

Assessment of Investment Potential of Regions Under the Impact of the Potential-Forming Space Transformation

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Abstract

One of the leading factors in improving the functioning of domestic economic entities and increasing their level of capitalization in the restructuring of the Ukraine's economic system is the formation and effective use of the region's investment potential, which should be considered the most important element of the region and its potential-forming space. Taking into account the above, it is important to identify and determine the impact of the transformation of the potential-forming space on investment activities of the region based on the assessment of its potential. In the presented article, the authors propose to determine the level of investment potential of the regions of Ukraine based on the methodology, which consists in the consistent implementation of five stages. The application of the developed algorithm for estimating investment potential is carried out using such methods as statistical, graphical, standardization, index and cartographic. The implementation of specific quantitative calculations according to the above method of assessing investment potential in the regional context allowed to divide the regions of Ukraine into groups according to the calculated complex coefficient of investment potential, which in further research can serve for the development of ways to improve the functioning and development of the investment process

Key words:

investment potential; region; potential-forming space; investment process; transformations; innovations

1. Introduction

Strategic development of Ukraine and its regions is to carry out radical structural transformations of the country's economic system, as well as potential-forming space of regions through innovation, creating competitive market conditions in all areas of the economic activity, which requires investment resources. Thus, in modern conditions, the urgent issues are the formation of the conditions for creating investment attractiveness of cities, regions and a

favorable investment environment, increasing the level of the investment activity of both domestic and foreign businesses.

In order to permanently carry out the regional reproduction process at a qualitatively high level, it is necessary to attract investment, the quantitative indicators of which in time are related to the uniqueness and peculiarity of a region, which represent the existing potential. Thus, the investment potential, firstly, determines the level of favorable region to support the reproduction process, and secondly, characterizes a set of economic, social, natural, and other special features of the region and its potential-forming space that contribute to its development. When considering investment potential of the region as a leading factor in the reproduction of regional processes, it is necessary to determine its place in the system of achieving sustainable development under the influence of the transformation of the potential-forming space.

Thus, currently, regional development significantly depends on the activity of investment processes, which are significantly affected by the available resource component, i.e., investment potential of the region. Increasing the level of competition for investment resources against the background of the uniqueness of the regional potential-forming space leads to the need to assess the investment potential, taking into account the characteristics of a particular region.

2. Literature review

Many scientific publications of leading scientists are devoted to the peculiarities of regional development, including investment development, including: Abramova A. (2021) [1]; Arefieva O. (2021) [2]; Dergaliuk M., Khanin S. (2021) [3]; Drapkin I., Dubinina E. (2020); Dubyna M.

(2021) [4]; Egorova, D. (2020) [5]; Fedyshyn M. (2019) [6]; Galanina T. (2017) [7]; Grigoraş-Ichim C.E., Cosmulese C.G. (2018) [8]; Kholiavko, N. (2021) [9]; Kolmakova E. (2020) [10]; Lyulyuchenko M.V. (2019) [11]; Naumov I.V. (2020) [12]; Okorokova O.A., Ulibina L.K. (2018) [13]; Popelo O. (2017) [14; 15]; Sharybar S.V. (2017) [16]; Shidov A.K., Altudov Y.K. (2017) [17]; Shkarlet S. (2017) [18-19]; Wei G., Sun P. (2020) [20]; Zhuk O. (2018) [21] and others.

The authors' research [12] is based on the development of a model for reproducing investment potential of institutional sectors at the regional level. The model takes into account the system of forecast scenarios of the reproduction and rational choice for the purpose of socio-economic development of regions. Within the article [5], investment potential of the regions is examined, and it is proposed to improve the analysis process through the results of pairwise correlation analysis. The basic assessment factors include the investment activity in the region; environmental costs, the number of companies that disclose non-financial statements, and the percentage of companies in the region that implement innovations in energy saving. The aim of the authors' research [4] is to build and evaluate an econometric model of the determinants of foreign direct investment at the regional level, based on the gravitational approach. The authors argue that the development of a methodology for assessing investment potential of the region and comparing it with the actual inflow of foreign direct investment will be useful for setting goals for regional authorities to intensify the process of attracting foreign direct investment.

