive advantages of Kazakhstan's regions in 2010

Region of Kazakhstan	Indicators								
	C_{GRP}	C_{VIP}	C_{VFC}	C_{VRT}	C_{VE}	C_{SP}	C_{U}	C_{AMW}	I_{PCA}
Akmola region	0,027	0,015	0,023	0,026	0,008	1,477	1,000	0,703	3,279
Aktobe region	0,054	0,079	0,078	0,064	0,100	1,083	1,094	0,898	3,452
Almaty region	0,046	0,030	0,066	0,040	0,003	0,985	1,036	0,753	2,958
Atyrau region	0,130	0,258	0,238	0,041	0,334	1,102	1,074	1,911	5,087
East Kazakhstan region	0,057	0,053	0,031	0,092	0,036	0,774	1,018	0,791	2,851
Zhambyl region	0,020	0,010	0,032	0,021	0,004	1,226	1,018	0,662	2,993
West Kazakhstan region	0,048	0,082	0,050	0,030	0,020	0,970	1,036	1,032	3,268
Karaganda region	0,086	0,085	0,045	0,103	0,079	1,711	1,055	0,857	4,021
Kostanay region	0,039	0,037	0,026	0,032	0,030	1,016	1,018	0,738	2,935
Kazylorda region	0,039	0,067	0,053	0,025	0,062	0,970	0,983	0,899	3,098
Mangistau region	0,068	0,136	0,080	0,024	0,084	0,560	0,906	1,716	3,575
Pavlodar region	0,047	0,070	0,040	0,037	0,027	1,625	1,036	0,837	3,718
North Kazakhstan region	0,021	0,007	0,056	0,024	0,002	1,204	1,000	0,666	2,981
South Kazakhstan region	0,055	0,026	0,011	0,050	0,030	0,565	0,983	0,741	2,462
Almaty city	0,081	0,009	0,085	0,087	0,070	1,912	0,935	1,428	4,608
Astana city	0,180	0,035	0,086	0,303	0,079	2,500	0,921	1,373	5,477

Note – compiled and calculated according to the Committee on statistics RK.

<**Table 3>** Indicators of integrated assessment of the economic potential and competitive advantages of Kazakhstan's regions in 2015

Region of Kazakhstan	Indicators								
	C_{GRP}	C_{VIP}	C_{VFC}	C_{VRT}	C_{VE}	C_{SP}	C_{U}	C_{AMW}	I_{PCA}
Akmola region	0,027	0,017	0,028	0,029	0,006	0,966	1,020	0,706	2,798
Aktobe region	0,048	0,067	0,080	0,068	0,068	1,556	1,020	0,878	3,785
Almaty region	0,049	0,030	0,069	0,052	0,005	1,120	1,020	0,738	3,082
Atyrau region	0,102	0,265	0,171	0,029	0,360	1,000	1,000	1,832	4,759
East Kazakhstan region	0,059	0,060	0,052	0,094	0,028	1,120	1,042	0,819	3,274
Zhambyl region	0,025	0,015	0,032	0,029	0,002	0,903	1,020	0,677	2,703
West Kazakhstan region	0,049	0,099	0,041	0,032	0,120	0,966	1,000	0,894	3,201
Karaganda region	0,075	0,078	0,062	0,089	0,052	2,000	1,020	0,891	4,267
Kostanay region	0,036	0,029	0,029	0,036	0,021	1,120	1,000	0,749	3,020
Kazylorda region	0,034	0,054	0,040	0,027	0,038	0,875	1,000	0,863	2,931
Mangistau region	0,058	0,126	0,081	0,023	0,122	0,933	1,000	1,837	4,180
Pavlodar region	0,045	0,060	0,054	0,046	0,019	1,867	1,042	0,845	3,977
North Kazakhstan region	0,020	0,009	0,018	0,025	0,002	0,667	1,000	0,670	2,411
South Kazakhstan region	0,061	0,033	0,068	0,055	0,029	0,459	0,926	0,699	2,331
Almaty city	0,103	0,019	0,098	0,107	0,064	7,000	0,980	1,469	9,840
Astana city	0,209	0,040	0,078	0,259	0,064	4,667	0,909	1,283	7,508

Source: Statistical Yearbook of the Republic of Kazakhstan by the Committee on statistics

The obtained results of the analysis indicate that in the group of leading regions with a high level of integrated index of economic potential and its competitive advantages included the fallowing regions – Astana city (9,840), Almaty city (7,508), Atyrau region (4,759), Karaganda region (4,267) and Mangystau region (4,180). The leader according to the assessment is Astana city, which is natural on the eve of the international innovation exhibition "EXPO-2017". Second place takes to the southern capital – Almaty city, thus again confirmed its status as the economic, financial, and innovative center of the country. Third place takes West Kazakhstan region, which has the largest production capacity due to raw mining materials.

In the end, the indicators of integrated assessment of the economic potential of the regions of Kazakhstan and its competitive advantages are quite balanced. However, to define industry "growth points" policy of spatial development and the elaboration of measures for their implementation requires a detailed analysis of the industry structure of regional economy of Kazakhstan. Therefore, we propose to move to the next stage of the analysis of economic development of the territory of Kazakhstan – the assessment of industry concentration regions of Kazakhstan.

