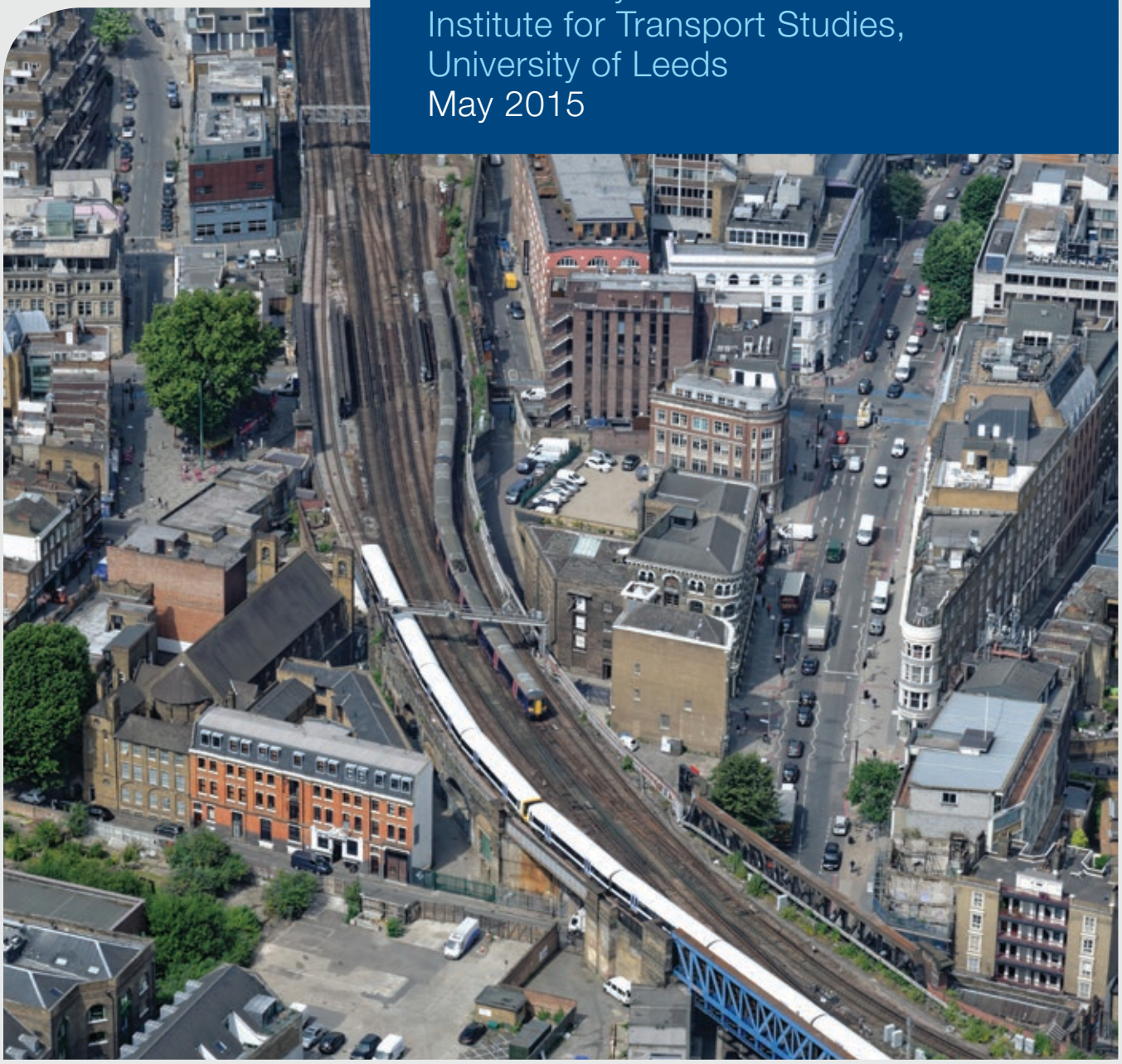
RAC Foundation

Transport Policy, Appraisal and Decision-Making

Tom Worsley and Peter Mackie
Institute for Transport Studies,
University of Leeds
May 2015



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About the Authors

Peter Mackie

Following two years as an Economic Assistant at the Ministry of Transport in 1968-70, Peter Mackie's career has been at the Institute for Transport Studies, University of Leeds. He was Professor of Transport Studies from 1995 (now Emeritus) and Dean of the Faculty of Environment 2002-8.

Peter has worked on regulatory policy in transport including studies of road haulage and the local bus market. He led a large ITS study for the Department for Transport on the economics of bus concessionary travel in England and more recently led a study for Greener Journeys on Buses and Economic Growth.

Within the field of economic appraisal, Peter has helped to develop the framework of cost-benefit analysis in transport and has worked on particular topics such as the valuation of travel time savings, the logistics benefits of road investments and the so-called wider economy impacts of transport projects.

He has been a member of various Commissions such as SACTRA, the Eddington 'friends' group, the Analytical Challenge Panel for HS2 and is currently a specialist adviser to the Airports Commission. He has contributed to the Round Tables of the International Transport Forum and has worked for the OECD and World Bank.

Tom Worsley

Joined ITS as Visiting Fellow in June 2011, following his retirement from the Department for Transport (DfT). He has held a number of senior economist posts during his career. He was responsible for setting up NATA (the New Approach To Appraisal) in 1997 and for the development of the Department's National Transport Model in 2000/1. When the Rail Group was established by the Department in 2005, he led the team responsible for Network Modelling Framework, a forecasting model used to provide the evidence to inform the 2007 Rail White Paper and High Level Output Specification (HLOS). More recently he has managed the team of economists who provide economic advice on aviation and shipping and on transport and the environment.

Acknowledgement

We are very grateful to the RAC Foundation for commissioning us to write this paper. Our approach was to interview a number of people who have found themselves on one side or another of the process by which policy is formed, projects created and analysed, and decisions reached. We were extremely heartened to have 100% acceptance of our invitations, and we thank David Bayliss, Sir Patrick Brown, Jake Cartmell, Richard Davies, Bob Linnard, David Quarmby, Bridget Rosewell, John Smith, two previous transport ministers, and a number of serving civil servants and local authority officers who by convention are not named. They gave their time and insights, and many of them read and commented on a draft. The paper would be the poorer without them, but responsibility for the content and findings of the paper is ours alone.

