

Valuation of Public Projects for Regional Development: Critical Approach

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Public projects for regional development are prepared and implemented in order to create social benefits for society of a particular region – to improve living and working conditions and/or to protect the environment. Every investment option should be evaluated and substantiated before the right investment decision is made. The valuation of public projects is complicated due to complexity of valuation of social benefits for the regional society. Expected impact of public project should effectively satisfy society needs. The methods for public projects' evaluation should be chosen in critical approach. The aim of this methodological research is highlight the main problems of methods used for evaluation of public projects for regional development. This article provides main characteristic of public projects for regional development, reviews the methods used for evaluation of public projects for regional development, presents problematic questions of public projects' evaluation raised in scientific literature, provides a summary of the main problems of evaluation methods used for regional development public projects.

Keywords: public project, social benefits, social discount rate, regional development.

JEL classification: H43, H54

Introduction

Public projects are the instrument for regional policy implementation. Public projects for regional development seek to improve living and working conditions and preserve the environment in the different regional areas. Planning of public projects for regional development starts from identification of society needs and consideration of historical, cultural, political and other factors in the community of a particular region. Public projects are investment projects which do not generate net income (or generate not enough to be financially justified) but provide social benefits to the society. Distinct feature of these projects are their goals: the goals are directed towards the society's welfare rather than generation of profit. For example, investments for social welfare improvement in different regional areas could be dedicated to set up a sports facility, public catering and entertainment basis, improve medical services, health care, ensure the safety of society members, develop care and education system of juvenile children, develop environmental

safety, water management, promote ecology, etc. Evaluation of public projects in order to satisfy society needs, plan rationally and make right investment decisions is a relevant topic of scientific discussions.

The relevance of the topic is reflected by the importance of evaluation of public projects for regional development and a need and necessity to evaluate them before making the investment decision, i.e. to evaluate ex-ante.

The problems associated with complicated evaluation of public projects for regional development arise due to the valuation of social benefits and calculation of social discount rate. Despite of a lot of scientific discussions the above mentioned problems are not still solved and the generally acceptable methodology is not developed.

The object of the research – valuation of public projects for regional development.

The purpose of the research – to reveal the characteristics of public projects for regional development, to determine the advantages and limitations of methods used for valuation of public projects and to provide a logic scheme for solving main problems of valuation of public projects for regional development.

The tasks of the research:

1. To highlight the features of public projects for regional development.
2. To identify the advantages and limitations of methods used for valuation of public projects for regional development.
3. To provide the logical scheme for solving main problems of valuation of public projects for regional development.

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The methods used for the research are analysis and synthesis of scientific literature as well as comparative analysis of the main concepts and methods on the issues of public projects for regional development.

The main characteristics of public projects for regional development

Investing is the one of economic development activities, carried out by the State, public authorities and organizations, business enterprises, households. It is a purposeful use of money for purchasing the assets or forming and improving certain skills in order to benefit in the future. Investment projects are prepared and developed for investment rational planning and justification. The investment project is a detailed plan of activities for the future. It financially, economically, technically and socially justifies investment goals.

According to the source of funding, investments are classified in to private, public and PPP. These investments differ by their goals and expected results.

Public projects for regional development are directed towards different needs of society of a particular region. These needs depend on economic, social, politic, geographic, cultural, ethnographic environment. Public projects for regional development seek to improve development of economic conditions, quality of social services and preservation of environment. The identification of society needs is the first step in preparation of the public project for particular region. The main steps before the implementation of public project are setting the goals, finding the funds for financing and evaluating the effectiveness of the project. In most of the cases public finance is limited, so the public project which gives the maximum benefits for society must be chosen, taking into account investment costs. For this reason every public project must be evaluated (Cordeva 1985; Zigera-Korn, 2013).

Evaluation of public projects for regional development is influenced by the main characteristics of public projects (Fig.1).

