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The Development of Assessment of the Integral Coefficient of the Region's Competitiveness

Violetta V. Rokotyanskaya
Moscow State University of Food Production,
Volokolamskoye sh., 11, 125080 Moscow, Russia

Abstract: Sustainable development of regional competitive advantages are aimed to create a comfortable environment for living people and its consistent improvement, increasing effectiveness of business structures which are ultimately should leading to improve the life quality of the population in controlled territory. Amid the growing independence of the regions which are promoting greater competition between them the expansion and strengthening of inter-territorial economic ties, regional competitive advantages have become the determining factor in the economic development of our country and contributing reduction of regional asymmetries to promote more balanced development, catalyzing the national economy growth. The purpose of research is extending the methodological tools of development directions of formation and sustainable development of competitive advantages of the region. The study has been modified method of determining the integral factors of regional competitiveness by groups of indicators of social sphere and environmental situation and the possibility of justification of the block matching of existing coefficients data principle which are allowing us to refine and expand the methodological basis of development towards sustainable development of competitive advantages of the region. There various methods of economic research are used: comparative, the main arrayed data, fitted-graphic, economic-statistical technique and economic-mathematical (observation, summary, grouping, correlation and regression analysis).

Key words: Evaluation of competitiveness potential of the region, regional efficiency, system of indicators, competitive position, factors

INTRODUCTION

The modern social and economic systems dynamism of the Russian Federation in many respects due to the external vectors of globalization and internal vectors such as proclaimed modernization of the domestic economy, accompanied among other characteristics of competition improvement in all levels (goods, services, companies, industries, areas of the state as a whole).

The competitiveness of the country consist the competitive advantages of its regions, each of which is specific because of the peculiarities of their natural resources, industrial, investment, innovation, employment and other forms of potentials.

In the current context the competition between regions is composed not only of the possibilities of lobbying territories interests by local authorities with a view to redistribution of financial resources from the federal government as well as the real investment attraction to the region, initiating activity of local business communities which are determining the identification and implementation of new and improvement of existing competitive advantages.

MATERIALS AND METHODS

There various methods of economic research are used: comparative, the main arrayed data, fitted-graphic, economic-statistical technique and economic-mathematical (observation, summary, grouping, correlation and regression analysis).

In the research method of determining the integral factors of competitiveness of the region through a group of indicators of social sphere (life expectancy, the level of fertility and mortality, morbidity, providing the population with medical institutions, crime conditions and others) and environmental conditions (pollution intensity, investment volume in fixed assets aimed to environment protection and rational use of natural resources and others) and provability of the principle of block matching of the existing coefficients are modified.

RESULTS AND DISCUSSION

Theoretical aspects of the regional competitiveness: Methodological aspects of the competitiveness definition

are extremely important in practical terms. Therefore, there are a lot attention in the scientific literature are attended to this issue.

Chainikov L.N. have analyzed the methodology for assessing the competitiveness of the region which are setting out in a number of researches and noted the following:

There is a diversity of approaches to the assessment of the competitiveness of the region is due to the different objectives set out in the evaluation.

The researchers examined methods agree that the rate of assessment of the competitiveness of the region a complex indicator. In addition, each author identifies various groups and scorecards, the most frequent of these include: living standards, the investment attractiveness of the region, a system of indicators of the economic potential of the region, the regional system of indicators of efficiency of the system of indicators of competitive advantages.

It is necessary to agree with the author of the research (Fatkhutdinov, 2007) which in its methodology allocates the index of current and strategic competitiveness which in turn are integrated.

It is an important condition for an objective assessment of the competitiveness of the region's views of the author of the research which in its methodology notes that the necessary comparison with the integrated assessment of the region-reference as is most appropriate to use the region (actually exists or conditional) has the best performance competitiveness.

Due to the fact that currently there is no single methodological approach to quantify the competitiveness of the region, our aim is to develop an algorithm for estimating the region's competitiveness. In our opinion (Rokotyanskaya and Gerasimov, 2015; Rokotyanskaya, 2012; Rokotyanskaya *et al*., 2011; Tatuev and Zhankaziev, 2015; Tatuev and Shirokova, 2015; Borodin *et al*., 2015), the competitiveness assessment should be carried out by using the following algorithm:

