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The DECODE Method for Strategic Tranpsort Assessment

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The DECODE Method for Strategic Transport Assessment

LIANA GIORGI & ANNURADHA TANDON

ABSTRACT The aim of this deliverable is to outline the DECODE method developed by the project CODE-TEN. The DECODE method is a strategic policy assessment tool that can be used to assess the impacts of large infrastructure programmes. It is scenario-led and combines information on socio-economic developments, policy developments and infrastructure strategies to produce images of the future transport system. These are, in turn, assessed at the strategic level – particular attention is paid to the indirect and long-term impacts.

Introduction

The first decade of the next millennium should see an expanding European Union with the CEEC countries and the Baltic States as new members. Transport infrastructure investment is a key vehicle towards integration. As the accession countries' transport systems display several gaps and, more generally, the political and economic situation remains unstable – at least in several countries – strategic assessment is called for.

The primary objective of CODE-TEN has been to develop a *strategic policy assessment methodology* that can be applied to assess the impacts of the development of Pan-European corridors. The methodology developed has been termed the DECODE method and combines top-down and bottom-up approaches. It uses scenarios in order to elaborate consistent 'images' of the future that combine information on three aspects: socio-economic development, policy developments and infrastructure planning. These images are then evaluated to identify their potential impacts.

What is strategic assessment? Strategic policy assessment was first developed in the environmental field where it came to be known as 'strategic environmental assessment' (SEA). SEA represents a development of 'environmental impact assessment' (EIA) to address specific strategic questions that cannot be addressed at project level or through an agglomeration or aggregation of the results of numerous project-specific EIAs. Strategic policy assessment thus more generally is policy analysis which focuses on policies, plans or programmes rather than on specific projects. It is meta-analytical in that it combines inputs, different actors' perspectives as well as analytical methods and tools.

What is the object of study? The object of study in CODE-TEN has been the *corridor* which is defined as a policy programme or plan which aims at overcoming the structural gaps in the extended European space with reference to the transport system and also regional development – hence at the increase of cohesion – through, primarily, investment in multi-modal infrastructure networks.

Why is strategic assessment for corridors needed? There are various elements to the notion of a corridor that justify strategic assessment:

- Any one corridor transcends more than one country, is multi-modal in profile and comprises several small scale projects and an elaborated phasing plan.
- Together the Helsinki corridors comprise the backbone of a network to cover Eastern Europe as an extension of the Trans-European networks in

the West – the impacts of any one corridor are heavily dependent on the developments along other corridors.

- The countries which the corridors transcend are transition countries which only gradually will be integrated into the European Union and which economically as much as politically lag behind their West European neighbours. These differences in entry positions are relevant for assessing implementation plans as well as for the interpretation of impacts.

Why a scenario-led approach? This context of uncertainty necessitates a scenario-led approach for strategic assessment. The main precondition for the use of the scenario approach is to identify the factors or dimensions that are likely to have a major impact on future developments in transport. These are three: external socio-economic developments; policy developments and infrastructure developments. How things develop along these dimensions will influence not only the amount of traffic but also the extent of environmental pollution and/or the extent of connectivity in Europe.

The Context of Evaluation

The objective of strategic assessment when applied to infrastructure investment programmes is to assess strategies, rather than specific projects, in the context of more general policy and socio-economic developments.

Two questions arise in this connection:

First, how to analytically combine information on strategic elements, i.e. infrastructure, socio-economic trends and policy to describe aggregate influences on the transport system;

Second, what series of assessment exercises to undertake and how to combine information on impacts at the network level.

With reference to the first question: In the practice of the policy process the specification of an infrastructure strategy is not independent from more general policy and socio-economic developments. For example, the decision to build a highway will not only take into account the transport demand in a particular region but will also consider the existence or not of pricing regimes as well as the actual and potential pressure of environmental groups opposing the construction of highways because of their negative environmental impacts. The forecast of transport volumes used to justify the need for building a highway has to take into account macro-economic developments in the home country as well as in neighbouring countries; as well as the long-term competitive position of the road in relation to other modes of transport which, in turn, is determined – at least in part –

by fuel prices and transport costs which are dependent among others on more general developments regarding duties as well as on technological changes.

