Estimation of Social Benefits in Cost-benefit Analysis

BEÁTA FODOR
PH.D. STUDENT

e-mail: vgtfodor@uni-miskolc.hu

SUMMARY

While examining the cost-benefit analysis related to public policy decisions in the Hungarian and international literature, this paper is looking for the answer to the question of what the methodological principles are according to which the benefit impacts can be determined. The processed Hungarian and English-language studies indicate that the theoretical-methodological questions of the determination of benefit impacts are not clear cut. The author has constructed a model that contains the most important method-components of the benefit impact analysis. Based on six major factors, the model illustrates the analysis of the benefit impact, divided into elementary methods.
Keywords: cost-benefit analysis, benefit impact, method-components of benefit impact analysis
Journal of Economic Literature (JEL) code: D61

INTRODUCTION

Even though the method of cost-benefit analysis was elaborated in the United States in the early 1800's, in Hungary it gained attention only after the change of regime in the late 20th century. In the progress of the development of democracy, cost-benefit analysis is gaining even greater importance in the preparation of Hungarian municipal decisions. Due to its usefulness, nowadays it is indispensable to perform a cost-benefit analysis when a non-business project is linked to EU support. According to the related system of rules and based on the calculations, the proportion and amount of the aid can also be determined.

Basically, the methodology is a decision-supporting procedure that compares every monetary and non-monetary, i.e. the full scale benefit impact of all decision variants, to the costs. In this approach, it is mainly used to substantiate public policy (municipal and governmental) decisions. Theoretically, it could be applied in the business sector as well, however, in that sector the interests are linked to yield-effects manifesting themselves in the form of money.

In this paper I am focusing on the major types of benefit impacts and the analysis of the recommendations of the literature related to the methodological opportunities of the estimation of their value.

THE GENERAL BACKGROUND OF COST-BENEFIT ANALYSIS IN THE LITERATURE

Cost-benefit analysis as a theoretical scientific category is a method related to the welfare economics which can be used to analyse public assets. Even in the 19th century there were recommendations related to this in the literature, however these were only very initial cost-benefit analysis-like calculations.

The first to go into this issue was Albert Gallatin in 1808 in the USA. Following his advice, an evaluation of the costs and benefits of a water related project was attempted (Hanley & Spash, (1993), p. 4.). In Europe, the first application of cost-benefit analysis can be attributed to Jules Dupuit, a French economist who, in a paper published in 1844, realised the concept of the consumer surplus that still plays an important role in the measuring of the social benefit to be determined in the cost-benefit analysis. Generally, the benefit is in connection with the value judgment of the customer. In other words: if something is advantageous for the customer, it can be regarded as a benefit. In the application of the method, the extent to which a person appraises or estimates something is determined by the extent he/she appraises the public assets. Dupuit pointed out that, for example, the benefits originating in the use of roads and bridges exceed the tolls to be paid for their use (Mishan & Quah (2007), p. 243).

The next milestone in the application of the method was the Flood Control Act of 1936, issued with the contribution of the U.S. Army Corps of Engineers, which required the costs to be determined and the benefits to be estimated for federal water resource projects. These required analyses that were not yet based on the methodological basis of cost-benefit analysis and, compared to that, they can be regarded as rather crude solutions.

In the United States in the 1950's, the application of cost-benefit analysis was extended to areas in connection with public interest other than water management, such as education and public health-care. With the help of economists, the "Green Book" containing the principles, norms and processes related to the carrying out of cost-benefit analyses for projects related to the hydrological basin of rivers was published in 1950. In its initial form, however, the method was not yet concerned with social values. Later, the Green Book had been updated several times.

In 1958, Otto Eckstein defined a more modern variation of the cost-benefit analysis. Eckstein laid out the foundations of the method to be later known as social cost-benefit analysis in welfare economics as well as its application in the field of water resources development (Tanzi (2011), p. 172).

The real change in the development of the method was triggered by President Ronald Reagan's Executive Order 12291 of 1981, which requires a so-called regulatory impact analysis (the initial method of the cost-benefit analysis) to be performed in case of government projects whose costs exceed USD 100,000 (Rodriguez (1988), pp. 505-546).

