

Executive Summary

Regional development processes of mega-projects

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Authors:

- Seppo Laakso, Kaupunkitutkimus TA
- Taina Haapamäki, FLOU
- Touko Väänänen, FLOU

BSR Access provides a Project Platform for transport interoperability and regional development within a framework approved by the Interreg V B Baltic Sea Region Programme. This study, "Regional development processes of mega-projects" is a part of BSR Access focusing on describing and analysing the wider economic impacts of selected European cross-border transport mega-projects.

Cost-Benefit Analysis on transport economic impacts has become a standardized process and achieved a strong role in the impact evaluation of large transport projects in EU and in other developed countries. There is a broad consensus that investments in transport infrastructure may have wider economic and societal impacts outside the direct external ones, but the wider effects can only exist if there are significant positive direct effects to households and firms using the transport infrastructure.

In this study we make a comparative analysis of selected cross-border transport mega-projects in Europe. How was the impact assessment carried out? What are the contents of the analysis and which methods are applied? For a background we present a framework of the economic impact analysis of transport system and accessibility changes, based on a literature review. The result, a discussion paper, will hopefully feed discussion by both planners of the transport systems and stakeholders of the EU-level and national transport policies. The discussion paper aims to support development towards more comprehensive and standardized practice of impact assessment in large transport projects in the EU.

Summary

Economic background

The major priority of EU has been to integrate European countries and regions by enabling free mobility for goods, services, people, and capital. Within EU transport has been understood to be fundamental to the economy and society.

Accessibility is the basic requirement for the transport of goods and mobility of services and labour between regions, and furthermore for trade and specialization. It is also needed for migration and commuting of people. The development of transport infrastructure and accessibility has for a long time had a dramatic impact on trade, economic growth, and social change at regional, national, and even global level. However, the impacts of the transport investments in the rich, developed countries with reasonably well functioning modern infrastructure, cannot be compared with the impacts of the new railways in the nineteenth century.

In a developed, modern country transport projects do not automatically lead to significant economic impact. The precondition for the effects is that the regional economies can take advantage of the accessibility benefits created through the transport project. In addition, the planning system and policymaking must allow for changes that create the conditions for the effects to materialize.

Impact analysis

Cost-Benefit Analysis (CBA) is a widely used tool for evaluating projects, especially in the field of transportation. The basic concept of CBA is to evaluate a project by its consequences, weighing the benefits that incur from completing the project against the costs in doing so. To find out the costs and benefits of a project, the analyst must be able to compare the state of the world with the project and without the project. This is usually done with a model in which different effects are compared to each other to determine the total amount of benefits that accrue from the project. The usual way is to convert the benefits into monetary terms with shadow prices. Typical effects that are appraised in transportation cost-benefit analysis are: travel time savings, travel cost savings, effects on: maintenance costs, ticket sales, producer costs of public transportation, tax income, traffic safety, greenhouse gases, local pollution, and noise pollution.

Wider economic impacts arise because the benefit of a change in the transport system to society may differ from the benefit perceived by an individual transport user. The sum of user benefits therefore does not

necessarily represent the total gain to society. In addition to the direct impacts, accessibility improvements due to an investment can affect the productivity of businesses directly or materialise through the labour market, the product market or the land and property market. Lower transport costs may lead to lower production costs and better productivity. Productivity can increase along with the growth of the size or density of a city or improved transport links between urban centres or other production locations. Enhanced accessibility may lead to larger labour market areas and affect employment rates and the incomes of the working-age population. Consequently, they can influence the tax revenue of the state, municipalities, and regions. Decisions on mega-projects are normally based on national level transport policy. However, the regions and municipalities have a crucial role in creating the conditions by which the positive wider economic impacts can realize, e.g. regional and local land use planning, station area design and development, and improvement of connecting transport.