For the purposes of assessment, i.e. for analytical purposes, it is useful to keep the different steps distinct, whereby this does not preclude that connections are made between the different levels at different stages. One way to do this in a systematic way is through the use of scenarios.

With reference to the second question: Transport planning has to consider four separate, albeit interrelated, questions, namely:

- Is the project worth the money?
- Can it be further improved in technical terms?
- Does it have a good chance to be agreed upon and decided insofar as it meets more general transport policy objectives?
- Does it have a good chance of being implemented in that it faces few barriers to realisation?

At the level of *project* assessment it is possible to consider these questions in any sequence or even in parallel. Ultimately insofar as the questions are interrelated the answers given to any influence the answers to the others. For instance, if the project is 'worth the money' but does not meet policy objectives it might have to be redesigned to meet the latter which in turn might increase or decrease its chance of realisation. Alternatively a project which meets policy objectives and faces no major barriers to implementation in terms of public acceptability might not be 'worth the money', thus also not possible to finance, unless further improved in technical terms.

The planning context is far more complex in the case of corridor assessment or more generally at the level of infrastructure programme evaluation: there is a plurality of national policy contexts to consider; consequently also a plurality of actors and potential barriers; and not least several projects each of a different size and time scale of implementation. Furthermore, the long-term scale of realisation of corridor infrastructure introduces an element of uncertainty that needs to be considered. Thus, it is wiser to impose a certain order on the 'tests' to be undertaken. In strategic assessment, we would contend, it is better to first address the question of political / policy suitability prior to proceeding to examine the economic efficiency or effectiveness of the project in question or its long-term indirect impacts.

Guiding Principles

The DECODE method is based on the following principles:

- The frame of reference is the full network;
- There is no single infrastructure strategy but rather a plurality of these;
- The infrastructure strategies are defined with reference to the full network and considering the actual national policy environments and stakeholder interests;
- There is no single scenario to describe future developments in the policy field and socio-economic trends but rather a set of possible trajectories or future images which logically combine socio-economic forecasts with policy environments at the aggregate level;
- The unit of evaluation or impact assessment comprises the infrastructure strategy as presently evolving set against the scenarios for the future concerning socio-economic and policy developments.
- Impact assessment tools have to be refined in order (a) to account for the geographical scope of the network and (b) to allow for the assessment of the spatial distribution of effects.

The DECODE method combines the top-down and the bottom-up approaches. The top-down approach is used to describe potential future developments in the policy field at the interface with socio-economic trends. The bottom-up approach is used to examine each single infrastructure project that forms part of the infrastructure investment programme and, in turn, to establish infrastructure strategies.

Methodological Steps

The steps of the DECODE method are as follows:

1. The first step is to obtain (if already available) or establish (if not available) a geographical information system on the network under consideration which distinguishes actual from future technical parameters for the various links;
2. The second step is to specify the socio-economic scenarios as well as the policy options for the future and the ways in which the latter will influence developments in the transport sector (in particular cost structures, modal split etc.). Insofar as we are here dealing with accession countries, the socio-economic scenarios have to also consider the scope and pace of

integration, thus we prefer to talk of socio-economic *and* integration scenarios rather than of socio-economic scenarios alone.

3. The third step is to define the infrastructure strategies for the whole network on the basis of information on actual policy developments in various countries and barriers to implementation, i.e. factors that determine prioritisation and phasing.
4. The fourth step is to examine the consistency between infrastructure strategies and scenarios with the objective of filtering out those *(corridor) development alternatives* that appear more likely (under our present state of knowledge).
5. The fifth step is to measure the impacts on each of the selected (corridor) development alternatives. This in turn implies:

a) making traffic flow estimations and assignments for each (corridor) development alternative as most impact measurement tools in transport use traffic flows for the estimation of impacts;

b) measuring impacts paying attention to the spatial distributional effects;

c) making informed judgements on the advantages and disadvantages of each (corridor) development alternative and where possible combining impacts to arrive at an overall score.