In Europe, the development of the method was different from that in the United States. Its application started in effect with the directives elaborated by the European Union that

require a cost-benefit analysis to be performed in case of major investments.

THE STATE OF COST-BENEFIT ANALYSIS IN HUNGARY

The cost-benefit analysis applied in the Hungarian practice has become a widely applied practical method since the change of regime in 1990. Compared to the initial solutions, it has undergone considerable changes in the meantime. The changes are still in progress. Compared to international practice, however, there is not yet a practice in this area that could be regarded as full-fledged. We can encounter the obligations and requirements related to the application of cost-benefit analysis in several areas of Hungarian and European law.

The turn of the millennium brought an upswing in the application of the method in Hungary. The government resolution related to the years 1999 and 2000 which required that "every ministry and the central administrative authorities [...] has to take care of a cost-benefit analysis of the decisions and the performance analysis of the work done. The tasks related to them are determined in the annual schedule" [Government Resolution 1052/1999 (V.21.)].

The government resolution related to the next two years (2001-2002) contains more detailed requirements for the practical application of the method. In this resolution, there is an even more considerable emphasis on the cost-benefit analysis destined to substantiate the method applied these days. The Government Resolution 1057/2001 (VI.21.) requires that:

- methodological assistance has to be provided to the development and support of a wider-range application;
- the legal background of the application of the analysis has to be elaborated (which organisations and institutions, under what conditions and circumstances, shall be obliged to perform an analysis);
- the current application opportunities of the method and the factors obstructing them under the current circumstances – concerning IT, human resources and access to the appropriate database – have to be analysed;
- it has to be analysed which areas have to be developed in order to eliminate the identified obstructing factors. The term and schedule of the realisation shall also be analysed.

In the literature we may often encounter cases indicating that the cost-benefit analysis playing a major role in public policy decisions may also be applied in areas where – unlike the business sector where the condition of the threshold of operability is that the total profit shall cover the total costs (Illés (2002), p. 44) – there is no income produced to such an extent that could be compared to the costs. Such an area is, for example, road construction (except for the case of toll roads) where the organisation financing the construction works will not have income in the future (Internet-reference: evaluation of transport development plans). A similar case is the renovation of the areas of common use of a settlement, the development and keeping clean of the stormwater drainage system, the installation of a local fire or police department as well as the development of the public transport.

As far as public policy decisions are concerned, the practical application of the cost-benefit analysis required to substantiate municipal decisions is still in its infancy; however, it is gaining in importance with the increasing social demands. The local municipalities of Hungary have different tasks and scopes of authority, part of which are mandatory and part of which may be undertaken by the municipality's own resolutions. In other words, there can be municipal tasks and administrative tasks where the decisions manifest themselves in the form of a resolution or a decree. A considerable part of the municipal decisions are related to the installation and maintenance of public assets (for example parks, roads, drinking water provision, canalization, etc.), a part of whose costs are covered by government funds (Act LXV of 1990). The economic substantiation of the spending of public funds supports the decision-making process related to the questions concerning the society. With its accession to the European Union in 2004, Hungary obliged itself to comply with the requirements (detailed in the guides) to analyse the investment projects supported by the EU (Council Regulations (EC) No. 1260/1999 and No. 1267/1999). These guidelines detail the tasks to be performed in the execution of the projects. A member state, after informing the Commission, has to provide the executive authority with information on the nature of the investment, the scheduling and realisation of the investment, the result of the cost-benefit analysis along with the financial costs and benefits, the analysis of social-economic benefits, the impact on the employment, environmental effects, etc.

In Hungary, COWI Hungary Ltd. (COWI Magyarország Kft.), commissioned by the National Development Agency (Nemzeti Fejlesztési Ügynökség) published a series of guides in 2009 based on the European and international theoretical and practical experiences. Each guide encompasses a sector: there are, for example, guides on the methodology for sewage disposal and treatment, waste management, road development, railroad development and public transport projects. The purpose of the guides is to provide uniform guidance on the economic evaluation of projects to be realized with EU support (National Development Agency (2009a, 2009b)).