According to the research of scientists [20], the factors that influenced the coordination relationship between investment potential and economic development have been identified. Among such factors, the authors note the economic base, living standards, level of industrial construction, level of information support and business friendliness. Using a geographically weighted distribution of regression coefficients, the authors divided the driving mechanisms of spatial distribution into five types: driven by economic base, industry, information programs, business conveniences and consumer markets. In the article [10], scientists have developed a methodology for assessing innovation and investment potential of the region. Scholars argue that due to the polarization of the social and economic space of the region, it is extremely important to classify municipalities according to the type of socio-economic policy and the prerequisites for innovative development. In the article [11], theoretical foundations of the investment activity in the construction industry of the region are investigated and systematized. The peculiarities of the mechanism of influence of the intensification process of the investment activity in the construction industry on the innovative potential formation of the region and the intensification of its development are analyzed. As a result of the study [13], the authors propose the development of a factorial model for assessing investment potential of the regional insurance market in

the context of socio-economic transformation of development institutions. Scientists have studied the main vectors of the development of the regional insurance market based on economic potential of the region.

The research [17] revealed the peculiarities of the formation of innovation and investment strategy in economy of the problem region. The authors study the role of development institutions as an important tool for implementing innovative investment strategies in the region's economy. Scientists have proved that federal development institutions, as one of the main tools for intensifying the implementation of investment strategies in the regional economy, need a clear functional commitment and orientation to address the problems of socio-economic development of specific types of regions. The research of scientists [7] is of practical importance, which is to develop recommendations for regional authorities to develop investment plans and socio-economic forecasts by giving certain areas the status of priority development. The main purpose of the study [16] is to assess the impact of social potential of rural areas on their investment attractiveness. The authors have developed a methodology for assessing social potential of rural areas on the basis of an open system of indicators. The authors rated and grouped municipal territories of the region, as well as studied the impact of social potential on investment attractiveness of the regions.

3. Methodology

To assess investment potential of the regions, rating methods are most often used in the methods, which in general are partial cases of the multidimensional analysis. The authors of this article propose to assess investment potential of the regions on the basis of a comprehensive ratio.

The purpose of this article is to assess the state and trends of investment potential of the regions of Ukraine, for which the study identified components of investment potential - financial, production, human, innovation and resource potential, as well as evaluation indicators that characterize them and on the basis of which they are carried out. calculation and determine the complex coefficient of investment potential.

In order to obtain effectiveness in the study, the following methods were used:

- statistical, which were used to form a system of indicators to determine investment potential of the regions;
- graphic, which was used to visualize the process of assessing investment potential of the regions;
- standardization, which was used to compare heterogeneous indicators that characterize partial potential of investment potential, which allowed a comprehensive assessment of investment potential of the region;

- cartographic, which is necessary for a visual representation of groups of regions by the value of the complex index of investment potential of the region.

3. Results

In order to measure such an index as investment potential of the region, we propose to use the following algorithm (Fig. 1).

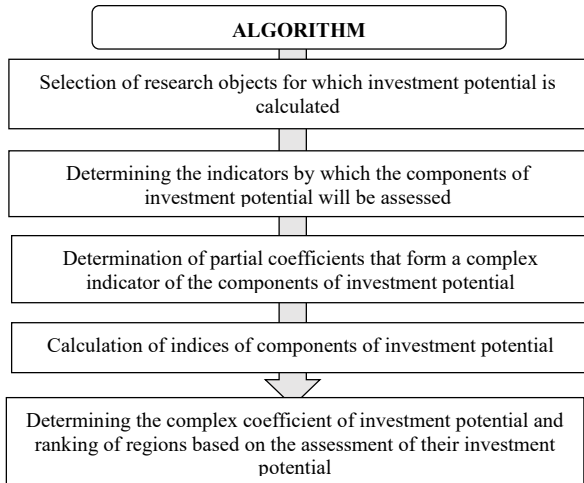


Fig. 1 Stages of the process of implementing the assessment of investment potential of the regions of Ukraine.