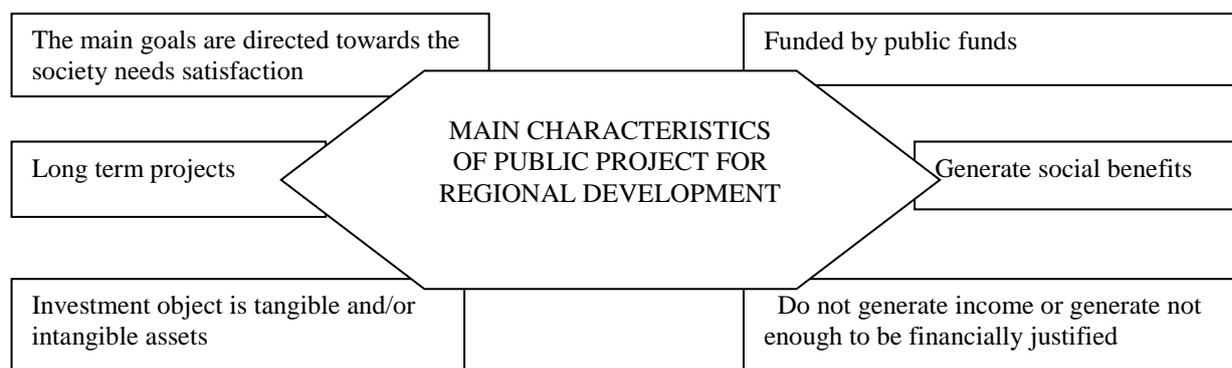


Fig.1. Main characteristics of public projects for regional development

Source: compiled by the authors.

Public projects can generate financial, economic and social benefits. Financial benefits (net income) are seldom generated, in most cases it is minimal and public projects are not financially effective. Economic benefits could be counted as exploitation cost savings after implementation of public project. Economic benefits are not the priority of public project. Despite of that it is sometimes difficult to differentiate them from social benefits. The goals of the public projects are their expected impact, i. e. the creation of social benefits for society. Public projects for regional development are dedicated to society’s welfare, human health, more qualitative life of future generations.

The main distinguishing feature of the public projects is the generation of social benefits. The scientific discussions on the features and relevance of public projects and their valuation raise a question of the ways of evaluation

of social benefits. The main problem which arises in the evaluation of social benefits is the measurement of social benefits in the monetary terms because they are non-marketable products (Hanley, Spash, 1993; Bateman, Willis, 1999; Jacoby, 2000; Nyborg, 2000; Glazer et al, 2002; Van de Walle, 2002; Price, 2010).

Public projects, including projects for regional development, are long-term projects and the investment horizon is sometimes longer than one generation: current generation pays for the benefit of future generations, so the question of how the social benefits should be discounted into present value is still open (Brukas et al, 2001; Hepburn, Koundouri, 2007; Goller, 2010; Almansa, Martinez-Paz, 2011; Chen, 2012).

A relation between social, environmental and economic welfare is very important. The funds that are invested into social or environmental care could be invested

into other productive and valuable areas, thus social or environmental problems can influence the price of economic growth (Parks, Godway, 2013).

All discussed factors should be taken into account in evaluation of public projects for regional development.

The advantages and limitations of methods used for valuation of public projects for regional development

There are several methods used to evaluate and compare public projects for regional development:

1. Cost-benefit analysis.
2. Multicriteria evaluation methods (SAW, TOPSIS, ELECTRA, PROMETHEE, VIKOR, complex proportional, streamlined complex and other methods).
3. Cost-effectiveness analysis.
4. Little's-Mirrlees Method.
5. UNIDO Method.
6. Strategic Landscape Investment Model.
7. Marginal Cost of Funds.

8. Modified Method of Priority Allocation and Selection.

One of the most popular methods is the cost-benefit analysis in which the costs and expected social benefits are measured in monetary terms and net present value is calculated. Cost-benefit analysis consists of 3 stages: financial, economic and risk analysis. Financial analysis in most cases does not make sense because public projects do not generate sufficient financial benefits and net present value becomes negative. Economic analysis covers the indicators of social benefits, and they are the most important for choosing the public project. However, the question of how can the social benefits be evaluated and what indicators should be used is still open. Besides, using cost-benefit analysis requires measurement of social benefits in monetary terms. How to measure non-marketable products such as human life and environmental changes? (Hanley, Spash, 1993; Hansjungen, 2004; Almansa, Calatrava, 2007; Hepburn, Koundouri, 2007; Sáez, Requena, 2007; Greenberg, Robins, 2008; Nooij 2011; Firini et al, 2012; Parks, Godway, 2013).

