THE BARTLETT SCHOOL OF PLANNING

Incorporating Principles of Sustainable Development within the Design and Delivery of Major Projects: An international study with particular reference to Mega Urban Transport Projects for the Institution of Civil Engineers and the Actuarial Profession

Working Paper 7

The Perspective of the City Planner

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1 Introduction

There is widespread concern as to the sustainability of the transport sector and infrastructure globally and nationally. The Centre for Sustainable Transportation at the University of Winnipeg defines a sustainable transport system as... “A sustainable transportation system is one that:

- Allows the basic access needs of individuals and societies to be met safely and in a manner consistent with human and ecosystem health, and with equity within and between generations.
- Is affordable, operates efficiently, offers choice of transport mode, and supports a vibrant economy.
- Limits emissions and waste within the planet's ability to absorb them, minimizes consumption of non-renewable resources, limits consumption of renewable resources to the sustainable yield level, reuses and recycles its components, and minimizes the use of land and the production of noise.”

The International Transport Forum's research findings report 'Transport and Energy: The Challenge of Climate Change' informs us of the following statistics:

- Transport is responsible for 13% of all anthropogenic emissions of greenhouse gases and 23% of world CO2 emissions from fossil fuel combustion. These emissions are set to double over the next 40 years.
- Cars account for half of transport CO2 emissions and ownership worldwide is expected to triple between 2000 and 2050.
- Air passenger traffic is expected to be 2.5 times higher in 2025 than in 2005 — air cargo traffic, three times higher.
- Shipping volumes doubled from 1985 to 2007 and the container sector is expected to triple from 2000 to 2020.
- Road transport accounts for the largest part of CO2 emissions from the transport sector and will remain the case in the coming decades despite more rapid growth in shipping and aviation.

Further problems include the environmental impacts of traffic congestion and further road building in an attempt to alleviate the problem; consumption of non-renewable resources (e.g. oil); noise; fragmented, inefficient and expensive public transport.

The use of recognised assessment techniques for project proposals has become mandatory as part of the selection and justification process for major transport infrastructure projects funded by the international financial institutions such as the World Bank, the International Finance Corporation, the African, Asian and Inter- American Development Banks as well as regional and national governments. However, while financial and economic issues relating to resource allocation for projects, development programmes and policies are all important, government policy makers and development banks and institutions are increasingly concerned with other issues – including the environmental, social, gender, health, poverty and welfare impacts of projects.

The origins of appraisal techniques lie in recognition that environmental damage often occurs as 'the largely unintended result of a range of interacting trends, situations, perceptions and motivations' (Ekins 2001). Thus attention has turned to sectors such as agriculture, energy and

transport whose activities have profound implications for the environment. In July 2004, EC Directive 2001/42/EC 'on the assessment of the effects of certain plans and programmes on the environment' came into force in the UK. Commonly known as the SEA directive, it applies to a wide range of plans and programmes (not projects), including "transport, regional development, town and country planning or land use" (Article 4, Para 2). The SEA directive is thus relevant to all type of spatial plan, including local plans, UDPs, structure plans, regional planning guidance and regional spatial strategies.

In its 2004 Future of Transport White Paper, the UK Department for Transport identified the need, in the context of more sustainable development, to "ensure that the wider impacts of future developments are reflected in appropriate appraisal methodologies" (DfT, 2004, p14).This heralded the need for recognition of more integrated understanding of impacts beyond the established economic and environmental indicators delivered.

Research undertaken by University of Leeds Institute for Transport Studies in 2005 concluded that whilst a mass of indicators relevant to sustainability existed, emphasis was needed to be given to operationalising a subsection of these indicators in a decision-making framework if sustainability concerns were going to form part of the planning rather than the mitigation process of major transport infrastructure. (Marsden et al., 2005).

Appraisal and evaluation represents a process of verification of the extent to which policy goals are met, as well as a procedure for improving the accountability of public institutions. In the field of transport, evaluation is not new, yet it is not as entrenched at the level of policy as in the fields of health, education or housing. Indeed, the term policy, as a research field in its own right, is new in transport, where 'planning' and 'assessment' have been dominant with infrastructure investment – and hence also project appraisals – delineating the main reference framework.

The objective of this paper has been to draw out the context, theory and methods for embedding social and environmental sustainability in transport policy and project appraisal.

2 Appraisal context

The political nature of appraisal is closely connected to the way it is situated in the decision-making context. An understanding and knowledge of the decision-making context is important in order to avoid the abuse of one as an appraisor, or of the appraisal results.

1. The European decision-making context is a particularly complex one. The term currently in use for describing this is multi-level governance.
2. The goal of achieving conditions of 'fair competition' is at the core of the harmonisation attempts in various policy sectors. These, in turn, have resulted in the emergence of supranational decision structures and to an impressive activity of the Union in the regulatory field.
3. Across all modes, the harmonisation of legislation is however not equivalent to implementation. Indeed the implementation deficit, the spatial distribution of which is not standard, represents a major constraining factor when establishing the 'background' conditions for evaluation.
4. In the field of infrastructure planning, the European Union has a major role to play, however its influence is constrained by the principle of subsidiarity.
5. Multi-level governance is also characterised by a more active involvement of economic interest groups, professional associations as well as of social movements, like environmental groups, in the decision-making process.

Generic frameworks of evaluation include those developed by international organisations like the World Bank, those elaborated by the Commission in the framework of the Sound and Efficient Management Initiative, SEM 2000, and those developed by national administrations, like the U.S. and the U.K. These generic frameworks come usually in the form of guidelines and consider evaluation principles and design.

With regard to transport specifically, at the national level there exist frameworks of evaluation for infrastructure assessment at programme and project level. These are used mostly for ex-ante evaluation, and for the prioritising and phasing of projects. There exist few transport evaluation frameworks at national level that consider policy explicitly. There are emerging European frameworks of evaluation for transport, whereby the work carried out in the 4th Framework programme or with reference to the TEN could be seen as providing input to the development of such a framework.

McGowan, F (2000) examines the main aspects of the EU policy making process, particularly as it affects the areas of energy and transport policy. In outlining the historical development of the Union and of its institutions, the author notes that the tension between intergovernmentalism and supranationalism, and in this connection, between the European and the national levels of decision-making, are reflected in the original structure of the Union. The EU displays a number of distinctive features which make it not easily classifiable as either a nation-state or an international organisation. The author identifies three such features: first, that the EU is a polity, but an incomplete one; second, that it has a propensity towards regulation, and third that it is based on multi-level policy-making.

In order to understand whether there has been a convergence in policies, including in the transport and energy fields, it is necessary to understand the institutional interactions. This

applies both to interaction between European institutions (in particular between the Commission, Council, Parliament and Court of Justice) and interactions within these institutions. Other relevant EU institutional characteristics are: the character of lobbying at European level with multiple paths of interest representation; multi-level governance and subsidiarity, i.e. the complex interface between European, national, regional and local levels of government, partly lacking an explicit or agreed upon 'division of labour' or modes of co-ordination; and the Europeanisation of policy and implementation gaps.

Pedret Cusco, V (2003) looked at recent developments in the common transport policy and the challenges of meeting the Kyoto targets as well as the increase in traffic expected with the enlargement of the EU; relevant measures that will form part of the Community Transport Policy. Emphasis will be placed on the better use of capacity, mainly on rail, inland waterways and short sea shipping; intermodality; interoperability; network interconnectivity, and bottlenecks. Other priorities of the Common Transport Policy are the better integration of environmental aspects in infrastructure planning; internal and external cost coverage; and the integration of transport policy concerns in other policies.

Parsons, W (2001) examines the varieties of frames used in policy evaluation, shows how these embody different 'assumptive worlds' and examines the implications of the latter for theory and practice of evaluation. It distinguishes at least eight analytical frameworks for evaluation: neo-classical economics, experimentalism, managerialism, public choice, pragmatism, interpretivism, evaluation through the price system, and critical realism. These frameworks apply equally to policy analysis or analysis for policy as they do to evaluation.

