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FORESIGHT EVALUATION: LESSONS FROM PROJECT MANAGEMENT

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FORESIGHT EVALUATION: LESSONS FROM PROJECT MANAGEMENT

The aim of this paper is to identify ways for improvement of the Foresight evaluation framework on the basis of analysis and systematisation of accumulated experience in the field of project management. The paper is based on a detailed literature review related to an evaluation of Foresight and traditional projects. The comparison of evaluation approaches allows to provide recommendations for Foresight evaluation framework improvement. The elements which can enrich Foresight evaluation process are the following: the development of an evaluation model; the extensive use of quantitative methods; the elaboration of evaluation scales; the inclusion of economic indicators into evaluation; and the provision of more openness and transparency for evaluation results. Given the importance of Foresight evaluation procedures and the lack of a commonly applied methodological approach, the value of this paper consists in identifying a Foresight evaluation framework and enriching it with elements of project management.

Keywords: Foresight, Evaluation, Project management, Framework.
JEL Classification: O22; O32.

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Introduction

High levels of uncertainty and risk are among the main obstacles for decision-making in the current economic and political situation (e.g. Beck, 1992). Foresight is one of the most effective tools of building long-term strategies and policies with the goal of promoting economic, political, and social sustainability. Strong evaluation procedures are thereby crucial and should be applied through all stages of Foresight implementation. One of arguments in favor of evaluation is that Foresight projects* attract time, human, and financial resources, and it is important to understand whether the resources are allocated efficiently. Georghiou (2003) stresses "three basic tests" for Foresight evaluation: accountability, justification and learning. This means that evaluation is provided in order to identify the efficiency of conducted activities, to analyse the effects of Foresight, and to find the ways for its improvement.

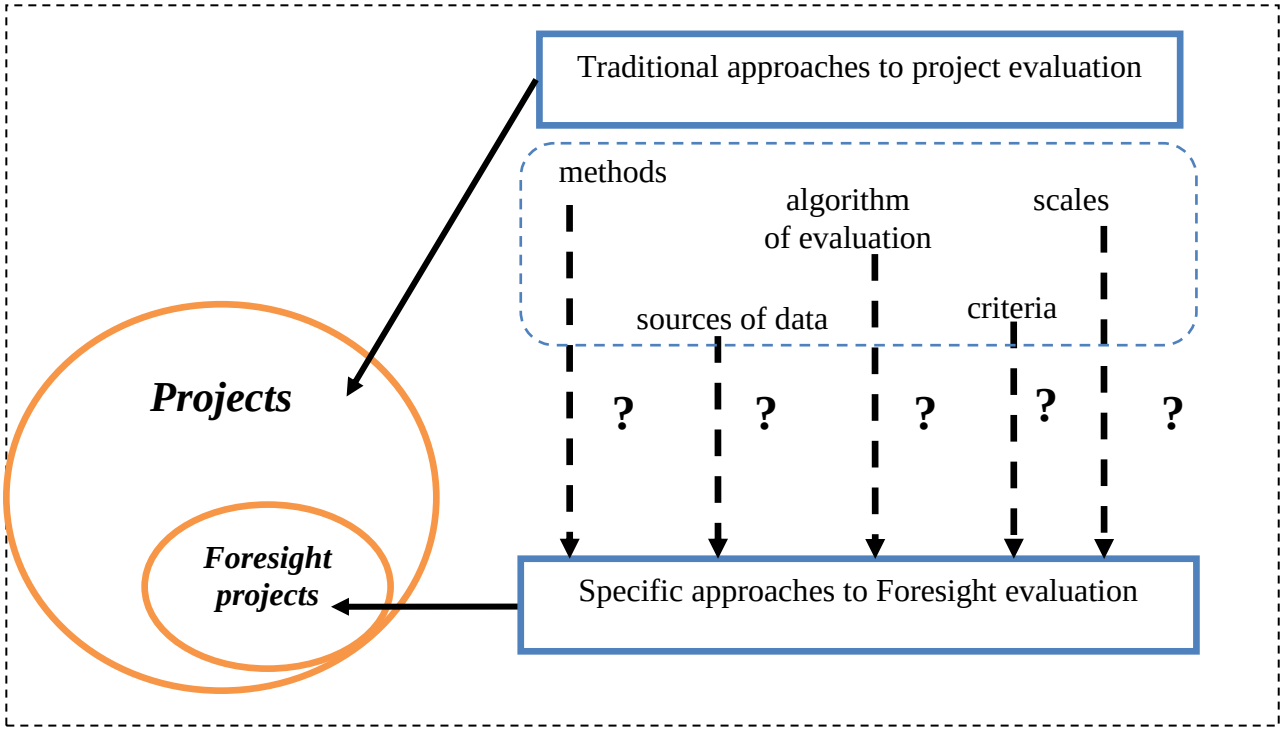
The importance of Foresight evaluation was realised in the late 1990s when the first Foresight evaluation projects took place. The list of the most remarkable recent Foresight evaluation programs include the evaluation of FUTUR (Germany), the Hungarian Technology Foresight Programme, the third round of United Kingdom Foresight Programme, the Vision 2023 Technology Foresight (Turkey), and the Colombian Technology Foresight Programme. Different evaluation methods and criteria were used in the framework of each programme. Therefore, it appears that no generally accepted framework for evaluation of Foresight activities has been developed to date. Only the separate examples of different frameworks for Foresight evaluation are provided by scholars and developed through practical cases (e.g. Alsan & Öner, 2004; Popper et al., 2010; Georghiou et al., 2006).

At the same time, the field of project management offers substantial experience regarding evaluation procedures. A project can be defined as "a temporary endeavor undertaken to create a unique product, service or result" (PMI, 1996: 4) and "a complex series of non-routine tasks directed to meet a specific goal" (Phillips et al., 2002). The results of Foresight (policy recommendations, roadmaps, lists of key technologies, etc.) can be justly defined as a "unique product". Foresight exercises also suit the requirements of time limitation ("temporary"), "non-routine" and "specifity". Therefore a Foresight project is, in essence, a standard project with its own specificity. Thus it is appropriate to implement methods and approaches suitable for project assessment into an evaluation of a Foresight project. In other words, the methodology of Foresight evaluation could be supplemented by some of the approaches and methods used in project evaluation. The question is whether and what methods and tools applied to project

* Foresight studies are implemented in a form of projects or programme – "a group of related projects" (HM Treasury, 2003: 1)

evaluation are suitable to analysis of Foresight and what improvements to the framework and process of Foresight evaluation should be made based on the project evaluation experience (Fig.1). The research therefore starts with investigating the latter, and then the gaps in Foresight evaluation are identified. After that appropriate methods and tools are chosen to fill these gaps. The purpose of this paper is thereby to elaborate recommendations for improvement of Foresight evaluation framework on the basis of analysis and systematisation of accumulated experience in the field of project management.

