Elvira Böcskei*

MEANS OF TESTING THE EFFICIENCY OF INVESTMENTS IN THE PERIOD OF PROJECT PLANNING

A beruházások hatékonyságának mérése a projekttervezésben

A period crucial in the development of Hungary's economic development closed on 31st December 2006, since that was the time when the country reached the end of National Development Plan I (NDP I.). In the period between 2004–2006 the country could use resources worth € 2.7 bn – € 1,996 mn from the EU structural funds, € 700 mn from domestic funds and € 5mn from private funds – within the framework of the National Development Plan [Economic Competitiveness Operative Program 2004-2006]. As a result, more than 74 pc of developments were financed by the EU, to which the central budget contributed 23.6 pc, while municipalities and private funds another 2.4 pc. The subsidies granted within the Operative Programs were intended to develop areas that could not have caught up with the other regions if left to their own resources. The subsidy, whose amount was annually increasing from 23 to 33, and, finally, to 43 pc, ensured that the country could utilise the opportunities provided by the support also in the initial years following the accession. For every sector of the national economy it was clear from the outset that the aim could not be calling in all the available resources at any rate, but that they should be utilised efficiently, investing them into developments harmonized with the preferences of the economic policy. The main objective of National Development Plan I was "to decrease the backlog in per capita GDP compared with the EU average", which has been partly achieved, but the lag still remained significant. Large-scale investments have been accomplished whose success can be verified in the years to come. Experience from the past years has made it clear that *harmonizing planning and implementation necessitates the timely application of feedbacks. More attention should be paid to exploring the effective machanisms of developments, it is necessary to apply different methods of meassuring performance that can be used to recognise and eliminate the so-called bottlenecks in time.* (Új Magyarország Fejlesztési Terv 2007–2013).

NDP I, which was the first phase of accomplishing the aims laid down in the Lisbon strategy, was closed, and at the same time it set the scene for the *"New Hungary Development Plan"*. The development plan for the period 2007–2013 set as its comprehensive goal the *extention of employment and creating the conditions for sustainable growth.* Based on these aims, the development plan ensures that, utilising the experience gathered over the past three years, we accomplish newer and newer investments and developments. *All this requires enterprises that can produce successful bids and prepare their cost-effective projects on a high quality standard.*

In order to be able to implement a project concept successfully, during the planning phase we must take into consideration all the aspects and effects that can largely impact the successful implementation.

As for the projects to be implemented, OECD's Development Support Committee formulated the following requirements:
- the project is to comply with the community, national and professional sector objectives,
- the project is to be viable, having realistic and measurable targets, with due attention to the opportunities and the hazards,
- the project is to be sustainable, allowing for the factors ensuring sustainability.

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*   *Director of Finance, senior lecturer, Budapest College of Management*

Having been acquainted with the requirements to meet while implementing the project, now we can go over to elaborating the phases of the project life cycle.To make our investments successful, it is necessary to overview the means to be applied.

Analysis of the internal factors and external conditions of the enterprise

SWOT analysis

SWOT analysis is one of the most commonly used methods of analysis, a four-domain matrix that provides a transparent analysis of the enterprise's position. It is a tool rather often used in the economic life for examining the internal and external environment of the enterprise. During the internal examination we can explore the strong and weak points of the enterprise, while examining the external environment might give us a picture of the opportunities and threats of the enterprise. A characteristic of the internal factors is that the enterprise is capable of changing them, while the external factors are beyong the scope of the enterprise.

Table 1
SWOT ANALYSIS

Strengths	Weaknesses
+/internal	-/internal
Opportunities	Threats
+/external	-/external

During the analysis the aim is not to explore all internal factors and all the expected external effects, it is much more important that the factors analysed should be made to serve the corporate strategy. Relying on the company's strengths, we should try to eliminate, or at least reduce, weaknesses, furthermore, increase the company's competitiveness, while at the same time keeping an eye on the negative effects of threats as well. Exploring opportunities might as well be the starting point of accomplishing a new investment or development. The logical frame matrix helps plan the detailed project aim as well as the expected result.