3.2. Evaluation of Concentration of the Regions of Kazakhstan

Based on the study of various scientific studies we can distinguish the following methodological approaches to assessing the economic profile of the territory. Methods for the determination of geographical concentration, which reflect the degree of concentration or sparseness of industrial production within a specific region or territory (for example, indicator GRP). The concentration can be determined in relation to the country, region, locality (for example, Herfindale-Hirschman Index, Gini Index, etc.). Based on the analysis and modification of existing methodical approaches to the assessment profile of the territory, and by using the index and coefficient methods, it is possible to provide a system of indicators that most accurately reflects the specialization and concentration of industrial production in the region (see Table 4).

We calculated of indexes of spatial concentration for all other regions of Kazakhstan, which is determined based on Herfindale-Hirschman Index (HHI). The obtained results of this analysis summarized in Table 5.

<Table 4> Methodological approaches to the analysis of indicators of the evaluation of the concentration territory

No.	Indicator	Calculation formula	Shorthand notation
1	Indicator of Herfindal – Hirschman Index concentration, or HHI (I_{HHI})	$I_{HHI} = (C_{GRP})^2$	I_{HHI} – indicator of Herfindal – Hirschman Index concentration; C_{GRP} – coefficient of region's share in the GRP of the country.
2	Aggregated Herfindal – Hirschman Index (HHI) of spatial concentration	$HHI = \sum_{j=1}^{m}(I_{HHI})^2$	HHI – aggregated Herfindal – Hirschman Index of spatial concentration; m – number of regions; j=1 – the highest index value is 1.

Note – compiled by the authors

<Table 5> Indexes of spatial concentration of Herfindale-Hirschman (HHI) of Kazakhstan's regions in 2010 and 2015, in parts

Region of Kazakhstan	Indexes of concentration Herfindale-Hirschman (HHI)	
	2010	2015
Akmola region	0,001	0,001
Aktobe region	0,003	0,002
Almaty region	0,002	0,002
Atyrau region	0,017	0,010
East Kazakhstan region	0,003	0,003
Zhambyl region	0,000	0,001
West Kazakhstan region	0,002	0,002
Karaganda region	0,007	0,006
Kostanay region	0,002	0,001
Kazylorda region	0,002	0,001
Mangistau region	0,005	0,003
Pavlodar region	0,002	0,002
North Kazakhstan region	0,000	0,000
South Kazakhstan region	0,003	0,004
Almaty city	0,007	0,011
Astana city	0,032	0,044
Aggregated index HHI	0,088	0,094

Source: Statistical Yearbook of the Republic of Kazakhstan by the Committee on statistics

According to the data obtained, we can conclude that the greatest spatial concentration by GRP demonstrated in 2015 – Almaty city, which is 1.3 times more compared to 2010. At the same time, clear trends in concentration not observed. In some regions, the concentration decreased in 2015 (Atyrau region, Mangistau region and Aktobe region), others increased (Almaty city, Astana city, South Kazakhstan region and Zhambyl region). Overall, the comparison between the dynamics of different indicators of concentration illustrates the close connection between regions of Kazakhstan.

4. Conclusions

This research prepared on the results of scientific research within the grant project of the Committee of Science of Ministry of education and science of the Republic of Kazakhstan on the theme "The new policy of spatial development of economy of Kazakhstan on the principles of inclusiveness and "smart specialization": concept, key priorities, institutions and mechanisms of implementation".

This paper presents the results of development of the authors on the selection and justification of the methodological approaches for quantitative evaluation of the economic potential, the degree of territorial differentiation of the profile and concentration of regions. This study shows the results of the analysis of the potential regional disparities and trends of economic development of Kazakhstan. By using, the proposed methodology shows the possibility of their use, evaluation of economic profile of the territory and identified of prospective regions. It provides some suggestions for improvement of future studies dealing with this subject. Based on this research finding of this paper, the practical implications listed below:

Firstly, the economic science will create new concepts based on developing a new strategy for spatial development. That is why special importance given to research involving new territorial aspects of the organization of life and spatial differentiation. Analysis of existing theories and concepts, we conclude that important subject in spatial economics is part of studies that cover the problems of concentration and specialization of production. However, in Kazakhstan since the beginning of the 21st century is finding new ways of divergence from dependence on raw materials. An important tool for establishing knowledge-based policy, which aimed at ensuring of territories base on "theory of proximity".

Secondly, we proposed new approach based on the classification of methods to assess the potential and economic profile of the territory. According to this approach, these methods can be classified into the following two groups: method of analysis the main trends of economic development, and method of evaluation of concentration of the region. Based on a reasonable methodology and analysis of statistical information for identification we used the indicators of integrated assessment of the economic potential and indicators of spatial concentration.

Thirdly, assessment of economic potential and spatial concentration in the regions of Kazakhstan is consistent with the trends of many countries with developing market economy. In addition, the obtained results coincide with the findings of the integrated assessment of competitive advantages, despite the fact that the latter assessment obtained by systematization of the factors of competitive advantage and their linkage with the resource capabilities of the region.

Fourthly, the most competitive regions according to the obtained results are Almaty city, Astana city, Atyrau region and Karaganda region. These regions are the prospects for the natural development of the agglomeration process; their growth will be determined by the location of the area of specialization, the distribution of which closely linked to the territorial localization. Therefore, it is possible to hypothesize, to reduce the excessive specialization and the need for industrial diversification of resource regions, which, if adverse changes in world market conditions continue to take the position, and leadership positions are put forward service and industrial areas focused on the production of innovative products. Thus, we can conclude on the gradual restructuring of the old model the spatial distribution to new model of formation of knowledge economy in the regions of Kazakhstan.

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