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Effektvurdering av store statlige investeringsprosjekter
Impact evaluation of large governmental investments

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Sammendrag: Denne rapporten beskriver eksisterende metoder og praksis for effektvurdering av offentlige prosjekter, med hovedvekt på metoder for evaluering i ettertid (ex post-effektvurderinger). Basert på gjennomgangen av eksisterende metoder og praksis presenteres et forslag til metodikk for ex post-evaluering av store offentlige investeringsprosjekter i Norge. Fokus er rettet mot prosjektenes samfunnsmessige effekter, dvs. det som betegnes som prosjektenes eksterne effektivitet. Dette i motsetning til en vurdering av hvorvidt resursene i selve prosjektet er brukt effektivt (intern effektivitet). Den anbefalte metoden illustreres med eksempler på mulig bruk i evaluering av ulike typer prosjekter.

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Summary

This report reviews existing impact assessment methods and practices for governmental projects, with an emphasis on methods for after-the fact evaluation (ex post impact assessment). Based on the review of existing methods and practices, methods for ex post evaluation of large-scale Norwegian governmental investment projects are proposed. The focus of the report is directed toward impacts of the projects at a societal level, i.e., what has been termed the external effectiveness of the projects. This as distinct from an assessment of the efficiency of the resource use within the project itself (internal effectiveness). The recommended method is illustrated by several examples of its possible use in the assessment of different types of projects.

Existing theories on project evaluation and impact assessment

Most of the literature on methods and practice for impact assessment applies to appraisals of the assumed impacts of alternative solutions before any decision is made regarding which alternative to implement, i.e. ex ante impact assessment instead of ex post. There is, however, considerable methodical overlap between ex ante and ex post impact assessment, regarding the relevant consequence categories, indicators for measuring effects against these categories, as well as the assessment of how beneficial or undesirable the respective effects are. In Chapter 2, four main groups of methods are reviewed: Cost-benefit analysis and related methods, broad analysis of society-level impacts, performance measuring, and benchmarking. The two first of these categories have been developed for and are primarily applied to ex ante assessment, but may also be used as tools for ex post evaluation. Performance measuring and benchmarking are methods having to a higher extent been developed for the purpose of ex post evaluation.

Cost-benefit analysis implies that benefits and costs are being monetarized to as great extent as can be defended scientifically. The initiative is considered to be profitable for society if the sum of all calculated benefits resulting from an initiative is higher than the calculated costs. Real economic impacts include effects that can readily be monetarized, physically quantifiable impacts that are difficult or impossible to monetarize, as well as non-quantifiable effects. Efforts are continually being made in order to enable monetarization of impact categories for which monetary values have hitherto not been assigned, notably by means of willingness-to-pay investigations.

However, the theoretical foundation of this type of analyses has been criticized from several camps. According to earlier reports from the Concept research program, the ability of cost-benefit analyses to summarize the impacts of an initiative in a meaningful way is higher, the lower is the importance of any distributional effects, the larger is the number of consequences that may be monetarized in a scientifically defensible way, and the lower is the extent to which the decision involves ethically difficult issues.

Since especially the social, but also many of the environmental impacts typically occurring as a result of large governmental works projects are difficult to assess with a high degree of precision, and even more difficult to value in economic terms, cost-benefit analyses can at best only comprise a limited part of the relevant impacts. A broader scope, allowing the inclusion of impacts that cannot be monetarized in a defensible way, is possible when conducting what we have called *broad analyses of society-level impacts*. Such analyses include social, environmental as well as economic impacts, all of which broadly defined. Large-scale governmental investment projects normally contribute to create benefits in relation to the needs and interests from which the projects have been justified, but may at the same time result in side-effects affecting other concerns and interests in a negative way. A broad analysis of society-level impacts should therefore elucidate how impacts of a project affect different population groups, and not only impacts at an aggregate social level. Environmental Impact Assessment and Social Impact Assessment are important partial methods within analyses of society-level impacts. Within this approach, the economic assessment will typically be carried out as a cost-impact analysis, as a large number of the relevant effects do not lend themselves to quantification and valorizing in a way meeting the requirements of a cost-benefit analysis.