There is no generally accepted methodology or procedure for evaluating wider economic impacts, unlike in the case of cost-benefit analysis. Project evaluation guidelines for several countries assess the effects on productivity, production, and employment due to improved accessibility. There are differences in the guidelines as to whether the wider economic effects are included in cost-benefit statement or whether they are presented separately. In the case of publicly financed projects the effects of construction generated by the transport investments on economy have been comprehensively excluded from the assessments. The reasoning is that the impact of public investment on the flow of income channelled elsewhere in the economy is offset by the cost to the society. However, the impacts of major transport investments and accessibility changes on output, labour markets, migration and population and land use, as well as the effects of construction are interesting from regional viewpoint, even if some of those impacts cannot be regarded as societal benefits.

Indirect impacts on regional economies consist of alternative approaches to the possible additional economic effects outside the direct impacts above. It consists of various identified procedures:

- Short-term multiplier effects: The value of economic activity following the money spent on construction and purchases during the investment period.
- Long-term effects on regional economic development: The structural changes in the economic development following the primary transport effects.

An alternative approach is to identify various mechanisms by which the direct impacts are forwarded to other parts of the economy:

- Direct mechanism: The most significant impact is the reduction of transport costs. Businesses of the region are offered improved accessibility to markets and resources and, the benefits of reduced costs of transport and thus enhanced productivity.
- Indirect mechanism: "Secondary" entities such as local businesses supplying inputs to directly affected businesses.
- Induced mechanism: Increased income leads to increased spending and thus to increased demand.
- Dynamic mechanism: Long-term changes in economic development; business location patterns, work force, labour costs, competition, prices, land use changes, that in turn affect the wealth in the region.

Case projects

This study is based on comparative analysis of selected mega-projects. The case projects were selected by the following criteria:

- Cross-border railway connection between at least two countries (EU's priority)
- Location in or a strong connection with the Baltic Sea region (focus of BSR Access project)
- Mega-project (estimated investments costs more than 5 billion € in 2019 price level)
- In planning or construction phase, or completed in the 2000's.

Selected projects:

1. Öresund Fixed Link connecting Copenhagen (Denmark) with Malmö (Sweden)
2. Oslo-Stockholm 2:55 project connecting Stockholm (Sweden) with Oslo (Norway)
3. Fehmarnbelt tunnel connecting Lolland Island (Denmark) with Fehmarn Island (Germany)
4. Brenner Base Tunnel connecting Innsbruck (Austria) with Fortezza (Italia)
5. Rail Baltica from Tallinn (Estonia) to Warsaw (Poland) over Latvia and Lithuania
6. Helsinki–Tallinn Railway tunnel connecting Helsinki (Finland) with Tallinn (Estonia) and Rail Baltica.

Comparative study on economic impact analysis of case projects

Analysis of transport system and accessibility changes of case projects is based on effective density measure. Accessibility refers to people's and goods possibility to reach places, activities and services. Transport projects increase accessibility by increasing people's and goods' mobility by decreasing travel times and travel costs. The comparison of the accessibility changes of megaprojects show that they all significantly decrease the travel time between large cities. However, most project appraisals lack a spatial analysis of accessibility changes that consider changes in reachable land use. Such analyses would help analysing regions that gain and lose due to the project.

A standard cost-benefit analysis was found of nearly all projects in the study. The analyses were compared in terms of effects appraised, length of the analysis period, discount factor used and general results. The cost-benefit analyses showed some differences in the effects appraised, the later analyses including more detailed analysis compared to the earlier ones. The EU guidance for transportation project evaluation (2014) might have standardised the analyses since its release.

A direct comparison of the cost-benefit analyses is difficult, since the appraisal periods and discount factors differ a lot between the projects. A higher discount factor implies that the decision maker values future benefits less compared to present benefits than with a lower discount factor. Another difference in the appraisals are the exact methods for the analyses. The methods with which the benefits are appraised were not discussed in length regarding many of the projects, which makes it difficult to assess their validity. A thorough assessment of the travel time savings and travel cost savings achieved through a project requires a travel demand model and a good description of the baseline scenario and appraisal scenario. The difference in the analysis tools relates to unavailability of common travel demand models, as not every country has a national model and even when they exist, the models need to be combined when evaluating cross-border projects.