- The economic rationale for the selection and formation of the system of individual competitiveness indicators to quantify
- Individual rankings of competitiveness indicators in order of importance
- The collection of information characterizing the socio-economic situation in the region needed to assess its competitiveness
- Calculation of the numerical values of individual indicators of competitiveness
- The selection of the largest quantitative values of individual indicators of the group studied regions
- Weighting coefficients of single indicators
- The calculation of integral indicators of the study area
- The calculation of the integral index of competitiveness of the region received conditional as the standard
- The calculation of the level of competitiveness of the analyzed region
- The analysis of the results of assessing the level of competitiveness
- The development of management decisions to improve competitiveness

In order competitiveness assessment of the region we offer the following individual indicators such as: quality of life; gross margin products (works, services) in the region; the proportion of loss-making organizations; the proportion of investment in fixed assets in the Gross Regional Product (GRP); consolidated budget expenditures per capita; the share of small enterprises in the total number of registered enterprises; the share of innovation-active organizations in the total number of organizations; shipped innovative products, the total volume of products shipped; graduates, postgraduates and doctoral students; export including CIS countries; the share of transport services and communication in Gross Regional Product (GRP).

Chainikova L.N. mentioned that the proposed algorithm allows the researcher based on the statistics published in the press on their own solve the problem of assessing the level of competitiveness of the region which is an advantage because it allows you to objectively assess the socio-economic situation in the region.

There two different approaches of competitiveness assessment are considered by Shepelev. The level of competitiveness of the region would be estimated by applying an integrated assessment of the competitiveness of the research region, comparing to the integrated assessment of the competitiveness of the region-reference. As region-reference the most appropriate region (actually exists or conditional) with the best characteristics of competitiveness are used.

Indicators of integrated competitiveness assessment: Integral estimates of competitiveness can be obtained on the basis of three partial indicator systems.

The economic potential of the region indicator systems: The economically active population, thousand pers; the average of the number of workers employed in small enterprises, thousand pers.; the cost of industries capital

assets, mln. rub.; agricultural area and arable land, thousand hectare. Gross domestic expenditure on research and development, thousand rub.; net financial result of the region, mln. rub.; investments in fixed capital, mln. rub.: gross regional product, mln. rub.

The regional efficiency indicators systems: Production of GRP (GVA) per employer in the economy of the region, thousand rub./pers.; production of GVA created in the industrial-ness per employer in the industry, thousand rub./pers.; GRP (GVA) per ruble of fixed assets in the region, rub; production GVA created in the industry per ruble value of fixed assets in industry, rub.; wage cost per ruble of GRP (GVA), rub.; labor productivity in small enterprises, rub.; GVA industrial production per ruble of industrial outputs), rub.; the level of profitability of sold products (works, services) in the industry units, %.

The competitive advantage indicator systems: The cost of fixed assets per employer in the economy, thousand. rub.; the level of validity of the regional capital assets %; the volume of investment in fixed assets per inhabitant of the region, thousand rub.; the share of employment in small enterprises per total employment in the region, %; the share of employment in privately owned enterprises per total employment, %; density of railway lines, km of lines per 1000 km^2; density of road, km per 1000 km^2 of territory; the average yield of grain crops in the past 5 years, center/ha.

For the synthesis of integrated indicators of economic potential, regional efficiency, competitive advantage and competitiveness can be directly used nonparametric methods of statistical analysis.

E.S. Shepelev believes that the method of «pattern» provides estimates of private indicators using actual values correlate with the best. Using the method of «pattern» should settle on the system of partial indicators of economic potential, regional effectiveness and competitive advantage.

Thus, we obtain the three components (TVET, Taff, Tpreim) necessary for determining the integral evaluation of competitiveness, prepared as a simple arithmetic average of the estimates.

In addition, this technique is improved to use the weighting factors for each of the integral component of the assessment of regional competitiveness.

For the synthesis of integrated indicators of economic potential, regional efficiency, competitive advantage and competitiveness can be directly used nonparametric methods of statistical analysis.

Manufactured calculation allowed carrying out the grouping of regions in terms of competitiveness in accordance to these it could be set from 0-1 it is possible to distinguish five groups of regions at regular intervals: Group 1 the highest level of competitiveness: Group 2 very high level: Group 3 intermediate level; Group 4 low level; Group 5 uncompetitive regions.

Another approach in assessing the competitiveness of the region characterizes relying on the concept of competitiveness proposed by M. Porterom. The competitiveness of the region-productivity (output) of regional resources and especially of labor and capital in comparison with other regions in which the resulting value of the Gross Regional Product (GRP) per capita as well as its dynamics. Due to the high complexity of the system it can be assessed and indicators. By analogy with the methodology of the World Bank (Taylor, 2000) the well-being of the region can be assessed by four main indicators calculated per capita: the size of GRP, largest production resources (fixed assets, etc.), the magnitude of natural resources in the value of human resources (education). Given the current economic situation in Russia, a large depreciation of fixed assets (physical and moral) it becomes important to ensure in the national economy of the reproduction process on the modern technology and innovation-based which requires investment. Therefore, you should add to this description mentioned above, the level of foreign direct investment in the region in view of the volume required for reproduction including in high-tech manufacturing. The competitiveness of the region can be determined by the level of livelihood on the basis of international and other standards as well as on the basis of other indicators and indicators.

