ANALYSIS OF BASIC EFFICIENCY ASSESSMENT APPROACHES OF THE PUBLIC-PRIVATE PARTNERSHIP

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Abstract

The article aimed to analyze the features of methodological approaches of the efficiency assessment of the public-private partnerships implementation. For this reason we analyze international experience of assessment approaches of the PPP projects and determine its advantages and disadvantages. Also the possibilities of use in practice basic estimation methods are defined and proposed the way to improve assessment process of PPP.

Key words: public-private partnership, value of money, assessment methods, cost-benefit analyze, public sector comparator, competitive bidding

Introduction

Implementation of projects on the basis of public-private partnership is a qualitatively new stage of cooperation between the state and business that can overcome limited capacity of state and local communities to finance social and infrastructure projects. This tool differs in scale and highly efficiency of resources use, inclines to innovations, makes good use of the private ownership advantages to improve the quality and efficiency of the management of public infrastructure.

The need to provide high-performance interaction of PPP determines the importance of clarifying methodological approaches to the economic feasibility of projects implemented on the basis of public-private partnership by taking into account a specific of national economy, identifying possible risks and methods of its assessment and management.

However, the complexity of evaluating the efficiency of public-private partnership and the lack of reflection in scientific publications leads to the need of further in-depth research in this direction. Therefore, the aim of this article is to analyze the existing methodological approaches to evaluating the efficiency of public-private partnerships in modern terms by taking into account international experience and local practices, identifying their strengths and weaknesses, as well as justification of specific recommendations of their practical application.

Methods of research: analysis and synthesis of economic literature, analysis of secondary data, systematization, comparison, summation of data and methods of scheme-descriptive representation

World practice of efficiency assessment of infrastructure projects

In many countries decide traditional public procurement as a standard option in providing goods and services to society. While the possibility of the PPP is seen as an exception or only after studying the experience of leader in the implementation such projects. In addition, it also means that there are no clear criteria for choosing the best way to achieve the goal of providing quality public services and goods. Therefore, it is necessary to set suitable criteria to find a proper instrument that will provide quality public infrastructure and the highest value for money. The term value for money refer to the effective use of public funds on a capital project, can come from the private sector innovation and skills in asset design, construction techniques and operational practices, and also from transferring key risk in design, construction delays, cost overruns and finance and insurance to private sector entities. (Pangeran, Wirahadikusumah, 2010)

In international practice efficiency assessment of PPP projects is based on the concept of «Value for Money» (VfM). It means the return on investment determined by comparative analysis of the costs, benefits and risks including quantitative and qualitative analysis. At present there are several basic alternative approaches of analyzing the efficiency of PPP projects, which are based on VfM concept: full cost-benefit analysis (CBA), Public Sector Comparator (PSC), and Competitive Bidding (Table 1).

Table 1. Basic methods of efficiency assessment of the public private partnership according to foreign practice

<table>
<thead>
<tr>
<th>Complexity</th>
<th>Method</th>
<th>Basis of comparison</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest</td>
<td>Cost Benefit Analysis</td>
<td>Traditional project</td>
<td>Germany</td>
</tr>
<tr>
<td>Medium</td>
<td>PSC</td>
<td>Before bids</td>
<td>Japan, South Africa, Hong Kong, Ireland, Holland</td>
</tr>
<tr>
<td></td>
<td></td>
<td>After bids</td>
<td>Australia, USA, Great Britain</td>
</tr>
<tr>
<td>Lowest</td>
<td>Competitive Bidding</td>
<td>Other PPP projects</td>
<td>France, Latin America, East Europe</td>
</tr>
</tbody>
</table>

Accordingly to the survey results of Organization for Economic Cooperation and Development (OECD) made in late 2010 in the process of assessing the efficiency of public private partnership in 20 countries that participated in the study, in 85% of cases the PSC method was used as the primary. In the case of traditional procurement, to evaluate the efficiency of 60% of projects use the Cost Benefit Analysis (Burger, Hawkesworth,
However, the CBA method is also used in the analysis of PPP projects, along with the use of additional guidance of governments and international organizations.

**Theoretical aspects of the basic methods of assessment**

The Cost Benefit analysis (CBA) is a systematic process of calculating and comparing the costs and benefits of the project, a decision or policy of the government. The CBA has two objectives:

- to determine whether there is a rational investment decision (justification / features),
- to provide a basis for projects comparing, i.e. the comparison between the total expected value of each option against the total expected benefits to determine how much the benefits outweigh the costs.

In the CBA-method costs and benefits are expressed in monetary terms, taking into account the time value of money, so that all project flows of costs and benefits are expressed in terms of "net present value" in course of time.