Each of these frameworks entail different assumptions about:
- epistemology and methodology;
- the complexity of the problems addressed;
- institutional settings or more generally the decision context; and
- social justice.

The paper also looks at the question of integration in evaluation. The author argues that this can be done through a multi-methodological strategy which distinguishes between first and second order evaluation. First order evaluation moves from programme verification to situational validation. Second order evaluation moves from systems discourse to the ideological discourse and focuses on the macro level using hermeneutic-interpretivist approaches. Better integration can be achieved through more frequent and better use of scenarios in evaluation.

Haight, F (2001) looks at the development of project evaluation and uses examples from traffic safety which reflect the classification and vocabulary used by the United States Department of Transportation. More specifically it looks at the issues important for project evaluation, the principles of evaluation and the types of evaluation. With respect to project evaluation, the paper addresses firstly, the issue of the need to be clear about the parameters of the problem to be evaluated, and secondly, the need to be aware that not all problems deserve evaluation.

The principles of evaluation outlined in the paper are that: the evaluation plan must be specified in advance; the evaluator should be unbiased; and that statistical tools need to be used carefully and wisely, recognising that human judgement is part of the process. With

respect to the types of evaluation, the paper distinguishes between evaluation with reference to the project timing (planning, implementation and evaluation) and with reference to the methods used (quantitative or qualitative).

Beuthe, M (2002) reviews the problems faced by evaluation/assessment with reference to cost-benefit analysis (CBA), multi-criteria and framework analyses (MCA). For CBA the problem lies in the understanding and definition of market values, their measurement in situation of non-competition and non-perfect competition, the valuing of impacts which do not have a market, the choice of the discount rate, national differentiation, income distribution and risk assessment.

For the application of MCA approaches to decision making, Belton, V., Steward, T. (2002) suggest the consideration of three distinct phases: problem structuring, model building and use of the model for informing and challenging thinking.

- The problem structuring phase is used to define the terms under which a decision making problem is considered, stakeholders to be included into the decision making process, the collection of information regarding the criteria for decision making to be considered. A combination of deliberative techniques can be used for the active involvement of relevant actors.
- The model building phase is dedicated at the definition of criteria and of the relative importance or value attributed to each of the criteria by different stakeholders.
- The application of the model using weights to determine the value of each criterion within the framework or model and scores to determine the performance of each alternative with regards to each criterion may bring directly to a decision or result in feedbacks to the previous phases to revise the definition of the problem, the choice of criteria etc.

MCA is both a framework for a decision analysis, consisting of steps and procedures for a conceptualisation of a problem involving multiple objectives and criteria, and a set of techniques aiming at elicitation, introspection and aggregation of decision preferences. Consequently, MCA represents added value to both:

- the decision process, by helping the decision-maker know more about the decision problem and explore the alternatives available; and
- the decision outcome, by helping elicit value judgements about trade-offs between conflicting objectives).

MCA is therefore useful for classification, determining priorities or selecting between alternatives. The use of MCA tools is particularly interesting for the direct participation of stakeholders, as it allows for visualizing different perceptions of the relative importance of the criteria by different groups, highlighting how results can change if different stakeholders' interests and perceptions are taken into account. MCA techniques thus provide a platform for consensus reaching.

Moreover, MCA techniques not only help find a solution to a multicriteria problem, but also to give the decision-maker an opportunity to learn about his/her own preferences and those of the involved stakeholders.

Hence, the Multicriteria approach is generally acknowledged to be a very suitable instrument not only to assess sustainability, but also to carry out the decision process in a 'sustainable sound' way. Indeed it allows the direct participation of stakeholders in the evaluation of alternatives, and the identification and discussion of trade-offs and conflicts of interests in order to build consensus. Given the high flexibility of the tool, its application is possible at both the planning and the project levels.

Problems with MCA include double counting effects due to inclusion of qualitative or political criteria; the shift from differential to unitary scale of measurement and its inability to assess the projects' worth from the budgetary perspective. The author argues that it is necessary to consider the application of evaluation methods in the context of a larger decision framework.

Rennings, K (2002) reviews the ecological criteria for appraising sustainable transport as set out by the OECD, defines the principles for the sustainable evolution of transport systems and the application of the sustainability criteria in cost-benefit analysis. The author defines the environmentally sustainable transport as representing a process, or a path to be followed. Sustainability is not a fixed ideal, but an evolutionary process of improving the management of systems, through improved understanding and knowledge. The process is non-deterministic with the end point not known in advance. Nine sustainable transportation principles – the so called Vancouver principles – are developed based on human perspectives: access, equity, individual and community responsibility, health and safety, education and public participation, integrated planning, land and resource use, pollution prevention, economic well-being.

For integrating sustainability aspects a modern concept of cost-benefit analysis has been introduced in the Second Assessment Report of the Intergovernmental Panel on Climate Change. CBA provides an analytical framework that seeks to compare the consequences of alternative policy actions on a quantitative rather than a qualitative basis. The internal and most of external costs and benefits can be analysed by using the traditional CBA which requires that all costs and benefits are expressed in a common monetary unit. If the external cost can be calculated and internalised by using the damage cost approach in an appropriated way resulting in secured values no sustainability criteria will be applied.

The main purpose of economic analysis for the World Bank is 'to help design and select projects that contribute to the welfare of a country'. This paper outlines the evaluation framework used by the World Bank for appraising projects, more specifically transport projects. It specifies how economic analysis is much broader than traditional cost/benefit analysis. The ten questions that an economic analysis in the World Bank looks at are:

- What is the objective of the project;
- What will happen if the project is implemented;
- Is the project the best alternative;
- Are there any separable components and how good are they separately;
- Who are the winners and losers;
- Is the project financially sustainable;
- What is the project's fiscal impact;
- What is the project's environmental impacts;
- Is the project worthwhile;
- Is it a risky project?

Much emphasis is placed on the institutional and regulatory environment into which the bank is lending. Project lending which contributes to improvement of that environment is thus of particular interest. Judging the extent to which that is being achieved depends on some of the high level priorities which the Board of the Bank have adopted. These include the avoidance of environmentally damaging investments, the widespread distribution of the benefits of projects throughout the national recipient community and the avoidance of uncompensated losses by virtue of spatial or occupational displacement resulting from a project. Strict standards are applied both to the environmental design of projects, which have to have formal environmental clearance before they are submitted for Board approval, and to the resettlement and involuntary employment severance. The requirement to attend to distributional aspects is increasing as the Bank concentrates further on its poverty reduction objective.

All of that contributes to a broadening of the format of project appraisal, and in a sense to attenuate the more conventional use of any strict ranking procedures based on traditional cost / benefit ratios. But in a different sense conventional economic evaluation has remained central to the appraisal process as there remains an extremely strong instinct to avoid “white elephants”, particularly those emanating from political glory seeking. The process through which that is pursued is essentially one of progressive refinement of the understanding of national priorities.

Nellthorp, J (2006) gives an overview of the current appraisal methods in the accession countries and the EU15. It highlights the way methods are adapted to address policy concerns other than the narrow economic efficiency of the transport system but also aims to draw out some difficulties with current approaches. It considers the treatment of environmental impacts, effects on economic development, employment and land use, and effects on accessibility, social cohesion and regional policy. In order to help prioritise the various individual projects, and to make the case for funding by the EU and by the international financial institutions, a common methodology for project appraisal has been introduced. In brief, the main outputs are: cost-benefit analysis - covering effects on transport system efficiency and safety; environmental impacts; policy impacts beyond the transport system; and financial implications for transport providers. The focus of the appraisal is directly related to the main policy concern of the funding bodies - i.e. obtaining the best value for money in socio economic terms for the countries concerned.