Critically assessing both the advanced approach to assessing the competitiveness of the region, Shepelev E.S. noted that the above-mentioned methods for assessing the competitiveness of the region do not take into account the perspectives of its further development, the existing methods of valuation of competitiveness compared to the state of the region at different points (interval) time or there is a comparison study region with comparable competing regions. Thus, in assessing the competitiveness of the region should take into account the near-term outlook for its development on the basis of its existing natural resources and industrial potential (Taylor, 2000).

Fetisov (2006) had developed a detailed set of indicators of internal and external assessment of the competitiveness of the region which is due to the high importance we consider it necessary to bring in full in spite of the extensive quotations (Table 1-3).

Table 1: The system of the local indicators for assessment of internal competitiveness of the region

Indicators (1)	Computation algorithm (2)
He potential of innovative mobility in the region	
K1: The share of expenses to R&D from the total expenses	The expenses amount of R&D/the total expenses amount
K2: The growth rate of innovation development	The number of innovation during the period/number of innovations in the basic period
K3: The share of expenses in the gross regional product	Expenses for innovation/gross regional product
K4: The share of new products, goods, services volume of sales	The sales revenue of new products, goods, works and services/total in the total amount of sales revenue of all kinds of products, goods, works, services
K5: The growth rate of the amount of economic benefit from the innovations based on the 10 thousand of the resident population in the region	The amount of economic effect from innovation based on the 10 thousand of the resident population in the region in the account period to the corresponding figure in the basic period
K6: Share of implemented innovation in the total number of elaborated innovation in the fiscal year	The number of implemented innovation/number of elaborated innovation in the fiscal year
The entrepreneurial potential of the region	
K7: Share of expenses for labor force reproduction in the total expenses	All kinds of expenses for labor force reproduction (labor costs, socio-cultural and personal services, etc.)/total expenditure
K8: He share of specialists with higher education of the total population of the region involved into business	The average number of specialists with higher education/average number of working-age population in the region engaged in the business
K9: The share of small and medium enterprises in shaping of gross regional product	The cost of commercial products for small and medium enterprises/cost of commodity products in the region
K10: The share of small businesses of the region of the small businesses in Russia	The number of small businesses in the region/number of small total number of businesses in Russia
The economic and financial capacity of the region	
K11: The growth rate of total assets in the business entity	The annual average cost of the total assets of business entity on the consolidated financial statements for the current financial year/the corresponding figure in reference period
K12: The share of net assets in the total assets	Net asset value/total asset value
K13: The coefficient of renovation of basic production assets	The cost of placed in operation new fixed assets/average annual value of fixed assets
K14: The profitability of regional economic development	The net financial result of business entity operations/gross regional product
K15: The financial independence of the region	Total expenses provided by financing with its own resources/total expenditure of the region
K16: The financial independence of the business in the region	The equity capital of business entity in the region/total capital of business entity in the region
Natural resource potential of the region	
K17: The ratio of the economic valuation of natural resources per 1 km^2. The total area of the region with the corresponding figure for the whole Russia	The economic valuation of natural resources per 1000 km^2 area in the region/corresponding figure for the whole country
K18: The share of the value of intangible assets in the total value of assets (for 1000 thousand. Rubles from the total value)	The average annual value of intangible assets ×1000 thousand rub. ×100%/average value of total assets
K19: The share of expenses for training, retraining and skills development in the total expenditure	Expenses on training, retraining and skills development/total expenditure in the fiscal year

The system of indicators of the potential opportunities assessment of the region: The assessment of potential opportunities of the region is done by appropriate indexes: innovative mobility, entrepreneurial, natural resources and economic-financial capacity by using the following algorithm:

$$IVKR = \sqrt{\sum_{i=1}^{n}(x_i^2)} \quad (1)$$

where, x_i is components, forming potential of the internal competitiveness (K1-19). The estimation of external potential opportunities of the region is done in accordance to the following indexes: regional values, investment prospects, cooperation:

$$IWKR = \sqrt{\sum_{i=1}^{n}(x_i^2)} \quad (2)$$

where, x_i is components, forming potential of the internal competitiveness (K1-11). The estimation of the level of sustainable competitiveness of the region is done by the following algorithm:

$$\ln CT_v(x(t, f), y(t, f)) = \sqrt{M(\ln K_v(x(t, f), y(t, f))- M(\ln K_v(x(t, f), y(t, f))))^2} \quad (3)$$