Economic and social effects

Problem tree

Making the problem tree is helpful in exploring the cause and effect relationships concerning the problems and difficulties arising during the analysis. By defining the problems we provide justification for the necessity of the project to be implemented. The analytical phase consists of three parts mutually having a causal relationship with each othe:

- Problem analysis
- Determining objectives
- Strategic analysis

Figure 1
PROBLEM TREE

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                          ┌──────────────────────┐
                          │ low utilisation of   │
                          │       hotels         │
                          └──────────────────────┘
        ┌─────────────────────────┐        ┌──────────────────────┐
        │ hotels quality standard │        │     hotel rates      │
        │    not appropriate      │        │      too high        │
        └─────────────────────────┘        └──────────────────────┘
   ┌──────────────────┐  ┌──────────────┐
   │ hotel renovations│  │   lack of    │   ┌──────────────┐ ┌──────────────┐
   │    postponed     │  │   programs   │   │ low quality  │ │ lack of proper│
   └──────────────────┘  └──────────────┘   │ of services  │ │  marketing   │
                                            └──────────────┘ └──────────────┘

        ┌──────────────────────┐        ┌──────────────────────┐
        │ regional infrastructure│      │ poor domestic and    │
        │     low quality        │      │  foreign tourism     │
        └──────────────────────┘        └──────────────────────┘
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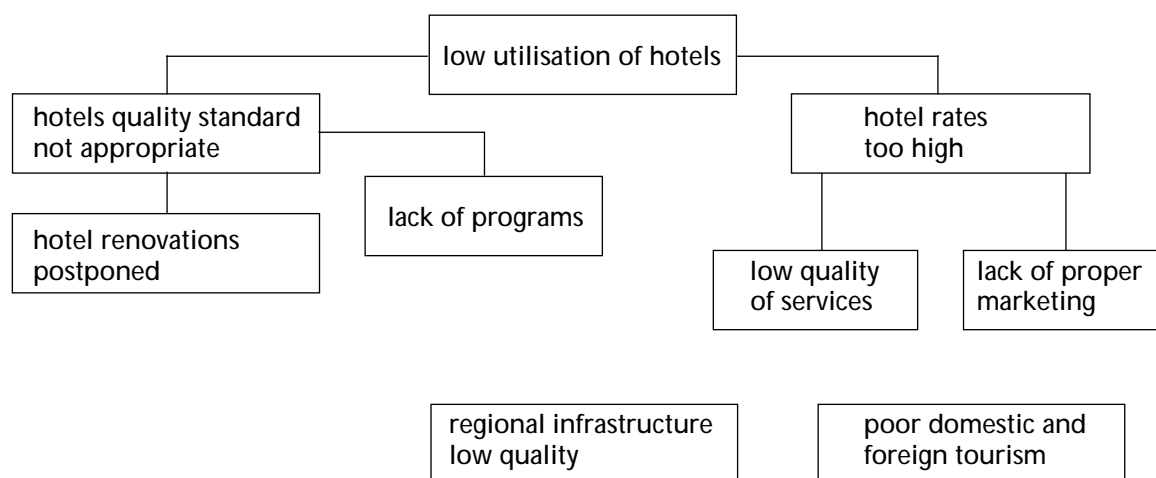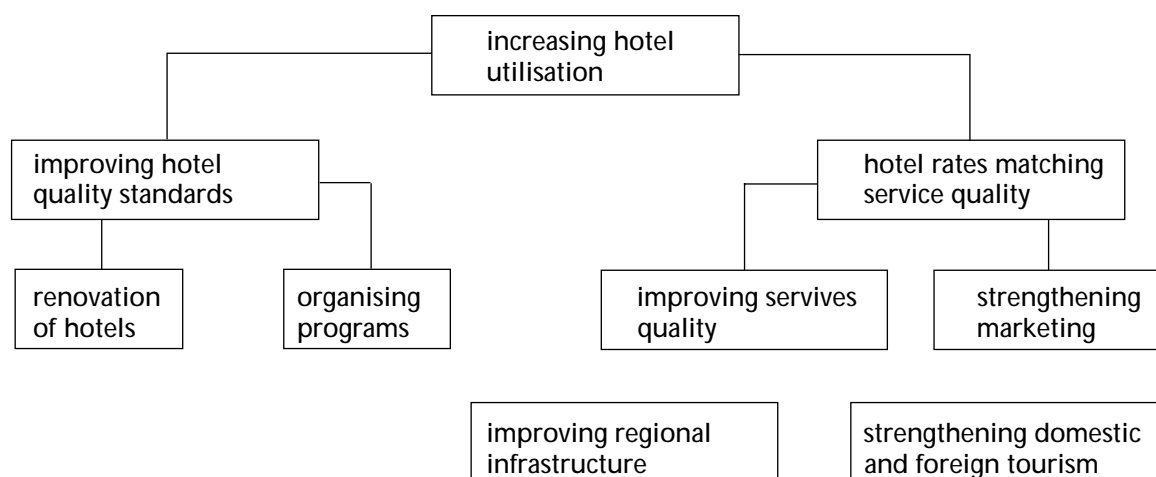
The problem tree was meant to explore the reasons for the poor domestic and foreign tourism that led to the low utilisation of hotels. Some of the reasons for the problems are the fact that the hotel renovations did not take place, no suitable programs are organised, services are of low quality and there was no proper marketing activity. All the above causes resulted in hotels having a low quality standard and at the same time offering too high rates. On the whole, this is the reason why the utilisation of hotels is low.

