

# Portfolio Approach to Investment Management in the Region in the Context of Goal-Oriented Investment Policy

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**Abstract**—For the regions of Russia, related to the author's typology to a problem type, defined as the optimum goal-oriented investment policy aimed at the formation of the target investment attractiveness of the region, taking into account its particular specific properties and involves organizing investor targeting. The economy of the regions do not have sufficient grounds for the use of the resource, the world economic, or innovation through investment development, therefore, the concept of integration is offered to them, but not in widespread cluster, and in the form of a portfolio. Regional economy can be represented as a diversified investment portfolio that combines industry and activities, unequal in its investment performance. The article presents the results of the formation of the portfolio for the Vladimir region as a typical representative of the problem regions. In forming the portfolio implemented principles: harmonizing conflicting goals of participants of investment activity, diversification, portfolio handling. To optimize the portfolio used statistical methods, the method of dynamic standard. The publication was prepared within the framework supported by the RFBR, research project №17-12-33002.

**Keywords**—*The investment policy, Region, Portfolio approach.*

## I. INTRODUCTION

In a country like Russia, with huge regional differentiation, investment management at the national level can not accompany the development and implementation of investment policy in the regions. In acute interregional competition for investment will work to attract them much more active, but it is not always based on scientific approaches to the definition of the investment priorities of development, the formation mechanisms of interaction with investors, which may reduce its effectiveness. This determines the relevance of the further development and methodological principles of investment activities on the meso-level management.

Issues of investment management, development and implementation of a regional investment strategy and policy formation and optimization invest Zion portfolio devoted to the works Blanc I., Buchwald E., Valentey S., Gubanova E., Kovalev V., Lakhmetkina N., Malyshev D., Mahotaeva M., Risin I., Shvakov E., Suspitzin S.A., Tatarkin A., Tatevosyan G., Treshchevskiy Y.,

Despite the multifaceted study of investment activity remain insufficiently developed some of its aspects, such as the development of approaches to investment management at the meso level, the development of mechanisms to coordinate the interests of the subjects of the investment process. Insufficient attention is paid to the methodology of formulating investment concept as the basis of a regional investment policy. Methods for determination of investment priorities proposed by the researchers reveal the sector attractive for private investors and the region, but the composition of these industries does not match that does not allow us to determine the industries in which management actions should be concentrated. It requires further development of the mechanism for selecting priority projects for inclusion in the regional portfolio and funding. To address these challenges directed the study..

## II. GOAL-ORIENTED POLICY AND INVESTMENT CONCEPTS

For each region, the investment policy is individual and must be tailored to its specific characteristics and properties. At the same time across a variety of regional economies, they may be combined into typological groups, as the basis for developing a regional investment policy (RIP) can serve some basic options, teach Pipeline similarities territorial entity, its properties, determine the conditions for investment and the nature of investment activity. The author has developed a typology of Russian regions by the nature of the investment activity and defined the basic options for a regional investment policy

One of the largest groups, including 15 subjects, including Vladimir region are problematic regions for which base as defined goal-oriented investment policies.

Goal-oriented policy is a systemic unity of the ideological concept of management of investment activity in the region as a set of ordered views, expressing the interests of participants of investment activity on the one hand, and the control mechanism to coordinate the interests of the other. As part of this policy to investment activity of subjects is broad, it includes both regional and municipal authorities, as well as investors, businesses and organizations, and other stakeholders. A broad interpretation of the composition of the subjects due to the desire to reach a maximum range of

economic interests of participants of investment activity. In contrast, the representation of the object RIP is narrow, this is regarded as a target investment attractiveness, the economic substance of which is to quantify the measures to achieve a balance of economic interests of economic entities, investors in the region and the state, completeness realization of the goals set by them. And this feature is due to the name of the proposed investment policy – goal-oriented.

The process of developing a goal-oriented investment policy in the region must start with the definition of the concept of investment and the composition of the priority sectors of the regional economy. Under the investment concept is understood the basic idea of defining the priorities and objectives, principles and instruments of regulation of investment activity. The basis of the concept of investment properties comprise the region that contribute to its potential advantages in the competition for investment resources. At the regional level, all the variety of assumptions to search for investment concepts can be combined in four conceptual frameworks: the resource, the world economic, innovation and integration.

The resource base of the investment concept of the attractiveness of regions, has significant reserves of mineral resources, favorable conditions for agriculture, tourism and recreation. At very high security mineral resources, primarily fuel and energy resource base forms the "inevitable investment priority", providing attractive to all types of investors, but results in a single-industry structure of the regional economy and a high dependence on world prices.