Where:

$\ln CT_v(x(t, f)), y(t, f)$ = The level of sustainable of regional competitiveness

$\ln K_v(x(t, f), y(t, f)$ = The statistical data of the regional competitiveness level of region V in the defined time frame

M = Math expectation

An innovative approach to the differentiation of the region competitiveness level: For the purpose of

Table 2: The system of local indicators to assess the region's external competitiveness

Indicators (1)	Computation algorithm (2)
Regional mobility potential	
K1: Coefficient of staff mobility	The number of individuals on the personnel reserve for filling vacant posts of state and municipal employees to 100 thousand resident population/equal figures of the country
K2: Coefficient of business assets mobility of the region	The average balances of stocks in the region to the average cost of the stocks in the basic production assets in the region
K3: Coefficient of marketing mobility	The number of new types of products, goods, works and services developed in the reporting period to the total volume in the reporting period
The potential of region investment prospects	
K4: The ratio of the total value of the projects implemented in the region for 100 thousand people to the corresponding indicator of the average in Russia	The cost of ongoing projects in the region ×100 thousand pers./figures of the national average
K5: The growth rate of budget financing funds to businesses	The volume of budget financing (subsidies) to small businesses in support small the region during the period/the corresponding figure reference period
K6: The growth rate of foreign trade turnover in the region	The volume of foreign trade turnover of the region during the period/the corresponding figure reference period
K7: The growth rates of the return on equity of business	Profitability of own capitals of the commercial organizations in accordance to the consolidated financial statements/the corresponding figure reference period
Image (brand) potential of the region	
K8: The coefficient of patents and trademarks in the region	The share of patents and trademarks in the total volume of goods sold, works and services for the reporting period to the corresponding indicator of the national average
K9: The index of image (brand) of the region	The aggregate of all costs in the region on advertising, creation and promotion of a product or service, research, creative development to the total value of the region's total costs during the period
K10: The growth rate of the number signed contractsin the region	The number of commercial contracts concluded by the region/the corresponding figure of the reference period
K11: The growth rate of the region's participation in the conferences, meeting and platforms both in the domestic and foreign markets	The average number of participants in the negotiating areas-representatives of the region/the corresponding figure reference period

Table 3: The determination of competitiveness types of the regional socio-economic systems

Competitiveness type	High	Medium	Low
Internal competitiveness of the region KP_v (x(t, f))	3.510 and higher	(2.01-3.50)	(0-2.00)
External competitiveness of the region PP_v (y(t, f))	2.610 and higher	(1.36-2.60)	(0-1.35)
Competitiveness of the region lnK_v (x(t, f), y(t, f))	4.370 and higher	(2.427-4.369)	(0-2.426)

increasing the efficiency of the management mechanism of the regional socio-economic systems competitiveness validity, the following approach to differentiation of the types (levels) of competitiveness are offered (Table 3).

In accordance to the research study and summarize of different methodological of competitiveness assessments of the region approaches which are proposed by revealed the necessity of expanding existing indicators range and as a result a system of indicators include the following.

Indicators of production capacity and efficiency of its use: The share of employed in the economy in the economically active population (%); manufacture GRP 1 employed in the economy (thousand rub./pers.); fixed assets 1 employed in the economy (thousand rub./pers.); manufacture GRP per 1 ruble of fixed assets (thousand rub); the level of life of fixed assets (%); the share of profitable enterprises (%).

Indicators of living standards in the region: GRP per capita (rub./pers.); per capita income (rub./pers.); the ratio of average per capita income to the subsistence minimum (%); the ratio of the average monthly wage to the subsistence minimum (%); area home for 1 person (in m^2).

Indicators of science and education: The number of companies producing research developments in the total number of organizations (%); the number of employees engaged in research and development for 1000 people employed in the economy (human); the number of graduate students per 1000 population (persons); the proportion of university students in the total population (%).

Indicators of investment activity: Investment in fixed capital per 1 inhabitant (thousand rub.); investments 1 ruble GRP (rub.).

Indicators of infrastructural support: Density of railways and roads (kilometers of tracks on 1000 m^2 of land); the proportion of paved roads (%); the number of residential units on the public network 1000; the number of registered mobile subscriber terminals per 1,000 people; number of credit institutions per 1000 of population.