Disclaimer

This report has been prepared for the RAC Foundation by Tom Worsley and Peter Mackie, Institute for Transport Studies, University of Leeds. Any errors or omissions are the authors' sole responsibility. The report content reflects the views of the authors and not necessarily those of the RAC Foundation.

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Foreword

In transport – as in every other area of public policy – things can be paid for by one of only two means: charging or taxation. So government decisions on policies and projects directly affect the balance of advantage between groups of people, as well as the public interest as a whole. Additionally, transport affects individual people's homes, livelihoods and quality of life.

There will always be an important element of judgement. But to what extent should governments be held accountable for following a systematic process to determine the best evidence available, and for demonstrating due regard to this evidence in reaching decisions? That is the subject of this paper.

In British government we have something of a paradox. This paper relates how Britain led the world in developing analytical techniques for generating evidence relevant to public decision-making. Yet the extent to which appraisals are published is variable, and ministers appear to reach decisions, sometimes committing many tens of billions of pounds of public expenditure, with insufficient consistency and transparency.

Much of the development work on appraisal has been – and continues to be – sponsored by the transport department. Her Majesty's Treasury, the arm of government responsible for oversight of public expenditure, has endorsed the techniques and codified procedures for marshalling the evidence. Transport ministers have signed up to these – latterly the "Five-Case Transport Business Case" – and officials have followed the Treasury guidance in writing their advice to the transport minister. But how much influence does all this have on the decisions that ministers then actually take?

The paper describes the way in which appraisal is evolving as data and analytical methods improve. As always there are matters requiring improvement, amongst which are: the implications of underemployment; the effects of transport on regional economies and land development; and – a particularly urgent item – valuation of predictability of journey times. Appraisal is also responding as objectives vary, be they public welfare, employment, inequality or economic growth. Devolution of powers of decision to local bodies creates new pressures, especially when so much of the taxpayer funding is provided from the central Exchequer: who decides, by what criteria, and how are those who have power to make decisions to be held to account?

A mechanistic set of appraisal rules can never replace the ultimate need for judgement, neither should it seek to do so. But central and local governments should demonstrate to the taxpayer and other interested parties that appraisals have been carried out according to well-founded, evidence-based principles which have been given due regard. The appraisals should be open to public scrutiny.

We believe that the present, solid analytical framework is informative and useful. We welcome the move to put the various economic and financial considerations in an overall context of an explicit strategic case.

Crucially, we agree with the authors that governments should also articulate and publish their strategic case for significant projects or policies, including a clear statement of what strategic problem the action is intended to address, and how it will contribute to the solution.

Professor Stephen Glaister

Director of the RAC Foundation

1. Introduction

This paper is about the interaction between transport policy, the appraisal process, and decision-making. Transport policy is articulated at two levels – *policy goals*, such as contributing to economic performance; and *policy levers* which aim to attain the goals, such as pricing, regulation, institutional change and investment. Policy analysis has an important role to play, more at the level of helping to assess how well particular interventions and levers will work, and less at the level of defining top-level objectives.

Dramatic shifts in policy are unusual. For every year when Transport Acts are passed, deregulating the buses or privatising the railways – or even placing the Highways Agency on a new footing – there are many years of operating within a given policy setting. Most work within government is about interpreting policy in specific contexts, identifying options and choices, and then assembling materials to input to the decision-making process.

One of the fascinating things about transport is that it involves multiple objectives, spatially specific impacts, a mixture of efficiency and distributive consequences, and a wide range of stakeholders. There are few other government departments without interfaces to transport. At this level, given the hurly-burly of schemes, priorities and funding, a solid analytical framework within which to operate has been found to be extremely useful. There are several reasons for this. Some types of decisions are essentially repetitive, and a reasonable degree of consistency across such decisions is desirable. There is, moreover, a need to demonstrate conformity with higher-level guidance such as the Treasury's *Green Book* (HM Treasury, 2003, 2015). Furthermore, the decentralised nature of transport, the many agents involved in its provision, and its interface with the planning system – all of these create a need for an analytical framework which many parties can use to inform decisions. And all of this means that appraisal guidance and method has found a fertile field, and has been applied more extensively in transport than in most other parts of government. This is true not just in Britain but also in countries with similar models of political economy, such as Sweden and the Netherlands.

The content of the appraisal framework provides the raw material – the inputs into the decision process. However, decision support and decision-making are not the same thing. A minister who subcontracted all decisions on road investment unquestioningly to the value-for-money metrics coming out of the appraisal process would not be doing the whole of their job. On the other hand, a minister who paid no regard whatever to the raw material would be brought up short by the Accounting Officer, the Permanent Secretary who is charged with ensuring the good management of public spending within that department. A topic of some interest is whether the appraisal process provides the right raw material to the decision-makers.

We have seen it argued that the world has changed fundamentally and that the appraisal regime has reached a tipping point. The overriding need to relate sector investment to economic performance; the belief in a dynamic rather than comparatively static view of infrastructure investment; the importance of representing the supply side and the behaviour of actors in regulated markets; and the increasingly devolved institutional environment – all, it is said, call into question the suitability of the cost–benefit analysis (CBA) framework. We certainly agree that the appraisal system will cease to be useful if it becomes ossified and remote from the concerns of decision-makers. We discuss below how to respond to current challenges, but first it is useful to set out how we got here, and what role economic analysis plays within the policy process. Throughout this paper we have confined our discussion to 'appraisal' as defined in the conventional English sense of an ex ante assessment. We do not consider the role of evaluation, i.e. ex post assessment.