Table 1. Advantages and limitations of cost-benefit analysis used for valuation of public projects for regional development

COST-BENEFIT ANALYSIS	
ADVANTAGES	LIMITATIONS
1) the method is composed of systematic financial, economic and risk evaluation therefore the investment decision is more justified; 2) it is possible to evaluate the project financial benefits and social benefits in monetary units; 3) the evaluation results are clear and comparable because the monetary measurement is used.	1) social benefits can not be always measured in monetary units, then there is no possibility to calculate economic NPV and IRR; 2) when social benefits are measured only in monetary units, results are incorrect; 3) it is not clear how to assess the social discount rate; 4) economic and financial indicators are inaccurate for long prognosis period and assumptions; 5) financial, economic and risk indicators can be controversial, therefore the investment decision depends on the subjective opinion.

Source: compiled by the authors.

Recently more and more multi-criteria valuation methods are used for solving the mentioned problems such as geometric averages, indicator values and weights multiplication sum – SAW, TOPSIS, ELECTRA, PROMETHEE, VIKOR, complex proportional, streamlined complex, and other methods. The reason is the universality of such methods: any complex phenomenon is expressed by multiple indicators can be evaluated in a quantitative measure. Another advantage is that one summarized indicator can include both maximizing and minimizing indicators expressed in various dimensions, i.e. indicators which cause the improvement of analyzed phenomenon in one case and worsening in another case. Such combining is possible due to normalization while all the indicators are turned into non-dimensional, i.e. are comparable with each other. Multi-criteria valuation

methods provide a possibility to combine indicators of social benefits expressed in either qualitative or quantitative measures, thus the measurement of social benefits in monetary terms becomes unnecessary. However, the main shortcoming of multi-criteria valuation methods is that they do not take into account the time value of money. Besides, multi-criteria valuation methods are not suitable to qualitatively evaluate one chosen public project for regional development as the only option. Nevertheless, these methods provide a possibility to rank several projects (Guitouni, Martel 1998; Zopounidis, 1999; Bisdor; 1999; Hites et al, 2006; Mendoza, Martins 2006; Tamosiuniene et al, 2006; Ginevicius, 2006, 2009; Ginevicius, Podvezko 2008; Shmelev et al, 2009; Frini et al, 2012).

Table 2. Advantages and limitations of multi-criteria valuation methods used for valuation of public projects for regional development

MULTICRITERIA EVALUATION METHODS	
ADVANTAGES	LIMITATIONS
1) enable to evaluate the indicators measured using various measuring units; 2) enable to evaluate the chosen indicators that do not have a quantitative expression; 3) the indicators can be chosen and combined depending on specific situation, project or evaluation purposes.	1) separate options are not evaluated; methods determine only investment options rates; 2) it is not clear how to evaluate the impact of public projects on social welfare when investment horizon is long; 3) the final result is highly determined by the weights of indicators; 4) the objectivity of evaluation is highly impacted by the qualification, logical reasoning and creativity of the expert

Source: compiled by the authors.

Cost-effectiveness analysis is used in choosing between possible alternatives for achieving a certain goal. Combination of investment cost and the expected social benefits is formulated. Social benefits can be measured

by many quantitative indicators, but for evaluation of social benefits of alternative projects should be chosen the same indicators (Kazanovski, 1968; Bleichrodt, Quiggin, 1999; Simic et al, 2011).

Table 3. Advantages and limitations of cost-effectiveness analysis used for valuation of public projects for regional development

COST-EFFECTIVENESS ANALYSIS	
ADVANTAGES	LIMITATIONS
1) the method helps to define the goals of the project and disclose the most effective way to achieve them; 2) identified social benefits, directly related to the project objectives; 3) social benefits generated by the public project can be expressed in different units of measurement (quantitative and qualitative).	1) the chosen indicators do not always express all social benefits generated by public project; 2) if a large number of indicators is included, obtained complicated combination that is not comparable to other alternative; 3) the time value of money is ignored; 4) it is not clear how to measure indicators of social benefits.

Source: compiled by the authors.

The scientists provide more methods and models for evaluating public projects, including regional development projects, such as Little's-Mirrlees Method (Stern, 1972), UNIDO Method (Simic et al, 2011), SLIM (Strategic Landscape Investment Model) (Hajkowicz et al, 2005), MCF (Marginal Cost of Funds) (Liu, 2003), MPSP (Modified Method of Priority Allocation and Selection) (Zilinskas, 2009). These methods are not broadly used and do not solve the above mentioned issues of measuring the discounted social benefits and calculating the social discount rate.