3 Basis of Appraisal Techniques

The UK Department for Communities and Local Government commissioned research into the performance of the planning aspects of the SEA directive in 2008. The research challenges included considering meeting the twin objectives of compliance with the SEA Directive and maintaining a proportionate response and any implications on the content of the CLG/PAS Plan Making Manual module on sustainability appraisal and to any programmes of capacity building PAS and other organisations might be undertaking.

The translation of the EU Strategic Environmental Assessment (SEA) Directive into English Spatial Planning has been achieved by means of the requirement for RSS's and DPD's to be subject to Sustainability Appraisal. The SA process has been charged with placing a disproportionate emphasis on environmental impacts and a correspondingly limited focus on socio-economic impacts. This is at odds with contemporary views of sustainability needing to be considered more holistically in terms of "triple bottom-line" i.e., sustainability needs to be seen in terms of economic, environmental and social impacts.

Development does not take place in a vacuum. There is always a surrounding social, environmental and economic context in which development and design takes place. Balancing these dynamics and appreciating their unique interactions can help us design sustainable environments and places that are borne out of specific local conditions rather than remote universal ones. By narrowing our focus to considering the potential environmental issues alone, without recourse to how they interact, we are only telling part of the story and, therefore, can only mitigate part of the risk.

In regeneration, sustainability has often been talked about simply in terms of whether a project can be sustained once regeneration funding stops but sustainability has a wider meaning and, under this heading, appraisal should include an assessment of a project's environmental, social and economic impact, its positive and negative effects.

While appraisal will focus detailed attention on each of these areas, none of them can be considered in isolation. Some of them must be clearly linked – for example, a realistic assessment of outputs may be essential to a calculation of value for money. No project will score highly against all these tests and considerations. The final judgement must depend on a balanced consideration of all these important factors.

The general approach to project appraisal is set out below:

- **Scoping -** The starting point for appraisal: applicants should provide a detailed description of the project, identifying the local need it aims to meet. Appraisal helps show if the project is the right response, and highlight what the project is supposed to do and for whom.
- **Context and connections -** Appraisal should help show that a project is consistent with the objectives of the relevant funding programme and with the aims of the local partnership. Are there links between the project and other local programmes and projects – does it add something, or compete?
- **Consultation -** Local consultation may help determine priorities and secure community consent and ownership. More targeted consultation, with potential project users, may help ensure that project plans are viable. A key question in appraisal will be whether there has been appropriate consultation and how it has shaped the project

- **Options analysis -** is concerned with establishing whether there are different ways of achieving objectives. This is a particularly complex part of project appraisal, and one where guidance varies. It is vital though to review different ways of meeting local need and key objectives
- **Inputs -** It's important to ensure that all the necessary people and resources are in place to deliver the project. This may mean thinking about funding from various sources and other inputs, such as volunteer help or premises. Appraisal should include the examination of appropriately detailed budgets.
- **Outputs and outcomes -** Detailed consideration must be given in appraisal to what a project does and achieves: its outputs and more importantly its longer-term outcomes. Benefits to neighbourhoods and their residents are reflected in the improved quality of life outcomes (jobs, better housing, safety, health and so on), and appraisals consider if these are realistic. But projects also produce outputs, and we need a more realistic view of output forecasts than in the past.
- **Value for money -** This is one of the key criteria against which projects are appraised. A major concern for government, it is also important for local partnerships and it may be necessary to take local factors, which may affect costs, into account.
- **Implementation -** Appraisal will need to scrutinise the practical plans for delivering the project, asking whether staffing will be adequate, the timetable for the work is a realistic one and if the organisation delivering the project seems capable of doing so.
- **Risk and uncertainty -** need to make sure you identify risk (is there a risk and if so what is it?), estimate the scale of risk (if there is a risk, is it a big one?) and evaluate the risk (how much does the risk matter to the project.) There should also be contingency plans in place to minimise the risk of project failure or of a major gap between what's promised and what's delivered.
- **Forward strategies -** The appraisal of forward strategies can be particularly difficult, given inevitable uncertainties about how projects will develop. But is never too soon to start thinking about whether a project should have a fixed life span or, if it is to continue beyond a period of regeneration funding, what support it will need to do so. This is often thought about in terms of other funding but, with an increasing emphasis on mainstream services in neighbourhood renewal, appraisal should also consider mainstream links and implications from the first.

The government is increasingly recognising the need to recognise the Human/Social capital value of its activities and investment and the recent National Performance Indicators for Local Authorities reflect this.
http://www.communities.gov.uk/publications/localgovernment/nationalindicator

This section presents a small number of specific appraisal tools for transport infrastructure

SWOT: Example of the strategic overview of transport issues for the Republic of Ireland
SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) is particularly useful for performing a strategic analysis at the time of the conception or evaluation of a programme or policy. Its implementation involves a number of steps:

- Scanning the key issues and problems faced by a region;
- Ordering priorities;
- Identifying opportunities and threats (factors outside the project, region, etc.);

- Identifying strengths and weaknesses (factors related to the characteristics of the project, region, etc.);
- Synthesising results and analysis of the SWOT matrix;
- Formulating strategies.

In this particular example a SWOT analysis was undertaken to examine the position of the Republic of Ireland with regard to the national transport sector and in relation to the overall context in which it exists. The analysis, based on the factors summarised in the matrix presented below, comes to the conclusion that the overall position of transport for the Republic of Ireland is one of weakness and inadequacy. This analysis allows the elaboration of strategy options aimed at eliminating identified weaknesses or at compensating for them through the development of identified strengths.

Example of a SWOT analysis matrix for the transport sector (Ireland)

Strengths	**Weaknesses**
Industrial base relatively modern Tradition of open economy Educated workforce Unspoiled environment Proximity to sea	Political stability Small size, peripheral location Poor indigenous resources Quality of domestic infrastructure Unsatisfactory access to transport Limited finance Unemployment, social problems
Opportunities	**Threats**
SEM - access to mainland Role as entrepot for the USA? Suited to tourism and leisure Telecoms based services Mariculture, natural energy	Uncertainty of future EC funding Scotland and Wales, post Channel Tunnel Large industrial alliances Unstable Europe- social / economic Emigration of workforce

Scores and Weights: Example of the "Corridor Ranking Framework" (Greece, Ireland and Portugal)

This tool is often used in the ex ante appraisal of projects, using a standard set of selection and ranking criteria. It usually involves two stages:

- Screening out projects that do not satisfy the relevant criteria.
- Ranking projects that have been retained according to the criteria.

In the case of the "Corridor Ranking Framework", the relative importance of corridors depends on the specific objectives that underpin transport infrastructure interventions and that contribute to attaining the global objective of socio-economic cohesion. The ranking of corridors in this three-country evaluation was undertaken on the basis of seven criteria that were themselves ranked according to their relative importance. The criteria used were the following:

- Does the corridor provide linkages to the rest of the European Community?
- Does the corridor connect important population centres (more than 50,000 inhabitants)?
- Does the corridor provide links to external access points (i.e. airports and seaports)?
- Are traffic volumes on the corridor high and, as a result, does congestion occur regularly, etc.?
- Does the corridor complete land and / or sea routes?
- Does the corridor facilitate international traffic?
- Does the corridor integrate remote or isolated regions with development potential?

In the case of evaluation of the transport sector in Greece, corridors between economic centres were ranked according to the criteria listed above, reflecting a number of transport-related objectives (e.g. improving connections to other European countries, linking up centres of high population concentration, improving links to ports, etc.) The method of scoring allows the relevance of the project to be taken into account by indicating whether the criteria apply to the project fully, partially or not at all. The criteria are also ranked according to their overall importance. This information is presented in the form of a matrix, an extract of which is given below:

It is important to note that the example above is only one way of ranking projects. Another set of criteria would reflect another set of objectives or a different type of intervention (e.g. total project cost, financial return, socio-economic value, relationship to objectives, leverage effects, timing considerations, local geo-political factors, environmental safety and other related objectives, network effects, etc.).