THE CLASSIFICATION OPPORTUNITIES OF THE PROJECTS

Projects may differ from one another; however, we can find properties based on which they may be grouped. Görög (2001) classifies the projects as follows:

- investment projects: "the project is a one-time, complex process of activities the result – the defined goal – of which is a ready-to-use facility that can be described via predetermined technical parameters and the realization of which is determined in terms of money and time as well" (Görög (2001));
- research and development projects: the result of these projects is a new product or technology, an improvement in an already existing product or technology, the introduction of the production of a new product or a new technology, the introduction of a new product or service to the market, or the reduction of the costs of the existing products or services;
- intellectual service (management) project: as a result of the project, the operational circumstances of the organisation will be changed, for e.g. changes in the ownership structure, re-organisation of the operation of the organisation, etc.

According to the literature, further classification aspects may be, for example, the content and the size of the project, the sector to which the analysed project belongs, the group of population affected by the project, etc. Important relationships may be found between the above-listed classification aspects. For example if a project is about keeping a public cemetery clean, it can be considered as either a minor or major project with the same content. While the keeping clean of the public cemetery of a small settlement is certainly considered as a minor project, however, this is not so self-evident in the case of

a larger town. Other than that, the requirement of proportionality has also to be kept in mind, i.e. how much expense a given task requires and whether the costs are proportionate to the result that can be expected. We may often encounter the assumption that in the case of minor projects (such as keeping clean areas of common use) there is no point in performing a cost-benefit analysis; that can only be regarded as a reasonable requirement in the case of major projects (reconstruction of public institutions, development of sewage network). It runs contrary to this if we are thinking about decisions related to the projects to be realized by the municipality, such as spatial development, country planning, economic development or human resources development. As for the size of the project, a project has to be considered as a "major project" if the total investment cost of the project is equal to or higher than 50 million EUR or, in case of environmental protection investments, 25 million EUR (Article 39 of the Council Resolution (EC) No. 1083/2006).

The projects falling within the competence of public policy decisions may be realised in different sectors, such as the manufacturing industry, construction industry, commerce (organising primary producers' market or weekly fairs), public catering, education, health care, etc. When analysing projects to be realised in these sectors, Florio et al put emphasis on taking the following impacts into account:

- in the case of traffic: the expectable local and global impact of the air pollution on people, nature and environment, the impact of the noise pollution on people, moreover, the savings on travel time, the changing of the accident risk,
- in the case of sewer systems, sewage disposal and treatment: the impact on subsurface waters, the protection of the geological layer, impact on public health,
- in the case of waste management projects: the impacts related to the elimination of illegal waste disposal sites, impacts originating in the reduction of land use, the reduction of the emission of greenhouse gases, impacts on public health, protection of source water systems,
- in the case of maintenance and development of areas of common use: the impact on the general state of health of people,
- in the case of a company founded by the municipality: the impact on the employment of the local population and on the infrastructure of the settlement.

It helps the assessment of the impact of investment and non-investment projects on other sectors (projects) if we first consider the relationships between the sectors (projects) which have to be taken into account when calculating the benefits. For example, traffic development may have impacts on commerce, on the state of health of people and therefore on health care, etc. (Egyházy (2007)).

Recommendations in the Literature Related to the Process of the Cost-benefit Analysis

In case of most projects, the cost-benefit analysis is preceded by a preliminary, sketchy financial analysis in which only those cash flows have to be taken into account that effectively emerge in the given project (National Development Agency (2009b) pp. 11-17). The numerical determination of the costs and incomes within the financial analysis is followed by the most important part of the analysis: the cost-benefit analysis itself, which may be regarded as a social-economic analysis as well. Here we determine the impacts that do not form part of the financial analysis, such as environmental impact, re-distributional impact, subsidies, etc. (Határon Átnyúló Együttműködési Program (2006), pp. 9-12).

The steps of the cost-benefit analysis are listed in most of the sources as follows (Bartus et al. (2005), pp. 5-6):

1. deciding whose preferences, i.e. benefits and costs, are taken into account,
2. choosing the alternatives to be evaluated,
3. specification of all possible impacts and the selection of the appropriate index number,
4. forecasting of the impacts,
5. monetisation of the impacts,
6. discounting,
7. summarising the costs and benefits,
8. sensitivity analysis,
9. choosing the alternative providing the best net social benefit.