6. The sixth step is to use the results to elaborate policy-relevant recommendations.

Top-Down Approach

The top-down approach defines the scenarios under which various infrastructure strategies are implemented. It takes into account the macro-economic scenarios and the policy scenarios. A scenario is a set of hypotheses that describes the 'image' of the transport system. The main influencing factors on the transport system are the socio-economic environment of transport, the spatial aspects of the latter and the transport policy context.

GDP emerges to be the most important socio-economic variable. Other socio-economic factors that are considered and/or forecasted in a consistent way include population, employment, foreign trade, sector development and motorisation levels.

Transport policy has both a short-term and a long-term effect on the transport supply variables like prices and costs of transport or the network development. Typically, it influences infrastructure investment plans in a direct fashion and costs and prices in an indirect way.

Socio-economic and integration scenarios

The macro-economic scenarios are developed with reference to socio-economic development and the scope and pace of integration in the context of Europeanisation. Socio-economic scenarios take into account the development of GDP along with demographic projections, motorisation rates, international trade, employment and economic sector development. These are estimated at the regional level, preferably NUTS II or equivalent. The integration scenario considers the accession process or the level of integration within and outside the EU. The latter influences economic development as well as traffic flows.

Under the DECODE method, four scenarios were identified by combining the socio-economic and integration scenarios.

	Quick integration (2005/2010)	**Slow Integration (2010/2015)**
High growth (up to 7%)	Renaissance	Dilution
Low growth (up to 2,5%)	Solidarity	Fragmentation

Renaissance scenario. This scenario is characterised by high growth and fast integration. It assumes that by 2010 most, if not all, of the new accession countries would have joined the EU and that those which do not will be well integrated in the European political and economic space. In other words, a 'virtuous circle' will develop facilitating growth and integration, both economic and political. The maximum growth rate under this scenario is seven per cent, the minimum four per cent. Countries more likely to display the maximum growth rates are Hungary and Poland, countries displaying the minimum Bulgaria and Romania.

Dilution scenario. This scenario is characterised by high growth and slow integration. Under this scenario reforms will be successful and Europe becomes a free trade zone with extended co-operation agreements driven by market rules and competition as well as globalisation with a strong influence of new information technologies and multi-nationals. The European Union as an entity with shared political and organisational structures however weakens, thus interventions for cohesion or structural changes are limited. Countries which are slower in implementing liberalisation will be slower in achieving a sustained growth rate.

Solidarity scenario. This scenario is characterised by low growth albeit fast integration. The accession process is slower, yet it definitely goes ahead despite comparatively low economic growth rates in both Western and Eastern Europe; in other words integration is driven by foreign policy and security considerations which at the same time point to the strengthening of the political dimension of the European Union. Structural and cohesion funds become the main vehicle for integration – the volume of financial aid is similar to that transferred to former European peripheral countries or less developed regions. Sectoral policies, including transport, become increasingly subjected to regional development considerations.

Fragmentation scenario. This scenario is characterised by low growth and slow or no integration. It assumes likewise a long transition process but also limited support for the accession countries. This also means that Europe loses some of its substance for actual EU Member States. Individual countries will tend to orient themselves towards regional markets. Regions neighbouring the European Union will have the most to gain. Economic reforms continue to be implemented albeit at a slower rate, convergence is realised only in the long run.

Policy scenarios

The DECODE method uses four 'ideal type' policy scenarios to describe national transport policies and the CTP:

Market approach with infrastructure investment. This scenario is characterised by an emphasis on liberalisation and deregulation and on increasing cross-border or international traffic. It also places an emphasis on infrastructure development. As the free market principles are favoured, road pricing for external costs and restricting road traffic are given a lower emphasis. This scenario assumes that the market will decide the kind of projects to be funded, whereby road takes priority.

