



Cost-benefit Analysis Tools and Models

Summary and Synthesis

Thomas Preuß and Holger Floeting

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1. Application range and characteristics of the tools and models

With the goal of creating cost transparency in the area of residential and commercial settlement development, various tools and models for cost-benefit analysis (or follow-up cost analysis) have been developed for the REFINA funding priority. The tools and models presented in this volume offer a broad range of applications for formal and informal planning in connection with settlement development. They feature many similarities and differences in terms of their spatial reference plane, the type of use analysed and the costs and benefit aspects depicted.

Application possibilities and characteristics of the cost-benefit analysis tools and models will be described in detail in the following sections, based on a synthesis of the research approaches presented and direct feedback from the REFINA projects involved.

1.1 Application possibilities of cost-benefit analysis tools and models

In general, cost-benefit analysis tools and models open up a broad spectrum of application possibilities for their users. They can be employed to the following ends:

- **Ex-ante cost-benefit analysis of building sites**
Some tools allow examination of individual construction projects and building areas, and even simultaneous appraisal of several building areas.
- **Ex-post cost-benefit analysis of building sites**
Some tools allow examination of individual construction projects and building areas, and even the simultaneous appraisal of several building areas.
- **Evaluation of location alternatives**
Some are capable of comparing the prime costs and follow-up costs for the development of different sites.
- **Comparison of building variations**
Because the tools offer the choice of an array of data entry parameters, it is possible to compare various development approaches (variations in development density, infrastructure provision requirements) and the resulting initial and follow-up costs.
- **Comparison of settlement development strategies**
Short-, mid- and long-term strategies of settlement development can be compared with respect to their relationship to the initial costs and follow-up costs incurred. Some potential strategies to consider include ceasing to issue zoning permits, reuse, zoning areas for development or combinations thereof.



In addition, various tools are suitable for:

- **Monitoring the utilization of infrastructures**

In addition to examining the initial and follow-up costs for infrastructures, it is also possible to integrate the tools into current studies on the short-, mid- and long-term utilization of infrastructures. Provided there is an intersection with comprehensive data covering the entire area regarding technical and social infrastructures and population development, the tools can be integrated into a monitoring/early warning system.

The results of cost-benefit analysis can be applied, either in connection with urban land-use planning (development scheme, land-use plan) or informal planning activities (e.g. settlement strategies, urban development strategies, strategies for urban districts). Yet they are also suitable for analysing individual sites, e.g. in the framework of test planning. They can assist in compiling administrative and council drafts and otherwise contribute to municipal reporting on settlement development. Furthermore, web-based tools allow citizens, associations and municipal government policymakers to gain information on various opportunities for shaping settlement development as well as the follow-up costs of the development. Consequently, tools of this nature heighten awareness on the issue of follow-up costs and promote communication on the topic. They can also be applied in areas beyond direct site-related planning, e.g. in public utilities, public works administrations, finance departments and school administrations.

The complexity of the tools and models varies significantly. Their operation requires users to invest various degrees of time and effort (entry of basic data, data management, interfaces with existing systems, etc.).

1.2 Characteristics of the tools and models

The following section will explain the tools' similarities and differences in terms of characteristics and potential applications. Due to the extremely heterogeneous nature of the tools and models' characteristics, the structure will be simplified here.

Target groups and topic addressed

The tools and models presented in this volume predominantly address administrative users. The software tool "FolgekostenSchätzer" ("Follow-up Cost Estimator"), module "Technical Infrastructure", is freely accessible in the Internet and mainly addresses local government policy and civic initiatives.¹

With two exceptions (the infrastructure cost model, Gießen-Wetzlar region, and cost-calculation model for regional settlement management), all tools and models only analyse undeveloped land for housing construction. Furthermore, cost-benefit analyses are generally of great interest to project and housing developers.

Spatial plane of reference

The tools and models' spatial plane of reference spans from individual sites to regions. Some tools and models are capable of reaching conclusions for various spatial planes of reference (individual sites, building areas, cities), while others focus on individual sites, districts, specific building areas or residential development sites.