Keeping these differences in mind, the projects seemed to be socio-economically profitable with the only exception of Helsinki–Tallinn tunnel which had a Cost-Benefit-ratio (CBR) of 0.45.

There are major differences with respect to the **analysis of wider economic impacts** or **indirect dynamic long-term impacts**. In every case project selected for this study, the possibility for wider impacts outside the cost-benefit analysis have been recognized and dealt with in the documents at some level. In addition, some projects have generated studies carried out by academic researchers and various regional organisations outside the project organisations. There are major differences between projects with respect to the geographical dimension of the impact.

Brenner Pass and Fehmarnbelt have been identified by EU as bottlenecks and missing links and Rail Baltica has been named as the main missing link in their TEN-T Corridors. These projects are expected, after being completed, to increase the efficiency and decrease costs of logistics with significant economic impacts in a very large area in Europe. In addition, they are expected to create significant consumer surplus in terms of timesaving in passenger transport. Wider economic impacts have only had a minor role (if any) in the decision making of the investment. Instead, they have been used as pieces of information to improve the acceptability

of the projects by showing that the projects benefit the regions and the firms locating and people living there. Öresund fixed link was constructed without EU's contribution in 1990s but afterwards it has been recognized as an important link in the TEN-T network. During and after the construction of the link several studies have been published on wider economic impacts, and the regional development has been monitored by various indicators. However, when the decision of the investment was made, wider economic impacts did not have a major role.

Oslo-Stockholm 2:55 and Helsinki-Tallinn fixed link represent very different cases, with the focus in the economic impacts on the major city regions in both ends of the connection, and in the case of Oslo-Stockholm also in the station regions alongside the rail. The focus of both projects is passenger transport while they would also serve logistics. Direct impacts are mainly based on time savings of passengers, especially business journeys and commuting. There are high expectations of significant direct benefits via consumer surplus but also wider economic impacts via labour markets, property markets and agglomeration. In these projects wider economic impacts have been studied within the project separately or as a part of the feasibility studies, applying various approaches and methods. While the decisions of implementing the projects have not been made it is too early to conclude what is the role of this information in the decision making.

Conclusions

Cost-Benefit Analysis

The impacts that are appraised in modern CBA are quite standardized. The appraisal methods however are rarely discussed, and it is difficult to validate the results. For example, the social discount rate adopted in the EU appraisal seems high compared to national guidelines.

The cost-benefit ratios (CBR) are generally above one in the case of projects having proceeded to the construction phase and having received AU funding. The CBR of the Helsinki-Tallinn tunnel project (FinEst Link organised by the states, regions, and capital cities) is the main exception with CBR under 0.5. This is one reason why the project has not proceeded. The appraisals seem to matter for the decision-making of the projects.

A critical component within the CBA is the estimation of the expected passenger and cargo volumes with assumed prices. Transport volumes significantly affects the results of consumer surplus estimates. The CBA-reports and other documents are not in all cases transparent with respect to the models and assumptions with respect to demand volumes.

Is there a tendency to over-estimate transport volumes? For example, the two Helsinki-Tallinn tunnel planning projects ended up to very different estimates with respect to the passenger volume in 2050: FinEst Link: 12.5 million, FinEst Bay 52 million.

Another critical component is the investment cost which in many cases ends up to significantly larger sums than estimated in the planning phase. However, there were not enough data available to carry out a cost history analysis in this study.

We recommend that in all publicly financed major project the estimations of passenger and cargo volumes and investment costs should be verified by an expert body that is completely independent of the client, financiers and those responsible for the design and initial calculations.

