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METHODOLOGICAL ASPECTS OF ASSESSING THE EFFECTIVENESS OF INVESTMENT PROCESSES IN THE SPATIAL DEVELOPMENT OF REGIONS

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Importance: indicators for assessing the effectiveness of investment processes in spatial development of regions. *Purpose*: development of an approach to the integral assessment of the effectiveness of investment processes in the spatial development of regions. *Research design*: the study has found that regional investment in terms of economic activity provides an opportunity to obtain additional income from potentially profitable areas. Considering that the level of development of the social and economic potential of the regions largely depends on solving the problems associated with the investment process, it should be noted that the active position of the state in the field of investment activities is primarily aimed at stimulating and attracting investment in certain regions. *Results*: systematization of indicators characterizing the investment activity of the region, formalization of the stages of building an integral assessment of investment processes in the spatial development of regions.

Keywords: investment processes, indicators for assessing investment processes, integral assessment of the effectiveness of investments in the region.

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Introduction

At present, it is a matter of strategic importance to create a favorable investment climate and increase investment attractiveness, both for individual regions and for the country as a whole [1]. This is due to the fact that investment is the most important component on the way out of the economic crisis and play a key role in the development of Russian economic activity [7]. Regional investment is of increasing interest not only for the whole country and authorities as a way to achieve economic and social results, but also to private investors,

because from the point of view of economic activity, it is possible to generate additional income from potentially profitable areas [5].

The process of stimulating the economic and social potential of the region largely depends on solving problems related to the level of investment development and the establishment of an effective system of interaction between commercial and administrative structures through partnership support mechanisms [6]. At the regional level, the investment goals and targets may not only increase the attractiveness of the area to potential investors, but also ensure the economic stability of individual regions and the country as a whole [4].

For a more complete analysis of the investment process, it is necessary to clarify the list of indicators characterizing various spheres of socio-economic and political situation of regions and Russia as a whole.

Methods and Results

An integrated approach to investment assessment at the regional level is needed. As part of the integrated method of studying the regional investment process, each region is examined through the lens of competitive federalism [11]. The most significant competitive advantage or, conversely, the weakness of a competitive position in a particular region (in terms of assessing investment prospects) is revealed in the process of positioning the investment system of the region, i.e., significant factors, that is, the factors that make up the activities of investors in the region [8]. In this connection, there is a need to identify a set of indicators that directly characterize the effective development of investment processes of regions [9].

Having studied and analyzed various approaches to assessing the investment processes in Russia and regions, the authors propose a set of indicators designed to assess the investment process on various aspects, including the manifestation of crises and risks [3]. In this context, indicators characterizing investment activity should cover the conditions, the process, and its result (Table 1).

Table 1

System of indicators characterizinginvestment activity of the region[1]

System input indicators (conditions of investment activity (C_{IA}))	Internal indicators for assessing investment activity (process indicators (P_{IA}))	System output indicators (assessing the results and effects (R_{IA}))
– GRP per capita; – The number of enterprises and organizations in the region in relation to the population; – Employment rate of the population; – Inflation rate; – Monetization coefficient; – Average per capita cash income of the population.	– Investment in fixed assets per capita; – Share of investment in fixed assets in gross regional product; – Share of investment in fixed capital from the budget; – Balanced financial result of enterprises /per 1 person employed in the economy (%); – Wage arrears.	– Volume of fixed assets entry; – Industrial production index; – Agriculturalproduction index; – Retail turnover per capita; – Volume of paid services per capita; – Export/import ratios; – Net capital inflow/outflow to GDP.

[1] Compiledaccordingto: [2, 3, 11].

One of the advantages of the proposed system of indicators is the simplicity of calculations and the availability of source data (Federal State Statistics Service). It should be noted that each set of indicators includes a fairly large number of indicators and requires a large amount of information. However, the multidimensional and versatile nature of the proposed assessment of investment activities raises some of the difficulties involved in applying such systems of indicators in practice. Therefore, the practical implementation of an integrated approach to assessing investment activity requires the construction of a aggregate (composite) indicator.