Case Studies: Example of transport sector projects (Ireland)

Case Studies were employed in Ireland to obtain both quantitative and qualitative data on the economic impacts of a number of specific transport projects. Surveys of users (local companies, road hauliers) and Cost-Benefit Analysis were used to inform the Case Studies. Whilst the Case Studies selected (a by-pass, a motorway, regional airport development and a seaport) provided some information to complement macro-level data resulting mainly from secondary sources, their contribution to the evaluation could be considered as less than satisfactory for a number of reasons: the benefits arising from the projects were considered individually and therefore could not be fully appreciated because the projects form an integral component of a system; and, secondly, competing factors overwhelmed the specific effects arising from the individual projects.

Although Case Studies in this example provide useful illustrations of interventions and their effects, their contribution to the evaluation could have been increased if a number of methodological considerations had been taken into account. Firstly, the selection procedure for cases should be transparent and the importance of the case in relation to overall policy objectives needs to be clarified. Secondly, as part of a transnational evaluation, the selection of cases should allow for the greatest possible degree of comparison across countries and regions to be undertaken. Finally, the measuring of impacts at the project level neglects the synergies and externalities generated by an intervention. In order to take these factors into account, a Case Study should focus on a number of key projects within a circumscribed geographical area.

DELPHI: An example of forecasting the development of transport telematics technologies

The advantages of telematics in the domain of transport is that they provide a way of optimising the use of existing networks through better traffic management and information. They therefore represent a partial alternative to road infrastructure investment. In this particular example, the DELPHI technique was used to forecast the likely level of use of a selection of transport telematics technologies in the year 2015 in medium-sized European cities. The DELPHI technique allows experts to collectively perform quantitative estimations of potential impacts of interventions.

The study itself involved a total of 224 experts in Advanced Transport Telematics technology (ATT) from the vast majority of Member States. It focused on 18 different ATT technologies and their possible adoption over the period up to 2015. By participating in a consultation process, this technique allowed the experts to provide information on the technologies they thought were likely to be adopted, the factors that might lie behind their adoption, and those that might restrict or retard this process.

A technique related to DELPHI, the Matrix of Cross Impacts (SMIC), was used in parallel with the study outlined above. This technique, unlike DELPHI, allows interactions among events to be considered by refining the probabilities relating to the occurrence of individual future developments. The resulting probabilities can be used directly in the planning process or as the basis for developing scenarios that can subsequently be used for planning.

Project Specific Financial and Economic Appraisal (Asian Development Bank (ADB) Appraisal of Central Asian Transport Projects)

ADB project appraisal approaches fall into two broad categories:

1. **Non-traded transport services such as highways projects (excluding toll roads), for which no direct tariff is charged.** Appraisals are not normally undertaken since there are costs but no direct revenues.

2. **Traded transport services such as rail, bus, air, or toll road services for which a direct tariff is charged.** In this case appraisal is normally undertaken assessing the impact of costs and revenues from tariffs on the implementing agency.

The example here is concerned with the approach to the former since in the evaluation of non-tradeable services projects such as a highway it is often more difficult to ensure whether the project is financially sustainable or not, and that there are sufficient economic benefits to justify the investment. Also, particular emphasis is increasingly given to the economic benefits of highway projects derived by the poor or otherwise socially excluded.

Considerable research into the economic benefits of roads projects has been undertaken for the international funding institutions. A good example of recent development of the approach is the recent paper Poverty Reduction and Road Projects: A Prospective Estimation Method, prepared for the Louis Berger Group Inc and the Asian Development Bank, building on actual project experience in Tajikistan, Kyrgyzstan and India. The paper presents an approach for estimating the potential poverty reduction benefits achieved by the rehabilitation of trunk and secondary roads. The approach has been applied to roads projects in a number of developing and transitional economies, including three recent ADB projects: Tajikistan Road Rehabilitation Project (October 2000); Kyrgyzstan Third Road Rehabilitation Project Feasibility Study (August 2001); and the Madhya Pradesh State Roads Sector Development Program (May 2002).

The approach focuses on the requirements of the ADB's Guidelines for the Economic Analysis of Projects. It also forms part of the infrastructure poverty impact analysis (PIA) which focuses on distributional and structural impacts on the poor. It relies on outputs from traditional project feasibility studies and on results from tailored small sample surveys of road users. The approach can be enhanced by Participatory Rapid Appraisals (PRAs). The approach relies on basic economic principles. A distributional analysis is carried out to show how benefits are typically distributed among (i) freight transport users, (ii) passenger transport users, (iii) vehicle owners (iv) the labour force, and (v) Government. Costs are assessed based on the net capital and maintenance costs. Economic benefits comprise road user cost (RUC) reductions, which are typically reduced or avoided costs to road users resulting from the improved condition of the roads. Base data includes traffic forecasts and road user unit costs by class of passenger or freight vehicle.

The impact and distribution of costs and benefits are also affected by structural constraints - particularly institutional constraints. Structural constraints analysis requires extensive fieldwork, and relies critically on project area surveys to assess the portion of saving passed on to users; the extent to which the poor use the road; whether benefits are passed on to poor; institutional constraints that prevent distribution of benefits; and complementary action needed. Estimates can also be supported by secondary data from larger scale surveys.

The economic impact of a project is estimated by summing total net benefits from each individual beneficiary category to give the net present value (NPV) of the total benefits. A sensitivity analysis is usually undertaken, to address in particular the effect of structural constraints.

This analysis can also be used as part of the poverty impact assessment (PIA). Surveys are undertaken to estimate how and why the poor use roads, and to determine the degree of competition. Estimated net benefits from the feasibility study - primarily savings in vehicle operating costs due to the improved road - are used to estimate the share going to the poor and very poor. Costs and benefits to the poor are then presented in economic values, and an

estimate of the share of total net benefits is used to derive the Poverty Impact Ratio (PIR), expressed as the percentage share of benefits which go to the poor as a proportion of total benefits.

Multi-Criteria Decision Analysis (MCA) is a discipline aimed at supporting decision makers who are faced with making numerous and conflicting evaluations. MCA aims at highlighting these conflicts and deriving a way to come to a compromise in a transparent process.

Since MCDA involves a certain element of subjectiveness, the morals and ethics of the researcher implementing MCDA play a significant part in the accuracy and fairness of MCA's conclusions. The ethical point is very important when one is making a decision that seriously impacts on other people, as opposed to a personal decision. The main potential problem faced by MCA, is the risk of 'easy arbitrary assessment' as the main reference of valuing the project is the public decision-maker. A key question concerns whose preferences are to be considered. The model often aids a single decision maker (or a homogeneous group). Various stakeholders will assign different priorities to the respective objectives, and it may not be possible to determine a single best solution via the multi-objective model. In constructing a decision making model the analyst communicates information about the nature of the problem by specifying why factors are important and how they interact. There is value to be gained in constructing models from differing perspectives and comparing the results. MCA is best used in conjunction with a variety of models, and effective stakeholder consultations, and could help to reconcile the differences between individual versus social, and selfish versus altruistic preferences.

Some of the MCA methods are:
- Analytic hierarchy process (AHP)
- Multi-attribute value/utility theory (MAV/UT)
- The evidential reasoning approach
- Non-structural Fuzzy Decision Support System (NSFDSS)

The choice of which model is most appropriate depends on the problem at hand and may be to some extent dependent on which model the decision maker is most comfortable with. The New Approach to Appraisal (NATA), which is a framework used to appraise transport projects and proposals in the United Kingdom, is a major practical application of an MCA-based approach to support Government decision making. Other applications of MCA approaches used by the UK Government are set out in its own MCA manual.

Cost-Benefit Analysis (CBA)
Cost-benefit analysis is a term that refers both to:
- a formal discipline used to help appraise, or assess, the case for a project or proposal, which itself is a process known as project appraisal; and
- an informal approach to making decisions of any kind.

Under both definitions the process involves, whether explicitly or implicitly, weighing the total expected costs against the total expected benefits of one or more actions in order to choose the best or most profitable option.