2. The Role of Transport Appraisal: a Potted History

2.1 Creating the method, 1960–75

A system of cost–benefit appraisal of transport schemes has been used to inform decision-makers in the UK over the past half century. In the mid-1960s a method known as TAL (Travel and Accident Loss) was providing decision-makers in the then Ministry of Transport (MoT) with estimates of time and accident savings as a means of helping to determine priorities from a long list of schemes for new motorways and highway improvements, at a time when road traffic was growing rapidly. The method filled a gap: in the absence of tolls or road user charges, commercial appraisal had no role to play; this was therefore a way of demonstrating to the Treasury, Parliament and the public a social value-for-money case. By the late 1960s, improvements in the MoT's methods, primarily in development of the values of time and of the concept of generalised cost, together with the use of long-term forecasts, resulted in COBA replacing TAL; the scene was thus set for the consistent use of CBA as a means of informing decisions about road transport schemes (McIntosh & Quarmby, 1970; Harrison & Quarmby, 1969). Interestingly, attempts to develop a more top-down national network modelling approach were unsuccessful, so appraisal proved to be largely a bottom-up tool. COBA (COst Benefit Analysis), an early computer program, was a form of CBA restricted to the effects of a new scheme on road users – and, through the inclusion of accident prediction, on pedestrians also.

Transport CBA was not limited to the roads-based COBA model. Indeed, some years before the establishment of COBA, CBA was used as a means of assessing the case for the Victoria Line, a route proposed in the 1944 Abercrombie Plan for the development of post-war London. The Victoria Line provided the first example in Britain of applying this method to a public transport scheme which, by providing a more direct route across central London, was expected to reduce overall fare revenues, and so fail any test of financial viability in an era when fares were related to distance travelled. Foster and Beesley's pioneering study (1963) showed a positive net present

value for the scheme, with benefits restricted to (1) travel time savings for public transport users, and (2) reductions in road congestion on account of some transport users switching from car. Following the 1968 Transport Act's introduction of specific grants to support loss-making, but socially desirable, rail services, CBA was used to help decide the case for grant or closure, but this regime only lasted until 1974 (Brent, 1979).

The Roskill Inquiry into the choice of a location for the third London airport (Roskill, 1971) was in many ways the state-of-the-art CBA of that era. It extended the method back through the screening and shortlisting process, and provided a relatively comprehensive assessment of four options, comparable in scope with the Airport Commission's current remit. But the exercise also showed the limitations of the method in a couple of senses. While advances were made in the modelling and forecasting of the costs and benefits involved in accessing the alternative sites by different modes, the attempts to value what is now defined as landscape, natural environment and heritage were held up by many critics as examples of what was wrong with CBA. The destruction of a Norman church at one potential site was valued, rather crassly, at the cost of the fire insurance cover in the event of the loss of the building, providing a field day for the critics. Moreover, a wide gap emerged between the analysis, the Commissioners and government: the analysis showed Cublington 40 miles to the north-west of London to be the best option; the Commission, however, favoured Foulness, a forerunner of Boris's Island; in the event, following the economic crises of the mid-1970s, the government preferred to develop the existing airport at Stansted, an option which was not even on the Commission's shortlist.

2.2 Transport cost–benefit analysis and the Framework Approach

Following a number of hostile public inquiries into highway schemes in the mid-1970s, including Archway Road in London and the Aire Valley Motorway in Yorkshire, the government set up an Advisory Committee (ACTRA, the Advisory Committee on Trunk Road Assessment), made up of academic and other experts, to review the then Department of Transport's appraisal methods. The Committee's report (ACTRA, 1977) was arguably the most influential piece of work on the practice of transport appraisal, and set the rules of the game for a generation. The Committee supported the use of CBA as a means of providing decision-makers with the information they needed. But while endorsing the overall method, they recommended that explicit account should be taken of the environmental and other unquantifiable impacts of road schemes. In response to this, the Department adopted the 'Framework Approach' to record in some detail these impacts and indicate their significance. ACTRA reviewed such evidence as was available on the scope that transport schemes had for acting as agents of economic growth, and concluded that transport investment did not yield significant development gains over and above the direct benefits already measured in the COBA appraisal. So appraisal continued to focus on the direct transport impacts, but was now extended to cover environmental impacts.

During an era in which the majority of transport investment was directed at incremental improvements to the inter-urban road network, there was no particular need for the Department for Transport (DfT)[1] to make radical changes to the objectives of the appraisal process. Its aims were to help ministers to make decisions about priorities, and hence about the projects that were to be taken forward to a public inquiry. And it provided the inspector, who adjudicated over this public debate into the merits of the scheme, with the framework for the conduct of that debate within the constraints of the government's overall transport policy. Sometimes this was highly controversial – for example, were national traffic forecasts policy givens, or were they up for debate? But the economic welfare framework remained the paradigm as a description of the public interest, which the inspector was required to uphold. Improvements to the evidence base for the values used were made during the 1980s, with new work on valuing time savings making use of stated preference survey methods as a complement to studies of revealed preferences. Similar methods to elicit the willingness to pay for changes in levels of safety risk formed the basis for significant increases in the value of reducing accidents, which coincided with a policy focus on improving the accident record on Britain's roads (Jones-Lee et al., 1985)

In urban areas, highway schemes were prevalent in the 1960s and 1970s, but a combination of high costs, public opposition, and a realisation that investment would not solve the problem acceptably led to a volte-face. Since the late

1 From this point on, we refer to the responsible Department as the Department for Transport or DfT despite its many names during the period reviewed.

1970s, big schemes have been either peri-urban in nature (for example the M25 and the M60) or dealing with specific development opportunities (such as the Limehouse Link to serve London's Docklands). Traffic management, junction improvements and bus priorities have dominated the wish lists of local authorities, with a few exceptional cases of life-expired heavy rail lines being replaced by lower-cost light rail schemes. These had the additional benefit of cutting door-to-door journey times because of more frequent and better located stops than were possible with a conventional railway. Urban multimodal transport models and cost estimates – which in the case of light rail often turned out to underestimate the outturn costs – provided the basis for estimating the costs and benefits of urban transport infrastructure, which informed ministers' decisions about the allocation of the local transport budget. These decisions were also informed by claims about the effects of better transport on areas in need of economic regeneration and on the economy of the cities for which the schemes were proposed. Gradually in the 1990s, we moved into an era of Local Transport Plans extending the Framework Approach beyond its application to inter-urban trunk roads into the urban multimodal context (MVA Consultancy et al., 1994).