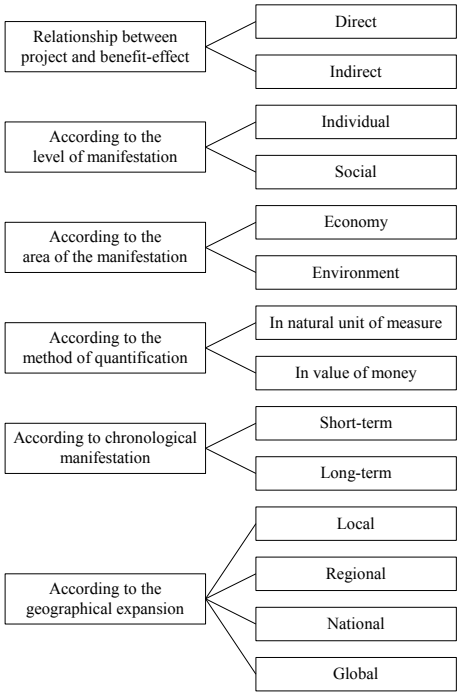
The special case of the cost-benefit analysis is when a task determined as mandatory by legal regulations has to be performed. For example if a sewer network required for sewage disposal has to be installed, which is a very significant communal interest, it is not necessary to perform a "real" cost-benefit analysis; in this case the most important task is to reduce the costs. In 1996, the Rhine–Westphalian Technical University (Rheinisch–Westfälische Technische Hochschule Aachen) presented a revised, simple aid for cost-analysis related to sewage treatment and sewer systems. The analysis is well illustrated by the case where the objective is to solve the channeling and sewage treatment of two settlements. In this case, there are several variations elaborated for the construction of the sewage treatment facility. The goal of the analysis is to find the variation where the investment costs are the lowest (Fekete, 2011).

The Appearance of the Benefit Impacts in the Literature

From the related recommendations of the literature, it is necessary to analyse those capable of casting light upon methods for the quantification of the benefits. It makes the situation more complicated that not even the theoretical-methodological questions are clear-cut. When analysing the benefits, we may encounter numerous cases in the literature. In the case of a given project, the realisation of not one but numerous impacts or even the drop-out of a part of the impact must also be taken into account. For example, if a municipality plans a community-building development but fails to inform the community about it ahead of time, for example does not organize public meetings or discussions related to the project, the original expectations may not, or only partly, be realised. Since a significant part of the project decisions are related to reconstruction (modernisation of a sewage treatment facility), development, renovation (for e.g. renovation of a playground, reconstruction of a stadium), or institutional or communal investment the benefit impacts emerging with the realisation of the project may be classified according to various aspects:

The benefit impacts may simultaneously be characterised according to six major aspects, so there are simultaneously six features related to the benefit impacts. The benefit impacts, according to the main features, may be divided into elementary methods. These elementary methods are not completely independent from one another; the application of certain methods may simultaneously result in other possible solutions as well. It may also happen that a benefit impact analysed according to a certain aspect is simultaneously characterised by different elementary methods. For example, the benefit impact

may simultaneously manifest itself at individual and at social level as well.



Source: own construction

Figure 1. The most important methods of benefit impact analysis

The Relationship Between Project and Benefit Impact

In public policy decisions about projects, the benefit impact may manifest itself either directly or indirectly and it may also happen that the same benefit impact can be considered both direct and indirect simultaneously. The direct benefit impacts, with few exceptions, emerge for the former customers, for the potential consumers, and for the contractor/operator. Travel time savings or the improvement of the general state of health of the individual are considered as such benefit impacts (Mechler (2005), pp. 16-19). The indirect benefit (emerging in the economy) is not directly related to any of the public policy decisions; however, it increases the attractiveness of the given region. A direct impact may be, for example, the increasing employment of public transport that results in the reduction of the operating and maintenance costs related to the individual use of vehicles (Farkas, pp. 4-6).