A hallmark of CBA is that all benefits and all costs are expressed in money terms, and are adjusted for the time value of money, so that all flows of benefits and flows of project costs over time (which tend to occur at different points in time) are expressed on a common basis in terms of their “present value.” Closely related, but slightly different, formal techniques include Cost-effectiveness analysis, Economic impact analysis, Fiscal impact analysis and Social Return on Investment (SROI) analysis. The latter builds upon the logic of cost-benefit analysis, but differs in that it is explicitly designed to inform the practical decision-making of enterprise managers and investors focused on optimising their social and environmental impacts.

Cost Benefit Analysis is typically used by governments to evaluate the desirability of a given intervention. The aim is to gauge the efficiency of the intervention relative to the status quo. The costs and benefits of the impacts of an intervention are evaluated in terms of the public's willingness to pay for them (benefits) or willingness to pay to avoid them (costs). Inputs are typically measured in terms of opportunity costs - the value in their best alternative use. The guiding principle is to list all of the parties affected by an intervention, and place a monetary value of the effect it has on their welfare as it would be valued by them.

The practice of cost-benefit analysis differs between countries and between sectors (e.g. transport, health) within countries. Some of the main differences include the types of impacts that are included as costs and benefits within appraisals, the extent to which impacts are expressed in monetary terms and differences in discount rate between countries. Agencies across the world rely on a basic set of key cost-benefit indicators, including:

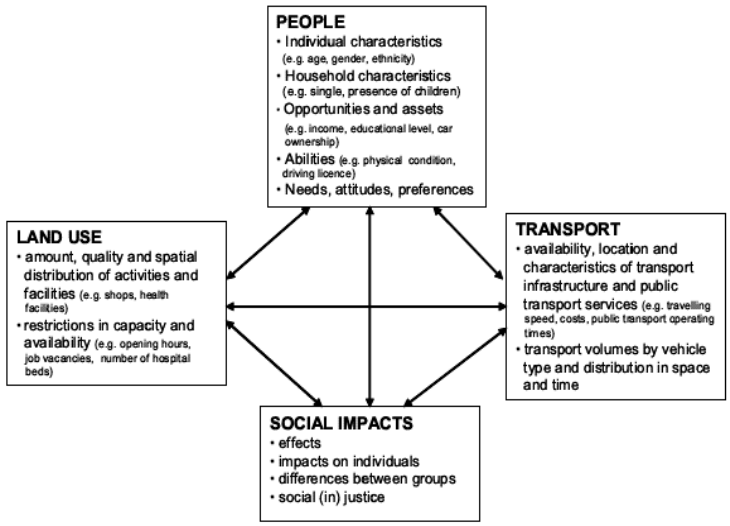
- PVB (present value of benefits);
- PVC (present value of costs);
- NPV (PVB less PVC);
- NPV/k (where k is the level of funds available) and
- BCR (benefit cost ratio, PVB divided by PVC).

Cost-benefit techniques were applied to the development of highway and motorway investments in the US and UK during the 1950s and 60s. An early, and often quoted, more developed application of the technique was made to London Underground's Victoria Line. Over the last 40 years, cost-benefit techniques have gradually developed to the extent that substantial guidance now exists on how transport projects should be appraised in many countries around the world.

4 Critical Review of Project Appraisals

The major difficulty in including social impacts in transport policy appraisal is that they can take on many forms, some of which are particularly difficult to estimate with any precision. Perceptions of the relative importance of different sorts of social impacts may also vary widely: perhaps, in part, because relatively little work has been done to develop methods, tools and techniques to rigorously estimate probable social impacts of transport changes (Forckenbrock et al., 2001).

However, ignoring social impacts in ex-ante assessments of infrastructure projects would suggest that only economic and environmental impacts are important, while the recognition of the importance of social impacts is increasing. One of the difficulties of including social impacts in transport policy appraisal is that, often, no clear distinction can be made between social, ecological and economic impacts. In general, ecological impacts merely focus on receptors, such as flora and fauna, whereas social and economic impacts concentrate on human beings. For instance, air pollution, noise and climate change affect flora and fauna, as well as human beings, Therefore, they have both social and ecological impacts (and sometimes economic impacts, as well). The distinction between economic and social impacts is often pragmatic. Economic impacts included in transport appraisal focus typically on (the valuation of) changes in travel times and related consumers' surplus, changes in employment and business activity and earnings, whereas social impacts focus on changes in social patterns, social problems and lifestyles (Fischer, 1999).1 Furthermore, economic impacts are often analysed at the macro level, while social impacts are analysed at the individual (or local) level.



In the UK, the Department for Transport uses the Transport Analysis Guidance as a requirement for all projects/studies that require government approval. The current guidance and future updates are published on a website (http:// www.webtag.org.uk). The website provides detailed guidelines for the appraisal of transport projects, and wider advice on scoping and carrying out transport studies. For projects/studies that do not require government approval, TAG serves as a best-practice guide. The guidance originates from the New Approach to Appraisal (NATA), launched in 1998, and is now the basis for the appraisal of, for example, multi-modal studies, Highways Agency road schemes, and major road and public transport schemes in Local Transport Plans.

The appraisal framework is made up of four parts (DfT, 2004). The first part consists of an Appraisal Summary Table (AST), which is a one-page tabular summary of the main impacts of a transport solution. Impacts are recorded according to five main objectives: environment, safety, economy, accessibility and integration. The AST includes both qualitative and quantitative information, the latter of which is expressed in monetary terms or other units. Monetized items currently include direct effects (travel time benefits, providers' revenues and costs), accidents, carbon emissions and noise impacts, and are input for a partial CBA to estimate a benefit/cost ratio, which, in turn, is input for an MCA. However, no weighting information is provided, and decision-makers must apply their own judgement when weighing the impacts to reach an assessment of the overall monetary value of a proposal.

Thus, it can be argued that the approach is no MCA in its purest form (Odgaard et al., 2005). The UK government is currently moving towards a pure CBA, in which more impacts (e.g. local air quality) are to be valued (DfT, 2006a). In contrast to Dutch guidance, the summary table does not include an overall score of options or alternatives. The second part of the WebTAG appraisal framework is an assessment of the degree to which the local and regional objectives of the study would be achieved. The third part of the framework is an assessment of the extent to which the identified problems would be ameliorated by the achieved option or options. The fourth, and final, part of the appraisal framework contains advice for conducting supporting analyses of distribution and equity, affordability and financial sustainability, along with practicality and public acceptability.

The 22 multi-modal studies, conducted in the UK so far, vary considerably in size and complexity. Larger studies cover major strategic transport networks. Smaller studies focus on more specific and localized problems. The London to Ipswich study was quite an extensive study, involving a land-use transport interaction model, and additional detailed highway and rail models, to examine the impacts of separate and combined road and rail transport investments in the London to Ipswich corridor, about 100 km north-east of London. The studies followed the Guidance on the Methodology for Multi-Modal Studies (GOMMMS), which was superseded in 2004 by the WebTAG framework. Annema et al. (2007) and the Commission for Integrated Transport (2004) have indicated that not all appraisals based on OEI and WebTAG are carried out to a consistent standard.

Generally across Europe a very broad definition of social impacts is used and, therefore, the different views on what should be included as a social impact and what not is sidestepped. For example, option values can be seen as economic impacts, but are essentially also social ones. The same goes for safety and some environmental impacts, such as health impacts due to emissions. Both the current Dutch and, in particular, the UK transport appraisal guidance, pay attention to a wide array of potential social impacts, but do not cover the full spectrum. A small number of impacts is addressed through quantitative measurements and assigned a monetary value, for instance, traffic casualties, noise nuisance and air pollution. These impacts are typically included in CBAs and EIAs, forming the basis for both guidances.