Objectives tree

While the problems tree shows the negative effects of the present, the objectives tree provides an outline of the possible future solution to the problems. For the objectives tree to show the right way to the solution the exploration of the real problems is necessary. After this, the task is really simple, as the exploration of the problems also shows the way to their solution.

Figure 2
OBJECTIVES TREE

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                          ┌──────────────────────┐
                          │  increasing hotel    │
                          │     utilisation      │
                          └──────────────────────┘
        ┌─────────────────────────┐        ┌──────────────────────┐
        │    improving hotel      │        │ hotel rates matching │
        │   quality standards     │        │   service quality    │
        └─────────────────────────┘        └──────────────────────┘
   ┌──────────────┐  ┌──────────────┐
   │ renovation   │  │  organising  │   ┌──────────────┐ ┌──────────────┐
   │ of hotels    │  │   programs   │   │ improving    │ │ strengthening│
   └──────────────┘  └──────────────┘   │ servies      │ │  marketing   │
                                        │ quality      │ └──────────────┘
                                        └──────────────┘

        ┌──────────────────────┐        ┌──────────────────────┐
        │ improving regional   │        │ strengthening domestic│
        │   infrastructure     │        │  and foreign tourism  │
        └──────────────────────┘        └──────────────────────┘
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The objectives tree is in close relationship with the results recorded in the frame matrix.

Cost benefit analysis (CBA)

The EU only supports projects that are also useful on a national, community level, and are economically lucrative.Of course, it does not mean that they must produce a financial return. We come across several cases that, though not yielding a profit, are useful both on a national and a community level. However, in every single case an essential requirement is that they should be viable in the long term. In the cost benefit analysis we analyse the economic and social costs and benefits. *Besides the costs and benefits involved in financial planning, it also comprises values that were not included as externalities* (external economic effects) *and indirect effects* (environmental and social effects). Usually it is justified to use more indicators simultaneously as the application of just one indicator does not provide relevant information as to the success of the project to be implemented.

The ratio of the discounted costs and benefits of a project (B/C)

B/C = PV (h) **/ PV** (k)

PV (h) (discounted benefits and positive effects)
PV (k) (discounted costs and negative effects)

Determining the discount rate used for the conversion to the present time of monetary movements occuring at different times is based on the alternative cost of capital. In the period 2006-2007 the rate with a real value of 6 pc was considered as a preference parameter. The project is worth implementing provided the indicator exceeds 1.

Economic discounted net present value (ENPV)

$ENPV = \sum [(PV (h) - PV (k)]^n$

ENPV (economic discounted net present value)
PV (h) (discounted benefits and positive effects)
PV (k) (discounted costs and negative effects)
n (years)

The economic discounted net present value is the differential between the gains and costs arising during the project life cycle. As the costs typically arise at the beginning of the investment, while the gains are only produced in the later years, the time length and the value of the discount rate have outstanding significance. The investment is worth implementing if the value is positive.