Performance measurement was previously often based on a quite narrow concept of productivity. Gradually, awareness has grown that such analyses have numerous unfavorable implications. One example of such perverted effects is the purchase of commodities from unreliable suppliers in response to a strict focus of the performance measurement system on purchasing costs. Many authors have put forth serious criticism against this culture. Their main message is that performance must be measured against a far broader range of dimensions. The concept of balanced management by objectives is an example of this concern. By measuring a broader range of performance dimensions, the behavior of the agencies is directed toward a focus on these dimensions. The so-called DPSIR framework for environmental indicators reflects a similar way of thinking. DPSIR denotes *Driving forces, Pressures, States, Impacts* and *Responses*. Initiatives and projects should be evaluated against all these five dimensions. The analysis will then throw light on

relationships and driving forces contributing to produce future impacts. The above-mentioned way of reasoning can also be drawn on in ex post evaluation of projects. If project participants have been made aware in advance that communication with society, neighborhood satisfaction with the project, industrial development resulting from the project, environmental impacts, etc. will be subject to evaluation, they will probably direct more of their attention to such effects when establishing, planning and implementing the project.

The noun *benchmark* has been defined as 'a predefined point, used as a reference for measurement'. In the context of performance measurement, benchmarking has as its main function to provide measurements with a point of reference. An ex post evaluation of a single project may elicit figures for costs-benefit ratios, amounts of traffic, user satisfaction, etc. Seen in isolation, this provides a certain insight into the performance of the project. Further information may be obtained by comparing this information with the original (ex ante) estimates, thereby enabling an evaluation of the realism of these estimates and the ability of the project to reach its goals. A comparison of the results with the evaluations of a number of similar projects may be even more interesting. The so-called reference class prognosis method is an example of a structured, quantitative benchmarking of the conditions of a project. The method implies that the project in question is compared to a group of similar projects, utilizing available information about the latter. Both benchmarking and the reference class prognosis method require a database of a certain amount and a certain degree of standardized evaluation criteria/measurement parameters, e.g. in terns of technical functionality and efficiency, economic effectiveness, social, political and environmental acceptance, and industrial development.

Existing practice – international and Norwegian examples

Searches on the Internet, in libraries and in research databases show that the vast bulk of literature on impact assessment of large governmental investment projects deals with ex ante analyses. In Chapter 3, some examples of existing practice are shown, which we believe will be relevant to ex post evaluation as well as to their original ex ante purpose. The examples include state-level systems for performance measurement in the USA, Swedish routines for monitoring the compliance of implemented transport policy measures with transport policy goals, systems used by state or regional authorities in USA for the evaluation of alternative public transport concepts, the so-called mark book of the Danish construction trade, and a framework for project evaluation and benchmarking developed by the consulting company IPA.

We have not succeeded in finding any systematic review or overview of previously conducted ex post evaluations of large governmental projects in Norway. However, a number of documents exist, where particular aspects of implemented governmental investment projects are addressed. Chapter 4 presents the main messages from a number of the most relevant among these documents. The overview does not claim to be complete. A common feature is that the documents have been produced for different purposes, thus varying in their focus and addressing different topics. Evaluations of the following projects are briefly presented: The project for a New National Hospital; ICT projects in the Social Welfare Agency; The Troll Oil project; defense equipment investments; renovation of the Royal Castle; the governmental representational residence and an old wooden representational building in Trondheim; the Highway Directorate's investigation of the planning and monitoring of large road investments; a proposal for ex-post evaluation of cost-benefit analyses of transportation investment projects,; the development of three offshore oil fields (Åsgard, Visund and Jotun); the repair of leakages in a railway tunnel; the purchase of F-16 combat airplanes; the Winix ICT project in the public educational system; the ICT project Tress 90; impact assessments of alternative solutions for the National museum for art, architecture and design; and the Comprehensive Plan for Watercourses.