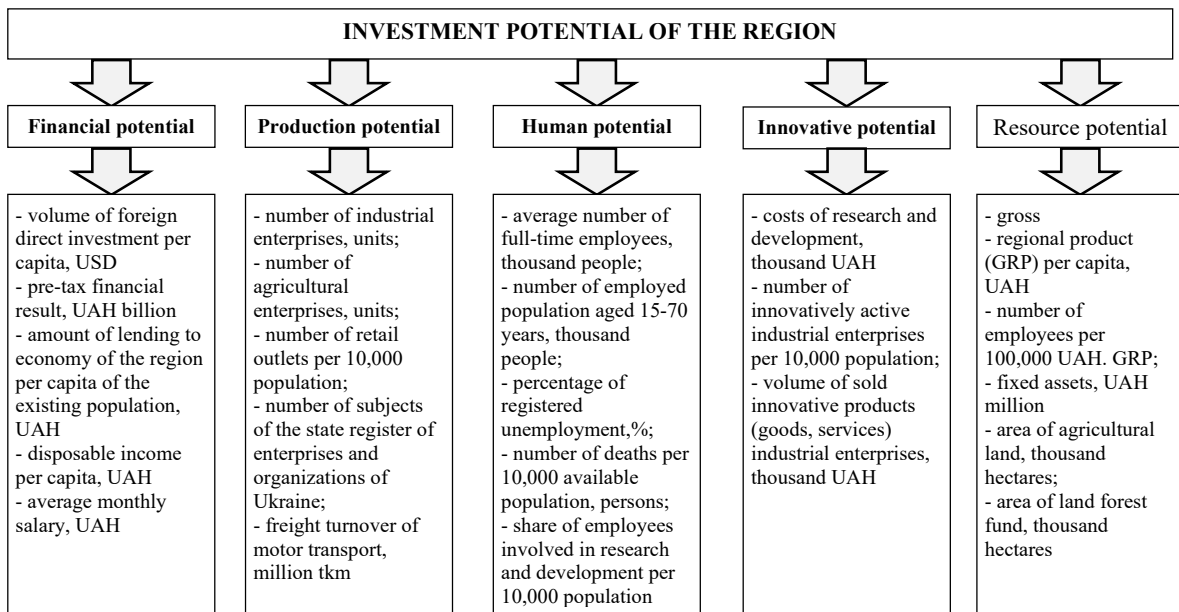


Fig. 2 Indicators for assessing investment potential by its partial potential.

(Source: developed by the authors.)

Based on the application of the above algorithm at the first stage, we select the objects of study in this research, and the object of study are the regions of Ukraine.

The next step of the algorithm involves the selection of indicators based on the regional statistical information, which will determine the indices of such components of investment potential as financial, production, human, innovation and resource potential, which will assess investment potential of regions.

One of the biggest difficulties in using this technique is the choice of partial indicators of each component of investment potential to assess them. A limitation that significantly affects this evaluation process is the availability of information offered by official statistics, so the expansion of such data may lead to an expansion or deepening of indicators. Their selection took into account not only the static characteristics of a particular object of analysis, but also the dynamics of indicators, which better reflects the state and changes in the components of investment potential of the country's regions, on which basis, the formation of the indicators list of each partial potential of investment potential of the region is carried out (fig. 2).

(Source: developed by the authors.)

The next stage includes the determination of partial coefficients, which form a comprehensive indicator of financial, production, human, innovation and resource potential. As these indicators have different units of measurement and areas of permissible values, it is necessary to standardize the indicators, as a result of which it is possible to have a uniform description for all indicators, which allows you to formally compare standardized objects.

Next, the calculation of indices of financial, production, human, innovation and resource potential, which is determined by the following formula, will be presented:

$$C_i = \frac{M_{ir}}{S} \quad (1)$$

where C_i – coefficient of the indicator of partial potentials of innovation potential of the i -th region;

M_{ir} – the value of a certain indicator of financial, production, human, innovation and resource potential of the region;

S – standardized deviation of the indicator.

To find the standardized deviation, let's use the following formula:

$$S = \sqrt{\frac{\sum (M_{ir} - \bar{M})^2}{n}} \quad (2)$$

where \bar{M} – the average value of the indicator for all regions studied;

n – number of regions.