Dutch guidance focuses on quantitative measurements and monetary valuation of impacts, whereas UK WebTAG covers a much wider range of social impacts through qualitative assessments, scoring impacts in terms of 'neutral', 'slightly beneficial', 'largely beneficial' or 'adverse'. There are several possible explanations for the current treatment of social impacts in the Dutch and the UK appraisal guidances and for their applications. Firstly, there are

problems with the identification and measurement of a number of social impacts in the appraisal of transport investments. The literature identifies social impacts associated with transport systems, but their importance differs in the appraisal of individual transport infrastructure plans or projects. Several impacts, such as safety perceptions, cultural diversity and averting behaviour, are more likely to be associated with general transport trends or major transport system changes (e.g. opening of transport facilities which connect remote areas to urbanized areas), than with transport improvements in regions or countries with already well-developed transport networks. Moreover, there are difficulties in translating theoretical concepts from social sciences to measurable indicators and empirical evidence. In particular, much research has been conducted on social cohesion and related concepts in the social science literature. However, in the transport field these concepts lack a clear definition of operation and lack evidence on how a transport investment or policy may affect people's level of participation in activities or the number of neighbourhood contacts (see Forckenbrock et al., 2001; Centre for Transport Studies, 2006).

Differences between the Dutch and the UK national appraisal guidance are also the result of differences in the national tradition of project appraisal. WebTAG follows a more objective-led approach, whereas THE Dutch guidance (OEI) follows a stricter welfare economic perspective (CBA). As a result, the Dutch evaluation framework treats accessibility impacts only partially; the framework focuses on travel time savings and lacks attention for the physical access to transport systems, transport option values and access to spatially distributed key services and activities. Moreover, OEI does not address social exclusion, or effects and valuations of travelling (e.g. journey ambience and physical fitness). Some of these differences in guidance are also induced by differences in transport policy, for example, social exclusion is a major policy issue in the UK but not in the Netherlands.

An important element in the analysis of social impacts is the treatment of differences between population groups and their valuation in terms of social (in)justice. Both OEI and WebTAG provide little guidance on the evaluation of the distribution of impacts among population groups. OEI and WebTAG require a disaggregation of costs and benefits across relevant economic interest groups in the AST, such as users and transport system operators. Furthermore, supporting analysis is suggested, which is to be reported outside the summary table.
OEI provides no further guidance on distributional analysis. To date, WebTAG provides some hints about the kinds of distributional analyses that could be carried out of each impact included in the AST, such as an analysis of the geographical distribution of effects (e.g. between rural and urban areas) and the distributional analysis across population groups (e.g. gender and race). WebTAG does, however, as noted earlier, provide guidance on requirements for measuring social and distributional impacts, using social research methods when projects include road pricing schemes (DfT, 2006b). Moreover, OEI and WebTAG provide no specific guidance on the analysis of cumulative distributional social impacts, for instance, cumulative effects of high traffic and pollution levels affecting low-income or other disadvantaged populations.

OEI and WebTAG also provide no guidance for the inclusion of social justice or alternative weighting systems, which would allow testing the robustness of decisions, in terms of justice and acceptability. Economic theory offers little help with the choice of weighting system (for a discussion see also Eijgenraam et al., 2000; Commission for Integrated Transport, 2004). OEI

follows the CBA principles; thus, a 'utilitarian' approach is taken, where justice is done when the total amount of utility is maximized, regardless of the distribution. However, several alternative theories or approaches to justice are documented in the literature, which can be used as input in the decision-making process, for example, an equal shares or an egalitarian approach (Khisty, 1996). WebTAG does not offer alternative weighting systems either, but these are rarely used in transport policy appraisal (see PROPOLIS, 2003 for an exception). Both applications studied in this article (and, to the authors' knowledge, all other applications to date) have not examined alternative weighting systems.

The New Approach to Appraisal

The New Approach to Appraisal (NATA) is a framework used to appraise transport projects and proposals in the United Kingdom. NATA is a multi-criteria decision analysis based tool that builds on already well established cost-benefit analysis and environmental impact assessment techniques (such as those contained in the Highways Agency's Design Manual for Roads and Bridges (DMRB)) for assessing transport projects and proposals.

The methods for assessing the value for money of transport projects have been at the forefront of project appraisal practice in the UK for many years. NATA was designed to build on that good practice by bringing together the mass of detailed appraisal information about the impacts of a transport proposal, some of which are expressed in monetary terms, some using quantitative measures or some just in qualitative terms. A key aspect of NATA is the use of standard worksheets to collate the large amount of cost-benefit analysis and environmental impact assessment data and then present it in a more concise, consistent and balanced way.

Within the NATA framework, the impacts of transport projects are categorised in terms of five high level criteria (economy, safety, environment, accessibility and integration), reflecting the Government's objectives for transport. Each of these criteria is divided into a number of sub-criteria and it is against each of these sub-criteria that the impacts of a proposal are assessed and presented in a 1 page Appraisal Summary Table (AST).
The division of the five criteria is shown below:

- Economy (Public Accounts, Transport Economic Efficiency: Business Users & Transport Providers, Transport Economic Efficiency: Consumers, Reliability, Wider Economic Impacts)
- Safety (Accidents, Security)
- Environment (Noise, Local Air Quality, Greenhouse Gases, Landscape, Townscape, Heritage of Historic Resources, Biodiversity, Water Environment, Physical Fitness, Journey Ambience)
- Accessibility (Option values, Severance, Access to the Transport System)
- Integration (Transport Interchange, Land-Use Policy, Other Government Policies)

NATA was introduced by the then Department for Transport, Environment and the Regions as part of the 1998 Integrated Transport White Paper [1] and first used in the 1998 review of trunk road schemes. Its development reflected the new Labour Government's aim of providing a more balanced approach to transport appraisals, in terms of both:

- private transport versus public transport; and
- the economic impacts compared to environmental impacts.

Accompanying documents to that review list the ASTs for 68 trunk road schemes and provided initial guidance on how NATA was to be applied to transport projects

A subsequent published study by academics at the Institute of Transport Studies, University of Leeds found that the decisions made by Ministers in respect of the road schemes were statistically significant in terms of how they related to the information about the schemes included on the ASTs. This demonstrated that Ministers were taking account of the information provided on the ASTs in a consistent way.

The NATA framework is now a cornerstone of UK transport appraisal practice. It has been applied to other types of road proposals, including small Highways Agency projects and local authority road schemes and to other modes of transport, including the major programme of Multi-Modal Studies, initiated by the Government, that were carried out between 1999 and 2003, Local Transport Plan major public transport schemes, as well as rail proposals. In 2003, a web based set of Transport Analysis Guidance (commonly referred to as WebTAG) based on NATA principles, was launched by the Department for Transport (DfT).

A further development of NATA has been its use of an approach that disaggregates impacts between all those who are affected by a proposal, rather than the traditional cost-benefit approach of simply assessing the net impacts on society. While the two approaches are equivalent at the aggregate level, the NATA approach allows a more detailed analysis to be made of those who gain and those who lose as a result of a proposal. However the NATA approach raises issues regarding the precise definition of the impacts that are included in the numerator and denominator of the Benefit-Cost Ratio.

As well as setting out methods for appraising transport proposals, WebTAG contains values that should be used to assess different types of impacts, including the value of time and vehicle operating costs.

A UK Government Multi-Criteria Analysis (MCA) manual, originally produced by the former Department for Transport, Local Government and the Regions and now overseen by the Department for Communities and Local Government, highlights NATA as an example of MCA being applied in practice to a major area of UK Government policy.

For those transport matters that are the responsibilities of the Scottish Executive, Welsh Assembly Government and Northern Ireland Assembly, the NATA principles have been adopted by the relevant transport authorities in those countries. Transport Scotland has issued its own transport appraisal guidance, 'Scot-TAG' (Scottish Transport Appraisal Guidance), which draws heavily on NATA. In Summer 2006 the Welsh Assembly Government consulted on the development of its NATA-based transport appraisal guidance, WelTAG, and published its guidance in June 2008. The appraisal procedure used by the Roads Service in Northern Ireland's Department for Regional Development is based on the five NATA criteria.