The late 1980s had seen a period of exceptionally rapid traffic growth caused by a combination of economic recovery and one-off supply side factors such as the completion of the M25. Arguably the pivotal year in that period was 1989, which saw the publication of new higher traffic forecasts and an extremely ambitious White Paper, *Roads for Prosperity* (DoT, 1989a). While on the face of it this should have improved the economic case for roads, it actually brought some issues to a head. The COBA method depended on making a comparison between doing something and a Do-Minimum reference case. In all but a few cases, traffic growth was assumed to be exogenous to the scheme (i.e. not generated by the existence of the scheme itself), the so-called 'fixed trip matrix' assumption. But with the rapid growth rates of the 1989 National Road Traffic Forecasts (DoT, 1989b), it was proving impossible to accommodate the design year forecast traffic on the Do-Minimum network at credible travel speeds, and the method was beginning to creak at the seams. The Standing Advisory Committee on Trunk Road Assessment (SACTRA), as the Committee responsible for the 1977 report had become, was given the remit of advising, and produced its 1994 report in which it recommended that variable trip matrix methods allowing for induced traffic as network conditions improved should be used in cases where the rationale for the scheme was to relieve congestion or provide capacity to cope with demand (SACTRA, 1994).

Prior to the growth in rail patronage in the mid-1990s which occurred around the same time as rail privatisation, most of the investment undertaken by British Rail (BR) was to fund renewal of the infrastructure in order to allow for the operation of existing services at minimum full-life cost. The improvements that were proposed, such as better-quality rolling stock, were appraised in terms of the additional revenue that would result from the demand generated by the improvement. BR commissioned research to provide evidence of the

revenue-generating effects of such improvements, documented in the mid-1980s as the Passenger Demand Forecasting Handbook, a manual which is maintained and updated by the privatised railway and remains accessible, as it was in BR days, only to those in the industry.

Studies of the case for new lines were the exception to this rule, in part because the incremental methods used to forecast the effects of service improvements on revenue were unsuitable for predicting the patronage of new routes. CBA was used by the government in 1973 to assess the case for the Channel Tunnel (Coopers & Lybrand & Great Britain, Department of the Environment, 1973). Twenty years later the Channel Tunnel Rail Link provided another example of new rail infrastructure and services which had been appraised using CBA.

The Central London Rail Study was set up in 1988 as a joint initiative between DfT and London Regional Transport to assess options for increasing the capacity of central London's rail and underground networks, in order to accommodate recent and anticipated growth in demand. The assessment methods followed the by then well-established techniques for appraising urban public transport schemes. One of the options identified in the study was a scheme for extending the Jubilee Line from the West End, though the Docklands development, to East London, the appraisal of which was taken forward in a separate study of options to serve Docklands. The government decided to seek Parliament's consent for this scheme, despite the benefits quantified in the CBA being marginally less than the estimate of the costs. The decision to proceed was made in the light of a number of factors, including the offer of a conditional contribution to the costs of the line by the developers of Canary Wharf, strong support from the Prime Minister, and a recognition that benefits of the effects of the land-use change made possible by the Jubilee Line Extension did not form part of the quantified benefits. The more ambitious proposals for relieving overcrowding by running suburban trains through new tunnels under central London were not pursued for another decade or more, despite two of the options having benefits forecast to be in excess of the costs by margins which were typical of schemes approved at that time. Demand declined in response to the recession in 1990, while no decision was reached about how the schemes might be funded, since funding of infrastructure which benefitted only rail passengers in London from the general tax revenues was seen as inequitable.

2.3 Transport and the economy

In 1996, the minister responsible for transport agreed with his Treasury colleagues to ask SACTRA to provide advice on the relationship between transport and the economy. As the decision on the Jubilee Line Extension made clear, ministers were aware of the inability of the conventional appraisal methods to capture the regeneration benefits of major new schemes. SACTRA was asked to provide the Department with a better understanding of the

increasing body of academic research, and of recent developments in land-use modelling and other spatial economic models which offered the prospect of practical application of the theory. The reference required SACTRA to review the Department's well-established cost–benefit appraisal methods and to make recommendations should they require changing to reflect the Committee's findings.

SACTRA (1999) concluded that the Department's cost–benefit appraisal framework, based on the first- round transport user benefits, was generally sound in many of the applications in which it was used. Some of the values needed to be updated, and the Department was advised to consider how to extend the method to impacts that were omitted, such as changes in reliability. But in the main thrust of its report, the Committee reconsidered the conclusion of ACTRA 1977 that the direct transport benefits of schemes should be considered to stand as a proxy for the final economic benefits.

SACTRA identified a number of circumstances in which market imperfections were likely to be important enough to invalidate the estimates derived from the conventional approach. Among these were imperfections in land and labour markets, as well as conditions in which the prices paid by transport users differed significantly, on account of subsidies or externalities, from the marginal costs. The Committee suggested that some of the consequences of relaxing the effects of the perfect competition assumption might be taken into account through developing Land-Use/Transport Interaction (LUTI) or Spatial Computable General Equilibrium (SCGE) models. While some LUTI models had been developed for use in Britain, including the MEPLAN and DELTA models, their use had been very limited because of their complexity, and because they did not link directly to the Department's appraisal methods. SCGE models were then only at an experimental stage though the subsequent development of the model used by the HM Revenue & Customs has improved the position. However, the way in which transport improvements – as opposed to, say, tax changes – are input to SCGE models remains challenging. The Department also published a discussion paper, *Transport, Wider Economic Benefits and Impacts on GDP* (DfT, 2005), which set out its understanding of the effects of investment on agglomeration and other changes in productivity, which were being implemented as part of the wider effects in the cost–benefit appraisal, and the relationship between these effects and the impact of transport cost changes on GDP.

The Labour Government that took office in 1997 had made a manifesto commitment to an integrated transport policy. This commitment was realised in the field of appraisal through the New Approach to Appraisal (NATA) and the comprehensive documentation in the Department's WebTAG (**Web**-based **T**ransport **A**nalysis **G**uidance) guidance of a mandatory set of appraisal and modelling requirements which were to be used by all sponsors of schemes seeking government support. NATA changed the way in which information about a transport scheme was presented to decision-makers, with a summary

of the full set of impacts provided in the Appraisal Summary Table, supported by more detailed documentation. NATA helped to demonstrate that decision-makers did not simply rely on the quantified costs and benefits which were valued in money terms, but also took account of the unquantified impacts. The overall framework was still founded on the principles of CBA, although on a broader set of benefits and costs than could be incorporated into a benefit:cost ratio (BCR). In the associated Roads Review, every scheme under consideration for entry to the roads programme was considered alongside every other, using the summary table, and a scaled-down programme capable of being delivered within a Parliament was developed.