The next stage of the analysis is the calculation of the components of investment potential, which is determined by the following formula:

$$I_i = \sum_{j=1}^n (1 - C_{ij})^2 \quad (3)$$

where I_i – complex coefficient of partial potentials of investment potential of the region;

n – quantitative measurement of the population;

C_{ij} – coefficient of the indicator of partial potentials of innovation potential of the region.

According to the above quantitative model, the maximum place in the rating of such partial potentials of investment potential as financial, production, human, innovation and resource will be occupied by the region that will have the greatest value of the complex indicator. The following indicators are determined - stimulants, i.e., those that have a positive effect on the object of analysis and disincentives - the absorption of which is negative. In this case, we'd like to note that all selected indicators are stimulants, except for the indicator "Percentage of registered unemployment, %", which has a disincentive effect". Thus, the difference between the unit and the partial ratio, which is defined as a disincentive to

investment development, is subtracted, while the difference between the unit, which is stimulants, is added.

At the last stage of the assessment of investment potential, the complex coefficient of investment potential is determined, as well as the assignment to each object of research - the region of a certain place in the ranking. In this case, the region with the highest value of investment potential should be considered the one for which this indicator is the maximum. The complex coefficient of investment potential is calculated as the arithmetic mean of such components of investment potential as financial, production, human, innovation and resource potential, according to the following formula:

$$I_{IP} = \frac{I_{fp} + I_{pp} + I_{hp} + I_{inp} + I_{rp}}{5} \quad (4)$$

where I_{IP} – complex coefficient of investment potential of the region;

I_{fp} – index of financial potential of the region;

I_{pp} – index of production potential of the region;

I_{hp} – index of human potential of the region;

I_{inp} – index of innovation potential of the region;

I_{rp} – index of resource potential of the region.

Based on the above-described methodology for assessing investment potential of the regions, the calculations of integrated indicators of financial, production, human, innovation and resource potential are recorded in Table 1.

The analysis of the obtained data in Table 1 indicates a significant difference in the values of partial components of investment potential, so the highest level of financial potential is in Kyiv, the highest level are in Dnipropetrovsk, Kiev, Zaporizhia, Poltava, Kharkiv, Odessa regions, and the lowest - Luhansk, Donetsk, Transcarpathian regions. The leading position in terms of production potential is occupied by the city of Kyiv, and such regions as Luhansk, Donetsk, Ivano-Frankivsk regions are outsiders. Among the regions with the highest level of human potential are Kyiv, Dnipropetrovsk, Zaporizhia regions, and the lowest positions in this indicator are occupied by Donetsk, Luhansk, Ternopil, Transcarpathian, Rivne and Chernivtsi regions. Regarding the innovative component of investment potential of the regions, the following should be noted: Kyiv, Zaporizhia, Kharkiv regions have a high level, while Ternopil, Chernivtsi, Donetsk and Luhansk regions should be referred to the regions with the lowest level. The level of resource potential is the highest in Dnipropetrovsk, Zaporizhia, Kharkiv regions, while Chernivtsi, Ternopil, Luhansk, Donetsk, Transcarpathian and Ivano-Frankivsk regions occupy the last places in terms of this indicator.

The dynamics of the values of the complex indicator of investment potential of the regions for 2018-2020 are presented in Table 2 and Fig. 3.

Table 1: Value of the potential indices of the regions and the complex coefficient of investment potential, 2020