This method is used for estimation the PPP projects, but it has certain characteristics. Thus, when the CBA is used the impact of the project on public welfare must be analyzed. Assessment process consists of several stages, during each the costs and benefits for different groups of population is carefully assessed with consideration the possible effects of the project, which can lead to additional losses or income. First, in applying the CBA-method it is necessary to define the objectives of the project and establish their hierarchy according to the nature of the project. An important step in the analysis is a comparative analysis of alternative project which aimed on estimation of possible socio-economic consequences of its implementation. The most difficult step is the valuation of intangible assets because of complexity with adding up the appropriate price of intangible assets. During the economic analysis the impact of the project on its users and participants is determined, and calculated the net present value (ENPV) as the difference between the benefits (PVB) and the costs (PVC) of the project. Furthermore, the efficiency of the project is evaluated by the main indicators (NPV, FIRR, DPP, PI, DSCR, LLSR, etc.). Multistage analysis reveals the influence of other factors on the project, which cannot be evaluated directly (political situation, environment, safety, etc.).

Thus, Ukrainian “Methods of efficiency assessment of PPP realization” is based on the concept of the CBA. Application of this concept in Ukraine allows to estimate is the project worth to participate in its implementation for government, as well as how the project implementation and co-finance is need. Furthermore, the CBA-method helps to define the market failures and correctly asses the need and adequacy of strategies proposed by partnership.

Guidance of the efficiency analysis of PPP in Ukraine is regulated by the Cabinet of Ministers resolution "Some issues of implementation of public-private partnership" from 11.04.2011 № 384, which fixes the procedure of the competition for determination the private partner for PPP, and also the procedure of efficiency analysis of the PPP. In addition, Ministry of Economic Development and Trade define "Some issues of the efficiency analysis of the implementation of public-private partnerships" from 27.02.2012 № 255, which includes "Feasibility form of public-private partnerships implementation" and "Methods for analysis the efficiency of public-private partnership".

The offered guidance by Government defines basic parameters and indicators of efficiency test and carries out in 5 stages (Fig. 1). Analyses based on the information described in the project proposal, feasibility form and other documents.

![Fig.1. The procedure of analysis of the PPP efficiency](image-url)

The CBA-method has the advantage that all the positive and negative impacts of the project could be weighed by using its monetary value equivalent, which makes it possible to evaluate the project as a whole. However, during the CBA accuracy of the results depends on the correct assessment of costs and benefits.
Studies have shown that during the analysis of intangibles assets actual costs are often much higher than expected, while the actual benefits often lower.

Recently, most countries assess the efficiency of PPP proposal by Public Sector Comparator, known as "comparative cost analysis of the public sector." Its feature consists of comparison of the project efficiency realized by public-private partnership and traditional procurement accordingly to the "price-quality" criteria. The PSC-method is based on a system of estimation indicators, which was designed for testing possibility of achieving additional VFM advantages of projects in case private financing comparatively traditional methods of procurement. In other words, the PSC-method based on a comparison of the proposed base project by the Government (sample), which provides a certain level of quality service, and alternative project proposed by the private sector.

The main PSC components are (Infrastructure Australia, 2008; Akintoye, Beck, 2009):
- Initial project cost (base direct and indirect costs, inflation, maintenance and lifecycle costs, third party project revenues);
- Retained risks (operational risk, risk of supply and others);
- Competitive neutrality, i.e. net competitive advantage that accrues to government by virtue of its government status (land tax, rates, payroll tax and other);
- Transferred risks (the risk of design and construction, maintenance risk, technological risk).

All of these components clearly demonstrate that the PSC represents the total lifecycle cost of the project to the government of meeting the output specification under direct public procurement. Calculation of the PSC and its comparison with the PPP project could be schematic reflected, Figure 2. The basis of comparison is the estimation of net present value (NPV) of the sample project and various proposals of PPP. Partnership with private sector is significant for the government if the project costs NPV of the PPP less than NPV of the PSC. The difference between the costs of the basic project and the PPP actually determines the amount of financial profit (value for money).

Index of financial profit (VfM) represents the relative superiority of one project over another taking into account differences in the transfer of risk, subject to identical results in quality and quantity of services (Hazapon, 2010). The calculation takes into account the total project cost over its whole life cycle, adjusted on the risk, the scope and quality of services that meet the requirements of users.

![Fig. 2. Comparison of implementation results of the PPP and traditional procurement](image)

The basic version of the project - PSC is based on the amount of services that should be provided during the period and the costs of design, construction and operation of the object. The most important factor is the consideration and assessment of risks associated with the project, as far as the cost of some risks for the government and the private sector may be different. Project cost (including risk) is estimated using the data of similar projects undertaken by the government.