Settlement development strategies

The tools and models allow the analysis of various building land development strategies and scenarios. This means that various strategies can be compared with one another, e.g. external or internal development (software tool LEANkom). Additionally, pre-defined courses of action (software tool

¹ <http://www.was-kostet-mein-baugebiet.de>



fokos^{bw}) or even freely definable scenarios (e.g. “FolgekostenSchätzer” and cost-calculation model FIN.30) can be calculated.

Types of areas and locations

As a general rule, a fiscal analysis within or between defined types of areas and locations is possible, which thus enables the comparison of pertinent variations in zoning schemes. Such analyses allow appraisals of new housing estates in green belts, new estates on the outskirts of towns, lesser utilized land within towns and cities, consolidated areas (partially or entirely developed areas on the outskirts of the settlement community), open spaces, and brownfields in central areas. To simplify the calculation models, district types are also summarized, e.g. gaps between buildings, internal sites and “green areas” (previously external areas).

Building types

For the most part, cost-benefit analysis tools differentiate between the types of buildings that are constructed in residential areas based on the density of inhabitants: single-family homes, semi-detached homes, terraced homes and multiple-family homes/multi-storey dwellings.

Portrayal of costs and revenues

All tools and models illustrate sections of the cost/expenditure dimension; some also illustrate the benefit/revenue dimension. All tools and models address the infrastructure costs that accompany settlement creation. One tool concentrates on the social infrastructure (software tool “FolgekostenSchätzer”, module “Technical Infrastructure”), two models concentrate on the technical infrastructure (software tool “FolgekostenSchätzer”, module “Technical Infrastructure”; infrastructure cost model, Gießen-Wetzlar region). In addition to infrastructure costs, many tools and models consider further cost parameters, such as the costs of preparing building land, preparation and financing of the plot, local public transport and the costs of transporting schoolchildren, as well as the costs for compensation measures. With regard to social infrastructure, the tools and models also take nurseries and primary schools into account.

The tools and models that analyse the benefit/revenue dimension do so using different approaches: one software tool presents specific revenues connected with the real estate sale beside the other revenues (software tool fokos^{bw}); others focus more strongly on fiscal aspects, such as real estate taxes, the municipal share of income tax, unconditional grant allocations (software tool LEANkom) or other citywide revenue, such as funding (FIN.30). Revenues from income tax, unconditional grant allocations, real estate tax and interest on credit balances are also included in calculations performed by the tool fokos^{bw}.

Examination of the development phases in an area

Some cost-benefit analysis tools and models show the phases of an area’s development project with its causally attributable expenses: from property acquisition to planning, preparation and construction of technical infrastructure to the sale of plots, completion of the area settlement with new inhabitants and the ensuing utilization phase. The time periods analysed by the models and tools varies. They generally foresee a time period of 15 to 25 years, or longer. The software tool “FolgekostenSchätzer” (module “Technical Infrastructure”) enables analysis with a perspective of up to 100 years.

Cost accounting approaches

In the cost-benefit analysis tools, costs are calculated according to both the average estimation of costs and the cost limit approach.

The average estimation of costs describes the appraisal of the overall costs that are proportionately allocated to a building site. The semi-fixed costs triggered by the building site or economies of scale (cost advantages per produced unit due to expanded output) are not represented. This approach was selected, among others, for the Gießen-Wetzlar region infrastructure cost model. An average estimation of costs is particularly useful when the average cost-oriented values need to be exploited for the analysis of plans or scenarios.



The cost limit approach describes the appraisal of additional costs that are triggered by a building site (e.g. cost-calculation model FIN.30). Unlike the average estimation of costs, both semi-fixed costs and economies of scale are illustrated here (cf. Dittrich-Wesbuer et al. 2008:40 ff.). Tools such as LEANkom utilize both cost-accounting approaches.

Data input by users

Normally, the users of costs-benefit analysis tools are requested to provide data about the number of housing units planned, as well as building types, and to assign a specific location type. More elaborate tools begin with the individual entry of data regarding the specific land zoned for new development; data includes land requirements for community facilities and green areas, as well as the requirements for additional spaces and for land for transport connections.