By the mid-2000s, a now familiar theme was developing in government, namely that weak transport infrastructure might be holding back productivity and economic competitiveness. To complement the bottom-up approach of scheme appraisal, the Treasury and DfT commissioned a joint review of the transport infrastructure programme under the chairmanship of Sir Rod Eddington. The Eddington Report (Eddington, 2006), like the SACTRA report, supported the use of CBA as a means of informing decision-makers and helping to determine priorities. The report considered the scope for a better-informed process of decision-making at a more strategic level, to inform choices about the allocation of funds between programmes – for example between local and national spending pots, or between road and rail investment. It suggested a way forward through a more systematic assessment of problems, and a comprehensive process for generating options, including influences on demand, as a means of ensuring that the transport budget was spent more effectively.

The Department responded to Eddington in its publication of a paper *Towards a Sustainable Transport System* (DfT, 2007). The paper committed the government to adopting a process for longer-term planning of transport investment across all modes, one which recognised the respective roles of national and local schemes. The focus of the strategy was on the Eddington analysis of problem identification, and prioritisation according to the categories of inter-urban routes, urban areas and links to ports and airports. CBA provided the means of determining priorities, with a further emphasis on the need to reduce transport's impact on climate change. However, ministerial changes, followed by the change of government in 2010, meant that this proved to be something of a blind alley.

The Eddington Report also recommended that the Department include in the WebTAG appraisal framework a requirement to estimate, where appropriate, the benefits of agglomeration, the impacts of imperfect competition, and certain labour supply effects, all of which are classified as part of the 'Wider Economic Impacts' of scheme. This recommendation followed from research undertaken for the Department in response to the SACTRA report and which provided evidence of the effect of transport cost changes on a measure of urbanisation defined as economic mass and of a relationship between this measure of economic mass and productivity. This capability to quantify the agglomeration benefits of a transport scheme, using an approach which was restricted to additional positive external effects, avoided the double counting of the conventional time savings and was consistent with the welfare-based cost–benefit method. The labour supply effect covered in the new WebTAG guidance on 'Wider Economic Benefits', later renamed 'Wider Impacts', provided scheme sponsors with the option, to be presented as a sensitivity test, of using the outputs from a LUTI model to show the effects of the relocation of economic activity predicted in the LUTI model on employment and on productivity. The quantification of these wider economic benefits resulted in strengthening the case for urban transport schemes to a significant extent in cases such as Crossrail, where it added around 40% to 50% to the benefits.

A further extension of appraisal methods was the requirement to consider and assess the impacts of an intervention across specific social groups, unless there was evidence that such an impact was likely to be minor. The WebTAG guidance identifies the socioeconomic groups of relevance and the set of impacts to be assessed. The intention of the distributional analysis is to identify the extent to which both the beneficial and the adverse outcomes of the project affect specific groups in the population more than the average.

Consultation on appraisal methods, initiated by the Department in 2008 as the *NATA Refresh* (DfT, 2009), resulted in a number of changes to the way in which the results of the appraisal were presented. One of these changes was to the way in which the costs of a scheme were defined. The change in taxation resulting, for example, from a change in fuel duty revenues when people switch mode, which had previously been counted as part of scheme costs, was reclassified to count as a change in benefits.

2.4 Wider still and wider

The main development in the policy framework into which the appraisal process plays under the 2010–15 Coalition Government has been the introduction of the Transport Business Case (TBC) model, following an approach which was developed by Treasury for application across all government spending programmes and has been taken up and implemented with particular enthusiasm by DfT. The Department's adoption, in 2010, of the TBC has helped to formalise the other elements of the decision-making process. The five-case TBC comprises:

- a strategic case, providing a rationale for the intervention, and setting the project into the wider strategic objectives of government policy; this is the really distinctive new feature of the TBC and we discuss it more fully in Section 5 below;
- an economic case, following a WebTAG-compliant economic appraisal;
- a financial case, establishing whether the project is affordable and how the costs will be funded;
- a management case, describing the processes which are in place to ensure that the project is deliverable, the governance in place to manage its delivery, and the risks involved; and
- a commercial case, setting out the contracting and procurement strategy and the management of the delivery risks.

The completion of the financial, management and commercial cases is a necessary condition to a project being approved. While each part of the TBC interacts with every other part – in that, for example, a revision to the patronage forecasts used in the economic case will affect the financial case for a rail scheme – these three parts of the TBC act in a rather different way in determining priorities when compared with the strategic or the economic cases. They provide a 'go', 'not ready' or 'no go' signal, rather than demanding

a judgement from the minister about how far up a list of projects which are ready to proceed a scheme should rank.

The role of the economic case is defined in DfT's value-for-money guidance (DfT, no date). The majority of schemes that ministers approve are forecast to deliver 'high' or 'very high' value for money. Guidance provided by ministers to the Highways Agency, Network Rail and promoters of local transport schemes set out these same requirements applying to the schemes for which these organisations are seeking funding. DfT's definition of value for money is based in the first instance on the project's BCR, derived from the costs and benefits which are quantified and valued in money terms in DfT's WebTAG. The unquantified benefits are then reviewed by decision-makers to establish whether, in their view, the magnitude of such impacts might be expected to change to a significant extent the monetised BCR. A Departmental guidance note was published (DfT, 2013a) in order to help local decision-makers understand how those responsible for advising ministers had reached a view about the money values that might be attributed to these impacts. This modification to the BCR, which follows from including the impacts which are omitted from the conventional BCR, is of particular relevance where the BCR would be raised above or pushed below a value of 2.0:1. Transport ministers have decided that schemes with a BCR, after being modified to reflect the likely unquantified impacts, of 2.0:1 and above are to be classified as 'high value for money', while schemes with a modified BCR of above 4.0:1 are labelled 'very high value for money'. Most schemes that fall into these value for money categories are likely to be approved.