World economy basis of the investment concept involves finding the benefits associated with the state of foreign economic relations: the development of export-oriented and import-substituting industries, attract foreign direct investment, the creation of special economic zones. On this basis, it can be based investment policy of export-oriented, cross-border regions, regions that produce import-substituting products.

Implement an innovative framework of the investment concept can regions with scientific, technical and human resources, allowing you to create and implement new products and services demanded by the market, to develop and implement modern technological processes, to actively participate in the inter-regional and international technology exchange and technical services. This concept requires a high level of wages and quality of life. It allows you to create long-term benefits, provides ample opportunities for the coordination of economic interests.

Integration foundation investment concept involves the development of territorial and sectoral integration, providing the implementation of the multiplier effect, the use of the entire spectrum of advantages, combining elements of the first three concepts, and on the possibilities diversify the structure of the regional economy.

A common form of implementation of the concept of integration is the formation of clusters. On the basis of cluster approach successfully developed regions with a variety of benefits, but in the absence of significant advantages of the

formation of clusters does not provide the expected multiplier effect.

When investing in funds invested in the cluster associated assets with similar characteristics, whereas the key rule financial investor - invest in assets with different investment properties. It is therefore proposed to implement an alternative approach to the cluster - namely portfolio. The economy of regions which do not have sufficient grounds to use one of the foundations of the investment can be represented as a diversified investment portfolio, bringing together industry, unequal in its investment performance. In particular the concept of integration in the form of a portfolio best meets the conditions prevailing in the economy of problem regions. To implement the concept of the integration of the portfolio need to consider the concept of the investment portfolio and the principles of its formation, considering their applicability to the regional level in the context of the formation of goal-oriented investment policy.

### III. DEFINITION AND CHARACTERISTICS OF THE INVESTMENT PORTFOLIO

The investment portfolio is usually defined as a certain way matched set of real or financial investments managed as a single entity. Gitman L. and Dzhonk M. treat it as "a set of investment instruments collected for a common investment objective." [1] In the definition of I. Blank "investment portfolio is purposefully generated set of financial instruments, designed to implement financial investment in accordance with the developed investment policies" [2]. The same approach adheres Kovalev V.: "Investment portfolio - a set of investment instruments, which serve to achieve their goals." [3]

The concept of portfolio is not only applicable to financial investment. So, N. Lakhmetkina points "of the investment portfolio of the enterprise called formed in accordance with the investment objectives of the investor's aggregate of real and financial investment objects intended for investment activities and is regarded as a unified custody object" [6].

With regard to the actual field of investment portfolio is considered as "as a collection of projects interconnected technological chain or as a set of projects, as a result of interactions which occur synergistic effects which increase the cost of an amount greater than the sum of the net present value of individual projects and lead to an increase in value of the enterprise". [5] At the regional level project portfolio (in particular - the PPP projects) is considered as "a set of projects of various industries and planned for implementation on the territory of the region to the PPP terms are grouped together for the purpose of effective management to achieve strategic goals and priorities of regional development". [6]

The process of forming the portfolio includes purposeful selection facilities investment, and its key task of modeling is "in creating the optimal conditions of investment, i.e. to provide an investment portfolio such characteristics are achieved when placing means at any given object can not" [7]. Thus, the identifying characteristics of the portfolio is a purposeful selection of components to comply with the investment policies difference investment characteristics

united asset availability synergistic effect controllability. But the main feature seems to serve as a way to achieve the conflicting goals.

The first principle of portfolio investment is to reconcile two conflicting objectives - while maximizing the return and minimizing risk. Harmonizing conflicting goals is achieved through diversification - a portfolio of assets with different investment characteristics with respect to yield and risk levels and return covariance parameters of profitability. Diversification is the second principle of investment portfolio. The show sufficient liquidity as the third principle of portfolio investment - the establishment of a certain percentage of the portfolio of assets that can be easily implemented. [8]

With regard to the portfolio of real investments are the following principles. In particular, N. Lakhmetkina includes their number: the implementation of the investment strategy of the company, compliance with investment resources portfolio, the optimization of yield and risk ratios, optimizing profitability and liquidity ratios, to manage a portfolio of [6].