All mentioned methods used for valuation of public projects for regional development have advantages and limitations. Cost-benefit analysis is usually used for valuation of public projects in order to choose the best investment alternative, but it is criticized for two main features: 1) theoretical value substantiation: if the priori-

ties are not correctly chosen, the main values – ecology, durability, fair allocation, social welfare – are not always indicated; 2) immeasurable social benefits. Due to this reason a question is raised – can the right decision be made using the method of cost-benefit analysis? (Aleknėvičienė, Baranauskienė, 2013). That is why it is necessary to look for possible ways to improve cost-benefit analysis, taking into account the criticism of the method.

Summary of critical approach on valuation of public projects for regional development

After summarizing the valuation methods of public projects for regional development it can be stated that the main shortcomings of these methods are complicated measurement of social benefits and determination of social discount rate (Fig.2).

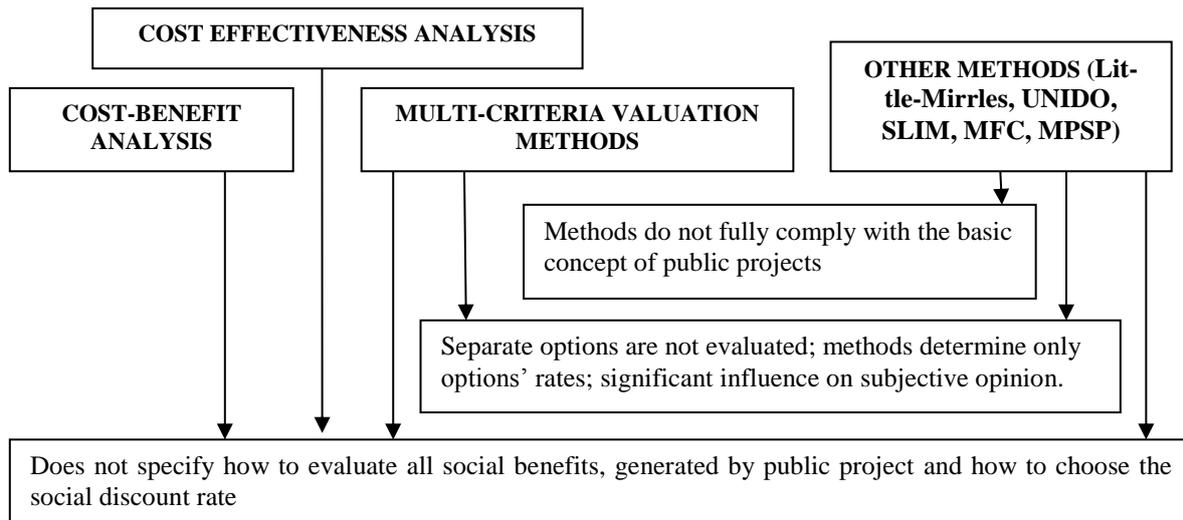


Fig. 2. The logical scheme of the main problems related with evaluation methods of public projects for regional development
 Source: compiled by the authors.

If a popular cost-benefit analysis is used, the social benefits generated by public project should be divided into measurable by monetary units and non-measurable indicators. Measurable in monetary terms indicators can be used for calculation of cash flows while using cost-benefit analysis. In this case the main steps are:

- 1) determination of project's results (benefits and damages);
- 2) substantiation and scope determination of project's influence on the environment (area, service market, consumption of goods/ services, state budget's expenses);
- 3) evaluation of project's results in monetary terms.

Suitable evaluation of social impact in monetary terms is an important task. It can be noted that during the evaluation of public projects, including regional development projects, only comparative value is attributed to a monetary unit, rejecting the provision that money is everything that matters. The problem is that in most cases market values for social consequences do not exist because social or environmental products are public goods. So, the indicators of social benefits, immeasurable in monetary units, are left and don't influence evaluation of public project. In this case very important impact on society created by public project is not noticed.

There is no generally acceptable method for evaluating the social or environmental factors which are non-measurable in monetary units, neither between the scientists nor the practitioners. The scientists raise many questions: which impact of public projects for regional development is economically significant; which consequences should be taken into account; are social benefits real and substantial? A calculated value includes social benefits and losses, ecological consequences, improved possibilities.