Management approach with infrastructure investment. This scenario lays emphasis on the management of supply and demand hence on regulation or management rather than deregulation, which is in fact what distinguishes this scenario from the previous one. Other goals are the promotion of intermodality and interoperability and the structural goals of increasing accessibility and promoting regional development. Infrastructure development is still considered a means to achieve these goals. Rail projects or a network approach are more likely to be prioritised under this scenario.

Market approach with an emphasis on decoupling. This scenario shares a number of features with the first one above with a greater emphasis on deregulation. It however does not place such a strong emphasis on infrastructure development and considers this also as being guided by the market. Instead it is in favour of measures promoting interoperability.

Management approach with emphasis on decoupling. In this scenario emphasis is placed on decoupling with the specific objective of promoting environmental sustainability, hence the strategic importance assigned to the application of environmental regulation and the restriction of local traffic. Overcoming structural deficiencies, hence promoting regional development, is still thought of as important, however not at the expense of environmental damage, hence also the absence of increasing accessibility as a significant goal.

Bottom – Up Approach

When establishing infrastructure strategies at the network level it is important to remember that even if the network transcends national boundaries, national interests continue to play a dominant role.

The DECODE method for establishing infrastructure strategies takes this into account. Infrastructure strategies at the network level are established in three consecutive steps:

1. Suitability: The various projects under consideration in each country are first examined for their degree of policy performance or ‘suitability’: how

congruent are they with national policy strategy and the national transport policy goals?

2. Adaptability: The second step is to establish again for each project under consideration in each country the degree of its 'adaptability'; this is defined by the likelihood of its implementation, in turn a function of the barriers it is likely to face.
3. The third step is to combine information on policy performance and adaptability to identify priority projects in each country and thereafter at the network level.

Suitability

The objective of the suitability test is to examine the extent to which a certain project or programme is in line with the national policy objectives in the field of transport *from the point of view of the policy-owner*.

The single and/or homogeneous policy-owner in any decision context is, of course, an abstract and analytical construction. For the purpose of the suitability test in DECODE, the policy-owner is defined as that set of actors which influences significantly the agenda setting in national transport policy, the point of reference being policy documents or key discourse texts.

The suitability test employed in DECODE follows the principles of the TENASSESS PAM. Each project is assessed against a comprehensive list of policy objectives which have been previously weighted to reflect the importance attached to each by the national policy-owner.

The question to answer for each specific project is: Can the project as currently proposed (i.e. considering its technical specifications) and from the view of the policy-owner be thought to contribute to the fulfilment of policy goal X? If yes, the project is given an unweighted score of +5; if the answer is no the project is given an unweighted score of –5. If the policy objective X is not relevant for the project in question, the latter is given a score 0.

The scores are multiplied by the weight for each policy area to provide the score on that policy area. The total project score calculated by adding the individual weighted scores per policy objective and dividing by the sum of the weights represents how 'suitable' each major project along a corridor is with reference to the national transport policy.

Adaptability

The still dominant paradigm in policy analysis – at least with reference to transport evaluation – relies on the technocratic utilitarian view which assumes that it is possible, through the use of the right tools, to measure needs, benefits and costs which, in turn, can provide the basis for achieving an optimal solution. Sociology nevertheless teaches us that it is as important to understand the discourses within which problems are defined and debated and, ultimately, constructed. In other words, if we work on the assumption of communicative rationality rather than rational choice, then we must recognise that the decision process is open with a number of actors having stakes and each with their own discourses.

The adaptability test builds on the logic underlying the TENASSESS Barrier Model, in turn an application of the decision-tree approach in systems analysis.

The objective of the adaptability test in the DECODE method is to identify barriers to the implementation of transport projects, thus to establish the degree of 'adaptability' of any particular project with regards outside pressures. Earlier research has shown that there is a small set of such barriers in the practice of the implementation of transport policy: there are barriers relating to socio-economic assessment; environmental assessment; the division of competencies with particular reference to regional responsibilities; technical standard harmonisation and financial acceptability.