Figure 1. The place of Foresight evaluation in the field of project evaluation



The paper is organised as follows. The first section provides an analysis of methods and approaches that are traditionally applied to project evaluation. After this, the second section describes approaches to Foresight evaluation. The third section presents the results of the comparative analysis of project evaluation and Foresight evaluation methodologies and provides the ways for improvement of the latter. Finally, the conclusion contains the main findings of the research.

Project evaluation: methods and approaches

Studies related to project evaluation have become an important part of project management research. Determining evaluation types, developing an evaluation framework, and identifying project performance are the main issues of project evaluation investigation.

Before analysing the way project evaluation is performed, two basic branches of project evaluation development should be described. First, project evaluation was considered to be important mainly for financial decision-makers due to their need to counterpoise investment risk and expected profit. Such evaluation was conducted before the project was accepted, and the results were the main argument for starting the project. Moreover, investors and other project stakeholders were interested in ex-post information on effectiveness and efficiency of resource (including financial) allocation. Thus, the economic evaluation of projects (mainly investment projects) was shaped as a separate research and practical area. For the purpose of this study, the evaluation approach developed within the bounds of economic evaluation is described as the "resource" approach. This approach is aimed at evaluation of the way project resources (time, financial, etc.) are used.

The second branch deals with evaluation of a project as a mix of interlinked activities aimed at the creation of a "unique product or service" (PMI, 1996). According to this definition of a project, not only the economic aspects should be evaluated. Objectives, stakeholders' behaviour, and organisational structure thereby extend the focus of resource evaluation, which in turn leads to the "process" evaluation approach. In this section, the methods and tools applied through the resource approach are analysed, then the process approach specificities are described, and finally, similarities of these two approaches are identified.

In the framework of the resources approach, a variety of methods and evaluation techniques exist for the purpose of assessing a project's performance and expected profitability. All methods are primarily aimed at justifying a project from a financial perspective. Thus, the methods are quantitative, and the evaluation indicators applied are linked with expected profit in one way or another. In some research papers, about twenty-five assessment techniques are provided, and these techniques form five groups of evaluation methods (Remer & Nieto, 1995): net present value methods, rate of return, ratio method, payback methods, and accounting methods. Evaluators of project economic performance extensively apply cost-benefit and cost-effectiveness analyses as well (e.g. HM Treasury, 2003; Grun, 2006). The earned value management technique can be used for evaluation of the project performance, as well as the tools of the phase-assured and phase-earned value analyses (Bower & Finegan, 2009). A brief description of these methods is provided in Table 1.

Table 1. Characteristics of project evaluation methods

Method	Description	Criteria/indicators
Net present value (NPV) methods	NPV is defined as a sum of annual net cash flows (a difference between inflows and outflows), discounted by a selected interest rate during a particular time period	NPV Present worth Future worth Annual worth Capitalised worth Life cycle costing Maximum prospective value criterion
Rate of return methods	Determination of the interest rate, providing zero present value of the cash flow; or the possible rate that can be obtained; or the increase in capital during the entire period of project implementation	Internal rate of return External rate of return Growth rate of return
Ratio methods	Determining the quotient between financial indicators	Profitability index Premium worth percentage Return on original investment Return on average investment Profit-to-investment Savings-to-investment
Payback methods	Determining of payback period of project – "the time interval between the start of sales and the point at which the total project cash flow becomes positive"	Conventional payback period Discounted payback period Project balance
Accounting methods	Analysis of project effectiveness from an accounting perspective	The return on original investment The return on average investment

Comprised from Remer et al., 1993; Remer & Nieto, 1995; Mishra, 2009; Phillips et al., 2002; Godinho et al., 2004

Some of above-mentioned methods, including internal rate of return, payback period, net present value, return on investment, return on equity, and investment efficiency ratio, are used as the common criteria applied to the resource evaluation approach (e.g. Remer et al., 1993; Remer & Nieto, 1995; Phillips et al., 2002).