Future planning of these factors should be conducted based on a critical view.

In summary the following problems for valuation of social benefits can be excluded:

1. Identification of social benefits.
2. Determination of the significance of social benefits.
3. Measurement of social benefits.
4. Combination of social benefits indicators.

One of the most distinctive features of public projects, including projects for regional development, is a very long forecast period, sometimes exceeding a period of one generation's lifetime (for example, growing a forest). Thus a big inaccuracy possibility occurs. The aspect of time is especially important because even if we know future costs and benefits, the decisions should be made today. The calculation of present value is very important. Future expenses and benefits should be recalculated into present value. The decisions are made for the future generation; also the liabilities are accepted for future generations. Discount rate is a cost of capital of investment project. The market based discount rates are used to evaluate business projects, meanwhile in order to evaluate public projects, including regional development public projects, social discount rate is used (Brukas et al 2001; Hepburn, Koundouri, 2007; Chen, 2012).

The scientists dispute about several factors influencing the discount rate and its determination: discounted life-long consumption, human capital (discounted productive activity of a lifetime), net contribution to the society, solvency (the economists generally agree that it is the best indicator). The solvency depends on the abilities or willingness to pay, market's shortcomings (for example, incomplete information), main rights (for example, a

right to have a healthy environment), other risk factors such as potential victims of clusters (Gollier 2002; Karp, 2005; Sáez, Requena 2007; Gollier 2010; Chen, 2012).

How every human evaluates the future depends on individual circumstances and risks. But this returns us to the problem of determining an appropriate discount rate. A use of a social discount rate which is higher than a real return rate in risk-free investments would mean that the society members save too much: if people save 2% but discount their future consumption by a higher discount rate it would not be logical. The rate of risk-free investment should be used as a background for social discount rate: in respect of the impact we must discount future consequences but without using a high discount rate (Price, 2010).

Social discount rate depends on the time horizon: the longer the horizon, the lower should be the social discount rate. The time horizon of public projects for regional development may vary from 5 to 100 years and even more. Scientists discuss about social discount rate changes in the time horizon: should it be constant or decrease.

The choice of the social discount rate plays a critical role in projects' valuation, and has been a subject of intense debate for the last several decades. In a perfectly competitive world, the market interest rate is the appropriate social discount rate. In the real world where markets are distorted, there are four alternative approaches in the choice of the social discount rate: social rate of time preference, social opportunity cost of capital, weighted average and the shadow price of capital. Economists have not reached a consensus as to which is the most appropriate.

The choice of social discount rate is based on these questions:

1. What approach is appropriate for determination of social discount rate?
2. Does the social discount rate change over time?

In the Table 4 there are provided main problematic issues of valuation of public projects (valuation of social benefits and choice of social discount rate), formulated steps for solving problems and disclosed possibilities of valuation methods to solve the tasks.

Table 4. Summary of analysis of methods used for valuation of public projects for regional development

Valuation Methods	Valuation of Social Benefits				Choice of social discount rate (SDR)	
	Identification of social benefits	Determining the significance of social benefits	Assigning values for social benefits	Combination of social benefits indicators	SDR determination approach	SDR changes in time horizon
Cost-benefit analysis	+/-	+/-	+/-	+/-	-	-
Cost effectiveness analysis	+	+	-	-	-	-
Multi-criteria methods	-	+/-	+	+	-	-
Other methods (Little-Mirrles, UNIDO, SLIM, MFC, MPSP)	+/-	-	+/-	-	-	-
Symbols: + task is solved; - task is not solved; +/- task is not completely solved						

Source: compiled by the authors.

The analysis of methods shows that none of the methods solve all the tasks in all steps of valuation of social benefits, and none of the methods clarify how to choose the right social discount rate.

Summarized information from Table 4 is useful for construction of logical scheme for solving the main problems of valuation of public projects for regional development (Fig.3).