The principle of the implementation of the investment strategy involves linking objectives formed portfolio investment strategy targets. The principle of matching resources investment portfolio - linking the portfolio of assets with disposable investment resources. The principle of optimization of yield and risk ratios associated with a specific priority objectives of portfolio formation and marketed by diversification. The principle of optimization of profitability and liquidity as measured by the achievement of the necessary proportions between these indicators, based on the priorities of the formation of an investment portfolio. The principle of handling the portfolio "means taking into account the staff of the enterprise features for operational portfolio management, its monitoring, re-vision and implementation of the necessary reinvestment" [6]. These principles indicate other authors. [7,9,10]

Thus, the composition of portfolio investment principles for the wider sphere of real investments. The composition of the portfolio of investment principles in relation to the regional portfolio is proposed to include, in particular, the principle of harmonizing conflicting goals of participants of investment activity. This harmonization achieved on the basis of diversification (the second principle of the formation of the region's investment portfolio). The third principle is to control portfolio - the possibility of targeting indicators of its structure and dynamics, as the ability to maintain or change the status of a regional investment portfolio.

#### IV. FORMATION OF AN INVESTMENT PORTFOLIO IN THE REGION

##### 4.1 Matrix industries

In accordance with the portfolio integration concept, the most appropriate for the problem type regions, criteria for the diversification of the regional investment portfolio may be: first, industry affiliation, taking into account the investment characteristics of the industry - their attractiveness for commercial investments, matching the interests of private investors, on the one hand, and compliance with the interests of the region, on the other hand; secondly, the basis of the investment concept - resource, world economy and innovation.

The analysis of the dynamics of the industry in terms of their commercial appeal and compliance with the objectives of socio-economic development for 2005-2016 years., Conducted according to the [11,12,13], To the identification of the most promising sectors in the region. Initially the industry were divided into four groups: growing, stable, unstable and depressed. After clarifying the prospects of improving the industry in the future depressive industry were excluded from further analysis, and in the group of unstable sectors allocated prospective and selective.

To implement the principle of harmonizing conflicting goals of participants of investment activity in the third stage is set matching the dynamics of the industry interests of private investors and the region. For the separation of industries in terms of their compliance with the interests of the private investor justified the composition and dynamics of the order of reference indicators. The greatest relevance to the interests of the private investor is achieved when the investments are responsible for sales growth with the growth of profits. Below is the standard number of subordinate profit growth rate (P), sales volume (V), investment (I), for leveling the inflationary factor is taken into account the rise in prices (C):

$$krP > krV > krI > 1 \quad (1)$$

$$krP > krV > krI > krC \quad (2)$$

Actual rows and regulatory factors are compared by Spearman (ko), Kendall (kinv). At full coincidence of each of them takes a value "1", with the full mismatch - "-1". To generalize the indicator used, Pp, changing from "0" (full mismatch) to "1" (full line):

$$P_p = \frac{(1+k_s)(1+k_{inv})}{4} \quad (3)$$

For values of summary measure from 0 to 0.33 attractiveness of the industry from the perspective of a private investor is low, 0,33-0,66 - medium and 0,67-1 - high. According to the results of calculation of the matrix formed investment attractiveness branches (see Fig. 1)

	Appeal		Unstable	
			Perspective	Selective
high	Real estate transactions (0,86) Trade (0,68)	Building (0,86) Woodworking (0,86) Manufacture of food products (0,68) Transport and communications (0,68)	Rubber and plastic articles (1,00) Electrical Manufacturing (0,86) Agriculture (0,68) Production of other non-metallic products (0,68)	
medium	Chemical and pharmaceutical industries (0,56)	Mining (0,39)		
low		Manufacture and distribution of electricity, gas and water (0,28)		Engineering (0,30) Metallurgy & Metalworking (0,23)

Fig. 1. Investment attractiveness of industries matrix

To assess compliance with the conditions for meeting the interests of the re-gion formed the normative ranges for economic activities and for the processing industries. Subordination growth factors in them is set, based on the following assumptions. The interests of the population meets the creation of high-paying jobs, business entities interested in attracting investment (I), and an increase in sales volumes (V) and earnings (P). For economically viable employment growth (W) and wages (R) is a prerequisite outpacing productivity growth. Objectives of development of the region responsible investment growth in production volumes, value added (DS), taxes, employment and living standards. The growth in revenue, profit and wages fund determines the growth of the tax base and, consequently, the content of the regional budget.