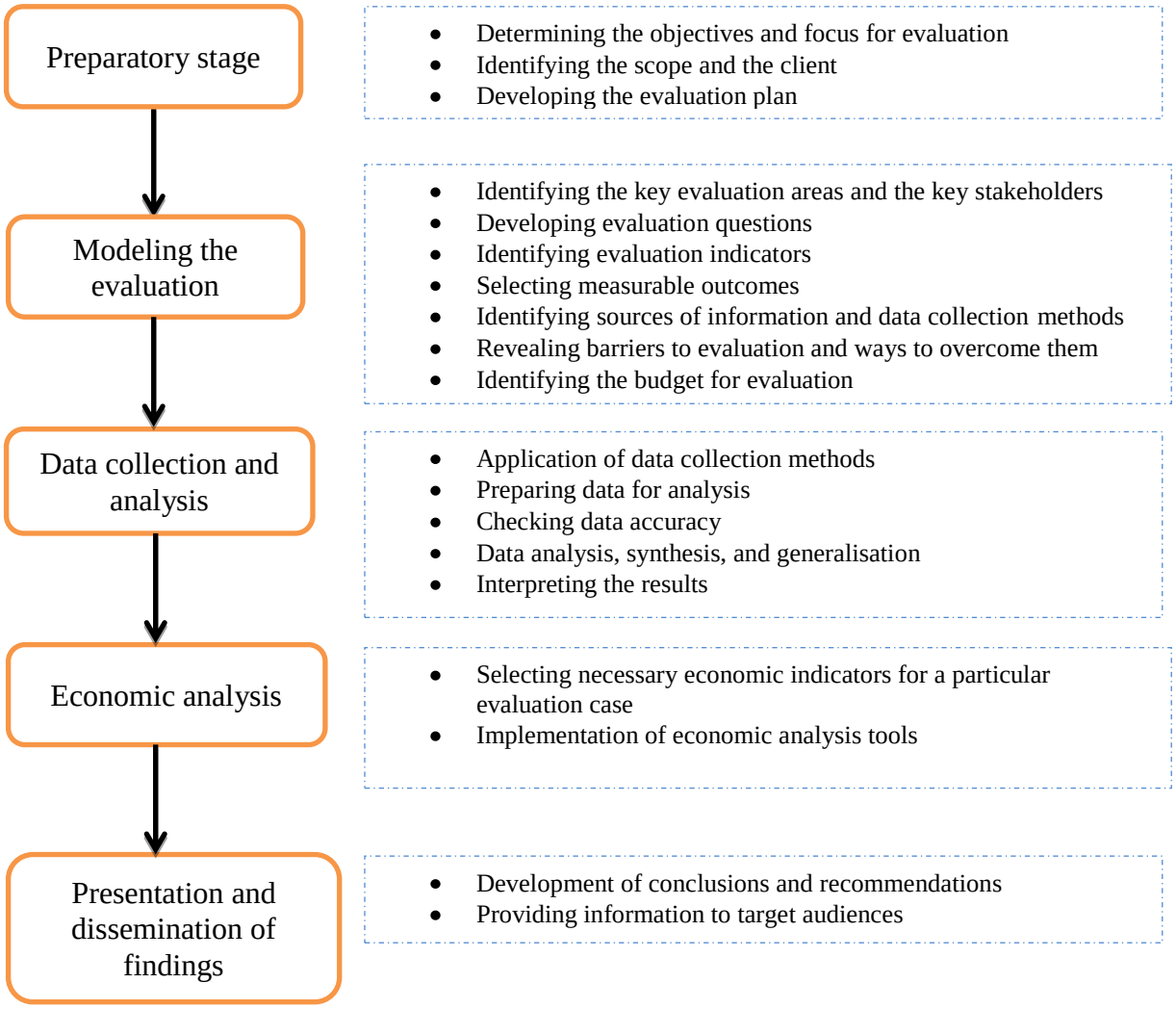
The process approach concentrates on evaluating the entire project; not only economic aspects are taken into account. Project objectives, stakeholders, additionality, impact, and effects are analysed together with resources. Various methods and criteria are provided for evaluation of the project's objectives. According to the SMART-criterion, project objectives should be ***S***pecific, ***M***easurable, ***A***chievable, ***R***elevant, and ***T***imed, while the ABCD-rule defines a measurable objective as one containing information on target ***A***udience, ***B***ehaviour expected from the latter, ***C***onditions and ***D***egree of accomplishment (e.g. Phillips et al., 2002; HM Treasury, 2003; Ricker et al., 1998). Moreover, project objectives have to meet the criteria of appropriateness and relevance. These can be included into the list of common criteria for process evaluation as well as effectiveness, efficiency, credibility, reliability, validity, and sustainability

(e.g. Zarinpoush, 2006; Phillips, 2002; Westat, 2002). Significant attention is paid to the analysis of additionality as an evaluation criterion, which was introduced by Buisseret in 1995. Both input additionality ("the proportion of inputs which would not have been allocated without public support") and output additionality ("the proportion of outputs which would not have been achieved without public support") are used as important criteria in both resource and process approaches (Georghiou et al., 2004).

Both quantitative and qualitative methods are used extensively in the framework of the process approach, and the following methods are applied most commonly: questionnaires, interviews, observations, documentation analyses, presentations, focus groups, statistical methods for data analysis, portfolio methods, and multi-criteria analysis (e.g. Zarinpoush, 2006; Westat et al., 2002; Eilat et al., 2008; Ricker et al., 1998, Bohanec et al., 1995). The use of portfolio methods allows projects to be assessed according to their contents and feasibility (Bohanec et al., 1995). Multi-criteria analysis concentrates on an evaluation of alternatives and a combination of quantitative and qualitative methods (e.g. Crown, 2009). Both resource and process approaches provide qualitative estimates of resource allocation, pay significant attention to cost-benefit analysis, and compare inputs and outputs from the perspective of archived results. All these methods are applied at different stages of the evaluation process.

Generally, issues related to the evaluation process framework are widely studied (e.g. INTERACT, 2007; Zarinpoush, 2006; IFAD, 2009; Grun, 2006; CAP, 2010). The number and content of stages differ for each evaluation process. Some authors suggest dividing the evaluation process into five stages: establishing the evaluation focus and its expected outturn; choosing counterfactuals; comparing the actual outturn with the targeted one and with the effects of counterfactuals; presenting the results and recommendations; disseminating and using the results and recommendations (HM Treasury, 2003). Other authors suggest the following stages: developing a conceptual model; identifying key evaluation points; developing evaluation questions and identifying measurable outcomes; creating an evaluation design; collecting data; analysing data; and providing information to interested audiences (Westat, 2002). The Japan International Cooperation Agency has developed a project evaluation framework that includes three basic stages: evaluation of project performance; assessing value judgment; and providing lessons, recommendations, and feedback to the next stages of the project or other projects (JICA, 2004). For the purpose of this research, the evaluation stages commonly applied in the process and resource approaches were identified and adjusted (Fig. 2).

Figure 2. The framework of the traditional project evaluation process



Based on HM Treasury, 2003; Zarinpoush, 2006; IFAD, 2009; Grun, 2006; CAP, 2010; Westat, 2002; JICA, 2004

The synthesis process of evaluation is comprised of the following five stages: preparation, modeling, data collection and analysis, economic analysis, and presentation and dissemination of findings. The first stage aims to create the necessary conditions to support the evaluation process and the development of an evaluation plan. Key elements of the evaluation process (actors, indicators, outcomes, methods, budget, etc.) are identified during the second stage. In the next stage, information related to the assessed project is collected and analysed. Methods of economic evaluation are implemented during the fourth stage. As a result of the traditional project evaluation, the performance of the entire project is determined, and the directions for project improvement are provided. Finally, these findings are disseminated to the target audience. Thus, the traditional project evaluation approach provides a fully fledged methodology of project analysis from different perspectives.