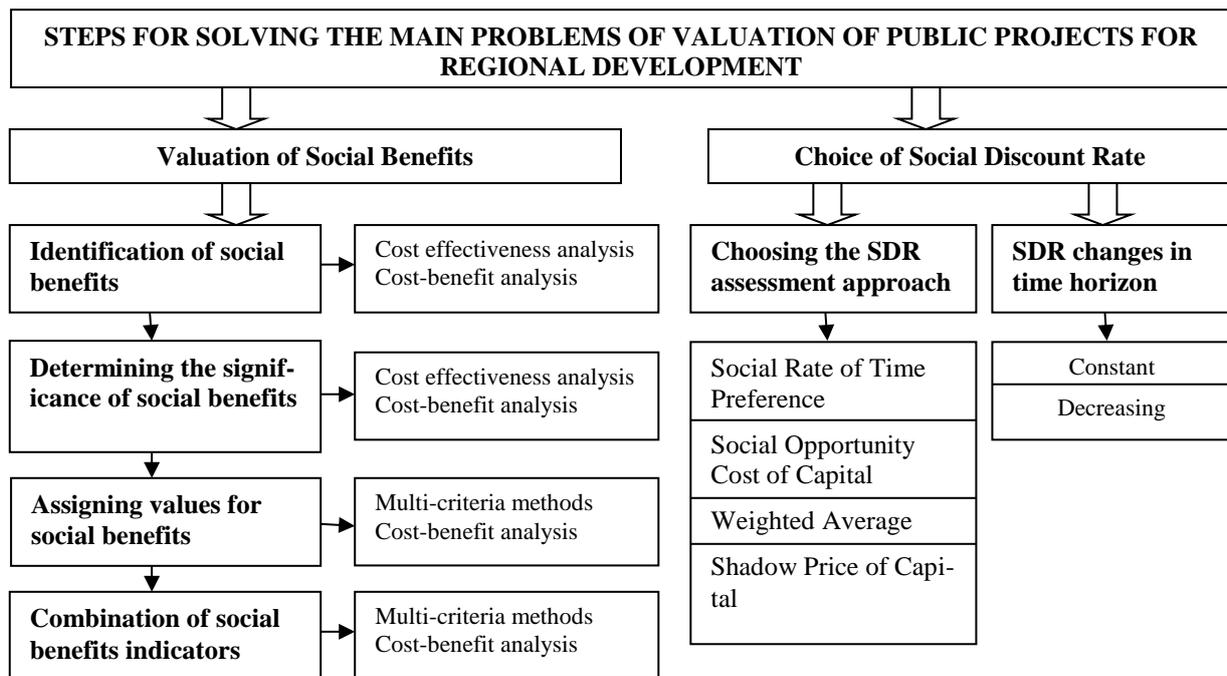


Fig. 3. The logical scheme for solving the main problems of valuation of public projects for regional development

Source: compiled by the authors.

The critical approach towards the methods described allows improving the process of valuation and ranking of public projects. Furthermore, it enables to make the right investment decision when choosing the best alternative for the use of public funds.

Conclusions

The features and exclusivities of public projects for regional development influence the choice of methods for projects' valuation. Public projects for regional development, in contrast to private investment projects, do not generate income (or generate not enough to be financially justified), but generate social benefits for the society of a particular region. The main purpose of these projects is to satisfy the public needs. In most cases public projects are funded by public sector and they are long-term projects – investment horizon can exceed one generation.

It is worth mentioning the main limitations of methods used for valuation of public projects for regional development: (1) complicated valuation of social benefits; and (2) determination of social discount rate. It can be stated that the valuation of public projects, including public projects for regional development, is complicated, because this valuation is influenced by complex factors. Firstly, public projects are long-term projects and in most of the cases current generation pays for the benefit of the future generations. Secondly, a relation between environmental and economic welfare is very important. The funds invested in the environmental protection could be invested into other productive and valuable areas. Third-

ly, the society expenses should be made earlier than it receives the benefit, so the main discounting have a larger influence for calculation of net present value of the benefits comparing with the cost. And finally, public projects are dedicated to society's welfare, human health, more qualitative life of future generations. These factors must be taken into account when evaluating public projects for regional development.

The analysis showed the main shortcomings of methods used for valuation of public projects for regional development and it is very important to pay attention to limitations of valuation methods in order to make a right investment decision. The logical scheme for solving the main problems of valuation of public projects describes possible steps for combination of several methods.

This theoretical research disclosed limitations of the methods, used for evaluation of public projects for regional development. In addition, the problem field for potential researches was identified: the analysed methods need to be improved or new methods need to be created for evaluation of public projects for regional development. As a result of rational valuation of public projects, the public needs are disclosed and goals of regional development are reached.

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