Analytically, the application of the adaptability test involves first, charting all the projects according to their phase of implementation (conceptual, planning, decision, implementation); and second identifying for each major project whether any of the afore-mentioned types of barriers are being faced or are likely to occur in the near future.

Prioritisation of projects

High suitability scores indicate congruence with national transport policy objectives. High adaptability scores indicate many barriers to implementation.

- Projects with a high suitability score and a low adaptability score are likely to be implemented without major delay and with no change in their design.
- Projects with *high* suitability and adaptability scores are most likely to require a re-design, thus a delay in their implementation is very likely. Such projects, experience shows, are often 'key' projects in the sense that whether and how they are realised influences the network and the transport

system more generally. Their 'key' character in part explains the many barriers or conflicts they face, i.e. their high adaptability scores.

- Projects with *low* suitability and adaptability scores are difficult to judge regarding their chance or not of realisation. Given their 'low' national profile their low adaptability might simply indicate little national interest in them. Such projects often get funded in situations where other key projects as described above do not get through.
- Projects with low suitability and high adaptability scores are the least likely to be implemented.

The aggregation of this information at the corridor level throws light on cross-border conditions and the consistency as such of the corridor programmes across different countries. For instance, if a corridor is planned as a multi-modal long-distance link, yet some countries favour road whilst others favour rail, then in an environment of financial insecurity this constitutes what we would call a negative boundary condition which can determine not only whether the 'corridor' as such materialises but also the medium- and long-term effects of network development.

Mapping all priority projects helps furthermore establish infrastructure strategies at the network level. The DECODE method uses five such strategies:

- All road projects
- All rail projects
- Priority road projects
- Network - Priority road, rail and waterway projects
- Do-nothing

(Corridor) Development Alternatives

The aim of the DECODE method is to identify and subsequently put to the test 'images' of the future which combine information on infrastructure strategies and scenarios. These 'images' we call (corridor) development alternatives.

The specification of infrastructure strategies as outlined in the previous section is an example of a micro-level of analysis or bottom-up approach. The specification of scenarios, on the other hand, follows a top-down approach. The interface between the two delineates the (corridor) development alternatives.

In theory it is possible to envisage all external scenarios under all possible policy scenarios and in turn for all infrastructure strategies. The number of possible

permutations depends on the number of infrastructure strategies defined. Assuming that there are six infrastructure strategies, the number of possible permutations is

5 (infrastructure strategies) X 4 (external scenarios) X 4 (policy scenarios) = 80

Insofar as external developments are not independent from policy developments and also not from infrastructure strategies, it is possible to reduce the number of possible permutations down to a smaller number of more realistic options.

There is inevitably simplification involved in this approach which begins already with the definition of scenarios as categories or 'ideal types' rather than as continua. However this simplification is necessary to keep analytical categories separate.

Once the number of (corridor) development alternatives has been reduced to a reasonable size, it is possible to proceed with impact assessment.

Impact Assessment

Impact assessment is the evaluation of whether and to what extent a programme/ plan / policy causes changes (in the desired direction) among a target population.

Any impact assessment exercise needs to establish:

- a typology of outcomes or net effects, corresponding to the objectives;
- a typology of criteria, each corresponding to one type of outcome or net effect;
- a typology of 'target population' or of 'social groups' on which impacts ought to be studied.

There are various strategies for impact assessment. The most frequently used are: design strategies for isolating effects of extraneous factors for partial coverage programmes in the form of randomised experiments or quasi experiments; design strategies for full-coverage programmes in the form of simple before and after studies, cross-sectional or panel studies and time-series analyses; judgemental approaches; and pooling evaluations in the form of meta-analysis. In transport the strategy most favoured is meta-analysis with elements of time-series.