The Level of Manifestation of the Benefit Impact

The first step of the cost-benefit analysis is to decide whose benefits will be taken into account in the analysis. In most studies, the effect components emerging with the realisation of the project are presented divided into individual and social effects. The private benefit is of great importance in public policy decisions. The private benefit may be increased by education, further training, work experience, or improvement in the state of health. The direct beneficiaries of the investments in the area of education are the people participating in some form of training and their families. According to Psacharopoulos (1995) in this case "the private benefits amount to what a more educated individual earns (after taxes), above a control group of individuals with less education. "More" and "less" in this case usually refers to adjacent levels of education, e.g., university graduates versus secondary school graduates" (Psacharopoulos (1995), p. 2.). In case of the projects where time saving can be expected, for example in the field of traffic development, the analysis is important because the time saved may be spent on working, recreation or other activities. According to Mishan, if the traveling time will be shorter due to an investment, the savings will be measured on the basis of the amount of money someone could make during a period of time equaling to the saved period of travel time (Mishan (1982), p. 293).

When making public policy investment and non-investment decisions, for each effect component it is the determination and quantification of the social benefit – that becomes social benefit through the individuals – that is of great importance in the cost-benefit analysis; however, its interpretation requires particular care. The social benefit means chiefly the circumstances and opportunities becoming more advantageous for the population (Mishan and Quah (2007), pp 179-201), such as social admittance, equal opportunities, being in the labour market, higher educational and cultural level, way of life, more spare time, etc.

The Area Where the Benefit Impact Manifests Itself

The benefit impact may manifest itself in the area of the economy and in that of the environment. The economic effects manifest themselves chiefly in the areas of employment-unemployment, competition, relationships between market participants, innovation effects, R+D effects, etc. The purpose of the assessment of the environmental impact is to analyse the effects of the project on its natural environment, such as pollutant emission, assessment of the changes in the impacts on natural habitats. In Hungary, the regulations related to environmental impact assessment are laid out in Government Decree 314/2005 (XII.25.). In this impact assessment the harmful or advantageous impacts partly or entirely taking place in the environment have to be analysed. The assessment covers the changes occurring in the quality of soil, air and water, land use, energy consumption, waste treatment, etc. According to Koloszár et al. – who were concerned with measuring the benefits of environmental protection measures and regulations – it is difficult to determine the benefits of environmental protection. In a study published in 1997, they identify the difficulty of measuring the benefit in the fact that these commodities (for e.g. recreational opportunities, a fine view, etc.) do not appear on the market. In spite of that, the authors think the benefit can be measured by "attaching it to a product on the market, such as the popularity of the pleasure resorts, that can be measured" (Koloszár et al. (1997), pp. 24-25). One of today's most serious environmental pollutions is noise pollution. According to Baros (2012), the urban noise caused mainly by traffic can be measured via objective and subjective methods. The disadvantage of the objective method (instrumental measurement) is that it does not take the impacts on the individual into account. The most appropriate method for measuring such impacts is surveying (Baros (2012), pp. 4-9). The waste management which may modify the state of the environment may also influence the way of life and the scale of values of the population (Buruzs and Torma, pp. 2-3).