Calculation results and data output

Using the data entered, the cost-benefit analysis tools use a basic cost model to calculate the follow-up costs for the technical infrastructure (roads, sewer system, gas, electricity, drinking water). It accounts for outlays for the initial construction of infrastructure networks, their long-term operation, maintenance, repair and subsequent modernization.

In the realm of social infrastructure (nursery schools, primary schools), data on population development can be used as a basis for generating estimates of future demand. In some cases, the tools consider data regarding distances between a series of infrastructural facilities that already exist and current utilization levels.

Data output generally ensues in the form of calculations and graphic depictions. The data can be employed for various purposes, e.g. as the basis for presentations and conceptual drafts. Moreover, various tools allow data to be exported to a separate Excel file for subsequent use in diagrams.

2. Limits of the cost-benefit analysis on municipal level

The cost-benefit analysis models and tools presented in this volume allow several payment flows affecting municipal budgets to be viewed in connection with the settlement development. This enables the revenues and expenses attributable to the building sites under examination to be made reliably transparent within the municipalities. In so doing, the models and tools fulfil their intended function.

However, the complex structure of municipal revenues and expenditures sets limits to the cost-benefit analysis for settlement area development. For this reason, the following section will cover those aspects which are not included in the cost-benefit analysis models and tools, or only included to a very limited extent. This information is provided in light of the fact that irrelevant or extraneous expectations are occasionally placed on the cost-benefit analysis models and tools. The explanations here allow these expectations to be confronted with sound arguments.

The limits, as well as the complexity of analysing payment flows, becomes clear in areas where infrastructural expenditures cannot be directly assigned to the municipal budget or an individual construction project.

For instance, local public transport financing (more than 50 percent of which originates from public sources), is one example of a highly complex subsidy/financing system (“spaghetti financing”) (cf. Lehmbrock et al. 2005: 325). The costs of providing local public transport services and the costs of transporting schoolchildren are not carried directly by the municipality – particularly in the case of municipalities that are integrated within larger districts. Indirectly, the municipalities are included by means of apportioning the financing of public transport costs. However, apportionment increases are frequently the direct result of urban sprawl in ever larger rings around the region, particularly in municipalities which are not located on major development and transport routes.

Various grant and subsidy schemes for the development of residential and commercial areas or the creation of social infrastructures, i.e. regarding (partial) financing for the operation of social



infrastructures carried by the Land or the administrative districts, are components of public investments in the municipalities. They reduce the one-off or ongoing expenses of the municipalities, but also represent incentives for investments with long-term follow-up costs for the municipality. To this end, sufficient economic analyses on the actual total municipal follow-up costs are required; these analyses need to take all financing sources and levels into account.

In the discussion regarding the effects of demographic change on the use of infrastructures (both networked and otherwise), it appears necessary to also examine the financial burden or cost calculations of private households and enterprises. In addition to aspects of accessibility and individual mobility, further perspectives will move stronger into focus, including the costs of utilities and waste management (as below-capacity utilization increases, specific costs will rise) and the provision of other media.

External development measures, i.e. plants located outside the actual building site, including, for example, access roads, supply/discharge pipelines and rainwater retention basins, should not be assigned exclusively to a specific residential area. The proportion of municipal costs for external development is heavily dependent on the size of the area and the development area's location within the municipal region. Frequently, such costs, based on the residential area, must be estimated (cf. Reidenbach et al. 2007: 110 ff.).

Another aspect related to the costs of settlement development is the monetary valuation of the countryside required. In discussions with the specialist public, but also in local political debates concerning the classification of undeveloped sites for residential and commercial space, it is frequently demanded – beyond compensation measures – that the usage or impairment of natural resources such as soil, biotopes, species and natural landscape be represented with financial equivalents in long-term cost-benefit analyses. However, there are still no uniform calculation bases for this purpose. Advances in this area can be expected, based on the REFINA project “Regionales Portfoliomanagement” (“Regional Portfolio Management”) and the calculation of the ecological worth according to a value-based costs-equivalence approach.²

3. Cost-benefit analysis and spatial policy decisions in municipalities

As revealed in the report by Jöne/Klemme in this volume, municipal decisions are swayed not only by technical-practical arguments, but also by the reputation of those involved, by public debate, by specific site preferences on the part of those who plan to build, and by the interests of local politicians during a (re-)election. These are all important components in the general bundle of factors which can ultimately affect the decision (cf. Feldmann et al. 2007). A rather politically motivated quest for proportional representation, according to which as many local districts as possible are to participate in the settlement land development, could potentially stand in opposition to the technical arguments for a suitable location choice.