A general observation from the review of the above-mentioned projects is that they do only to a limited extent address the topics focused on in the present report. The evaluations are only to a little extent able to throw light on whether or not the right concept was chosen, and neither on the possible range of alternative concepts. Most of the evaluations hardly elucidate the zero alternative, and to the extent that this is done, the analysis is not conducted in any systematic or standardized way. Most of the evaluations refer to ex ante forecasts of direct costs and any revenues from the projects, but they seldom make reference to ex ante calculations of social costs and benefits. The evaluations address wider societal impacts, distributional effects etc. only to a limited extent.

Proposal for a new method

Chapter 5 describes our proposal for a method for ex post evaluation of large governmental projects. First, we discuss the purpose of such evaluations, followed by considerations about the appropriate contexts against which the project should be compared, the appropriate time of the evaluations, and more specific details of the evaluation method. Moreover, the data required in order to carry out the recommended evaluation is discussed, along with the roles to be filled in a system of

institutionalized ex post project evaluations, and the consequences of such an institution for different agents.

Purpose

The purpose of ex post evaluations is firstly to assess whether or not the original objectives of the projects were actually achieved. In addition, ex post evaluation may provide valuable contributions to the knowledge base for future ex ante analyses, increase the motivation among those who carry out the ex ante analyses for making realistic and sober assessments, and contribute to a standardizing of analyses and other information making up the base for decisions about project implementation. Through ex post evaluations it will also be possible to build a database about impacts of large governmental investments. Such a database may be useful when designing and planning future projects.

Thus, what the proposed ex post analyses aim to draw the attention toward is the ability to choose the right projects and concepts, the quality of analyses and decision-making processes in the early project phase, and the effects obtained through the projects. Key questions are: Was the scope of the ex ante analyses sufficiently broad? Did the project result in the planned effects? This implies that the evaluation should not be confined to a product evaluation, but should also include elements of a process evaluation.

Key questions to be raised concerning the planning and decision-making processes in connection with large projects include: Which terms were set for the ex ante analyses and the choice of concept? Have changes or developments occurred in the cost-benefit estimates during the course of the process, or in the design of the concepts? Were the various calculations (costs, benefits, etc.) and discounting rates for the implemented and alternative concepts reasonable? Were alternative concepts made subject to serious elucidation?

Points of reference and bases for comparison

When assessing the effects obtained through a project, a key question is the appropriate situation against which the situation after implementation should be compared. In order to evaluate the real effects of the project, the situation after implementation must be compared to the situation that would have occurred at the same time in the absence of the project. Such a counterfactual analysis is complicated, and it is therefore not appropriate to require a too high degree of precision in the assessments. Also the question of whether the right concept was chosen requires a counterfactual analysis – in this case with a comparison with the

hypothetical situations resulting if each of the alternative concepts had been chosen. Moreover, the obtained effects can be compared to the benefits and negative impacts predicted before the decision and commencing of the project. This will be an important indicator of the quality of the planning work. Finally, the impacts of the evaluated project can be compared to what other, similar projects have brought about. This provides an external reference through a form of benchmarking.

Needless to say, a mere comparison of the situation after the implementation of the project to the pre-project situation is simpler to conduct than the counterfactual analyses necessary to uncover the impacts of the project. Such simple juxtapositions can provide experiential data about changes typically associated with the relevant type of project, hence making up a source for inputs to forecasts in connection with future projects. However, such simple before-and-after comparisons are insufficient as a base for conclusions about the *effects* of a project.

Scheduling of the ex post evaluation

Often, some time has to pass after implementation before the positive effects of a project manifest themselves. Actually, start-up problems often result in a decline in perceived utility immediately after the opening of new infrastructure. If the project is being evaluated too early (e.g. within one year after completion), there is a risk that the evaluation takes place at a time when the project has not yet realized its benefits. On the other hand, if the evaluation takes place too late (e.g. more than 4-5 years after completion), it may be difficult to identify which changes are due to the project and which are results of exogenous developmental trends. The project organization may also be scattered at such a late time, thus rendering the collection of data and information difficult. Thus, the timing of the ex post evaluation will have to vary from project to project, but if possible, a recommendation is the end of the second year of operation as a standard scheduling. By then, any warranting periods and startup problems have usually been passed, while the effects have usually not yet been significantly amplified or counteracted by new projects or exogenous developmental trends.