Approaches for Foresight evaluation

Several specific features of Foresight projects should be pointed out before beginning an analysis of Foresight evaluation. There have been numerous attempts to define what Foresight is (e.g. Coates, 1985; Georghiou, 1996; Keenan, 2003; etc.): nonetheless, there is no single shared understanding (partly due to the changes in comprehension of Foresight and the development of related methods and tools). Despite the absence of a common definition, the following basic features of Foresight are usually emphasised: future orientation, broad participation (large number of actors with different interests and knowledge), evidence (different kinds of data used), coordination, action orientation (support for actively shaping the future), and multidisciplinarity (Popper et al., 2010).

Issues concerning a theory of Foresight evaluation have been extensively examined by a variety of scholars (e.g. Georghiou & Keenan, 2005; Popper et al., 2010; Rijkens-Klomp & van der Duin, 2011) and various evaluation frameworks have been developed through several practical cases. The subjects of research papers related to Foresight evaluation are the following: factors of Foresight success, areas of Foresight impact, and different aspects of the Foresight process.

One research area focuses on defining Foresight success and identifying factors that lead to such success. Some scholars consider Foresight to be successful if it provides more effective learning and more creativity in developing strategies and initiatives (Bezold, 2010). However, project success can be determined in relation to a wide range of various project objectives, thereby a widely recognized definition of Foresight success is still undeveloped. At the same time, several factors of Foresight success have been determined. The following factors could be mentioned: strong interconnections between public, private and academic sectors; inclusion of different stakeholders; links to the current policy agenda; development of novel methodologies, creativity and lateral thinking; proactive public work; and taking previous experience into account (Calof & Smith, 2008; Meissner & Cervantes, 2008; Habegger, 2010). Some scholars have determined pitfalls of Foresight projects as well as factors of success (Öner & Beser, 2011). These pitfalls can take place at all stages of project implementation (foundation, planning, organising, controlling, execution, feedback and continuity).

The impact of Foresight activities is the principal indicator of Foresight evaluation, and at the same time, the main reason for Foresight intervention. Four types of Foresight impacts (including awareness raising, informing, enabling and influencing) form a Foresight impact schema (Johnston, 2012). For the purpose of impact evaluation, researchers determined several

directions of the most considerable Foresight influence. These areas comprise: knowledge society emergence; science, technology and innovation (STI) system; business; policy-making and decision-making processes, and public understanding of science and technology (e.g. Popper et al., 2010; Havas, Schartinger & Weber, 2010; Rollwagena et al., 2008). Some scholars suggest analysing internal criteria (related to actors, processes, objectives and inputs/outputs), wider environmental factors, and external factors together for the purpose of qualitative evaluation of Foresight impact (Amanatidou & Guy, 2008). In accordance with the close interconnection between STI system and Foresight, the impact of the latter is assessed from the national innovation performance perspective (Meissner & Cervantes, 2008).

Issues devoted to the choice of evaluation criteria and to the development of an evaluation algorithm are quite widespread. A wide range of criteria is implemented during practical evaluation cases, such as sufficiency and efficacy (Dursun et al., 2011), value added (Rijkens-Klomp & van der Duin, 2011) usefulness, and importance (Georghiou et al., 2004). However, the following criteria are considered to be the most important: appropriateness, efficiency (input-output, input-effects, and input-impact relations), effectiveness (objectives-output, objectives-results, and objectives-impact relations), and relevance (Georghiou & Keenan, 2005; Meissner & Cervantes, 2008; Popper et al., 2010; Destatte, 2007). The most "economic" criterion – value for money – is assessed through evaluation of the funding mechanisms' performance and is characterised mainly in qualitative terms (Popper et al., 2010). The specificity of the "behavioural additionality" criterion is widely investigated by researchers in regard to evaluation of Foresight impact. Behavioural additionality is the difference in firm behaviour resulting from the intervention (Georghiou et al., 2004.) Some scholars (Georghiou & Keenan, 2005; Destatte, 2007) propose including behavioural additionality to the list of Foresight evaluation criteria, and several questions for evaluation of this criterion were developed (Li et al., 2009; Georghiou et al., 2006). There are many other criteria that are used for the evaluation of different aspects of Foresight projects, for example, appropriateness of objectives and the experience of the project team (e.g. Georghiou et al., 2004; Yoda, 2011; Calof, 2011). The criteria proposed by the above-mentioned scholars and developed through several practical cases were systematised and classified in accordance with the assessed elements of Foresight projects[†] (Table 2).

[†]Various approaches to identifying the key elements of foresight projects have been implemented (e.g. Fuller & Loogma, 2009). However, the proposed perspective is considered to be more suitable for the purpose of this paper, due to the fact that it allows researchers to evaluate not only methodological aspects but also objectives, clients, stakeholders, project teams, process, and results of Foresight projects.

Table 2. Foresight evaluation criteria

Evaluation topic	Criteria	Method of evaluation	Scale
Objectives	Appropriateness	Interviews	Answering evaluation questions (e.g. How appropriate were the project's objectives? Did the project's objectives accurately address a stakeholder needs?) Interviewees estimate level of appropriateness
	Level of attainability/ achievement	Comparison with outputs	All objectives were achieved – more than half of objectives were achieved - less than half of objectives were achieved - objectives were not achieved at all
	Adequacy of formulation	Interviews	Yes or no
Project team	Level of education, qualification and experience level	Analysis of documentation	Share of each group of project team members according to education and qualification level. Evaluation questions about experience: Has the project team implemented any Foresight projects before? What is the experience level of each member of the project team? Have previous projects implemented by the team been successful?
	Level of dependence	Interviews with project team members	Strongly dependent on individual interests - slightly dependent on individual interests – independent
Client	Position of initiator	Analysis of documentation	Negligible - medium powerful national position - powerful national position
	Interaction with project team	Interviews with project team members	No interaction - interaction on project team's initiative - interaction on client's initiative - efficient interaction on mutual initiative
Stakeholders	Key sectors' involvement	Analysis of stakeholders' presence from different sectors	Shares of stakeholders from: science and academic community - public sector – business
	International, national, regional and local level presence	Analysis of stakeholders' distribution according to level	

Methodology	Relevance of methods to objectives	*Matrix analysis*	Determining the contribution of each method to achievement of a particular objective
	Quality of output	Interviews	Were results achieved through implementation of a particular method of high / medium / low quality?
	Variety of methods	Analysis of documentation	Unstructured use of instruments - instruments used selectively - mix of different instruments
Process	Effectiveness of organisational structure	Interviews	Effective - partly effective - slightly effective – ineffective
	Complexity of actions planning	Interviews	Planning was successful - there were some slight planning mistakes - there were serious planning mistakes - planning was perfunctory
Outcome	Products and services provided by Foresight project are analysed		
Effects	Effectiveness	Comparison of effects and objectives	Very effective - effective - moderate - poor - very poor
	Efficiency	Comparison effects and inputs	Efficient or inefficient
	Value for money		Excellent - good - neutral - slight – poor
	Value added		No value added - partially involved in policy definition - systematic integration in policy definition

Based on Georghiou & Keenan, 2005; Meissner & Cervantes, 2008; Popper et al., 2010; Rijkens-Klomp & van der Duin, 2011; Destatte, 2007; Georghiou et al., 2004; Georghiou et al., 2006.