Final cost of the PPP project evaluated through the assumption about the possible amount of risks transferred to the private partner, as well as assumption about necessary reward to the private partner for the provision of services. An important aspect is the determination of the capital cost that would be required for private partners.

Both options will contain risks that public partner bear as usual. Basically they have macroeconomic nature (for example, inflation and cycling of the economy). The determining factor for transferring such risks to the government is the private partner’s inability to control, manage and secure this risks or excessively high cost of risk-management tools.
The PSC mechanism can be considered in detail on the example of the highway construction, which is offered to implement through PPP concession type DBOM, i.e. design, construction, operation and maintenance. The amount of capital costs of the project is EUR 760 millions, total capital costs adjusted for risk – EUR 958 millions. From the private partner are expected to: detailed design and construction of motorway to the requirements of the customer, procure the necessary funding for capital costs, operate and maintain the motorway according to the requirements of the customer over the concession period of 25 years (Kerali, 2006). Analysis of the propositions for implementation highway project is represented in Table 2.

Table 2. Summary of PSC results for proposed motorway project

<table>
<thead>
<tr>
<th>NPV (millions, discounted with 10%)</th>
<th>Public</th>
<th>Bid A</th>
<th>Bid B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital costs</td>
<td>760,4</td>
<td>651,8</td>
<td>687,3</td>
</tr>
<tr>
<td>Economic and social costs of delay</td>
<td>71,3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development costs</td>
<td></td>
<td>15,3</td>
<td>18,4</td>
</tr>
<tr>
<td>Administration and inspection</td>
<td>8,6</td>
<td>40,6</td>
<td>38,6</td>
</tr>
<tr>
<td>Insurance</td>
<td>20,8</td>
<td>22,1</td>
<td>24,5</td>
</tr>
<tr>
<td>Operating costs</td>
<td>43,3</td>
<td>62,9</td>
<td>58,9</td>
</tr>
<tr>
<td>Maintenance/ Rehabilitation</td>
<td>50,2</td>
<td>32,5</td>
<td>37,7</td>
</tr>
<tr>
<td>VAT</td>
<td>4,1</td>
<td>3,9</td>
<td>4</td>
</tr>
<tr>
<td>Corporate tax</td>
<td></td>
<td>31,2</td>
<td>34,5</td>
</tr>
<tr>
<td>Cost of finance</td>
<td></td>
<td>78,7</td>
<td>85,3</td>
</tr>
<tr>
<td>Total</td>
<td>958,7</td>
<td>939</td>
<td>980,2</td>
</tr>
<tr>
<td>Value-for-Money</td>
<td></td>
<td>+19,7</td>
<td>-30,5</td>
</tr>
</tbody>
</table>

Thus, the results show in general terms that the proposal A provide better value for money than traditional public funding, as it allows to save about EUR 19.7 million. However, quantitative analysis is not enough for an objective vision, because the concept of «Value-For-Money» requires also a qualitative analysis of all available factors, so the winner of the bidding may be the other person.

The feasibility of the project based on public-private partnership is also provided through competitive bidding. There are certain mechanisms of selection the private partner to comply with the competition principles of transparency, objectivity and non-discriminatory. The Grantor needs to analyze the suitability of the technical elements and the commercial and financial feasibility of the project, the soundness of the financial models and of the bidding proposals. The most common system uses the following evaluation procedures (Mandri-Perrort, 2009):

1) Prequalification – Firms interested in the project are required to establish technical competence and financial viability. The purpose is to limit the field of applications to those that meet the minimum requirements to participate in a competitive award process.

2) Evaluation of technical proposals - Technical proposals are submitted on how the Developers would execute the project and further technical and financial capacity information is submitted. Grantors establish technical evaluation criteria by which to assess the proposals.

3) Evaluation of financial proposals – financial evaluation criteria are then used to assess the bidders’ financial proposals.

Selection the competition criteria is a very important stage on the way to the effective use of public-private partnership (PPP). Well-defined criteria provide conditions to achieve the desired result: to attract investment for the modernization of existing facilities and construction of new municipal complex, to elevate indexes of the operating utilities and its organization, and as a result to improve the quality of public services for consumers. However, the definition of the competition criteria is a very difficult process that is often accompanied by errors and violations by the organizers of the competition. Thus, we propose a system of criteria that will help to adequately assess participants and determine the winner (fig.4).