Traffic flows

With reference to the assessment of the impacts of infrastructure programmes, the first step is to make traffic flow estimations and assignments for each (corridor) development alternative.

Traffic flow estimations derive from observations on the actual relation between transport demand and supply and assumption as to future developments. In the tool currently in use in DECODE the following variables are used for making traffic estimations.

- Population, GDP and employment actual and forecasted under the four different socio-economic scenarios.
- Growth rates of foreign trade under the four socio-economic scenarios.
- Transport costs such as taxes and fees for each of the four policy scenarios.

Traffic assignments abide to the network constraints as defined by the infrastructure strategies under consideration.

Typology of impacts

What impacts are to be estimated depends on the geographical level of coverage and objective of the analysis. The DECODE method does not categorically specify the impacts that should be calculated, but has impact assessment as an integral part of the methodology for strategic policy assessment.

For the purpose of strategic assessment, indirect long-term effects are of particular relevance. In other words, strategic assessment prioritises the measurement of strategic environmental and accessibility impacts next to direct impacts.

Table 1 displays the performance indicators used for the impacts under consideration in DECODE.

Table 1. Performance Indicators for Strategic Transport Assessment

Category	Impacts	Indicator(s)	Spatial Disagg[n]
Direct	Investment Cost	Total investment cost of do-something CDA relative to the do-nothing scenario, *millions of euro, 1995 prices and values*	Country
	VOC Savings	Change in total resource VOCs on the network, for freight, in the CDA relative to the do-nothing scenario – considers time savings for freight only *millions of euro, 1995 prices and values*	EU, CEEC I/II/III
	Safety	Change in fatalities on the network in the CDA relative to the do-nothing scenario, *fatalities per annum*	Country
Environmental	Noise	Change in a single proxy score for total noise, across exposed areas, across modes, *km^2 under 55dB(A)*	Country
	Local Air Pollution	Change in area influenced by high CO concentration, *Km^2 under 8 mg/m^3 (8 hour average)*	Country
	Regional Air Pollution	Change in NO_x emitted, unweighted, *tonnes per annum*	Country
	Global Air Pollution	Change in CO_2 emitted, unweighted, *tonnes per annum*	Country
Indirect	Land Take	Financial cost of land take should be included in Investment Costs. Additional external social cost over and above noise and air pollution (ie. severance; visual intrusion; etc) proxied very roughly by Land Take. *Km^2*	Country
	Accessibility (Economic)	Change in GDP within 4hrs travel time; *%*	Country
	Accessibility (Demographic)	Change in population within 4hrs travel time, *%*	Country

Aggregation of impacts

Impacts can be aggregated at the European level, corridor level, corridor development alternative level or at the national level. The most common methodologies for combining impacts are:

- **Cost-benefit analyses** display the relationship between project costs and outcomes, with both costs and outcomes expressed in a common numeraire, typically in monetary terms, as value is defined in relation to the 'willingness to pay'. CBA makes use of shadow prices to estimate the value of resources or outcomes for individual and, subsequently, social welfare. The assumptions underlying the estimation of shadow prices are at the heart of cost-benefit analysis. Weights are primarily used to correct for non-optimal distributions; policy weights are used (albeit less frequently) for assessing the differential importance attached to objectives or for determining whether and how to add impact scores. The method of valuation of non-market items, like environmental resources, is one major area of debate among CBA experts.
- **Cost-effectiveness analyses** are often used to provide input to cost-benefit analysis when it is not possible to obtain any indicator of how individuals valuate a specific outcome. Cost-effectiveness analysis allows an appreciation of the very aggregate impact of a particular project or programme by considering what would happen, in probabilistic terms, if an alternative or no course of action were to be adopted.
- **Multi-criteria analyses.** Like cost-benefit analysis, multi-criteria analysis starts from the premise that there are both positive and negative impacts. Unlike cost-benefit analysis, multi-criteria analysis does not assign a common unit of measurement to all impact types as it considers social welfare to be more than the sum of individual welfares and value, more generally, to comprise more than the 'willingness to pay'. Most multi-criteria analyses methodologies recognise the importance of CBA but consider it as more applicable to commercial appraisal / business appraisals. MCA makes little use of weights derived from survey data on consumers' 'willingness to pay', market data on consumer behaviour or income distribution data. The weights used in MCA are established using a judgemental approach on the basis of time series observations or the pooling of evaluations.
- The DECODE method at its present level of development uses two methods for the purpose of aggregation of impacts: first, the EUNET method which combines cost-benefit and multi-criteria analysis and second, the TENASSESS PAM method which applies the goal achievement matrix.