The italics means criteria proposed by the authors.

The above-mentioned theoretical issues provide a wide range of recommendations for Foresight evaluation organisation, but some important elements of the evaluation framework are mainly developed by practice, including the methods of evaluation. To collect and interpret data for Foresight evaluation, interviews, questionnaires, surveys (traditional as well as online), documentation analysis, and benchmarking are the typically used methods.

A review of the literature reveals that there is no consensus among scholars about necessary and sufficient steps of the evaluation process. Georghiou and Keenan (2005) suppose that the framework of Foresight evaluation process depends on its rationale. The authors identify three main rationales for Foresight: providing policy advice, building advocacy coalitions, and providing social forums. In accordance with another suggestion, there are five such rationalities: "prioritising investment in STI; building new networks and linkages around a common vision; extending the breadth of knowledge and visions in relation to the future; bringing new actors into

the strategic debate; and improving policy-making and strategy formation in areas where science and innovation play a significant role" (Georghiou, 2008: 19-20). Each of these methods provides different outcomes and determines different focuses of evaluation (Georghiou and Keenan, 2005).

Some authors focus on determining the key elements of the evaluation process, and propose developing its framework according to these elements. For instance, the adjusted integrated Foresight management model (IFM) is suggested to be used as a checklist (Alsan & Öner, 2004). IFM is a modification of the Knowledge–People–System–Organisation (KPSO) framework proposed by Öner & Basoglu (2000) and the integrated management model (IMM) developed by Bleicher (Alsan & Oner, 2004). IFM includes three levels of management (normative, strategic, and operational) and three elements (structures, goals, and behaviour). The checklist includes the same three levels of evaluation, while the elements are replaced from the KPSO framework (people, system, and organisation). The main advantage of this approach is the possibility of quantitative evaluation of national Foresight studies and comparison between these studies. Another model that is appropriate for implementation through Foresight evaluation, the integrated development management model (IDMM), is also based on IMM (Öner & Saritas, 2005). IDMM includes the same three levels and three elements, but concentrates on "their integration with each other" (Öner & Saritas, 2005: 895). The main criteria applied through IDMM implementation are "the clarity and limpidness of the plan; the unity of the plan; the integration and totality of the plan; and the coherence, harmony, and acceptability of the plan as a whole" (Öner & Saritas, 2005: 895).

Li et al. (2009) identified six phases of evaluation that summarise the evaluation experience of some European countries: objective–outputs evaluation; objective–outcomes evaluation; objective–impacts evaluation; effects–outcome–impact assessment; comparison inputs and outputs; and mission–implementation–outcome evaluation.

In many cases, the evaluation process framework is developed specifically for a particular project. The evaluation of the Columbian Technology Foresight Programme includes the following stages: scoping, understanding, evaluating, and learning. The evaluation plan is developed at the first stage, while interviews and data analysis are conducted at the second stage. At the third stage, intermediate results are presented and discussed with experts and benchmarking is conducted. At the final stage, an evaluation report is prepared and validated (Popper et al., 2010). Construction of the evaluation system, application of the system, and reporting are stages in the evaluation process for Vision 2023. The stage of system construction is comprised of identifying objectives and data resources, choosing evaluation tools, and creating

an evaluation model. In the next stage, methods are implemented and findings are presented (Dursun et al., 2011).

The experience of framework development from different Foresight evaluation studies (Cuhls & Georghiou, 2004; Dursun et al., 2011; Georghiou et al., 2004; Georghiou et al., 2006; Popper et al., 2010) was explored from the traditional project evaluation perspective, i.e. in comparison with the most commonly applied stages of project evaluation process (Table 3).

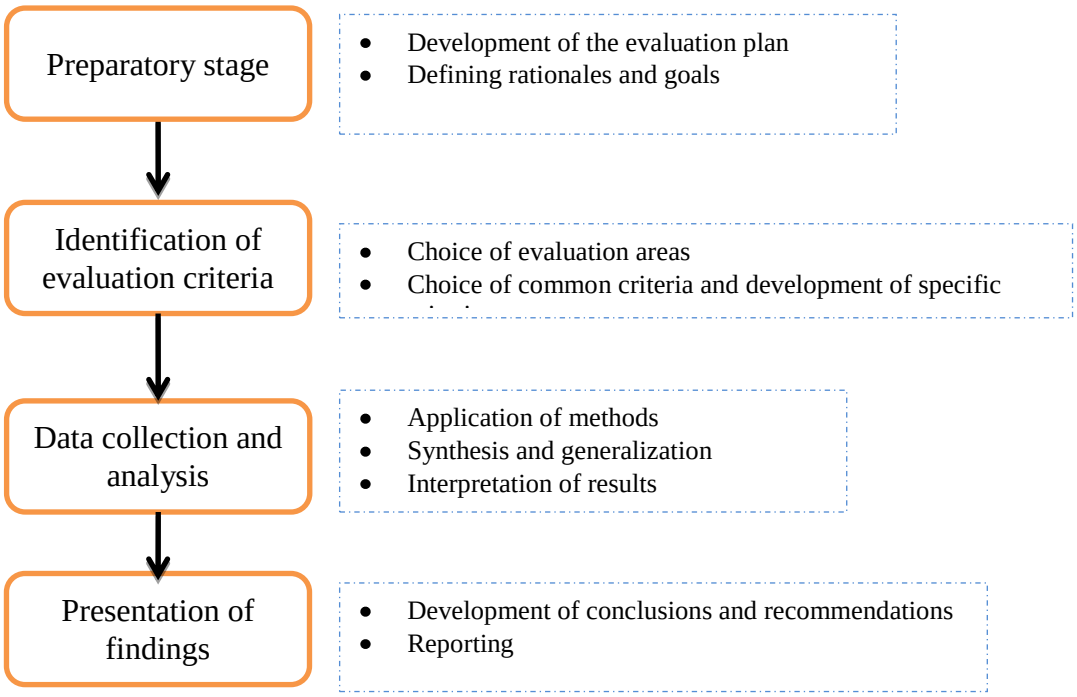
Table 3. Comparison of the framework of project and Foresight evaluation processes