More specifically about data sources, evaluation parameters and relevant aspects

The evaluation methods should aim at covering a sufficiently wide range of consequence categories to be applicable to essentially different concept solutions. Needless to say, both positive and negative impacts must be assessed, as must any distributional biases resulting from the projects. To some extent, the ex post evaluation will consist of a repetition of the ex ante analysis with real-life figures,

thus enabling an assessment of the accuracy of the work carried out during the early stage of the project. In projects where concepts are being changed during the process, the evaluation should assess the realized concept, but when comparing concept alternatives, the original concept should also be included in the comparison.

In order to accumulate experience from several project evaluations, a database or library of such information should be established. Data should be standardized at as high a number of the evaluation points as possible and be made available for future benchmarking, research and analysis. The data should be managed in such a way that they can be accessible for future quality assurance teams evaluating the ex ante analyses leading up to choices of concepts (KS1) and project designs (KS2), as well as those who carry out future ex post evaluations. The responsibility for this might be located to the Center for Governmental Economy Management (SSØ) or the Concept research project.

High-quality ex post evaluation requires a good information base, including zero-point measurements, data about the zero alternative and information about alternative concepts. This places demands on the amount and quality of data and related analyses provided as a base for decision-making. It is therefore crucial that the above-mentioned KS1 and KS2 assessments ensure a good information base for future ex post evaluation.

We have developed a proposal for evaluation parameters for different types of projects, grouped into three standard categories: Investment costs, operational costs, and consequences of the projects. The latter category includes, among other things, data for the use/production making up the core function of the installation, direct utility for users, safety and reliability, environmental conditions, social impacts and regional impacts. Moreover projects have subdivided the projects into four thematic main categories: Transportation projects, building projects, defense projects, and other projects (mainly ICT projects). Chapter 5 includes a table showing relevant evaluation parameters within each of these thematic categories.

Responsibility for and roles in ex post evaluation

The relevant ministry, in cooperation with the Ministry of Finance, should carry the main responsibility for initiating ex post evaluations of relevant projects. Funding covering the costs of evaluation should either be provided as a part of the budget of the project subject to evaluation, or alternatively be granted from a particular item in the National Budget. The latter is necessary to ensure funding possibilities in cases where the project organization has been dismantled before the initiation of the ex-post evaluation.

Examples of ex post evaluations according to the proposed method

Chapter 6 shows a few illustrative examples showing how ex post evaluations following our proposed method may be carried out. The examples include the construction of a new National Hospital, four railroad projects, and a road tunnel. The National Hospital case shows types of impacts and considerations relevant to include in a broad, project-specific evaluation. The railroad projects and the road tunnel exemplify how a continual monitoring of more specific parameters may be carried out. In addition, the evaluation of the road project shows how a broader cost benefit analysis can be carried out.

Conclusions

The main conclusions of the report are briefly summarized in Chapter 7. The project group proposes that a scheme of mandatory ex post evaluations of large governmental projects be established, based on the following main principles:

1. The purpose of the ex post evaluation is to uncover impacts of the implemented project, based on comparisons with the situation had the project not been implemented (the zero alternative), and with the effects of alternative, but not chosen concepts developed and assessed in connection with the KS1 evaluation.

   Moreover, the evaluations should include:

2. An assessment of the project implementation in terms of effectiveness, quality, and results. The implementation should be evaluated against a selection of relevant reference projects

3. An assessment of the extent to which the benefits and costs associated with the realized project are consistent with the ex ante forecasts on which the decision to implement the project was based, and an explanation of any deviations

4. An analysis of society-level impacts, assessed from a broad perspective

5. An appraisal of whether or not the right concept was chosen. This appraisal should include an assessment of whether or not a different project should have been chosen, judged in the light of new knowledge obtained about the implemented project as well as the development of social and technological conditions relevant to the project

6. A comprehensive summarizing of experience from the project, including a strategy for communication and learning.

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