Municipal policy decisions are still influenced by highly generalised population growth conceptions that are strongly linked to the level of new construction within the site. Many municipalities regard the development and sale of building land as a source of income. And in the short term, this income can contribute to improving what are frequently strained budgetary situations.

From a local government policy viewpoint, expectations regarding the “benefit” or “value” of a land zoned for development – both of which are relevant for decisions – cannot be illustrated directly in a

² For the monetary valuation of natural resources, revitalization areas, ecological compensation areas: Constanza, Robert, Ralph d'Arge, Rudolf de Groot, Stephen Farber et al. (1997): *The Value of the World's Ecosystem Services and Natural Capital*, in: *Nature*, Vol. 387, pp. 253–260; Rat von Sachverständigen für Umweltfragen (SRU) (1996): *Konzepte einer dauerhaft umweltgerechten Nutzung ländlicher Räume*. Special report, Stuttgart; SRU (2002): *Für eine Stärkung und Neuorientierung des Naturschutzes*. Special report, Stuttgart; SRU (1996): *Zur Umsetzung einer dauerhaft umweltgerechten Entwicklung*. Environmental assessment, Stuttgart; SRU (2000): *Schritte ins nächste Jahrtausend*. Environmental assessment, Stuttgart; SRU (2002): *Für eine neue Vorreiterrolle*. Environmental assessment, Stuttgart; SRU (2004): *Umweltpolitische Handlungsfähigkeit sichern*. Environmental assessment, Baden-Baden; LEG Saar mbH, Fachhochschule Aachen, RWTH Aachen, Altenbockum & Partner, Probiotec GmbH (2008): *Flächenkonstanz Saar – Wege für das Land – Konzept für eine Neuflächeninanspruchnahme von “Null”*, final report of the REFINA research project, p.1.



comparison of financial costs and benefits. This encompasses the preservation or development of urbanistic and social qualities, which cannot be isolated from other factors and represented as mere financial figures. These include the positive future expectations placed on construction projects, which are designed to either preserve or create jobs locally. On the one hand, the classification of commercial areas aims to preserve jobs (expansion or relocation of local enterprises) or usher in new jobs locally. On the other, it is connected with the expectation of business tax revenues (which are very difficult to predict in the long-term). Though these types of factors can be included in cost-benefit analyses, accounting for factors with fiscal benefits that are not directly attributable is, methodologically speaking, highly demanding.

Flexibility on the part of municipalities, something that is demanded by financial players, along with the desired short response times in providing commercial areas, could lead to an unnecessary stockpiling of sites. The integration of financial and municipal players into increasingly complex interdependencies also complicates municipal approaches to economic land use in the commercial area. The costs of stockpiling sites could be represented with tools that are customized for commercial land development. However, the “value” of action options, which result from the stockpiling of commercial areas, can hardly be monetized.

The preservation, expansion or construction of social infrastructure elements, such as day care centres, schools and sports/recreational facilities, are considered to be key “soft” location factors that determine the attractiveness of a residential area. Attractive retail shopping options are considered to be just as important.

The availability of land or the ownership structures also play a significant role, as does the concrete interest of investors which can be quickly seized upon, especially during the establishment of spatial and chronological priorities for building land development.

In practice, decisions that affect construction activity and the creation and/or adaptation of infrastructure are often made in separate decision-making processes, i.e. under the stewardship of various players acting independently or by commissioned agencies and funding institutions.