Constraints on public spending mean that few schemes classed as 'medium value for money' – i.e. with a modified BCR of between 1.5 and 2.0:1 – and none classified as 'low' (with a value between 1.0 and 1.5) are likely to be approved. The Department publishes a table biannually which shows the percentage of investment spending on projects classified as 'high' or 'very high' value for money. The most recent table (DfT March 2015) shows that 89% of investment spending was expected to achieve this objective in previous years the figure was 100%. This does rather raise the question about whether the nomenclature is appropriate since in current circumstances a scheme may be 'high value for money' in absolute terms but represent only modest value for money relative to the other projects with which it is competing for funding. The economic case also provides the basis for ranking mutually exclusive options, and therefore for determining the preferred option for resolving or ameliorating the transport problem in question.

The Department continues to commission research from external independent experts, of which a recent example is the report *Transport Investment and Economic Performance: Implications for project appraisal* (Venables et al., 2014). An extensive programme of research, along with other proposals for updating and improving transport appraisal methods, has been announced in the Department's October 2013 paper *Understanding and Valuing the Impacts*

of Transport Investment (DfT, 2013b) and a more recent progress report (DfT, 2014). A new study on the national value of travel time and reliability is currently in progress. Two other organisations with an interest in transport, the RAC Foundation and the Independent Transport Commission, have played a leading role in reviewing trends in transport and policy developments, filling some of the gaps in knowledge about likely future developments and options for managing these changes, and commenting on the implementation of transport policy (e.g. Smith et al., 2011).

This brief overview of the Department's appraisal methods shows how durable they have been. There have been thirty ministers responsible for transport since Barbara Castle (1965–8), who together with Chief Economist Sir Christopher Foster was largely responsible for setting up the then Ministry of Transport's appraisal methods and establishing their role in the decision-making process. They have lasted because, while the principles underlying them remain unchanged, the methods themselves have been adaptable and flexible enough to respond to new policy concerns. The account above outlines some of these responses made in order to ensure that, through a process of updating the methods and introducing incremental improvements, the role of appraisal remains relevant to decision-makers. There is much common ground between the appraisal principles of the 1963 study of the Victoria Line and those of the economic case for HS2.

While some of the changes to the appraisal methods have been made to reflect what might be classed as technical improvements – such as updating values of time or expressing certain environmental impacts in money terms – many have been made in response to policy objectives. An example of this is the addition of agglomeration benefits in order to meet policy concerns about the impacts of transport on urban areas that existing methods failed to capture. Part of the analysts' task was to demonstrate that this source of benefits was additional to the transport user benefits which were already accounted for within the existing method and that, in so far as it was possible, the investment was a cause of the additional economic benefit and not a consequence of it.

Several of the people we spoke to suggested that, if the appraisal system had not been developed or had proved less responsive to new demands, some other framework to inform decision-makers would have had to be invented. They noted the range of applications of the appraisal process, which, if the Department's guidance on proportionality is heeded, allows for consistent decision-making across a wide range of schemes, varying by size, scope and mode.

Further evidence of the value of a transport investment appraisal method based on CBA comes from a review of international practice commissioned by DfT (Mackie & Worsley, 2013). Most northern European and English-speaking countries overseas have adopted CBA as a means of providing decision-makers with advice about the case for a scheme. Differences were noted between countries in the extent to which distributional and spatial factors that fall outside the CBA influenced the decision, and differences also existed between devolved authorities in countries with a federal administration. However, the similarities of appraisal method across the seven countries studied greatly outweighed the differences.

3. Some Critiques of Transport Cost–Benefit Analysis

In the previous section, we have shown how transport CBA has been developed incrementally over a lengthy period. Not surprisingly the appraisal framework and method has come in for a considerable amount of critical attention. Of course some of the criticisms are made simply because the consequence of accepting the framework is an unpalatable outcome for the critic, who is prejudiced in favour of or against a scheme. But others are principled critiques which come from a genuinely disinterested viewpoint.

3.1 The political science critique

The political science critique argues that CBA encroaches too far on the discretion of democratically elected politicians to make choices on behalf of society. Attempting to add up apples and pears, proponents say, is a largely futile exercise which is as likely to confuse as enlighten. Peter Self's attempted demolition of the Roskill Report as 'nonsense on stilts', and Alan Williams's entertaining rebuttal, remain the best exposition of the issues at stake (Self, 1970; Williams, 1973).

3.2 The technical critique

The technical critique broadly accepts CBA and the Framework Approach as a useful device around which to conduct a public debate on the merits of doing something, but rejects particular features of the modelling and valuations which are used to populate the framework. Among the most famous disputes is the 'roads generate traffic' issue, which concerns the reasonableness or otherwise of assuming that traffic growth is wholly exogenous to the provision of additional capacity. This was the subject of the 1994 SACTRA report. Another set of issues is raised by the sheer dominating importance of the valuation of travel time savings (or more properly the differences in journey times) in the transport CBA approach. Examples of such issues include whether evidence on the value per minute of saving ten minutes can reasonably be extrapolated to the value of saving a minute, and whether savings in business travel time

should be assumed to be 100% convertible into additional output valued by the wage rate plus overheads. These have been live issues since time immemorial and may never be entirely resolved. But commercial forecasts made by train operators or by airlines of revenue generation through service improvements rely on very similar methods; these issues are not unique to CBA.

3.3 The planners' critique

The planners' critique is the belief that the engineering–economic method focuses essentially on the wrong phenomena, ones which are far too narrow. What is important, according to this point of view, is how changes in accessibility can be converted into changes in land use, and how transport can work in a package deal with other interventions in land use, skills and regeneration policy to improve the performance of the spatial economy. We return to this below. An overlapping critique is that, despite the statements in the Treasury *Green Book* (2003, 2015) and WebTAG, CBA in practice pays relatively little attention to social and distributional impacts, except in the unusual cases where these impacts are the raison d'être of the intervention. There is a good reason for this; in our view, a full distributive assessment of HS2 or airport capacity in London would be an order of magnitude more difficult and expensive to undertake than an efficiency assessment, and such difficulty and cost would be out of proportion to any social or distributional change attributable to the scheme.