New Approach to Appraisal (NATA) brought together cost-benefit results with those from detailed environmental impact assessments and presented them in a balanced way. NATA was first applied to national road schemes in the 1998 Roads Review, but subsequently rolled out to all modes of transport. It is now a cornerstone of transport appraisal in the UK and is maintained and developed by the Department for Transport.

The EU's 'Developing Harmonised European Approaches for Transport Costing and Project Assessment' (HEATCO) project, part of its Sixth Framework Programme, has reviewed transport appraisal guidance across EU member states and found that significant differences exist between countries. HEATCO's aim is to develop guidelines to harmonise transport appraisal practice across the EU. Transport Canada has also promoted the use of CBA for major transport investments since the issuance of its Guidebook in 1994.

Accuracy problems

The accuracy of the outcome of a cost-benefit analysis is dependent on how accurately costs and benefits have been estimated. A peer-reviewed study of the accuracy of cost estimates in transportation infrastructure planning found that for rail projects actual costs turned out to be on average 44.7 percent higher than estimated costs, and for roads 20.4 percent higher (Flyvbjerg, Holm, and Buhl, 2002). For benefits, another peer-reviewed study [14] found that actual rail ridership was on average 51.4 percent lower than estimated ridership; for roads it was found that for half of all projects estimated traffic was wrong by more than 20 percent (Flyvbjerg, Holm, and Buhl, 2002). Comparative studies indicate that similar inaccuracies apply to fields other than transportation. These studies indicate that the outcomes of cost-benefit analyses should be treated with caution, because they may be highly inaccurate. In fact, inaccurate cost-benefit analyses may be argued to be a substantial risk in planning, because inaccuracies of the size documented are likely to lead to inefficient decisions. (Flyvbjerg, Bruzelius, and Rothengatter, 2003).

These outcomes (almost always tending to underestimation, unless significant new approaches are overlooked) are to be expected, since such estimates:

1. rely heavily on past like projects (frequently differing markedly in function or size, and certainly in the skill levels of the team members),
2. rely heavily on the project's members to identify (remember from their collective past experiences) the significant cost drivers,
3. rely on very crude heuristics ('rules of thumb') to estimate the money cost of the intangible elements, and
4. are unable to completely dispel the usually (unconscious) biases of the team members (who often have a vested interest in a decision to 'go ahead') and the natural psychological tendency to "think positive" (whatever that involves).

Another challenge comes from determining which costs should be included in an analysis (the significant cost drivers). This is often controversial as organizations or interest groups may feel that some costs should be included or excluded from a study.

5 Importance of Context

When providing Appraisals and Impact Assessments on major investments inevitably there needs to be flexibility in how and when that is delivered. Policy changes according to political events and changes in the economy and society and this presents challenges and opportunities for revisiting policy objectives and outcomes. We maintain a strong client liaison to track any changes that need to be made and how that affects policy outcomes and the ability for documents to be published in the public domain.

Comparative Analysis

According to Pickvance (1991) comparative analysis is only applicable when one goes beyond juxta-position and seeks to explain the observed differences or similarities in phenomena in two or more cases. This belies the inherent irony and subsequent methodological challenge for comparative theory; for comparative analysis to be meaningful and productive, it must go beyond a mere juxta-positioning, i.e. there has to be a degree of difference between the cases one is comparing to understand why techniques or polices are different. But, there must also be a degree of similarity in order to be able to compare in the first place. The notions of similarity and difference form the basic foundations for comparative analysis as well as providing its biggest methodological conundrum; that at different scales of analysis similarities become differences and vice versa. The resultant grey-area in between is the arena of comparative analysis for it aims to reduce unexplained variance and find patterns and relationships (Oyen, 1990).

Comparative analysis can serve several purposes, which have been summarised by Masser (1990). Firstly, it is a useful tool for testing hypotheses and establishing a benchmark for research. Secondly it can be useful in transferring experience and solutions to problems. By identifying best practice on solving similar problems, comparative analysis can provide a blue-print for how it could work in another country or situation. Following on from this, another purpose for employing comparative analysis is to brainstorm and derive new insights into a problem, solution or condition. It can illustrate innovations and examples which can be modified to fit another context of set of conditions.

Haar (1964) celebrates this particular value of foreign exploration as not so much in the discovery of readily transferable concepts, technologies and techniques that can be packaged up, carried back duty free and unwrapped to delight policy makers, but in the stimulus of insightful reflection of culture and experiences. This a crucial point in that comparative analysis should not be used as a means of merely copying and pasting solutions or approaches but it should educate and enrich our understanding of them and help to emulate and prefect them. In this respect, comparative analysis should be considered a powerful component of the policy making process. Approaches to comparative analysis can be comfortably divided into those that seek to find similarities as a meaningful insight into how embedded and causal a variable is; and those that seek to celebrate difference as an indication of the importance of culture, locality and context.

Policies are developed in anticipation of, or as a response to, a problem or an issue. With different political regimes and ideologies, problems and issues can be solved, eradicated or exacerbated, can disappear and re-emerge. Comparative analysis, as suggested, can help to

develop new policies. However, there is a danger in differentiating between old policies to be replaced or emulated and new policies that replace them. There is a tendency to assume that the term old denotes a sense of out-modedness, antiquity, irrelevance and stasis, whilst the term new denotes up-to-date sophistry, authority and reliance. It is therefore important to realise that chronological reviews of knowledge run the risk of presenting intellectual history as the inevitable replacement of one approach by another; the latter being more sophisticated than the former. (Mc Dowell 1994)

There is a raft of literature that comments on the broad tendency for policies to drift over to the UK. Halsey (1978) is sceptical about the robustness of US policy donation claiming that “ideas drift casually across the Atlantic, soggy on arrival and of dubious utility.” Whilst, since the 1960’s for Wannop, (1985) it has been possible to see a broadening stream of methods of urban planning and urban policy initiatives flowing from the US to the UK running between political and administrative environments and that many of urban policy initiatives we have been taking in the UK since early 1970s have been considerably borrowed from those taken earlier in the US.

Policy Learning and Transfer

A comparative analysis that emphasises the importance of a consideration of historical trends is essentially concerning itself with the process and experience entailed in a technique or approach’s journey from donor to host country. How did it happen and who was involved? Whether lessons were learned and subsequently taken on board when; considering to adopt a policy, modifying it on the basis of context and best practice and then finally adopting it as a robust bespoke policy to suit the host context?

Cross-national experience is having an increasingly powerful impact upon decision-makers within the private, public and third sectors of nation-states. In particular, 'policy transfer' and 'lesson-drawing'. (Stone 2000) Literature on policy learning and policy transfer is widening as a reflection of the increase in attention to it as a decision-making strategy.

There are important epistemological differences between the terms. Policy transfer is defined as a process in which knowledge about policies, administrative arrangements, institutions etc. in one time and/or place is used in the development of policies, administrative arrangements, institutions in another time and/or place (Dolowitz and Marsh, 1996). The focus is on understanding the dynamics and actors of the decision-making process when adopting or indeed exporting a policy. (Page 2000) Lesson-drawing on the other hand is more concerned with the conditions or context of the transfer and then reconciles this with the end product of transfer; i.e. how far has the host country adapted it to suit conditions or context. (Rose 1993) argues that the prime object is to engage in policy transfer to use cross-national experience as a source of policy advice.

6 Innovative New Approaches

IASON Integrated Appraisal of Spatial economic and Network Effects of Transport Investments and Policies (EU funded research project)

A common understanding of rules for the assessment of socio-economic impacts of transport related projects and policies at the EU level is useful in the sense that:

- it helps to make good judgements about alternative transport investment options, both for priority setting and for making good judgements about the rate of return of transport investments;
- it makes trans-border evaluation schemes comparable and can also be used for developing criteria for cross-border investment and compensation schemes;
- it allows to compare policies aimed at stimulating the development in peripheral regions with those alleviating congestion and transit traffic problems in more central located regions of the Community.