The diversity of interests, as represented above, shows that cost-benefit analysis tools provide increased transparency regarding the expected short-, mid- and long-term costs of construction projects and thus make a significant contribution to a well-founded decision-making process on land use. In particular, they allow development strategies as well as site alternatives to be compared. However, such tools ultimately remain instruments of decisional preparation and support. Cost-benefit analyses represent just one component in a complex process of deliberation regarding commodities, values and arguments that, as a matter of natural course, can only be partially expressed quantitatively or monetarily.

4. Contribution of REFINA research in creating transparency on the follow-up costs of settlement development

A comprehensive analysis of the economic aspects involved in settlement development was carried out in the REFINA projects. This primarily encompassed analysing and presenting the correlations between population development, settlement strategies and the resulting prime costs and follow-up costs, including their transfer into calculation models or other user-oriented tools. Comprehensive tests and feedback mechanisms with the model municipalities participating in the REFINA projects enabled the practical configuration of the models and tools. Most of the models and tools focus on the development of living space. Methodologically speaking, they are based on the urbanistic calculation and the fiscal analysis of effects, while also developing these further.

Some models and tools allow basic data to be interlinked (e.g. the fiscal equalization scheme at municipal level, real estate tax), standard municipal settings (e.g. locations of the social infrastructure), demographic and income data, as well as data on the respective building land or financing model. The



integration of population development models at building area/municipal level in the cost-benefit analysis tools also allows the presentation of expected demographic changes.

Different models and tools analyse the land development over the complete genesis of the area, extending from purchase through development and settlement to the completely settled area with a long-term utilization phase. They also illustrate fluctuations in revenues and expenditures over time.

Several models allow the sum of individual planning decisions on settlement development to be balanced, whereby the calculation model for a regional settlement management for the region Bonn, Rhein-Sieg/Ahrweiler is summarily balanced within the context of a regional portfolio analysis. Based on various usage scenarios, it evaluates not only the private (entrepreneurial) use of a property, but also the effects of structural investment within the environment, thereby allowing swift decisions to be reached and facilitating regional welfare economic optimization.

It is worth highlighting the long-term analysis of follow-up costs involved in settlement development (20 years and longer), a function which is prevalent in all the models and tools.

The process and implementation perspective, i.e. the prerequisites and framework conditions of using a cost-benefit analysis tool in the municipal administration and in the political decision-making process, have been investigated more closely in the REFINA LEAN² project (cf. the report by Jöne/Klemme).

In a detailed feedback process with pilot municipalities and regions, practical models and tools for analyzing the costs and revenues of settlement development were developed in the REFINA projects. These products have been provided to the municipal administrations and the public, either as applications (e.g. at www.was-kostet-mein-baugebiet.de) or will be made accessible to the potential user group in the foreseeable future.

The tools or prototypes developed as part of REFINA offer various spatial and technical application possibilities. Given their level of abstraction and depth of analysis, they primarily address administrative authorities and municipal policymakers. At the same time, they also sensitize citizens and interest groups to correlations between settlement/infrastructure development and demography.

In this way, the Federal Ministry of Education and Research funding priority REFINA has led to significant progress in cost transparency in the area of municipal settlement development.

5. REFINA research on follow-up costs: lessons learned

Within the framework of the REFINA funding priority, the issue of follow-up costs is of great importance as part of the interdisciplinary topic “economic instruments”. In the fashion of an ever-learning and networked research consortium, the stakeholders who examined this issue – research institutions, system developers and municipalities – exchanged information on methodology and specialist approaches both informally and in several workshops, and analysed the respective solution schemes.

The following section summarizes some of the key findings of this process of exchange and knowledge assimilation, which are essential to the development and further enhancement of cost-benefit analysis models and tools.

Accuracy of portrayal and manageability in implementation

When developing cost-benefit analysis models and tools, two basic requirements must be met. On the one hand, in order to be of sufficient impact, they should comprehensively portray existing payment flows, as well as the factors that influence them. On the other hand, they cannot be designed to be so complex that they are too difficult for users in local governments to employ. However, extremely sophisticated applications must be accompanied by qualified consulting services. Depending on the



depth of analysis and intended application of the findings, cost-benefit analysis tools vary in how well they can be aggregated as well as their compatibility with other data-driven systems.