The Method of Quantification

The benefit impacts may be determined in natural units of measure or in a value of money. In order to make the benefits emerging as the expected results of a project comparable, sums of money have somehow to be attached to the factors determined in natural units of measure in order to make them expressible in value of money. Due to several reasons, the quantification of the benefit impacts is difficult in the case of project variations related to public policy decisions. It is important to emphasise that the benefits may either be monetised or they may not be expressed in terms of money; they can be of quantitative or qualitative nature, so thus, the benefits have somehow to be converted in order to make them comparable and enable the calculation with the entire economic value of the given investment project. For example, in Hungary COWI Hungary Ltd. – commissioned by the National Development Agency – prepared a detailed study related to the development of transport. Out of all effect components emerging in such projects, the travel time savings, the decreasing accident risk, the lower fuel costs and the environmental impacts are estimated. However, there are effect components whose monetization is not necessary unless the judgment of the project is not clear-cut. Such effect components may be the impacts on spatial development, wildlife and landscape. In order to simplify the quantification of the travel time savings and make it well arranged, the impacts on existing and new passengers are analysed separately (National Development Agency (2009a), pp. 73-105). The existing passengers may experience a change in terms of traveling circumstances and travel time, such as the reduction of travel time, crowdedness, and waiting time and increased comfort (Farkas, pp. 2-6). When analysing the accident risk, it has to be taken into account that with the increasing number of vehicles in traffic, the number of eventual car crashes may also increase. However, certain studies come to the conclusion that the accident risk decreases with the increase of the traffic, which could be accounted for by the decrease in the speed. The estimated value of this can be calculated on the basis of the probability of accidents classified as fatal accidents, accidents causing major injury, and those causing minor injury. In order to make the traffic development investments of the EU member states comparable, the European Union has launched the HEATCO (Harmonised European Approaches for Transport Costing and Project Assessment) project (Egyházy (2007), pp 144-146). The guides developed in Hungary determine the travel time savings and the changes in accident risk, as well as the difference in the environmental impacts based on the results of the HEATCO study (National Development Agency, 2009a).

According to the Chronological Manifestation

The cost-benefit analysis must cover the useful lifespan of the project proposals or, if this can not be determined, the application of a 20-30-year time span is recommended (IT Commission of Administration, 2009: p. 11). From a chronological point of view, the benefit impact may manifest itself immediately but also years or even generations later. As Adorján pointed out in his research concerning the field of education, the benefits presented in the cost-benefit analysis often manifest themselves only generations later. So thus, in case of such an investment it is not only the expected lifespan of the given institution that must be analysed, but also the length of the time span during which the benefits originating in the investment will manifest themselves for the society (Adorján, 1999).

According to the Geographical Expansion

The benefit impacts to be determined in the cost-benefit analysis may be analysed according to their geographical expansion. They may affect the inhabitants of a settlement, the population of a county, the society of the entire country or may even have an impact on the global society as well (Bartus et al. (2005), pp. 6-9). A certain part of the impacts manifest itself at local level. According to the Hungarian regulations, such is the environmental protection which has to be defined as a local task that may include the reduction of noise emission which may be realised as protection against traffic, industrial, etc. noise, as well as the protection of the natural and artificial environment which means the preservation and restoration of the values and their prevention from being damaged (Horváth (2007), pp. 17-20).

SUMMARY

The estimation of the benefit impacts in the cost-benefit analysis is extremely complicated. The processed English- and Hungarian-language studies are not uniform regarding the methodological principles used to analyse the benefit impacts. As a result of the research of the method, the author has constructed a model regarding the manifestation of the benefit impacts, based on which the benefit impacts may simultaneously be characterised according to six major aspects. The major classification determinants were the following: the relationship of the project and the benefit impact, the level of the manifestation, the area of the manifestation, the method of quantification, chronological manifestation and geographical expansion. The benefit impacts may be divided into elementary methods according to the major features. This means that, according to the major aspects, the benefit impact may manifest itself directly or indirectly, at individual or social level, in the field of the economy or the environment; it may be expressed in natural units of measure or in value of money, it may manifest itself in the short-term and long-term and it may expand to local, regional, national or transnational areas as well. These elementary methods are not completely independent from one another; this means that the application of certain method components may simultaneously lead to other possible solutions, and it does not exclude the chance that the benefit impact is simultaneously characterised by different elementary methods.

Acknowledgements

The described work was carried out as part of the TÁMOP-4.2.2/B-10/1-2010-0008 project in the framework of the New Hungarian Development Plan. The realization of this project is supported by the European Union, co-financed by the European Social Fund.