	Preparatory stage	Modeling evaluation	Collecting data and analysis	Economic analysis	Findings presentation and dissemination
FUTUR (the first phase)	Formulation of evaluation hypotheses	–	Conducting surveys	–	Preparation of final report
Hungarian Technology Foresight Programme	Design and distribution of questionnaire	–	Analysis of results of questionnaire, interviews and documentation analysis	–	Presenting evaluation results
United Kingdom Foresight Programme (the third round)	Formulating evaluation objectives and scope	Analysis according to "logic chart"	Interviews, documentation analysis and benchmarking	–	Preparation of final report
Vision 2023	Determining evaluation objectives	Designing evaluation model	Information sources identification; distribution of questionnaires; implementation of interviews, questionnaires, documentation analysis	–	Reporting and presenting the findings
Colombian Technology Foresight Programme (the second cycle)	Developing the evaluation proposal	–	Implementation of scanning, interviews, documentation analysis, benchmarking and surveys	–	Further analysis, preparation of final report

To sum up the above-mentioned examples of stages in the Foresight evaluation process, several common elements can be identified. In all cases of Foresight evaluation, some preparatory activities (e.g. determining rationales or planning) take place. After that, evaluation

procedures are implemented and results are presented. The framework of Foresight evaluation constructed in correspondence with project evaluation framework is shown on Figure 3.

Figure 3. The framework of the Foresight evaluation process



The proposed framework of Foresight evaluation process includes four main stages. The preparatory stage is similar to project evaluation. However, the following stages have several distinctions. The activities of the second stage are aimed at identifying indicators for evaluation. Data collection and implementation of the evaluation techniques then take place. The final step of evaluation is formulation of general conclusions by the evaluation team, which describes whether the project was a success, identifies factors of Foresight success or failure, determines project's strengths and weaknesses, and provides recommendations for follow-up Foresight activities.

Comparison: project evaluation vs. Foresight evaluation

As mentioned in the previous sections, the approaches applied to evaluation of economic efficiency and project implementation are quite different, but some elements of both can be applied to Foresight evaluation. For the purpose of identifying these elements, we compared a traditional approach to project evaluation and Foresight evaluation approach (Table 4). Although there is no universal methodology for Foresight evaluation, the common features of frameworks used in practical cases and proposed by scholars were identified (e.g. Alsan & Öner, 2004; Meissner & Cervantes, 2008; Daim et al., 2009; Popper et al., 2010).

Table 4. Comparison of project and Foresight evaluation approaches

Criteria for comparison	Traditional project evaluation approaches		Foresight evaluation approach
	Resource approach	Process approach	
Purposes of evaluation	Evaluation of economic efficiency and effectiveness	Evaluation of the whole project performance; providing recommendations for project development and improvement	Analysis of project's success; evaluation of its impact; development of recommendations for follow-up Foresight projects
Common criteria for evaluation	Simple rate of return; payback period; benefit-cost ratio; net present value; effectiveness; efficiency	Effectiveness; efficiency; appropriateness; relevance; eligibility; credibility; reliability; validity; sustainability	Efficiency; effectiveness; appropriateness; relevance
Types of methods used	Mainly quantitative methods	Qualitative and quantitative methods	Mainly qualitative methods
Methods used	Cost-benefit analysis; cost-effectiveness analysis; payback methods; accounting methods; discounted cash flow analysis; multi-criteria analysis; other statistical analysis	Questionnaires; interviews; observation; documentation analysis; group discussion; presentation; focus group; statistical analysis; multi-criteria analysis	Questionnaire; documentation analysis; interviews; survey (including online surveys); benchmarking
Evaluation results	Economic effectiveness and efficiency of a project are determined	Performance of project is estimated; ways for project improvement are identified	Success of a project is determined; strengths and weaknesses are described; recommendations for continuing or stopping Foresight are developed

Given the fact that Foresight has several specific characteristics, the process of its evaluation differs considerably from the traditional project evaluation framework. First, the purpose of evaluation is different. Project evaluation concentrates on the efficiency of funds' usage or the economic justification of a project (especially for investment projects) and searching for ways to improve the project's design. Meanwhile, Foresight evaluation emphasises the importance of project success assessment, and its results have an influence on the future directions of Foresight development. As the purposes of evaluation determine the general design of the process, the evaluation frameworks are constructed in different ways. Significant attention

is paid to pre-evaluation procedures according to the traditional approach: evaluators conduct an in-depth analysis of data sources and methods for data estimation, and also identify barriers for full-fledged evaluation and opportunities for overcoming these obstacles. A preliminary stage takes place for Foresight evaluation process as well. However, this stage comprises only evaluation plan development (as usual, "for internal use only") and listing the selected evaluation criteria without any specifications. As a result, users of information on Foresight evaluation have limited capabilities to understand the principles of criteria and methods selection. Furthermore, the traditional approach highlights the necessity of identifying key evaluation stakeholders, while no attention is given to this issue during analysis of Foresight.

Several similarities should be pointed out concerning the common evaluation criteria applied by the process approach for project evaluation and the approach for Foresight evaluation. Nearly all of the common criteria were borrowed from the process approach and then used in Foresight evaluation. Moreover, some criteria are common to the resource and process approaches. However, there is a significant disadvantage of this borrowing process: effectiveness and efficiency are assessed mainly with qualitative methods, although originally the criteria should be estimated quantitatively. Analysis of other criteria is implemented according to different scales that are not formalised; for this reason, the results of different Foresight evaluation initiatives become incommensurable.

At the same time, Foresight evaluation addresses many evaluation topics that are beyond the scope of the traditional evaluation approach, including the client, project team, and methodology applied in assessed project (Table 5). Additionality as an indicator is employed in both traditional and Foresight evaluation approaches. Nonetheless, the focus of additionality analysis is different: the former approach estimates input and output additionality, while the latter concentrates on behavioural additionality. Objectives are also included as the subject of evaluation of analysed approaches, although some distinctions arise with regard to criteria.