The objectives of IASON are as follows:

- To improve existing assessment frameworks by ensuring that direct and indirect impacts are clearly distinguished within the appraisal, and that the incidence of benefits and costs, and sources of additionality and/or double counting are transparent;
- To perform a systematic and quantitative analysis of the network, spatial and socio-economic impacts of transport investments and policy by refining existing EU-level models (a.o. CGEurope, SASI and SCENES) and carrying out scenario simulations;
- join assessment experiences from the scientific community to ensure feedback from the policy-makers as to the relevance and usefulness of the IASON approach;
- Finally, to learn from the experience of applying the framework in practical contexts so as to provide recommendations for project analysis of transport investments and policies and for the development of supporting tools and databases.

In order to improve the understanding of the impact of transportation policies on short- and long-term spatial development in the EU, the project has gathered empirical evidence about the linkage between the transportation system for good and for people on the one hand and the dynamics of firm and households location on the other. It has refined and validated existing modelling for assessing short-term welfare effects as well as long-term locational dynamic implications of transport policy scenarios.

With regard to overall economic impact of transport projects and policies, it can be said that socio-economic macro trends have a much stronger impact on regional development than transport policies. If one considers that under normal economic circumstances the long-term growth of regional economies is in the range between two and three percent per year, and additional regional economic growth or less than one or two percent as is observed in Western Europe over twenty years can be considered small.

Concerning the effects of specific policies, Social Marginal Cost (SMC) based pricing, relative to the base, has an effect which can be considered large. It replaces an inefficient tax by an efficient charge, and thus creates new efficiencies within the economy. Speeding up the TEN-T

programme has an effect on GDP which is relatively small. The test with the different models indicate that the TENs have relatively strong distributive effects to the economy, affecting in particular the East-West growth balance and stimulating the rate of cohesion. High-speed rail projects seem to be more effective in terms of promoting regional economic activity than conventional rail projects, and rail projects seem to be more effective than road projects. All transport pricing scenarios have negative economic effects but these can be mitigated by their combination with network scenarios with positive economic effects, although the net effect depends on the magnitude of the two components. The network scenarios in general reduce disparities in accessibility, but reduce disparities in GDP per capita only if also the TINA projects are implemented. Pricing policies are not favourable for the poorer regions. CGEurope shows a characteristic spatial pattern of pricing scenarios, i.e. disfavouring the peripheral regions. Also, network effects of transport initiatives tend to be additive, i.e. little evidence was found with respect to sub- or superadditivity of transport projects.

Concerning the linkage between accessibility and economic growth, it was found that the increases in regional accessibility from TENs policy translate into relatively small increases in regional economic activity. For regions in the European core with all the benefits of a central geographical location plus an already highly developed transport and telecommunications infrastructure, additional gains in accessibility through even larger airports or even more motorways or high-speed rail lines may will bring only little additional incentives for economic growth. For regions at the European periphery or in the accession countries, however, which suffer from the remote geographical location plus an underdeveloped transport infrastructure, a gain in accessibility through a new motorway or rail line may bring significant progress in economic development. But, to make things even more complex, also the opposite may happen if the new connection opens a formerly isolated region to the competition of more efficient or cheaper suppliers in other regions.

The linkage of a transport model with a regional economic or macro economic model combines the benefits of a transport model, which has a detailed underlying network, with the benefits of a model, which measures the economic effect of changes in transport patterns to economic sectors and captures the effects of various investment strategies.

Policy implications

The state-of-the-art of appraisal of transport projects and policies is developing rapidly. However, the TEN-T projects and in particular the opening of Europe to the East poses formidable challenges for transport appraisal. Better transport infrastructure will link together places with quite different labour markets, standards of living and access to goods and services. In such conditions the general conclusions are: for major projects and policies, a good quality transport sector cost-benefit analysis is vital.

This requires adequate data and modelling of the transport networks to generate the inputs to the analysis. A wider economy model linked to a transportation model does offer a way forward in modelling the total effect, including the economic network effects. The outputs of such models include forecast changes in GDP, employment by region and consumer surplus. Conceptually such models generate the total economy - wide benefit of a project or policy - an appraisal that is consistent in its treatment of effects from both national and supranational perspective is capable of dealing with cross-border effects. The choice of scale and models is important to highlight these effects the relationship between the total benefit and the benefit

measured in a transport-only cost-benefit analysis is understood in principle, but the size of the difference between them in practical cases is as yet poorly understood.

Markets which are notoriously imperfect, such as land and labour have not yet been fully incorporated into the wider economy models used within IASON from the perspective of the policy makers, the spatial pattern of gains and losses is important, and spatial economic models can help to identify these. Therefore a consistent approach of transport cost-benefit analysis plus spatial economic modelling may be an attractive combination providing insight into the absolute value, or social rate of return on investment and the spatial and social distribution of winners and losers.

The project has made available a new set of interconnected instruments that now can be used to assess the spatial and economic consequences of transport policies. Besides producing broad pictures of the overall economic impact for the EU, the function of the models is in particular to point the attention of policy makers to those regions, sectors or policy packages where the indirect impacts of infrastructure and pricing policies are above average. While the wider economic impacts can be substantial as transport impacts propagate over time through the economy, these are not necessarily always welfare effects that are additional to the transport impacts. When they are, they can be of significant magnitude, and these cases can now be uncovered by models like CGEurope and E3ME, when linked to the appropriate transport modelling tools.

7 Summary & Conclusions

Transport policy appraisal should ideally cover three dimensions of sustainability— economic, ecological and social. However, social impact appraisal often receives little attention, despite the fact that these impacts, particularly the distribution of 'costs' and 'benefits' of a transport policy across population groups and regions, often receive much public and political attention in decision-making processes.

It can be concluded that the UK transport appraisal guidance (WebTAG) includes a much broader spectrum of social impacts than e.g. Dutch appraisal guidance (OEI), but it does not cover the full range of potential social impacts as identified in the literature. Dutch guidance focuses on quantitative measurements and monetary valuation of impacts, whereas the UK guidance deals with an important range of social impacts through qualitative assessments. Both guidances assign a monetary value to a few well-known social impacts, such as traffic safety and delays caused by road construction. A number of potentially relevant social impacts are not sufficiently dealt with in the guidances, particularly temporary impacts of transport investments, health impacts and social cohesion effects. In addition, the Dutch evaluation framework only partially deals with accessibility impacts and does not deal with the effects and valuations of travelling itself (in addition to travel time savings). The current Dutch and the UK appraisal guidances also provide little guidance for the evaluation of the distribution of impacts across population groups, the accumulation of impacts on these groups, and social justice assessments. As a result of which, practical applications also pay little attention to these impacts.

1. In most countries transport evaluation focuses on infrastructure planning and assessment and in this connection ex-ante programme or project evaluation. In some countries a multi-modal perspective is taken, i.e. masterplans for infrastructure cover both rail and road; in some a modal perspective is taken, i.e. road and rail administrations operate separately. In no country is there ex-post evaluation of infrastructure programmes.

2. Environmental issues are considered in evaluation as part of project assessment and/or as part of programme assessment. Equity, i.e. distributional issues, are less often considered with the exception of accessibility.

3. There would appear to be no systematic practices for ex-post project or programme evaluation or for policy evaluation (both ex-ante and ex-post). In the latter connection, the evaluation could be said to be more of a political nature or relying on the commissioning of expertise, whereby procedures are not very transparent. Only in a few cases (for instance Netherlands) are elements relating to the more general transport policy environment (like regulations) considered either for establishing reference scenarios or for 'correcting' assessments.

4. Regions are responsible for regional planning and public transport, yet they are not obliged to use the methods of evaluations used at the national level. The interfaces between the national and regional levels are unclear; so are those between the national and European levels.

Improve the potential role of social impacts in decision-making. Decision-makers may find it difficult that some social impacts are quantified and monetized, while others are not. It can be argued that integrating social impacts into a CBA can be a great advantage, as this could lead to a more consistent and integral comparison of policy options.

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