Region	I _{fp}	I _{pp}	I _{hp}	I _{imp}	I _{rp}	Complex coefficient of investment potential	Ranking of regions according to the complex coefficient of investment potential
Vinnitsia	8,22	3,01	7,24	3,11	4,43	5,20	9
Volyn	7,13	2,87	5,97	2,42	2,43	4,16	17
Dnepropetrovsk	10,11	4,75	8,51	4,42	5,57	6,67	3
Donetsk	7,39	0,93	4,51	1,99	1,35	3,23	23
Zhytomyr	7,83	1,73	7,34	2,58	3,41	4,58	13
Transcarpathian	7,29	3,06	4,61	2,47	1,47	3,78	19
Zaporizhia	9,28	4,52	8,51	5,21	5,38	6,58	4
Ivano-Frankivsk	8,71	0,98	4,68	2,38	1,37	3,62	20
Kiev	9,75	5,09	9,97	5,09	4,81	6,94	2
Kirovohrad	7,63	4,08	6,91	2,51	2,57	4,74	11
Luhansk	6,98	0,91	4,46	1,79	1,28	3,08	24
Lviv	7,83	4,38	4,92	2,84	3,24	4,64	12
Mykolayivska	8,52	4,24	6,27	2,97	4,23	5,25	8
Odessa	9,13	4,76	6,62	3,51	3,71	5,55	7
Poltava	9,64	4,07	7,63	4,51	4,54	6,08	6
Rivne	7,61	2,51	4,76	3,86	2,64	4,28	16
Sumy	8,94	1,27	7,42	3,28	3,87	4,96	10
Ternopil	7,54	2,15	4,57	2,01	1,45	3,54	22
Kharkiv	9,28	4,32	8,51	5,21	5,38	6,54	5
Kherson	8,33	3,57	5,87	2,34	1,88	4,40	15
Khmelnysky	7,92	2,71	6,47	2,31	1,97	4,28	16
Cherkasy	8,21	1,21	6,73	2,20	2,13	4,10	18
Chernivtsi	7,42	1,97	4,75	2,11	1,59	3,57	21
Chernihiv	8,10	1,43	7,29	3,74	2,01	4,51	14
Kiev city	19,21	11,47	6,31	2,79	5,11	8,98	1

(Source: calculated by the authors)

Table 2: Value of the complex coefficient of investment potential of the regions, 2018-2020

Region	Value of the complex coefficient of investment potential			Rating place		
	2018	2019	2020	2018	2019	2020
Vinnitsia	5,81	6,43	5,20	11	6	9
Volyn	5,01	4,73	4,16	19	20	17
Dnepropetrovsk	6,72	6,76	6,67	4	3	3
Donetsk	4,11	4,14	3,23	24	24	23
Zhytomyr	5,33	5,21	4,58	16	16	13
Transcarpathian	4,39	4,32	3,78	23	23	19
Zaporizhye	6,48	6,57	6,58	6	5	4
Ivano-Frankivsk	4,51	4,64	3,62	22	21	20
Kiev	6,89	7,54	6,94	3	2	2
Kirovohrad	6,61	6,17	4,74	5	9	11
Luhansk	3,79	3,67	3,08	25	25	24
Lviv	5,11	5,17	4,64	18	17	12
Mykolayivska	6,29	6,31	5,25	7	7	8
Odessa	5,58	6,02	5,55	14	10	7
Poltava	7,98	6,61	6,08	2	4	6
Rivne	4,62	4,51	4,28	21	22	16
Sumy	5,61	5,51	4,96	13	14	10
Ternopil	5,24	5,03	3,54	17	18	22
Kharkiv	6,18	6,22	6,54	8	8	5
Kherson	5,92	5,71	4,40	10	12	15
Khmelnysky	5,74	5,63	4,28	12	13	16
Cherkasy	5,41	5,33	4,10	15	15	18
Chernivtsi	4,91	4,81	3,57	20	19	21
Chernihiv	6,03	5,87	4,51	9	11	14
Kyiv city	8,87	9,08	8,98	1	1	1

(Source: calculated by the authors)