Necessity of target-group specific tools

Models and tools should differ in their depth of analysis and complexity, depending on the target group.

Reliable support for local governments and municipal policymakers in land management decision-making requires data processing that is as detailed and municipality-specific as possible, ensuring that inaccuracies regarding the computed costs and revenues can be kept to a minimum.

Simple models and tools with all-inclusive data acceptance are important. These are essential tools for interested members of the general public; they offer a straightforward introduction to the topic and can contribute to awareness of the problems of settlement and infrastructure development.

Entering data from individual municipalities

To reproduce the real circumstances at a location as accurately as possible, tools should offer the possibility of entering specific data about building areas and infrastructural needs. The costs of social infrastructure in particular, which are more complex in nature than technical infrastructure costs, and differ depending on demographic development within the boundaries of the municipality or catchment area under examination, should integrate municipal data stores. Furthermore, in the event of under- or over-utilization of infrastructures, the semi-fixed costs must be taken into account.

Integration of population models

In order to obtain information that most accurately reflects the actual increase in the number of inhabitants resulting from zoning permits for new building land (people moving in from outside the community, migration within the community), cost-benefit analyses should incorporate site- and municipality-specific population data. To satisfactorily portray populations and income structures in new building areas, models can exploit data from the Socio-economic Panel (SOEP), as exhibited in the LEAN² model.³ The population models from the “FolgekostenSchätzer” software, on the other hand, primarily implement data from the German microcensus.⁴ The Income and Expenditure Survey (EVS) is yet another possible data source.⁵ Data on population composition and development gathered in localities themselves can also be included in the data pool.

Accounting for the actual occupancy of building sites

How quickly areas of residential development are settled, i.e. occupancy levels and the resulting utilization rates for technical infrastructures, as well as existing and arising social infrastructures, should be included when analysing the cost-effectiveness of new housing estates. It therefore appears advisable to re-evaluate the revenues and expenditures of building sites on an annual basis.

Adjusting tools to Länder-specific financing circumstances

The varying approaches and computation formulas of the Länder, e.g. with regard to municipal financial equalization and the financing of social infrastructures, require a range of cost-benefit analysis models and tools that are tailored to the needs of each Land and that calculate the revenue-related aspects of building area development.

Realizing and elucidating multiple-use potentials

³ The SOEP is a representative survey of private households that is carried out annually in Germany and comprises 20,000 people. On the basis of this survey, the German Institute for Economic Research (DIW) compiles an anonymous set of data on the composition of households, occupational and family biographies, labour participation and earnings.

⁴ The microcensus is Germany's official representative set of statistics on population and the labour market. In a detailed regional and professional breakdown, it provides statistical data on the economic and social situation of the population, the population structure, families, communal living arrangements and households, employment, job seeking, training and continuing education, living conditions and health. The Länder statistical offices carry out the survey and process the data.

⁵ The federal and Länder statistical offices perform the Income and Expenditure Survey (EVS) every five years (most recently in 2008). Among other things, it includes details on income sources and levels for private households.



Initial compilation of data for entry in cost-benefit analyses is extremely laborious for public administrations; however, long-term use and data management can result in multiple-use applications. This includes integrating the tools in settlement development monitoring processes as well as the set-up of interfaces. Key interfaces might be those between administrative planning offices and local councils; other important interfaces might involve the administrative entities responsible for investment and budget, school development, child day-care facilities, the transport infrastructure and supply and waste infrastructures.

Cost transparency requires transparent input data and assumptions

The employment of cost-benefit analysis models and tools – as other decision-making support tools – requires the data entered to be as comprehensive and reliable as possible. Analysis results on the revenues and expenditures involved in settlement area development that are exploitable and closely reflect reality can only be attained if the input data is transparent and credible. Assumptions about the speed of settlement and utilization of building sites should be depicted in a similarly transparent manner.

