

The Cost-Benefit Analysis in the Management of it Projects

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Abstract

The cost-benefit analysis is a way of evaluating a project in terms of economic efficiency. It means comparing the total costs with the benefits expressed in financial terms, being a technical analysis which is vital for the optimal allocation of resources in order to maximize benefits. The effective use of this method involves identifying and measuring the positive and negative effects that an activity has registered, as well as the various resources used.

Key words: costs, benefits, risks.

J.E.L. Classification: M41

1. Conceptual delimitations of cost-benefit analysis

Being an analysis of the effectiveness of various types of programs, by considering the systematic relationship between benefits (all positive consequences) and costs (resource costs), plus the negative cost-benefit, the cost – benefit analysis has been launched during World War II, in order to evaluate military alternatives and was subsequently extended to analyze various social programs. It is often seen as the PPB (programming, planning, budgeting). This method has rapidly developed in the 50's and 60's in the U.S. and then expanded into Europe, with particular reference to social policies.

The cost – benefit analysis is a technical analysis to an optimal allocation of resources in order to maximize benefits. Its use involves identifying and measuring positive and negative effects that an activity means, as well as the various resources used. It also assumes introducing a common translating unit. Usually there is an attempt to estimate all the benefits and costs in money. It is more and more obvious that many benefits and costs cannot be expressed in money and therefore it is necessary to find a more general unit.

The cost-benefit analysis is essential in risk management, in the risk control stage. In order to obtain an accurate picture of the estimated costs and benefits, they must be linked to the risks involved by the implementation of the project. The decision to invest in risk mitigation measures should be made only after using the cost-benefit analysis. For example, the risk of loss due to fire can be controlled either by buying a security, or by installing an automatic fire. Compared with the costs of the two types of

measures per year, then the benefits obtained (according to the results of risk analysis) and you get the optimal decision.

Risk control refers to all the ways in which attempts to reduce the effect risks have on the risks of a project or an organization are made. This step is taken only after a risk analysis was conducted. There are four ways to control risk:

- a. acceptance;
- b. reduction;
- c. transfer;
- d. avoidance.

Acceptance is the best solution when the risk is low and can be supported. Simply, no measures are taken against these risks, and when they are produced, their effect is absorbed by the organization without any problem.

Measures to mitigate the impact are ideal for medium-level risks. These may be measures of security and access control, security policy, contingency plans, staff training, the use of protective equipment, etc.

Transfer of risk to another entity is the best solution for catastrophic risks, i.e. risks of rare but high severity. The most used method of transferring risks is insurance.

For risks that cannot be tolerated, the best way of avoiding them is avoiding them completely. For example, to prevent widespread fraud, limits of payment for managers may be established. For amounts exceeding a certain value, only certain people in the organization have the right to approve payments, etc.

Risk analysis is a systematic assessment of risks to which an organization is exposed. The first step is to identify threats to the organization's exposures, then estimate the probability of materialization for each threat and the effect it may have on activities. Each risk is associated with a likelihood of manifestation (as often occurs normally exposure in a year), then one must estimate how serious is the impact on the organization (severity levels). The values of these two columns is the probability of loss caused by exposure.

For example, let's assume that we use a scale with 3 levels, on which the risk probability is 3 and the impact (severity) is 2. In this case, the risk level is 6 (3×2), therefore we are dealing with a medium risk.

Starting from this data, one may determine which risks should be addressed with priority and what resources are needed for these measures. The organization may be subject to a risk of high severity, but whose probability of occurrence is low (catastrophic risk), therefore it belongs to the ones with a medium level. On the other hand, some risks with a small level of severity may occur frequently, thus their cumulative effect is big.

All organizations should undertake a cost-benefit analysis to include the estimated impact of the project for all the categories of beneficiaries, before launching such a project. But, as it also happens in business, some ideas for projects are overestimated in the beginning, and they turn out not to be viable. Since many It projects involve serious investment and internal changes within the organization that initiated them, it becomes crucial to substantiate them through a detailed cost-benefit analysis.