Economic internal rate of return (ERR)

$ENPV = 0 = \sum [(h-k) / (1+ERR)]^n$

h (benefits and positive effects)
k (costs and negative effects)
ERR (economic nternal rate of return)

The economic internal rate of return shows how big is the maximum return on capital below which the investment is worth implementing.

Multi-component analysis (MCA)

Multi-component analysis is usually applied as an additional indicator if we also are to take into account environmental and social effects that are difficult to express numerically. It can help in selecting the optimal investment from different projects. A fundamental requirement for the chosen erffects is that their weighting should be appropriately justified, as this can largely influence objectivity. One of the topical issues of our day, for example, is energy supply. In building a power plant, beyond the costs, the examination of environmental effects and the plant's ability to generate jobs are also factors of primary significance. In the event of having to choose between two projects in which the above factors carry different weight, the one with the more favourable value is worth implementing.

Table 2
MULTI-COMPONENT ANALYSIS

Denomination	Costs	Environmental effect	Job creation capacity	Rating
Investment A	3	5	4	0.65x3+0.30x5+0.05x4 =**3.65**
Investment B	4	2	5	0.65x4+0.30x2+0.05x5 =**3.45**

In the above example, let us assume that the costs are 65 pc, the environmental effects are 30 pc, the job creation capacity is 5 pc, while the value of these effects is weighted from 1 to 5, where 1 is the weakest and 5 is the most favourable value. In our example the implementation of Investment A is advisable.

Sensitivity and risk analysis

The aim of sensitivity analysis is selecting the critical variables whose positive or negative changes have a major impact on the return on the investment. In selecting the critical variables, we must act with the utmost circumspection, as there are no standard solutions. It is a basic rule that the variables must be independent of each other, as any internal dependence might lead to the distortion of the result. For example, if we also include the operational costs and the costs of the services in the critical variables, then the operational costs will also likely include the costs of the services, so the latter have to be taken out from the critical variables. After the critical variables have been selected and the direction of their changes is determined, the probability of the occurance of the change must also be determined (risk analysis). After determining the probability distribution of the critical variables, the probability distribution of the net present value and the internal rate of return can be calculated.

Scenario analysis

Though scenario analysis cannot replace sensitivity- and risk-analysis, its examination can be useful within a given hypothesis. In the case of the previously selected critical variables, we determine the extreme (optimistic and pessimistic) values within the probability distribution domain. In this case it is unnecessary to precisely determine probability distributions. Finally we calculate the internal rate of return.

Table 3
SCENARIO ANALYSIS

Denomination	Basic case	Optimistic estimation	Pessimistic estimation
Internal financial rate of return			
Internal economic rate of return			

Environmental impact study

The conditions regarding the environmental viability are regulated in a specific government decree (20/2001. 14 Feb). While evaluating the feasibility of the project, special attention is paid to the elements of the environment (water, air, soil, flora and fauna), natural and climatic conditions, the landscape, and the impact on settlements. The analysis must also cover the changes in the health, social and economic circumstances of the population and the effects on their quality of living.

Financial feasibility

Logical frame matrix

The logical frame matrix is used for project management and control, as it is very helpful in determining project goals and preparing the budget. Its advantage is that it is suitable for planning the complete project process, mapping the individual **areas of intervention**, planning the **indicators,** as well as the places of **occurance of the indicators**, and the for **reviewing the problems and conditions** that might possibly arise.

The matrix can help us find answers to the following questions:
- What is the **strategic goal** of the investment to be implemented?
- What **aim** are we trying to attain by implementing the project?
- What **results** can be expected from the investment?
- What means and indicators are necessary for accomplishing the **activity**?