3.4 The GDP agenda

The GDP agenda argues that the currency of CBA is fairy gold. BCRs of 4 sound good, but what do they really consist of? How real are the benefits? Close behind this thought, and amplified by the global financial crisis, comes the proposition that it would be much more secure and robust to measure the changes in GDP caused by transport improvements. Forget about the direct transport benefits; concentrate instead on what happens in the 'real economy'. The growth in the real economy attributable to the scheme provides additional tax revenue: a well-chosen set of schemes pays for itself. A variant of this is the proposition that transport CBA may be a good framework for considering marginal projects, but is not good for considering projects which are in some sense step changes.

3.5 The localism agenda

Implicit in many of the arguments for CBA is that the best way to get social value for money is to have central control over a pot of money and then ensure that it is allocated to the opportunities which yield the best expected return. This implies that DfT as central agency possesses the resources and capability to elicit the truth from a wide range of authorities and agencies in competition for funding. An alternative theorem is that, faced with a shot to nothing in a world where capital schemes are centrally funded, the incentive to 'play the system' will be almost irresistible and the discipline imposed by CBA will be too weak. Protagonists of this position, the localism agenda, say that ultimately it is necessary to line up political power, revenue raising, decision-making and control in the same place, at a local level. While CBA might still provide a framework, it would not be surprising if the value set at the local level were different. A particularly difficult issue in the case of transport is deciding what is legitimately local and what is national, and how to handle the multitude of circumstances where they overlap, as we discuss below.

The combination of these critiques has led to a sense that after fifty years of piecemeal development, an intellectual crossroads has been reached, with transport CBA under scrutiny, perhaps subject to intellectual challenge. Before we examine the challenges further, we wish to digress slightly to the role of analysis more generally.

4. The Role of Analysis in Contributing to Policy

A different critique of CBA has been that it has not been used, or at any rate not turned out to be very useful, at higher levels of policy. The preceding section refers almost exclusively to the domain of projects, and whether they are worthwhile. But projects must come from somewhere – they must fit into some prevailing ethos, there must be a whole domain of prior decisions which lead to the situation in which (say) the A14 Cambridge–Huntingdon scheme is brought forward and needs to be assessed. In fact there are several different prior stages in policymaking which can be identified.

4.1 Policy goals

First of all, there are the policy goals themselves. For a long time, these have been broadly the same, being based on the proposition that reducing the impedance between places is a 'good thing', contributing to social well-being. Indeed, this is so ingrained in the psyche that it is rarely mentioned in official documents, which tend to refer to the next level down, namely objectives such as fostering economic growth, improving safety and environmental quality. These objectives have remained broadly constant over time. But the interpretation of what they mean has changed, partly because of changes in knowledge and understanding, partly because of changes in external pressures that governments face, and partly because society and technology change. For example, environmental assessment has broadened from essentially local (noise, pollution) through regional (loss of heritage and biodiversity assets) to global (carbon).

Moreover, policy priorities have fluctuated. For example, in the 1980s, as mentioned earlier, safety policy was pushed right up the agenda, in part by an effective junior minister, Peter Bottomley, who was influential in creating a stretch target for reducing road deaths and in commissioning economic work which led to a doubling of the safety values used in appraisal. Here, analysis and policy went closely together. Our perception is that achieving policy goals for the reduction of carbon emissions has been viewed as extremely important

for the last twenty years, but has perhaps not been quite at the same level of policy priority in the last five years or so. This is primarily because the global financial crisis and its aftermath has elevated economic performance in relative importance. So the issue of the evidence base on the relationship between infrastructure and economic performance, and whether this is fully captured and represented in policy analysis and scheme appraisal, has come strongly on to the analytical agenda – an issue to which we return later in the paper.

4.2 Policy levers

To a much greater extent than policy objectives change, the policy levers which are in fashion also change. This is perhaps most apparent in relation to regulatory and ownership policy, where in our view policy tends to be formed through some more-or-less ideological prism, and analysis is used in a subordinate role to provide support for a predetermined direction of travel and to help inform key policy choices within the mission. We would place the great decisions on rail privatisation and bus deregulation in that category. Clear policy direction is important – the real issue is how to achieve the right blend between policy formulation and analysis, which may vary from case to case. The Green Paper of 1993, *Paying for Better Motorways* (DoT, 1993), led to an analysis of how a direct payment regime might work, which led to a conclusion that for a variety of reasons – inefficient diversion, technology, avoidance, collection costs – motorway tolls would only work in unusual circumstances in Britain.

Policies for implementing congestion charging have also proved amenable to economic analysis. The Department's National Transport Model facilitated the assessment of alternative fuel duty escalator strategies analysed in a companion document to the *Ten Year Plan* (DETR, 2000a), *Tackling Congestion and Pollution* (DETR, 2000b). This was then followed by the *Feasibility Study of Road Pricing* in 2004 which used similar methodology to assess the demand side (DfT, 2004). But this is one of the best illustrations of the need for a blend between analysis and policy direction: given the technical and political difficulties in implementing road user charging, the policies which have been informed by appraisal have rarely been adopted. A notable exception was the introduction of congestion charging in London. The modelling and appraisal of a London congestion charge provided the evidence the newly elected mayor needed to implement a central London cordon charge. In this case, the political will and the evidence base on technical and economic feasibility did combine to enable something to happen (Richards, 2005).

Then again, there are examples of policymaking without analytical support. A case in point was the expensive decision to go for a free, national concessionary bus travel scheme for senior citizens and people with disabilities. This would have been susceptible to some form of economic and social analysis, but that didn't happen. Questioned by the House of Commons Transport Committee (2008), the following exchange took place between the minister, Committee member Graham Stringer and the senior civil servant:

> "Q436, answer from Mr Harris:
>
> In terms of social inclusion… pensioners… are making journeys that they would never have considered making before… I think the principle of offering pensioners, older people and disabled people free bus travel is one which is very difficult to criticise.
>
> Q438–440, extracts from Mr Stringer:
>
> When those people move, apart from them moving, is their quality of life either in health, education or in other ways, is the government looking at measuring that?
>
> Q438 and Q440, answer from Mr Harris:
>
> To be honest I am not aware of specific bits of research that DfT have made in this case… There will be an analysis after it is fully implemented… I should think this is a political decision the government has made… because we think this is a good thing.
>
> Q443, answer from Mr Linnard
>
> …We have not tried to do an assessment in economic terms of the benefits of it. As the Minister has said, it is essentially a political decision for wider reasons."