Table 4: The results of used methodology of the integral coefficient of competitiveness in sub-federal units in SFD, 2014 year

Territorial entity of SFD	IKR_r	$\sum_{i=1}^{N} x_r/x_{SFD}$	$\sum_{j=1}^{N} x_r/x_{SFD}$	$\sum_{b=1}^{N} x_r/x_{SFD}$	$\sum_{c=1}^{N} x_r/x_{SFD}$	$\sum_{d=1}^{N} x_r/x_{SFD}$	$\sum_{h=1}^{N} x_r/x_{SFD}$	$\sum_{k=1}^{N} x_r/x_{SFD}$
Adigeya republic	15.54	2.09	2.95	2.66	1.16	1.48	2.37	2.84
Kalmikiya republic	6.04	0.06	1.35	1.15	0.09	0.85	1.13	1.42
Volgogradskaya oblast	10.49	0.20	1.27	2.96	0.14	2.80	1.46	1.76
Astrakhanskaya oblast	10.05	0.16	1.41	2.87	0.12	2.26	1.13	2.36
Rostovskaya oblast	10.50	0.22	1.04	2.33	0.19	2.90	0.94	2.88
Krasnodarskiy kray	30.29	7.17	2.93	3.70	0.90	4.49	8.96	2.06

Composed by authors of the research, based on datas from the we-site: www.gks.ru

To compare the regions were calculated summary competitiveness coefficients in each of the Southern Federal District (SFD), based on formulae of geometrical.

As follow up to the existing economic literature practices as well as our own research, the block-based scorecard (traditionally presented in statistical surveys and as a rule, do not require additional calculations) of competitiveness assessment are proposed (the first five blocks include adapted indicators, sixth and seventh are research development).

At the same time a commonly used and already became traditional set of indicators for determining the competitiveness of the region, taking into account the indicators of the production potential (production of gross regional product per 1 working inhabitant of the region, thousand rub.; percentage of the economically active population, %; the volume of the fixed assets per 1 employed in the economy , thousand rub.), quality of life (income per capita, rubles per month, real gross paid wages, rubles per month; housing area per 1 inhabitant of the region, m^2), science and education (proportion of university students in the total number the region's population, %; the number of graduate students per 1000 population, persons; percentage of organizations conducting research developments, % etc.), investment activity (investment in fixed assets per 1 inhabitant, thousand rub; investment per fixed assets 1 ruble of gross regional product, rub., etc.) and infrastructural support (number of credit institutions per 1000 people; density of roads-km of road surface on the territory per 1 hectare; the number of public buses per 100,000 population and others) should be supplemented with blocks of containing parameters which are describing the specifics of the social sphere (life expectancy, the level of fertility and mortality, morbidity (by type), providing the population with medical institutions, the state of crime (number of registered crimes including related acts of violence against the victims) and environmental conditions (atmospheric emissions of pollutants from stationary resources, kg per 1 inhabitant per year, the degree of contamination in the environment, investment in fixed assets aimed to environmental protection and rational use of natural resources per 1000 people). Thus, modified methods of estimating the integrated coefficient IKR of regional competitiveness can be formalized as follow:

$$IKR_r = \sum_{i=1}^{N} \frac{x_r}{x_{SFD}} + \sum_{j=1}^{N} \frac{x_r}{x_{SFD}} + \ldots + \sum_{k=1}^{N} \frac{x_r}{x_{SFD}} \quad (4)$$

$$IKR_r = \sum_{ij}^{nl} \sum_{i=1}^{N} \frac{x_r}{x_{SFD}} \quad (5),$$

Where:

IKR_r = Integral coefficient of comparativeness of the region-r

x_r = Value of statistical item for region r

X_{SFD} = Value of statistical item for larger territorial units in this case-SFD

i, j, …, k = Indicators on the corresponding blocks

N = The maximum the number of indicators in the block

n, l = Number of indicators block

As appraisal criteria we suggest to use the attitude indicator in the r-region to the larger territorial entity (Federal District, the country as a whole). This approach is more affordable as it does not require the introduction of weighting coefficients and avoid subjectivity in their nomination, significant simplifying calculations, etc. The results of proposed method for data on 2014 year are the following (Table 4).

CONCLUSION

Also, the proposed method of estimating the integral factors of competitiveness enables to comparison of inter-regional cross-section both in the final integral factor of competitiveness and to the blocks of indicators, often in the case of the integral (additive) factor is eliminating the differences and identifying the most developed or on the contrary, depressive blocks in spot.

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