In addition, at this stage a performance management system should be developed that provide a mechanism for assessing and monitoring the activities of partners, and the motivation system for both parties. As the foreign practice shows the procedure of competitive selection involves a careful analysis of the proposals in terms of their strategic feasibility and viability. In some cases, the initiator may be provided the following benefits:

- Add bonus points in the official evaluation process of applications;
- The right to overbid the best competing bid by offering a better alternative (Swiss Challenge);
- The right to automatic participation in the final stage of the competition;
- Application of the method Best and Final Offer (BAFO) in the case of multi-competition, which provides the inclusion in the tender by Grantor additional phases, reducing the number of participants and obtain appropriate financial guarantees;
- Payment of compensation to the author of the project initiated by the state, winner of the tender, or both simultaneously.
Fig. 4. System of the competition criteria to determine the winner of the PPP competitive bidding

Discussion and conclusions

While the PSC method is similar to CBA in that the PSC should be measured in net present value, thus viewing all the costs over the life cycle of the project as if at their present value, the PSC has several differences from the CBA. Unlike a cost-benefit analysis which looks at cash flows including their accumulation basis as well as other non-cash items, the PCC looks at cash flows — not their accrual basis. Thus, non-cash items such as depreciation are not always necessary to consider as part of the PSC (Goldbach, Goldman and others, 2011). The Public Sector Comparator also focuses on the following three elements:

1. Sample project is based on recent public methods of providing production (public procurement);
2. The PSC takes into account the risks and its costs that would incur by the chosen method of service;
3. PSC is based on the assumption that there is no net financial benefit between the public and private sectors. This allows fund assessments of partners to be viewed equally.

Based on the above we can determine the sequence of basic steps of a comparative analysis of projects (with a private partner and without his participation) (Fig. 3). First, project is initiated and determines the method of its implementation, which is elected by the analysis of the projects based on public-private partnership and traditional public procurement. If the net present cost of sample project is lower than the PPP project, the way of traditional public procurement is elected, which is subjected to a full cost-benefit analysis, and finally determines method of project implementation (direct government funding or government procurement). In case of the sample project’s costs excess of the PPP option, the project implementation is based on public-private partnership.

Fig. 3. The sequence of basic steps of a comparative analysis of alternative projects (with private partner and without his participation)

However, in recent years there has been growing criticism of the PSC application, i.e. the reliability and accuracy of calculations, the complexity of financial modeling, despite the fact that the PSC is one of the most popular methods of assessment and is widely used in project analysis.

The main arguments against the use of this approach are (Leigland, Shugart, 2006; Akintoye, Beck, 2009):
- Exclusion of important risks. Some risks have a potential impact on the project cost, but in the face of uncertainty it is difficult to evaluate because the expected cost of the project is calculated without regard of their influence. In the developing countries such risks is the main reason for revising the PPP contract;
- The lack of consensus on the discount rate. There is uncertainty about selection an appropriate discount rate and forecasting future cash flows;
- The ability to manipulate data and assumptions. The calculation of the sample project - PSC - depends on the subjective estimation, therefore small changes in the assessment of risk exposure and level of the discount rate can have unpredictable consequences for the budget.

For example, the conclusions of the state audit report of Estonia which confirms that the PSC method is complex and ambiguous in its application. The audit report indicates that the Estonian public authorities do not properly use the PSC method in assessing the relative attractiveness of PPP. Results of implementation PPP projects were evaluated by primitive calculating, and the benefits of the project were identified as reduction of costs and profits. As result unfavorable and non-transparent contracts have been signed, which have included overvalues excessive profit margins and risk premium (Pangeran, Wirahadikusumah, 2010). In fact, if the PPP projects assess properly many of them would be rejected (research in Estonia indicate that the costs of long-term PPP projects is 25% higher than public procurement). It should be noted that the PSC method is not used in Ukraine. In our view, this could be caused by the following:
- Lack of objective statistical basis for evaluating the value of the project (which is last for 25-30 years), due to the initial stage of the relations development of public-private partnership in Ukraine;
- No adapted methods for CIS with regard to the characteristics and risks inherent to these countries and their markets;
- High cost and complexity of financial modeling in the case of the PSC method;
- The usage of the PPP mechanism primarily to attract private capital in large-scale projects with minimal public participation, and the absence of public funding of the project makes application of this method impossible.

A key objective in developing the PSC is that it provides a reliable means of demonstrating value of money and in terms of whole of life costs imparts confidence in the assessment process. If private sector bids can demonstrate value for money against the PSC, then private sector provision should be pursued. Grimsey and Lewis stated that fashioning the PSC performs the following role: promotes full costing at an early stage in project development; provides a key management tool during the procurement process by focusing attention on the output specification, risk allocation and comprehensive costing; provides a means for testing project value for money; provides a consistent benchmark and evolution tool; encourages competition by generating confidence in the market that financial rigor and probity principles are being applied.