CBA/MCA EUNET Method

The comparative assessment of the (corridor) development plans using the traditional CBA and MCA approach is carried out in the following manner:

Step 1: The impacts of the various corridor development alternatives are calculated. Where possible they are monetised and included within a cost-benefit analysis. This is not always possible because some impacts are heterogeneous and do not lend themselves to monetary valuation (eg. environmental effects of land take) and other impacts are not monetised as a matter of convention (eg. accessibility, which would risk serious double-counting with time savings). Therefore some impacts are measured in quantitative terms but not monetised. Monetised and non-monetised impacts are then brought together within an overall assessment framework. The results at this stage are presented as disaggregate descriptive analysis.

Step 2: The various indicators are brought together in an overall assessment, both in absolute terms and relative to the do-nothing scenario. The results at this stage are presented as an aggregate analysis with socio-economic weights.

Step 3: This assessment is presented at different levels of spatial aggregation insofar as this is allowed by the impact type – total Europe; East and west Europe separately; impact by country.

Step 4: The (corridor) development alternatives are ranked based on the assessment results.

Step 5: The implications of alternative approaches to developing the TENs including infrastructure and pricing policy combinations are assessed.

Step 6: The sensitivity of the ranking and robustness of particular policies to changes in external forces including European economic growth rates and differing speeds of integration between the EU and the CEEC is tested.

Goal achievement matrix TENASSESS PAM method

In the context of impact assessment / aggregation the goal achievement matrix represents a form of multi-criteria analysis where impact types are closely related to policy objectives and where weights are constructed as policy weights to reflect the policy owner's valuation of outcomes. The TENASSESS PAM allows the carrying out of a sensitivity analysis to examine how the overall score of a programme changes if alternative views to those of the dominant policy-owner are adopted.

Policy Recommendations

The output of the DECODE method for strategic assessment – in this case with reference to corridor development plans – can be used in the following ways:

a) To select one (corridor) development alternative – either the one with the highest overall score or the one with the highest positive scores on dimensions of particular relevance. In this case what the strategic assessment can provide in addition is an indication of the risk factors or alternatively of the external conditions that would have to be met for any particular (corridor) development alternative to display these positive impacts;

b) To select those projects that are the most robust across (corridor) development alternatives in terms of positive impacts and submit these to more detailed project appraisal;

c) To map detailed infrastructure strategy plans at national level (for instance for accession countries) that are consistent with European developments;

d) To use the results of the spatial distribution of impacts to guide rules of financing or the sharing of costs.

Research Recommendations

The DECODE method is a strategic policy assessment tool. It is scenario-led and uses systems analysis to combine information on socio-economic developments, policy developments and infrastructure strategies to formulate various strategies for corridor policy programmes.

The estimation of impacts is an integral part of the DECODE method. However, the choice of tools used for traffic assignment, impact assessment and combination of impacts are independent of the DECODE method.

This is one area which would specially benefit from further research – to develop dynamic tools for impact assessment, in particular for the measurement of network effects and with better methods for dealing with missing or incomplete data sets.

To this end it is also necessary to create a transport information system, regularly updated, to cover the extended European space, i.e. both actual and would-be members of the EU as well as neighbouring countries.

Finally, another area deserving further research concerns the valuation of outcomes and resources particularly in the context of sustainable development and sustainable mobility.