The main purpose of constructing an aggregate indicator is to measure the performance of the unit of analysis (region) on a specific topic.It can be used as a starting point for studying the situation, as it provides information on the area and allows to perceive results that are not directly detectable. The aggregate indicator is characterized by the fact that it summarizes numerous aspects that may be interrelated in one value, thus reducing the complexity of the information and facilitating its comparability.

Let us describe step by step the procedure for constructing an integral indicator for assessing the level of development of investment activity in the region:

1. The conceptual scheme of the aggregate indicator for assessing the investment activity of the region, covers three interconnected blocks of the logical chain of the investment activity process (conditions → process → result). The assessment of the first link of the chain should be projected into the final result. In other words, the indicators of individual links should be correlated with each other.

2. As indicators for assessing the selected blocks in the logical chain of investment activity, we will use the temporalvalues of indicators presented in Table 1 for the following reasons:

– firstly, it will make it possible to get away from physical units of measurement, which will further facilitate the process of generalization of indicators.

– secondly, the geometric mean should be used as a model of the aggregate indicator for the rates.

The rates for the indicators of the selected blocks are presented in Table 2.

Table 2

System of indicators for assessing the investment process[2]

№	Name of the group of indicators	Name of the indicator	Method of calculation
1	Indicators for assessing the conditions of investment activity (C_{IA})	Growth rate of Gross Domestic Product per capita (%)	$(GP_{PC2} – GP_{PC1}) / GP_{PC2}$, where: GP_{PC}=Gross Product per capita for the reporting period (2) and for the previous period (1)
		Growth rate of number of enterprises and organizations in region to population (%)	$[(N_{EO}2 / P2) – (N_{EO}1 / P1)] / (N_{EO}2 / P2)$, where: N_{EO}=number of enterprises and organizations for the reporting period (2) and for the previous period (1); P=populationfor the reporting period (2) and for the previous period (1)
		Employmentgrowth-rate(%)	proportion of the employed population of a certain age group to the total population of the corresponding age group, in percent
		Inflation growth rate (%)	rate of sustained increase in overall prices of goods and services over time
		Monetization rate (%)	ratio of total Money Supply M2 to Gross Domestic Product (GDP)
		Growth rate of average per capita cash income of the population (%)	$(APCI_{P2} – APCI_{P1}) / APCI_{P2}$, where: $APCI_{P}$=Average Per Capita Cash Incomes of the population for the reporting period (2) and for the previous period (1)
2	Indicators for assessing the process of investment activity (P_{IA})	Growth rate of investment in fixed assets (%)	$(I_IFA_2 – I_IFA_1) / I_IFA_2$, where: I_IFA=Investment in Fixed Assetsfor the reporting period (2) and for the previous period (1)
		Share of investment in fixed assets in gross regional product (%)	ratio of Investment in Fixed Assets to the value of Gross Domestic Product (GDP)
		Share of investment in fixed assets from the budget (%)	ratio of budget-funded investment in fixed capital to total investment in fixed capital
		Growth rate of the balanced financial result of enterprises /per 1 person employed in the economy (%)	$[(FR_2 / N_{E2}) – (FR_1 / N_{E1})] / (FR_2 / N_{E2})$, where: FR=balanced financial result of enterprises for the reporting period (2) and for the previous period (1); N_E=number of people employed in the economy for the reporting period (2) and for the previous period (1)
		Growth rate of overdue wage arrears (%)	$[(OWA_2 / P_2) – (OWA_1 / P_1)] / (OWA_2 / P_2)$, where: OWA=overdue wage arrearsfor the reporting period (2) and for the previous period (1); P = population for the reporting period (2) and for the previous period (1)

[2] Nikitenko A.O., Sivtsova N.F. AssessmentoftheEffectivenessofInvestmentProcesses in the Subjects of the Central Federal District // Modern Problems of Socio-Economic Systems in the Context of Globalization: proceedings of the XVI International Scientific and Practical Conference, Belgorod, October 27, 2022 / scientific. ed. by E.N. Kamyshanchenko, Yu.L. Rostopchina, A.A. Shvetsova. Belgorod: Publishing House «BelGU» NRU «BelSU», 2022, p. 44. (in Russ.)