REFERENCES

1052/1999 (V.21.) Korm. határozata: a közigazgatás továbbfejlesztésének 1999-2000. évekre szóló kormányzati feladattervéről (Plan of Governmental Tasks Concerning the Continued Development of the Public Administration System in 1999-2000), Magyar Közlöny, 44. szám

314/2005. (XII.25.) Korm. rendelt: a környezeti hatásvizsgálati és az egységes környezethasználati engedélyezési eljárásról (Procedure of Environmental Impact Assessment and Unified Permission for the Use of Environment)

1260/1999/EK Rendelete: A Strukturális Alapra vonatkozó általános rendelkezésekről (Laying down general provisions on the Structural Funds)

1267/1999/EK Rendelete: A csatlakozásra felkészítő szerkezetátalakítási irányvonalak eszközrendszerének létrehozásáról (Council Regulation (EC) No 1267/1999 establishing an Instrument for Structural Policies for Pre-accession (ISPA)), L 161. szám

1057/2001 (VI.21.) Korm. határozata: a közigazgatás továbbfejlesztésének 2001-2002. évekre szóló kormányzati feladattervéről (1057/2001. (VI.21.) (Plan of Governmental Tasks Concerning the Continued Development of the Public Administration System in 2001 and 2002), Magyar Közlöny, 69. szám

1083/2006/EK Rendelete: Az Európai Regionális Fejlesztési Alapra, az Európai Szociális Alapra és a Kohéziós Alapra vonatkozó általános rendelkezések megállapításáról és az 1260/1999/EK rendelet hatályon kívül helyezéséről (Council Regulation (EC) No 1083/2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulation (EC) No 1260/1999), Brussels, L 210/25

1990. évi LXV törvény: A helyi önkormányzatokról (Act LXV of 1990 on Local Governments)

A közigazgatási informatikai bizottság (2009): Az elektronikus közigazgatási projektek költség-haszon elemzéséről, 29. számú ajánlása (IT Commission of Administration: On the Cost-Benefit Analysis of Electronic Public Administration Projects. Recommendation No 29), p. 11.

ADORJÁN, R. (1999) Költségeink haszna, avagy haszontalanságunk költségei, Költség–haszon elemzés az oktatás területén: egy kecskeméti iskolaépítési példa (The Benefits of our Costs or the Costs of our Uselessness – Cost-Benefit Analysis in the Field of Education: An Example of School-building Construction in Kecskemét), Iskolakultúra, (99/3)

BAROS, Z. (2012): A városi zaj környezeti és társadalmi hatásainak vizsgálata Debrecen városában (A study into the environmental and social impacts of urban noise in the town of Debrecen), PhD dissertation, University of Debrecen,

BARTUS, G. & MONOSTORI, K. & SZABÓ, M (2005): Fejlesztéspolitika társadalmi hatásai 3: A fejlesztéspolitikai intézkedések teljes társadalmi költségének becslése (Social Impacts of Development Policy 3: Estimation of the Total Social Costs of Development Policy Measures)

BURUZS, A. & TORMA, A.: Regionális fejlesztések fenntarthatósági tényezői, Fenntarthatósági vizsgálatokhoz alkalmazható indikátorok áttekintése, Regionális települési és ipari hulladékgazdálkodás (Sustainability Factors of Regional Developments. A Survey of Indicators Applicable in Sustainability Analyses. Regional Municipal and Industrial Waste Management), pp.2-3. (http://kornyezet.sze.hu/images/kutatás/Környezettudományi%20Tanácskozás/2011/Hulladekgazdalkodas_BA_TA.pdf)

Developing Harmonised European Approaches for Transport Costing and Project Assessment (HEATCO): HEATCO Deliverable 5: Proposal for Harmonised Guidelines, Contract No. FP6-2002-SSP-1/502481

EGYHÁZY, Z. (2007): Magyarország közlekedési kapcsolatai az európai térségfejlesztésben és a regionális együttműködésben (The Traffic Relations in Hungary within the European Regional Development and Regional Co-operation), PhD dissertation, Corvinus University of Budapest, Budapest.

FARKAS, I.: Fejlesztési változatok komplex szemléletű értékelése a közforgalmú közlekedésben (Assesment of Development-Variations in Public Transport from a Complex Perspective), Széchenyi István Egyetem, Győr, pp. 2-6. (ko.sze.hu/hu_HU/downloadmanager/.../3247)

FEKETE, J. Gy. (2011): Környezeti stratégiák (Environmental strategies), Pannon Egyetem (http://www.tankonyvtar.hu/hu/tartalom/tamop425/0021_Kornyezetstragtegia/ch14s02.html)

FLORIO, M. – FINZI, U. – GENCO, M. – LEVARLET, F. – MAFFII, S. – TRACOGNA, A. – VIGNETTI, S.: Útmutató a beruházási projektek költség-haszon elemzéséhez (Guide to cost-benefit analysis of investment projects), pp. 55-120.