When asked whether or not they made such an analysis before launching the initiative, most project officials have a negative answer. Most of the times, such analysis

is carried out only in retrospect, once the project has been finished, when the investment can no longer be recovered.

Due to poor planning, some projects never reach this final stage, and evaluations (most of them positive) are made only for successful projects.

Most of the projects that are not based on a solid economic plan will fail in obtaining the necessary funds and achieving their objectives.

2. Cost-benefit analysis of it projects

In order to evaluate IT projects, the cost-benefit analysis involves comparing the efforts involved with the project estimated impact. Therefore, one must estimate the costs and benefits of the project, taking into account the risks and project duration.

When talking about an IT project, the risks refer to:

- *Equipment*: the central processing unit, the peripherals, communications, the data-preparing equipment, the equipment used for the input or automatic generation of entry data, cables and other switching elements, or special output equipment;
- *Software*: designing the applications software, its programming and testing, the cost of the acquisition of software applications, changing programs, operating systems, language translators, utilities, the documentation of the programs and of the system, licenses to use the software, the acquisition of the systems for the management of the database, the spreadsheet programs, word processors, the design and development of computerized variations etc..;
- *Documentation*: Documentation about the systems used, the program documentation, user documentation, the documentation of the training programs, operating standards and operating procedures;
- The *costs* of the improving of the existing system: updating software versions, substituting storage capacity on your hard disk or other devices, expanding computing power, etc. additional terminals;
- *Staff*: computer operators, system analysts and programmers, data entry personnel or personnel used for data conversion, consulting, the management team;
- *Conversion*: testing the system, converting files and data, parallel operations, training;
- *Installation* expenses charges of supply-transportation, installing the peripheral equipment;
- *Office supplies*: materials for data storage, the design and the modification of forms, pre-printed forms, computers specific supplies;
- *Management*: utilities and energy;
- *Maintenance/safety*: hardware software maintenance, backup and maintaining the backups, additional power plants, UPS-es;
- *Financial*: Financial expenses, salaries, legal fees, consulting fees, insurance;
- *The maintenance of the working environment*: air conditioning, humidity and dust control;
- *Physical security*: protection against fire and water, furniture, proper lighting facilities.

The benefits generated by the project can be quantifiable and unquantifiable. They pertain to: savings made by reducing the number of the clerks, providing better services for the customers, increased labor productivity, better decision making, better control, lower operating costs, increasing the circulating money by reducing the inventory, faster billing, a better revenue and payments forecast.

3. The cost-benefit analysis for an electronic portal

In cost-benefit analysis of an IT project, the costs and the benefits of the project must be estimated, taking into account the risks and project duration.

Thus, for example, in order to design an electronic portal, the main elements of the analysis concern:

A. Costs:

- Internal investment required for the transition from traditional to electronic services
- The costs needed for creating the electronic portal
- Management and maintenance

B. Benefits:

- Benefits for the institution
- Benefits for the citizens (or other beneficiaries)
- General benefits

C. Risks:

- The political risk
- The organizational risk
- The lack-of-utilization risk
- The technological risk
- The suppliers' risk
- The execution risk

A. *Costs*

Most of the analyses stop only at the operational costs of the electronic system, ignoring the infrastructure costs, the integration of the activities from various departments and institutions, or the costs involved by later upgrading. These omissions create a distorted image about the effectiveness of the project. An important fact is that the analysis should capture all the costs the project involves:

1. Internal investment required for switching from traditional to electronic services:
 - a) hardware & software
 - b) data transfer in an electronic format
 - c) human resources: training the existing employees, recruiting experts, etc.
 - d) restructuring activities and processes.
2. The costs caused by creating a new electronic portal
 - Hardware and software
 - Programming and design
 - Integrating the database
3. Management and maintenance

- Maintenance and technical support
- Updates
- Re-technologization and modernization
- Security
- Informing and promoting
- Supporting internet access of the target group

B. Benefits

Many benefits offered by the programs used for the making of electronic portals are difficult to predict and quantify, but it is important to estimate these benefits in order to get a full picture of the usefulness of the projects:

1. Benefits for the institution:

- A reduction of the costs for providing information and services;
- An increase of the work effectiveness: less time for processing, reducing the number of errors;
- A more rapid collecting of information;
- The possibility of creating new services, of integrating the processes, of automation, etc.;
- New income sources from paid services or online advertising.