For the comparative analysis of the mega-projects, it is important that the main documents of the project from all stages of the project are publicly available, especially if the project receives funding from EU.

Wider economic impacts

There are major differences between mega-projects with respect to their capacity to generate wider economic impacts. These impacts seem to have a minor role in the decision making of transport projects having a high priority in the EU's transport strategy. The logistic importance of a potential transport infrastructure project in some of the TEN-T corridors is a key factor in the decision making and financing. Especially the TEN-T "missing link" projects have normally high CB-ratios which is an important criterium in the decision making.

The projects connecting two or more cities by rail and focused on passenger transport have a major challenge to show that project may have wider benefits. These projects may have significant wider impacts due to agglomeration, labour markets, and land use, in addition to direct net benefits. But there may also exist negative impacts outside the projects impact area, due to shifts of population, firms, and jobs between locations, and they should also be counted. The problem is that the methods and data are still under-developed and not standardized for this kind analysis. It is also possible that such wider impacts do not exist which could be considered as net benefits in addition to the direct impacts calculated in the CBA. Still, for example real estate development potentials and other land use impacts may be important at regional and local level even, when they may add nothing to the CBA.

We recommend that projects in which passenger transport plays an important role are required to analyse the wider impact, from the viewpoint of regional changes of at least enterprises, labour markets, land use and population. The analysis should include the potential shifts of activities between the regions and both the positive and negative effects in various regions involved.

In the analysis of wider impacts, it is important also to identify the conditions by which the positive impacts can be realized, e.g., regional development strategy, cooperation between regions, land use planning, station design, and development of transport connections. Another important issue is, how can the negative impacts in the outside locations be prevented?

It should also be noted that the impacts on transport volumes via labour markets and land use changes should be included in the CBA. For example, if improved accessibility due to a new railway connection lead to the real estate development and new inhabitants and jobs in station neighbourhoods, this may provide additional users and increasing demand for the railway. This can be considered if the demand forecasting is dealt with as an iterative process.

In any case, wider impacts have a role in political discussion, marketing of the project and improving its acceptability.

A lot of new research has been published on wider economic impacts since year 2000. New articles and reports seem to show that impacts are generally smaller than thought earlier (in 1990s). Impact mechanisms are also better known. In addition, national instructions for impact evaluation have been developed in many BSR Access countries.

Decision making and finance

Most of the case project have their origins far behind in the history. First initiatives have been presented several decades ago in several cases.

Transportation projects compete especially about time in parliamentary decision-making processes. Cross-border projects are not necessary very high on the priority list of national governments, compared with

projects within a country and connecting several regions. The role of EU and the status of a cross-border project in the TEN-T network is therefore important.

Strong political willingness seems to be key in furthering mega-projects.

The project organisations mostly want to be seen as a neutral provider for information even when advocating for the project.

The mega-projects that include car connections seem to be funded or there are plans to fund them through user-financing e.g., turnpikes.

Lessons to be learned

Political will is the most important asset for a project to be realised.

Project organisations should have a clear strategy for furthering the project bit by bit in the political system.

Credibility of analyses matter and can be used to collect political capital for the project.

Analyses can and should be used to gain political capital for the projects.

Political pork barrel deals might matter when projects mostly benefit certain regions.

The over-estimation of the transport demand and under-estimation of the investment costs are major risks for the successful implementation of transport infrastructure project. Estimates of passenger and cargo volumes as well as investment costs should be verified by an expert body that is completely independent of the client, financiers and those responsible for the design and initial calculations.

Methodologies of appraisal in the CBA should be more standardised or overseen. The usage of the infrastructure brings most benefits in the CBA and there might be incentives to overstate it in the appraisal.

Instructions for the evaluation of wider impacts should be produced including instructions for the spatial analysis of accessibility changes.

Projects with passenger transport having an important role should be required study the wider impact, from the viewpoint of regional changes of at least enterprises, labour markets, land use and population.