Thus, research of using methodological approaches to evaluating the efficiency of public-private partnership shows the usage of Cost-benefit Analyzes and Public Sector Comparator is more common in the world. The PSC method is based on comparing the results of the net present value and risks throughout the life cycle of the project, implemented by traditional public procurement and on the basis of public-private partnership. In the case of the PSC method accuracy of the results depends on the truthfulness of estimates of revenues, expenses and risks of the project. Using the PSC in any meaningful way according to its original objectives is probably not very feasible. However, PSC can be used as an aspect of general project appraisal and used to ensure or reinforce better project design and to support negotiations. In turn, the CBA is comparing the total discounted costs and benefits of each project, but it also has weaknesses. The CBA-method has the advantage that all the positive and negative impacts of the project could be weighed by using its monetary value equivalent, which makes it possible to evaluate the project as a whole. However, during the CBA accuracy of the results depends on the correct assessment of costs and benefits. Studies have shown that during the analysis of intangibles assets actual costs are often much higher than expected, while the actual benefits often lower.

Selection of specific assessment method of projects depends on the development of PPP relations in the country, level of its economic development, financial conditions, investment climate etc. Thus, the Ukrainian method of estimating the efficiency of PPP is based on the method of CBA. It is clear that there are no clear criteria for choosing a universal method of evaluation of PPP projects to achieve the public goal. Therefore, due to the fact that the global practice of using PPP is not always successful, we believe that the stage of assessing the efficiency of PPP projects is needed to make more carefully and stiffening. For this reason, we think that the phased implementation of all three methods of the projects selection will prevent governments from failures. Thus, the first step will be to analyze based on the method of CBA, then use the elements of the PSC method, and after a thorough evaluation of the project, a competitive biddings. However, the main concerns of whether the project offers value for money and what are the key advantages and disadvantages of a particular project under PPP still need to be analyzed.

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### VIEŠOSIOS IR PRIVAČIOSIOS PARTNERYSTĖS PROJEKTŲ EFЕKTYVUMO VЕRTINIMO POŽIŪRIŲ ANALIZĖ

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Santrauka

Per pastaruosius 15-20 metų ilgalaikiai sutartiniai santykiai tarp viešojo ir privataus sektorių išsivystė daugelyje šalių, plečiant viešąją infrastruktūrą bei teikiant paslaugas. Tai santykiai vadinami viešąja ir privačia partneryste (angl. PPP). PPP projektai yra ilgalaikio pobūdžio, didelės apimties ir svarbos, įvairių iššūkių tikslui pasiekti. 

Taigi, yra įvairių sąlygų ir įvertinimo poreikis bei palyginimas, kokiai veiksniai reiškia, kad viešąja ir privačia partnerystė yra labai sudėtingi ir reikalauja sukurto ir sudaroma struktūrą, pasiruošimo, įvertinimo, suderinių sudarymo ir kontroliškų procedūrų. 

Pasaulio PPP patirtis rodo, kad apie pušę tokių projektų buvo nustatyta ir palygininta su neįvertintais projektais. Neįvertintas projektas gali turėti paskaičius protėvui atlikti projektą ir jį reorganizuoti, arba projektą atšaukti. 

Taigi, yra įvairių sąlygų ir įvertinimo poreikis bei palyginimas, kokiai veiksniai reiškia, kad viešąja ir privačia partnerystė yra labai sudėtingi ir reikalauja sukurto ir sudaroma struktūrą, pasiruošimo, įvertinimo, suderinių sudarymo ir kontroliškų procedūrų. 

Tarptautinėje praktikoje PPP projektų efektyvumo vertinimas yra grindžiamas pinigų laiko vertė. Tai reiškia, kad investicijų graža nustatoma atsiržvelgiant į kaštus, naudą, kiekibę ir kokybę rizikos analizę. Šiuo metu yra naudojami kelis pagrindiniai alternatyvus metodai, vertinant PPP projektus: naudos-išlaidų analizės (angl. CBA) metodas, viešojo sektoriaus programos (angl. PSC) metodas ir konkursinio kainos pasiruošimo metodas. Kiekvienas metodas turi pripažintumų ir trūkumų, todėl yra poreikis nustatyti aškūs kriterijus, pagal kurus esamą privalumą pasirinkti ir atsakingiausiai atlikti projektų vertinimą, palapinsi naudojant visus tris vertinimo ir atrankos metodus, o tai padėtų apsaugoti vyriausybės nuo nesėkmių.