2. Benefits for the citizens:

- The possibility of self-service and thus avoiding bureaucratic ins and outs;
- Increased satisfaction due to non-stop access, better informing, integrated services obtained in only one place, and comfort.

3. General benefits:

- Transparency, eliminating bureaucracy;
- Improving the relationship between the members of an organization.

C. Risks

In order to obtain an accurate picture of the estimated costs and benefits, they must be limited to the risks involved by the project:

- The political risk: a change of government or the lack of a high-level political support. Possible results: canceling all the benefits by reducing budgets and personnel, abandoning the project, etc.;
- The organizational risk: the changes can be rejected from within the organization. Possible results: a significant increase of the costs and reduction of the benefits for the institution;
- The lack-of-use risk: is due to inadequate or inexistent Internet connections, the lack of knowledge in operating computers, the fears of security or confidentiality or the lack of simple means of payment. Possible results: significant reduction of all benefits;
- The technological risk: rapid technological progress may well shorten the life of such a project. Possible results: increased costs for technology;
- The suppliers' risk: rapid progress leads to massive changes in the IT market, a thing which may lead to bankruptcies or merges meant to eliminate certain suppliers that are involved in the project. Possible result: increasing

maintenance or technical support costs, increasing the duration of implementation, reducing the quality of the services;

- The risk of execution: the impossibility to find adequate people or funds; slow progress, budget overruns, etc. possible results: increased costs and period of implementation;

In carrying out IT projects, the following recommendations should be respected:

1. Make a detailed and rigorous analysis: in order to determine the real value of the project, it must be examined in detail. The planning part is essential since it provides the information needed to evaluate the project. The institution must establish detailed objectives, bench-marks and criteria of success for the projects it proposes.
2. Evaluate the project both during its implementation as well as after its completion: this approach will allow you to tailor and improve the less performant areas, thus leading to an increase in the chances to have a successful project. Moreover, this assessment will also determine the effectiveness of the initial evaluation, thus enabling a better planning of the project (which may include representatives of all those affected by the project: government, community, companies, experts, etc).
3. Take steps to increase the impact of the project, such as:
 - Cost reduction, through:
 - Technological jump – choose the most modern and complete solutions, avoid convenient, superficial solutions;
 - Focus on actions that allow you to maximize the impact: provide the most requested/used services and postpone the others until the users are ready (there is a number of studies on the use of the Internet by citizens); start with services that address large companies – most of them have Internet access and allow large savings (see the success of e-Auction);
 - Signing contracts with the major hardware and software suppliers, which allow the payments to be done according to the results, in order to reduce initial investments and risks.
 - Increasing the impact by:
 - Widening the target group – instead of choosing a specific category of beneficiaries (e.g. companies), complete the services you provide, so that you can serve other clients too, thus obtaining large economies.
 - Stimulating the use of computers and Internet – public access points, call-centres, incentives for the investments of the companies that offer IT/Internet services.
 - Developing new services, making links to other services (even some that have to be paid for, offered by the private sector) in order to indirectly expand the offer (supply) and obtain any eventual additional incomes (bear in mind that the portals of the public institutions generally attract a very large number of users.

Conclusions

The cost-benefit analysis is a very useful device in deciding on allocation of resources for investments financed from public funds or private ones. It can help the dividend identify the projects that maximize the net social benefits and establish the order of priorities for realizing the public projects having a public or a private financing, selecting projects having an important role from the social point of view and with a minimum impact upon the natural environment.

Thus it has an important role when deciding the allocation of resources for a project, in determining the sustainability of the project, in finding the actual value of a certain project, in the analysing the sensitivity of the project.

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