Reference dynamics of economic activity:

$$krDS > krP > krV > krI > krR > krW > 1 \quad (4)$$

$$krDS > krP > krV > krI > krR > \quad (5)$$

According to the types of manufacturing industries:

$$krP > krV > krI > krR > krW > 1 \quad (6)$$

$$krP > krV > krI > krW > krC \quad (7)$$

Match the actual dynamics regulatory rows is determined by the coefficients of Spearman, Kendall and generalizing factor Pr, which is calculated analogously by the formula (3). The rating is given according to the scale: 0-33 - low, 0,33-0,67 - average, 0,67-1 - highest matching balance of interest (see Fig. 2)

#### 4.2 The choice of sectors for inclusion in the portfolio

Each matrix can be seen as an investment portfolio, however, such a portfolio is not balanced. The composition of the industries with a high level of compliance with the interests of the investor and the interests of the region's close, but not the same. This composition is too wide, with limited investment resources of all sectors can not qualify for priority funding. Not established relationship with the concept of investment in the region. On the basis of the matrix is difficult to determine the final composition of the portfolio and use it

as an investment management instrument. It is therefore necessary to achieve a balanced investment portfolio.

	Compliance with the interests of the region		Unstable	
			Perspective	Selective
high	Real estate transactions (0,86) Chemical and pharmaceutical industries (0,80) Trade (0,69)	Woodworking (0,89) Manufacture of food products (0,74) Building (0,86)	Rubber and plastic articles (0,93) Production of other non-metallic products (0,65)	
medium		Manufacture and distribution of electricity, gas and water (0,64) Mining (0,63) Transport and communications (0,55)	Electrical Manufacturing (0,59) Agriculture (0,51)	Engineering (0,45)
low				Metallurgy & Metalworking (0,32)

Fig. 2. Compliance matrix sectors interests of the region

In accordance with the chosen investment portfolio concept in Vladimir to be included three types of industries: resource, innovation, import substitution. Excluding industries and activities that can not be attributed to any of these categories, we obtain the following composition of the regional portfolio. Resource industries and sectors, the investment competitiveness of which is based on the availability of local resources: agriculture and forestry (at the same time is an import substituting industry), wood processing, manufacture of other non-metallic mineral products, mining (mineral resources). Import-substituting sectors: agriculture, food processing, mechanical engineering, manufacture of rubber and plastic products. Innovative industries and activities: chemical and pharmaceutical industry, production of electrical equipment, transport and communications.

The portfolio contains the industry with different levels of liquidity and profitability, including high, but in relation to such an object, as a branch of the re-gion, the relationship between such key characteristics as the risk and return reverse, so it is impossible to optimize the regional portfolio on the basis of these criteria.

#### 4.3 Portfolio Optimization

Therefore, to determine the final composition of the portfolio and the allocation of scarce investment resources between projects of different industry sector, it is proposed to conduct portfolio optimization by solving two linear integer programming problem.

First optimization model allows for the selection of sectors for inclusion in the investment portfolio. portfolio optimization carried out taking into account the measures are consistent with the dynamics of development of the industry to balance the interests of private investors and the region. As an asset are included in the optimal portfolio, is considered the region's industry as a whole. The volume of demand for investment resources is made up of all the general

requirements of the projects of this industry sector submitted for funding (a list of such projects is available on the Investment portal of the Vladimir region) [16].

Criteria, reflecting a measure of conformity to balance the interests of private investors, and the region is the integral coefficient  $P_c$ , which is defined as the product of the coefficients  $P_p$  and  $P_r$ . An optimization model is of the form:

$$P_c = \sum_{i=1}^m P_{pi} \cdot P_{ri} \cdot z_i \rightarrow \max, \quad (8)$$

$P_c$  – integral index, which reflects the balance the interests of compliance with the participants of investment activity;

$P_{pi}, P_{ri}$  – indicators of compliance with the interests of private investors and the region for the  $i$ -th branch,  $i = 1 \dots m$ ;

$z_i$  – a binary variable that reflects the nature of the decision on the inclusion of the sector into a regional investment portfolio ( $z_i = 1$  if the sector is included in the portfolio,  $z_i = 0$ , if the industry is excluded from the portfolio).

Restrictions:

$$I_{maxt} \geq I_t^n \quad (9)$$

$$I_t^n = \sum_{i=1}^m I_{it} \cdot z_i, \quad (10)$$

$I_{maxt}$  – the maximum amount of available investment resources of the year  $t$ ,  $t = 1 \dots T$ ;

$I_t^n$  – the amount of investment in projects of priority sectors of the region's investment portfolio  $n$ ;

$I_{it}$  – investments in projects  $i$ -th industry in the year  $t$ .