End of tables 1

№	Name of the group of indicators	Name of the indicator	Method of calculation
3	Indicators for assessing the results and effects of investment activity (R_{IA})	Capital input growth rate (%)	$(FAE_2 - FAE_1) / FAE_2$, where: FAE = fixed assets entry for the reporting period (2) and for the previous period (1)
		Growth rate of industrial production index (%)	$(I_{IP2} - I_{IP1}) / I_{IP2}$, where: I_{IP}=industrial production index for the reporting period (2) and for the previous period (1)
		Growth rate of agricultural production index (%)	$(I_{AP2} - I_{AP1}) / I_{AP2}$, where: I_{AP}=agricultural production index for the reporting period (2) and for the previous period (1)
		Retailturnover-growthrate (%)	$[(RT_2 / P_2) - (RT_1 / P_1)] / (RT_2 / P_2)$, where: RT= retail turnover розничныйfor the reporting period (2) and for the previous period (1); P = population for the reporting period (2) and for the previous period (1)
		Growth rate of paid services per capita (%)	$(V_{PS2} - V_{PS1}) / V_{PS2}$, where: V_{PS}= volume of paid services per capita for the reporting period (2) and for the previous period (1)
		Growth rate of export-to-import ratio (%)	$[(E_2 / I_2) - (E_1 / I_1)] / (E_2 / I_2)$, where: E = exports for the reporting period (2) and for the previous period (1); I= importsfor the reporting period (2) and for the previous period (1)
		Growth rate of net capital inflow/outflow to GDP (%)	$[(NC_2 / GDP_2) - (NC_1 / GDP_1)] / (NC_2 / GDP_2)$, where: NC=net capital inflow/outflow for the reporting period (2) and for the previous period (1); GDP = Gross Domestic Productfor the reporting period (2) and for the previous period (1)

3. An assessment of the multidimensionality of the proposed system of indicators can be carried out by testing the system for multi-collinear rates. The GDP (GRP) growth rate should be used as an indicator of the resulting value. The selection will be based on a comparison of the values of the linear correlation coefficient between the rate of the result and the indicators included in the system with the values of the paired linear correlation coefficient between the rates of the indicators themselves.

Obviously, the matrix of paired linear correlation coefficients would need to be constructed for each block of the proposed system.

This toolkit allows to adjust the dimension of the composite indicators for the selected blocks and simplify the conceptual scheme.

4. Since the calculation of the rates of the proposed indicator system will be

based on data from the database of the Federal State Statistics Service, there is no need to simulate individual values, since data collection is unified throughout Russia. In this case, the only clarifying point is the question of time series closure. But it is also not relevant for temporal indicators. One of the methods of closing time series is the transition to growth rates.

5. The rationing will be carried out according to the above scheme, for a direct stimulant indicator and the reverse. Normalization allows for adjustment of the variation of the temporal values, which in the future will have a certain value when calculating the geometric mean.

As a result of these steps during construction of the consolidated indicator for assessing the investment activity of the region, average temporal characteristics will be obtained for the normalized components, which require further aggregation.

6. The use of weights in the aggregation of averaged rates allows them to be reduced to a single value as an arithmetic weighted mean. Meanwhile, the question of determining the weights of the consolidated indicators of the selected blocks requires detailed work.

The solution of this problem without the help of experts relates to the mathematical substantiation of weight characteristics of the aggregate indicators of the selected blocks.