GÖRÖG, M. (2001): Bevezetés a projektmenedzsmentbe (Introduction to Project Management), Aula Kiadó, Budapest

HANLEY, N. & SPASH, C.L (1993): Cost-benefit Analysis and the Environment, MPG Books Ltd, Great Britain, Határon Átnyúló Együttműködési Program 2004-2006 (2006): Útmutató: Megvalósíthatósági tanulmányok és költséghatékonysági elemzések készítéséhez (Guide to Feasibility Studies and Cost-Efficiency Analyses), pp. 9-12.

HORVÁTH, M. T. (2007): Nézetek és látszatok, decentralizáció a pénzügyi környezet szemszögéből (Views and Illusions: Decentralization from the Aspect of the Fiscal Environment), Közigazgatási olvasmányok, Budapest, pp. 17-20.

ILLÉS, M. (2002): Vezetői gazdaságtan (Managerial Economics), Kossuth Kiadó, Budapest

KOLOSZÁR, M. & ÁSVÁNYI, Zs. – Bulla M. (1997): Az EU-konform környezeti szabályozás és költség-haszon elemzése, implementációs vizsgálata (EU conforming Environmental Regulation, its Cost-Benefit Analysis and Implementation Analysis), Budapest

MECHLER, R. (2005): Cost-benefit Analysis of Natural Disaster Risk Management in Developing Countries, Sector Project "Disaster Risk Management in Development Cooperation", pp.16-19.

MISHAN, E.J. (1982): Költség-haszon elemzés (Cost-Benefit Analysis), Közgazdasági és Jogi Könyvkiadó, Budapest,

MISHAN, E.J. & QUAH, E (2007): Cost-Benefit Analysis, Fifth Edition, Routledge, Taylor & Francis Group, London and New York

Nemzeti Fejlesztési Ügynökség (2009a): Módszertani útmutató költség-haszon elemzéshez, KEOP támogatáshoz, Közútfejlesztési projektek, Vasútfejlesztési projektek, Városi közösségi közlekedési projektek (National Development Agency (2009): Methodological Guide to Cost-Benefit Analysis EEOP (Environment and Energy Operational Programme) Aids. Road development, railroad development, urban public transport projects.) COWI Magyarország Kft.

Nemzeti Fejlesztési Ügynökség (2009b): Módszertani útmutató költség-haszon elemzéshez, KEOP támogatáshoz, 2009. március (National Development Agency: Methodological Guide to Cost-Benefit Analysis. EEOP Aids. March 2009), COWI Magyarország Kft.

PSACHAROPOULOS, G. (1995): The Profitability of Investment in Education: Concepts and Methods, Human Capital Development and Operations Policy, Working Papers.

RODRIGUEZ, L. (1988): Constitutional and Statutory Limits for Cost-Benefit Analysis Pursuant to Executive Orders 12,291 and 12,498, Boston College Environmental Affairs Law Review, Issue 3, pp.505-546.

TANZI, V. (2011): Government versus Markets: The Changing Economic Role of the State, Cambridge University Press, Cambridge.

Internet-reference: Közlekedésfejlesztési tervek értékelése (Evaluation of transport development plans), (http://www.google.hu/url?sa=t&rct=j&q=k%C3%B6zleked%C3%A9sfejleszt%C3%A9si%20tervek%20%20%C3%A9rt%C3%A9kel%C3%A9se&source=web&cd=2&sqi=2&ved=0CCUQFjAB&url=http%3A%2F%2Fko.sze.hu%2Fhu_HU%2Fdownloadmanager%2Fdownload%2Fnohtml%2F1%2Fid%2F3279%2Fm%2F3247&ei=oBmMULj3B8_Ksgah4YF4&usg=AFQjCNGRjLoIw5mqy7xyiJoGAiM8uBnpZw)