Cost-benefit analysis as a component of the deliberation process

Valid cost-benefit analyses can help support and bolster arguments for consolidated settlement development in the course of political and administrative deliberation processes for land management decisions. However, findings on expenditures and revenues connected with building site development are just one component in the complex deliberation process involved in municipal land use decisions. Similarly, making planning decisions solely contingent upon fiscal criteria would neglect other factors that are important for the general welfare of the community.

Ways of implementing models and tools

There are various ways of implementing cost-benefit analysis models and tools.

In principle, it appears necessary to offer practice-oriented training courses and consultation to arm municipal planning office employees, municipal policymakers and the general public with applicable information concerning issues related to follow-up costs, as well as existing tools and models for cost-benefit analysis.

Simple cost-benefit analysis tools that are aimed at a wider public can be made available as online applications. Models and tools that are designed for use in public administration should include accompanying or integrated instructions for users, and explanations regarding content that make them more easily manageable. For analysis of more sophisticated interrelationships, consultancy sessions from qualified professionals that integrate cost-benefit analysis tools should be seriously considered.

6. Unresolved issues and aspects of further implementation

REFINA research on the follow-up costs involved in settlement development has led to the creation of practical models and tools. This ensures a solid basis for their implementation in municipal administration and policymaking, as well as among the wider public. This necessitates a range of sustainment activities, as well as enhanced development that is user-friendly and designed to suit specific target groups. A range of relevant aspects will be presented in the following section.

Greater consideration of the reciprocal effects and stakeholders

Through the in-depth evaluation and description of costs and benefits which are not directly assigned to a building site or stakeholders from outside the municipality, the interaction between players involved in land utilization could be given greater consideration. In particular, the intermunicipal and reciprocal regional effects, as well as the reciprocal effects with other public service areas (e.g. local public transport) could be made more transparent.



Strengthening the regional perspective

Given diverse structural and spatial interdependencies, particularly in urban agglomerations or in spatially defined commuter belts, a stronger regional viewpoint appears to be necessary. The extent to which complex interdependencies can be suitably illustrated in models and tools should be examined.

Integration of sensitivity evaluations

A useful addition of cost-benefit analysis tools could encompass the stronger integration of sensitivity evaluations, which, particularly leading up to the building site development (ex ante) illustrate the effects of different utilization levels or settlement speeds.

Stronger focus on commercial areas

Most of the cost-benefit analysis tools developed in the REFINA projects support the study of residential areas. For municipal authorities and policies, it would also be helpful to implement tools, which, in order to evaluate commercial areas, along with expenditures, also allow the reliable presentation of short-, mid- and long-term revenues, or the factors which influence these. Additionally, the feasibility of reliable revenue estimates should be verified.

Contraction and renaturization analysis

In order to cope with the requirements of shrinking municipalities and regions, models and instruments should be developed specifically for the conditions of contracting building sites, renaturization and the adaptation of local infrastructures. These could enable short-, mid- and long-term costs or cost savings to be estimated.

Communication and decision-making relevance

Those aspects involved in the diffusion of cost transparency and cost-benefit analyses in municipal administration and policymaking are still in need of investigation. Questions that need to be examined here include which specific means of communication, procedures and approaches can be used to make data on the costs and benefits of settlement development projects relevant for the decision-making process.

The interaction of spatially-relevant players

Land use management decisions in municipalities and regions are the result of decision-making, management and coordination processes between state, social and economic players in network structures (governance). Therefore, a closer investigation of the interaction between all spatially relevant players appears to be necessary. This needs to take the respective cost-benefit calculations into account, as well as all associated similarities and differences between the players themselves. This will ultimately lead to important conclusions regarding the adaptation or improvement of instruments, procedures and approaches.

Launching the tools

The models and tools developed in the REFINA projects should – in as far as this has not already been carried out – gradually be developed into web or Office applications that can be made accessible to the municipalities or the public. Supplementary information on the structure, required input data, application possibilities and limits of the tools would be helpful for their practical introduction.

Impact analysis

Lastly, accompanying studies on the implementation of cost-benefit analysis tools could provide information on further optimization potential, as well as findings on the useful integration of these tools into land use management decision-making processes and administrative planning actions and other relevant administrative processes.



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