Table 5. Comparison of subjects of project and Foresight evaluation processes

Subjects of evaluation:	Traditional Project evaluation approaches		Foresight evaluation approach
	Resource approach	Process approach	
Objectives	–	Evaluation according to the SMART criteria (Specific, Measurable, Achievable, Relevant, Timed) and the ABCD rule (Audience, Behavior, Conditions, Degree)	Evaluation according to appropriateness, level of achievement, and adequacy of formulation
Stakeholders	–	Degree of consensus between stakeholders is estimated	Presence of key institutions; involvement of key sectors; assessment of international, national, regional and local level presence
Methods	–	–	Relevance to objectives, variety and usefulness of methods are evaluated
Project team	–	–	Analysis of level of education and qualification, experience level, level of dependence
Additionality	Input and output additionality		Behavioural additionality
Output	Analysed with respect to input	Only numerical characteristics of expected and unexpected goods and services provided by the project are analysed without qualitative characteristics	
Impact	Evaluation of changes as a result of the project: enhanced networking, partnerships, skills, knowledge, etc.		
	Changes in company value		Policies and strategies, STI-system, social sphere
Resources	Estimation of resource allocation, justification of costs according to achieved results; comparison of costs and benefits.		Value for money (often only qualitative estimation)

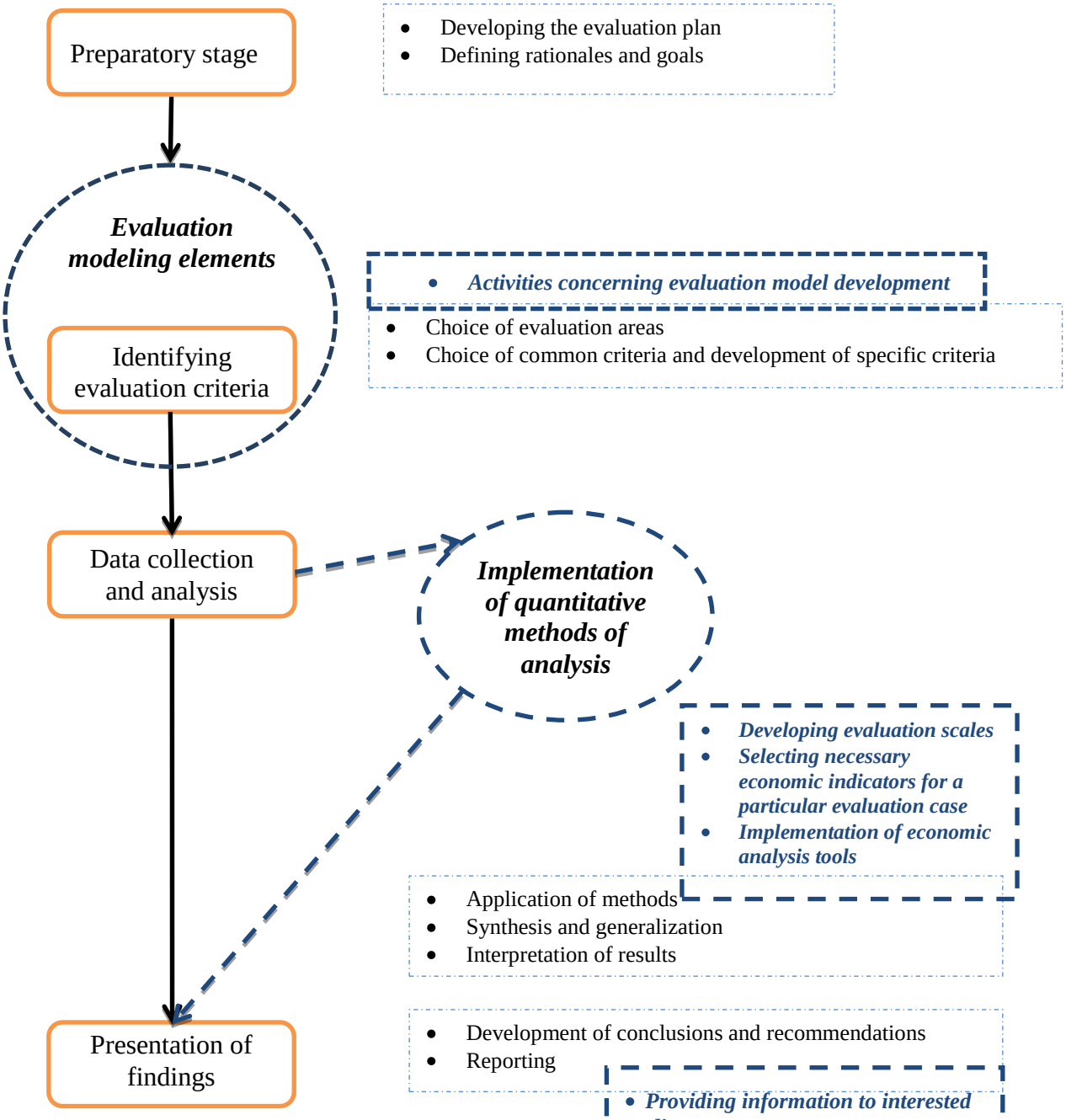
The main distinction concerns the evaluation of resource allocation. Foresight evaluation provides only a qualitative analysis of the indicator “value for money”, while the traditional approach presents a variety of quantitative methods and criteria for funds’ usage and the project’s justification. Consequently, the results of evaluation through analysed approaches differ significantly. By the end of the resource analysis, the evaluation team prepares a report that includes findings about project effectiveness and efficiency, and causes of ineffectiveness or inefficiency. The results of the process evaluation concern the project's performance, managerial mistakes, and ways to correct the project’s disadvantages. Both mentioned elements of the traditional approach provide well-structured conclusions about the assessed project from economic or managerial points of view. Foresight evaluation allows determination of whether a

project is beneficial, and provides recommendations concerning the rationale for continuation of Foresight activities.

The frameworks of Foresight and traditional projects evaluation processes differ significantly as well. The evaluation process in four case studies was compared with the traditional project evaluation framework (Table 3). Certain stages in the traditional evaluation approach, such as designing an evaluation model and economic analysis, are not usually present in Foresight evaluation. Several distinctions connected with applied criteria and methods take place during other evaluation stages.