The procedure for assessing weight characteristics relates to the calculation of linear regression coefficients, expressing the relationship between the GDP growth rate and the calculated aggregate indicators for the selected blocks. During the construction of the regression equation, coefficients for each factor variable are determined, on the basis of which the weights of the factor features are determined by normalization, depending on their role in the formation of the resulting indicator.

7. In practice, an index is calculated as an integral assessment of the investment attractiveness of regions. At the same time, it is difficult to independently calculate this indicator without involving specialists in the field of rating.

Thus, the procedure for constructing an integral indicator for assessing the level of development of investment activity in the region can be schematically represented as (Fig. 1):

1. Formation of an empirical base to build a model for assessing the effectiveness of regional investment processes
1.1. Preparing preemptive period data
1.2. Rationing of the system of indicators for blocks of assessment of investment activity: *conditions – process – result*
1.3. Calculating the system of indicators for blocks of assessment of investment activity: *conditions – process – result*
⇓ ⇓
2. Development of a typology of the investment activity of the regions
2.1. Adjusting the dimension of the composite indicators for blocks of assessment of investment activity: *conditions – process – result*
2.2. Determining the aggregate values of the indicator system for blocks of assessment of investment activity: *conditions – process – result*
2.3. Developing rating classes for averaged normalized indicators for assessing regional investment activity
⇓ ⇓
3. Calculation of the integral assessment of the effectiveness of the investment activity of the region
3.1. Determining weight characteristics in the aggregation of average normalized temporal indicators for blocks of assessment of investment activity: *conditions – process – result*
3.2. Integrated regional assessment of regional investment activity (calculating weighted average by aggregate indicators of blocks: *conditions – process – result)*
3.3. Development of recommendations for the practical application of an integral assessment of the effectiveness of investment activities in strategic planning

Fig. 1. Stages of construction of integrated assessment of investment processes in spatial development of regions[3]

This relationship between the individual stages determines the multiplier effect of the economic development of the regions manifested in the conditions of stimulating investment policy, in which the intensification of investment activities and the creation of a favorable investment climate become a prerequisite for sustainable regional development.

Conclusion

The system of indicators for assessing the investment activity of the region proposed by the author, as well as the calculation of the integral value, will make it possible to evaluate the investment process in Russia and individual regions according to various parameters for assessing the level of social and economic development, considering the crisis impact.

In the proposed approach, among the methods for aggregating the construction of a generalizing indicator, it is possible to distinguish the calculation of the geometric mean for the indicators of each block and the determination of the arithmetic weighted average when assessing the integral value.

[3] In authorial vision.

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МЕТОДИЧЕСКИЕ АСПЕКТЫ ОЦЕНКИ ЭФФЕКТИВНОСТИ ПРОЦЕССОВ ИНВЕСТИРОВАНИЯ В ПРОСТРАНСТВЕННОМ РАЗВИТИИ РЕГИОНОВ

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Предмет: показатели оценки эффективности процессов инвестирования в пространственном развитии регионов. *Цель*: разработка подхода к интегральной оценке эффективности процессов инвестирования в пространственном развитии регионов. *Дизайн исследования*: в ходе исследования установлено, что региональные инвестиции с точки зрения экономической деятельности дают возможность получения дополнительного дохода от потенциально прибыльных территорий. Принимая во внимание, что уровень развития социально-экономического потенциала регионов в значительной степени зависит от решения проблем, связанных с инвестиционным процессом, следует отметить, что активная позиция государства в области инвестиционной деятельности, в первую очередь, направлена на стимулирование и привлечение инвестиций в отдельные регионы. *Результаты*: систематизация показателей, характеризующих инвестиционную деятельность региона, формализация этапов построения интегральной оценки процессов инвестирования в пространственном развитии регионов.

Ключевые слова: процессы инвестирования, показатели оценки инвестиционных процессов, интегральная оценка эффективности инвестиций региона.

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