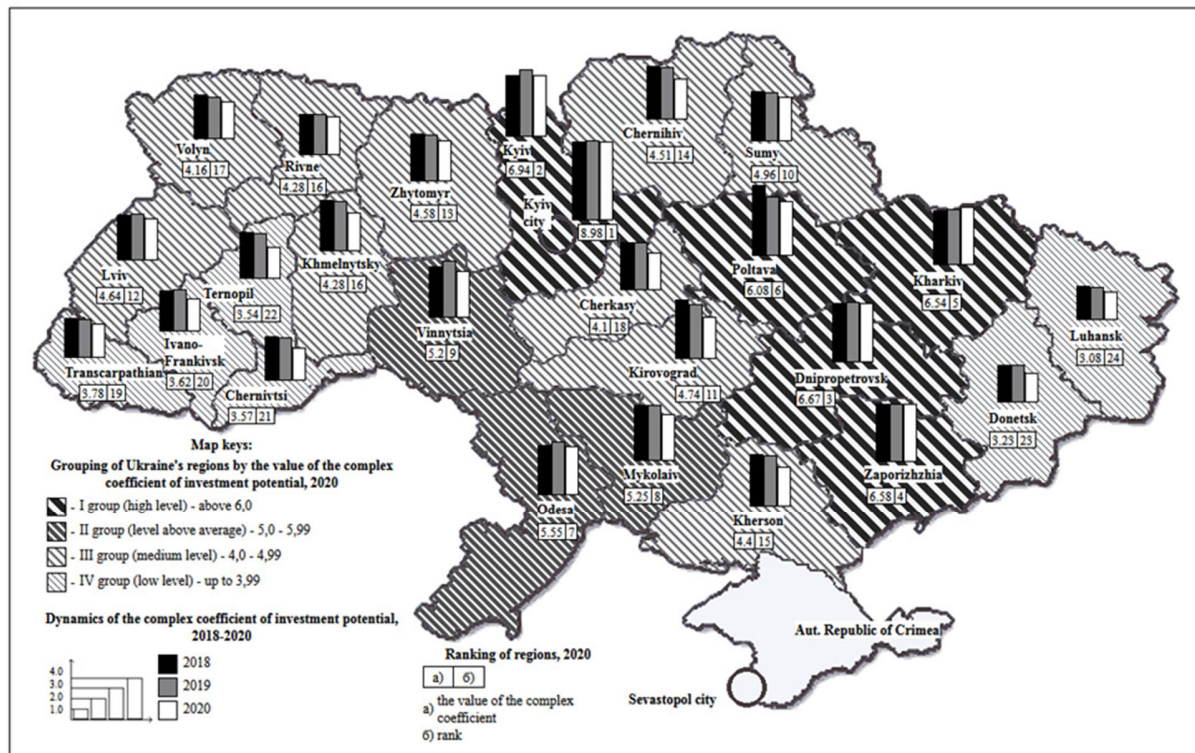


Fig. 3 Cartographic analysis and rating of Ukraine's regions by the value of the complex coefficient of investment potential. (Source: developed by the authors.)

According to the results of cartographic analysis and ranking of the regions of Ukraine by the value of the complex coefficient of investment potential of the region, it can be concluded that the group of leading regions includes Kyiv (8.98), Kyiv (6.94), Dnipropetrovsk (6.67), Zaporizhzhia (6.58), Kharkiv (6.54) and Poltava (6.08) regions. Transcarpathian (3.78), Ivano-Frankivsk (3.62), Chernivtsi (3.57), Ternopil (3.54), Donetsk (3.23) and Luhansk (3.08) regions were outsiders. Other regions of Ukraine fell into the group of regions with an average or above average value of the complex coefficient of investment potential with the value of the indicator from 4.1 to 5.55. The obtained results of ranking the regions by investment potential indicate the existence of their significant differentiation.

4. Conclusions

The method of estimating investment potential of the region proposed by the authors is complex, as it takes into account the system characteristics of the potential-forming space of the region and presents it as a holistic system with such components (partial potentials) of investment

potential as financial, production, human, innovation and resource.

The methodology used by the authors is objective and includes evaluation parameters, which, firstly, are based on statistical data, and, secondly, take into account all components of investment potential.

The study allows us to draw the following conclusions:

- Kyiv has the highest level of investment potential, which significantly exceeds other regions in such partial components of investment potential as financial and production;

- the calculated values of investment potential by region indicate a significant regional differentiation of this indicator, and therefore a significant disproportion of regional investment activity, so in Kyiv the level of innovation potential in 2020 is - 8.98, and in Lugansk - 3.08;

- there is a significant dynamics of the estimated parameters of the partial components of investment potential, which leads to a change in the level of investment potential of individual regions.

The results of the authors' methodology for assessing investment potential of the region allowed them to be grouped by the level of this indicator, which will allow

further research to develop ways and steps to improve the use and intensification of investment activities in the regional dimension.

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