Thus, the framework of a Foresight evaluation can be improved by supplementing it with several project evaluation elements. The proposed methods for such improvements are presented in Figure 4.

Figure 4. The supplemented framework of Foresight evaluation



The development of the evaluation model is an indisputable advantage of the traditional approach. Modeling should be added after the preliminary stage of Foresight evaluation as a fundamental element of evaluation process. The model of an "average" evaluation exercise is based on identification of the main evaluation steps, choosing the executive member of evaluation team at each step, and trying out different evaluation procedures. Therefore, modeling will help prevent potential mistakes and overcome barriers for evaluation with fewer wasted resources. In addition, it may provide a more quantitative and detailed evaluation process. Several steps are necessary to guarantee successful implementation of this recommendation:

development the samples of evaluation model for projects of the same types (e.g. for national, regional, sectoral and problem-oriented) and with similar purposes; identifying the projects' specific features that can influence evaluation framework; providing a set of tools for modeling with regard to Foresight peculiarities. So, the first lesson from project management is to include the modeling stage in Foresight evaluation.

Another proposed change concerns the more extensive implementation of quantitative methods. By incorporating quantitative methods into Foresight evaluation, evaluation results from different studies would be comparable and the level of subjectivity would decrease. For instance, when level of education and qualification is estimated, it is reasonable to use quantitative indicators such as the share of members with a PhD, the number of previous successful projects, etc. It will be probably useful to estimate the extreme levels for such indicator for different types of projects. The identifying of these extremes would be based on the international experience and experts' opinions. Such methods as ranking, scoring, bibliometric, statistical and approximate analysis can be applied. Thereby the extensive use of quantitative methods corresponds to the second lesson learnt from project management.

To make implementation of the previous proposition possible, it is necessary to take into account the third lesson – to develop common scales to evaluate each type of criteria. The main methods for formation of scales would be expert analysis based on international Foresight evaluation experience. One of the most significant requirements is a wide dissemination of related information concerning rules and methods of estimation and interpretation of results. The implementation of evaluation scales will in turn help to reduce time and resources consumed in the preparatory and modeling stages.

Both quantitative methods and evaluation scales are in close interconnection with the fourth lesson for the improvement of Foresight evaluation methodology. Such evaluation topics as output and effects are analysed principally from an economic perspective. Effectiveness, efficiency, value for money, and value added are, in essence, economic indicators, thereby an economic approach to evaluation is an essential requirement for getting correct results. Cost-benefit and cost-effectiveness analysis, discounting, and statistical methods should be applied. Thus, adding elements of economic analysis to the framework of Foresight evaluation may provide more complex evaluation as well as effective management of follow-up projects from the financial perspective. Obviously methods of economic analysis applied in project management should be adjusted to suit specificity of Foresight projects. Development of a software product for evaluation needs based on using quantitative methods, common evaluation scales and elements of economic analysis is perspective way for increasing the efficiency of evaluation process. The software product would be able to conduct several procedures of data

analysis, which in turn provides evaluators and experts with more structured and formalised information and reduces time consumed.

Results of Foresight evaluation should be available for interested audiences. The foundation of a specific organisation of Foresight evaluators would guarantee openness and transparency of evaluation results. For example, brief characteristics of the mail elements of final evaluation reports (if full reports are classified) would be placed on the Internet site of such organisation. The European Foresight Platform (EFP) has the same experience in regard to Foresight project's descriptions. Probably the proposed evaluators' organisation can operate in the framework of the EFP. Thus, fifth lesson from project management is providing more openness and transparency for evaluation results.

Conclusions

Projects of all types are subject to evaluation processes at every stage of their implementation. Ex ante evaluation is aimed at supporting decision-making activities, which seek to decide whether the project should be implemented, while ex post evaluation helps to identify the project's strengths and weaknesses. This research focuses on ex post evaluation mechanisms applied to project evaluation in general, with special attention paid to Foresight projects.

Traditional approaches to project evaluation comprise economic analysis of the project's efficiency and analysis of the entire project's performance. Techniques to evaluate investment projects fall within the boundaries of the first area; the second research area includes issues concerning projects of different types. The traditional approach has accumulated a wide range of theoretical concepts and practical recommendations for evaluation process organisation.

Foresight evaluation is a quite "young" scientific and practical area, although several successful evaluation activities have been implemented and a significant number of research papers have been prepared. Thus, though specific approaches to Foresight evaluation have been shaped, the formulation of its framework and methods is still ongoing. The development of a general Foresight evaluation framework is presented in this paper.

This paper carries out a comparative analysis of evaluation approaches to traditional and Foresight projects and identifies directions for improvement of the Foresight evaluation framework. This comparison reveals several distinctions. These differences can be partially explained by Foresight specificity, i.e. the long-term impact of Foresight projects leads to the lack of implementation of financial indicators. Meanwhile, some adjustments should be done to improve the performance of the Foresight evaluation process. It is rational to borrow some

elements of the traditional approach's evaluation process and to therefore supplement the Foresight evaluation framework.

Certain lessons for Foresight evaluation from project management were identified:

1. ***Development of an evaluation model.*** This element of the evaluation process has started to be applied in analysis of Foresight projects, but it is still not widespread.

2. ***The extensive use of quantitative methods.*** The implementation of quantitative methods may extend the boundaries of evaluation areas and make the evaluation process more formalised.

3. ***Elaboration of evaluation scales.*** Common scales for evaluation of each criterion are an indispensable condition of providing comparability of evaluation results and for increasing the level of transparency of evaluation procedures.

4. ***Inclusion of economic indicators in evaluation.*** This is important due to the necessity of attracting investment and proving the financial justification of the assessed project. Furthermore, the controlling function is realised by comparing financial indicators with planned level norms.

5. ***Increasing transparency for evaluation results.*** Information concerning methodology, selection of criteria, and implementation methods of a Foresight project is not always available for interested audiences, and moreover it is sometimes classified. This is a significant obstacle for Foresight evaluation skills and knowledge dissemination.

In the framework of this research the main ways for improvement of Foresight evaluation methodology were identified. The in-depth analysis and detailed instructions for implementation of proposed changes are objectives of following researches.

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