Table 4
LOGICAL FRAME MATRIX

Denomination	Intervention strategy	Indicators	Sources of indicators	Assumptions
Strategic goal	Increase touristic attraction	Economic activity improves	GDP growth	
Project aim	Launching health and wellness centres	Appearance of new health and wellness centres	Number of guests	Quality services, programs
			News jobs	
Results	Number of seats increasing	Number of hotels built increases	Records of technical transfer	Proper infrastructure
Activities	Assign resorts to be built (renovated)	Ensure means (real estate)	Project progress report	Region's natural conditions
				Preconditions Commitment to investment, raising resources

Our example only presented the connecting points of the logical matrix to be built for renovating or building resort centres. Once we have committed ourselves to launching an investment, the first concrete step must be assigning the sites of the resort centres to be built. The investment will result in an increase of the resort centres, which, of course, will have its direct and indirect effects as well. Provided the health and wellness centre is built, we have achieved our project aim, and, at the same time, the touristic appeal of the region also improves.

In the second column we have presented the indicators whose determination depends on the aims and results laid down in the first column. From this it follows that its effect can be measured from the strategic goal (project aim, results) through the activities. The **output, result** and **impact indicators** are characteristic of the established indicator systems.

The output indicators are usually physical effects indicators (building hotels). The result indicators provide information on the direct and indirect effects of the project (building or renovating the hotel also improves the regional infrastructure). **The impact indicators** show the end result, which may have specific (increasing number of guest nights) and general (increasing GDP, healthier society) effects. It is characteristic of them that they are discernible in the long run and they concern wider strata of the population.

The efficiency and lucrativity of the project need to be determined prior to the implementation, in the phase of planning. During the determination of indicators, the so-called SMART system of criteria must be observed. The general requirements are:

- **S**pecific: the indicators must be specific, individual,
- **M**easurable: the result achieved must be measurable,
- **A**vailable: the information must be available for anyone interested,
- **R**elevant: they must carry significant (relvant) information,
- **T**ime-bound: they must refer to a time or period.

The determination of the indicators related to the project must be done with due care, as the result undertaken must be accomplished and also reported on. Providing the sources of indicators ensures the place of attaining information. Furthermore, it is useful to determine those persons who are responsible for providing data, and the times of the reports. Fionally, the last column of the matrix serves to review possible problems and hazards.

Preparing the cost plan for a project

A basic requirement for a project to be implemented and supported is that it must be economically well-grounded. The cost plan to be prepared should contain all the direct and indirect costs that may arise in connection with the implementation of the project. Beyond this, attention should be paid lest the principle of cost-effectiveness is infringed. The budget and cost-effectiveness requires a clear, transparent and detailed budget to be prepared, further on, the necessity of the expenditures should also be justified.

Concerning the techniques of cost planning,the following types can be distinguished:
- planning proceeding bottom up
- planning proceeding top down
- counter-current planning (a combination of the two above methods)

In EU tenders it is advisable to apply the bottom up technique, which involves determining the costs at the different cost places, planning of the expected costs for the products, planning the operational costs for the organisation as a whole and compiling the cost plan (Körmendi – Tóth; Controlling in the management practice of domestic organisations). The hazard implied in top down cost planning is that financially overplanned projects are usually turned down. Besides costs planning, special attention is paid to expected revenues (benefits). The time schedule of the expected costs and incomes must also be prepared to avoid possible liquidity problems. The coordination of incomes and costs must be ensured, and in the special cases when the investment does not produce any revenues, additional financial resources must be allocated to its operation. The financial analysis comprises the implementation of the project as well as its operation and maintenance.

Accordingly, financial analysis is divided into three parts:
- assessment of the financial situation without the investment,
- assessment of the financial situation emerging as a result of the investment
- summing up financial results and assessing the general financial plan

Of the financial indicators it is the financial discounted net present value and the financial internal rate of return that are most recommended to apply.

Financial discounted net present value (FNPV)

$$FNPV = \sum [(PV (h) - PV (k)]^n$$

FNPV (financial discounted net present value)
PV (h) (discounted cashflow output)
PV (k) (discounted cashflow cost)
n (years)

The financial discounted net present value is the differential between the discounted values of the financial revenues and costs arising during the project life cycle. The investment is profitable if it has a positive value.

Financial internal rate of return (FRR)

$$FNPV = 0 = \sum [(h\text{-}k) / (1 + FRR)]^n$$

FRR (financial internal rate of return)
h (cashflow output)
k (cashflow cost)

In the case of internal rate of return the value of the interest rate must be higher than the annual nominal rate of inflation. Provided this condition is fulfilled, the investment is profitable.

LITERATURE

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