When using this model, the total amount of available investment resources may be allocated by industry has not completely. Full funding prepared projects sectors with the highest investment priorities, depending on the value of the integral index and overall resource requirements. Projects not included in the first priority group, funded by a residual principle - the residue is distributed between the available resources. The criterion by which the distribution is made is one or another indicator of the effectiveness of the project. In this capacity, it can be used indicators of net present value, profitability index, the researchers [15] offer for this project as indicators of sustainability. In this paper we propose to use the number of jobs newly created in the implementation of the investment project.

For the distribution of the available balance of investment resources serves optimization model:

$$R = \sum_{j=1}^k R_{ij} \cdot z_j \rightarrow \max \quad (11)$$

$R$  – the total number of new jobs created;

$R_j$  – the number of jobs created during the implementation of  $j$ -Project  $i$ -th industry sector,  $j = 1 \dots k$ ;

$z_j$  – binary variable reflecting the nature of the decision to include the project in the regional portfolio ( $z_j = 1$  if the

project is included in the portfolio,  $z_j = 0$ , if the project is excluded from the portfolio).

Restrictions:

$$I_{ocrt} \geq I_t^m \quad (12)$$

$$I_t^m = \sum_{j=1}^k I_{jt} \cdot z_j \quad (13)$$

$I_{ocrt}$  – the remainder of available investment resources of the year  $t$ ,  $t = 1 \dots T$ ;

$I_t^m$  – the amount of investment in priority sectors of the projects financed on leftovers;

$I_{jt}$  – investment in  $j$ -projects the  $i$ -th branch of the year  $t$ .

The proposed models have been tested by the example of the Vladimir region, which used information on regional investment projects proposed for implementation in 2018 [16].

**Table 1.** Basic options for a regional investment policy

Priority sectors in the region	Number of projects	Need for investments, mln. rub.	The number of jobs created	$P_p$	$P_r$	$P_c$
Agriculture	54	14424,30	2566	0,68	0,51	0,35
Mining and quarrying	4	3420,00	295	0,63	0,63	0,4
Woodworking	4	22842,00	877	0,86	0,89	0,77
Manufacture of other non-metallic mineral products	2	6807,7	1254	0,68	0,65	0,44
Mechanical engineering	6	6178,827	924	0,3	0,45	0,14
Manufacture of food products	5	1160,18	110	0,68	0,74	0,5
Manufacture of rubber and plastic products	3	678,60	184	1	0,93	0,93
Chemical and pharmaceutical industries	6	5030,00	647	0,56	0,8	0,45
Electrical	2	1414,00	220	0,86	0,59	0,51
Transport and communications	3	643,364	80	0,68	0,55	0,37

The total amount of available investment resources in the current year amounts to 52.319 mln. rub. Applying the first optimization model, we see that in its entirety can be financed projects of all sectors except agriculture. The total amount allocated to the investment resources of 48.175 mln. rub. The distribution of the residual principle subject to RUB 4.144 mln. rub. In this case, all projects funded by a residual principle, have the same Branch, but they could also refer to a number of industries. The second optimization model is applicable to the dis-tribution of the remaining resources, and in fact, and in another case.

Application of the second optimization model allowed a selection of 35 of the remaining 54 projects. Of these, a number of major projects include, in particular, the project of reconstruction of the cell equipment of two buildings integrated poultry farms (the need for investment of 100 million rubles, the number of new jobs - 570), a project to build a complex for the cultivation and production of turkey meat (the need for investment in 1200 million rubles, the number of jobs created - 300). Small and medium-sized projects were selected for inclusion in the investment portfolio and funding: livestock premises reconstruction project (1.5 million rubles, 4 jobs), construction of platforms for content calves (3.1 million rubles, 2 jobs) construction of a family farm raising turkeys (80 mln. rub., 35 jobs).

#### V. CONCLUSION

The study developed a regional approach to the formation of an investment portfolio diversified by sector principle. The portfolio comprises ten branches (activities) as the most appropriate to balance the interests of all participants in the regional investment process, having different investment characteristics. In this case, the priority sectors identified in the region with the main provisions of goal-oriented investment policy, the most adequate for the Vladimir region, as well as for other troubled regions.

It provides a method of optimizing the portfolio, which allows not only to determine the final composition of the branches, but also to the selection of projects to finance, to manage regional investment portfolio.

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