The right blend of analysis and policy to inform this decision was not achieved. Yet in that case, as soon as the policy came to be implemented, all sorts of questions emerged about how to measure the compensation due to operators for revenue forgone and additional costs in a free-travel environment. The need to provide guidance which would give funding authorities a baseline against which to demonstrate compliance with the 'no better off, no worse off' principle enshrined in legislation, and thereby head off endless appeal cases and judicial reviews, became acute. So economic analysis, though not of the health and education benefits, that might have provided evidence about the case for the scheme, came in subsequently at the post-implementation stage (Dargay et al., 2010).

Overall we think that economic analysis has played a variable but relatively modest role in policy formulation. Often, policies are presented as being "non-negotiable". They form part of a prior commitment, and decision-makers may reject alternative policy options as being inconsistent with their objectives. We were told by one protagonist that Secretary of State Nicholas Ridley's policy goals for the bus industry in 1984 were a deregulated, privatised and entirely unsubsidised industry. On being told he could have the first two but not the third, he settled for that. Rail privatisation is an example of a decision where substantial ex ante economic analysis of the structural options would have been inconsistent with the overriding policy requirement to get the job done. In any case, economic modelling of the effects of policy options on transport providers and their efficiency is often seen to be difficult and controversial, and refuge is taken in the assumption that markets will behave contestably even if there are few firms in them.

4.3 Programmes and plans

In between the policy level and the scheme level there is the intermediate level of strategies, programmes and plans. They may include initiatives of various kinds. They may be regular exercises such as the Comprehensive Spending Review, or they may be one-offs involving a high-level concept or vision then being implemented through a package of interventions by means of a bidding process. For example, the list of projects in the *Transport Ten Year Plan 2000* (DETR, 2000a) were all appraised using indicative estimates of costs, and options were selected which looked as if they would be likely to deliver value for money. Other examples of appraisal informing a strategic package of investment are the 2007 and 2012 rail High Level Output Specifications (HLOSs) (DfT, 2012). The value for money of the anticipated programmes was appraised after a set of specimen schemes had been developed and a rail demand forecasting and appraisal model had been used.

At Transport for London, there has been lengthy experience of plan development using CBA methods and the use of a close analogue to BCRs, the 'passenger miles per pound net cost pass mark' approach to ranking and prioritising public transport service policy options within a budget constraint.

But Transport for London is probably the only transport agency in the UK to have a long and continuous history of building up its own business case development manual. Other cities have a long way to go to achieve that level of maturity of their processes.

Policy concerns have influenced the relative sizes and composition of the programmes of road, rail and local transport investment. Road investment dominated the transport capital programme throughout the years up to the recession of the early 1990s. Passenger rail patronage remained fairly constant and, with no case for additional capacity, the investment programme on the railways was focused on minimising the costs of maintaining the service when renewals became necessary.

While investment in rail infrastructure enhancement is invariably subject to appraisal, the requirements for appraising rail franchises on their renewal are rather limited in scope. Incremental enhancements or decremental changes to the pattern of services which bidders propose will be assessed. But more fundamental questions about the rationale for grant are not appraised, and have in truth been off the agenda since the Railways Act of 1974. Nor is there any economic assessment of the geographical coverage of a franchise, its structure or the appropriate level of competition between operators. These issues, which involve a mixture of supply side and demand side questions, would require a rather different evidence base to be built up. It will be interesting to see whether devolution, be that in Scotland or in the case of Rail North, has any effect on the long-standing position that some potatoes are too hot to handle.

One area where one would have expected modelling and appraisal to be crucial tools is in urban transport policy. The technical state of the art was developed substantially in the 1990s through the Common Appraisal Framework and Integrated Transport Strategies, but a combination of resources and politics have made implementation difficult. Bids to DfT have generally been made up of a mix of minor improvements and safety initiatives, with the occasional separately funded major scheme which could be appraised on a standalone basis. A few tram schemes have gone through the system based on evidence on patronage levels, reductions in road congestion and, in some cases, avoidance of heavy rail renewals expenditure. At the local level, these schemes are often regarded as more than merely incremental, helping to improve the image of the city and its city centre environment. At central government level, trams are one of the best examples of policy being cyclical, and of the timing of scheme submission against economic and policy cycles being crucial.

More generally, appraisal seems to have played less of a role than might be expected in helping to determine priorities across modes. There is evidence (Dodgson, 2009) to suggest that rail schemes tended to deliver lower BCRs than highway schemes, although the rail schemes included in this comparison

had been appraised before the recent upturn in rail demand. Cross-modal comparisons are difficult to make, and their absence together with modal budgets set for arm's-length agencies such as the Highways Agency and Network Rail, and for major local transport schemes, means that the desire that exists in principle for across-the-board investment appraisal has not been matched in reality. The cause of extending appraisal consistently across modes was not helped by the 2001–3 Multimodal Studies, which were expensive and failed to be genuinely multimodal, and in some cases failed to be in synch with the budget available for new investment, which itself was drastically affected by the Hatfield disaster[2] and subsequent collapse of Railtrack.

Appraisal has played a role in protecting transport's capital budget during times of public spending cuts. The appraisal process provides transport ministers with evidence of value for money, which gives them an advantage over those departmental ministers whose spending proposals lack such a persuasive case. And by quoting, in support of transport investment, the benefits to business and commercial users of the transport network and the agglomeration-based productivity effects, transport ministers have had some evidence to support the assertion that investment has a direct effect on the government's economic growth objective and hence generates much of the revenue required to fund it.

The change made in 2010 by the introduction of the Transport Business Case has the potential to extend the role of appraisal into policy implementation. The TBC requires the sponsor of a scheme – or, arguably, a policy – to provide both an **economic case** based firmly on the cost–benefit methods that have evolved over the past half century and a **strategic case**. The TBC also fulfils certain other objectives, such as demonstrating that plans for managing and delivering the project are in hand. The strategic case provides the opportunity to set a policy or package of schemes in the context of wider policy objectives and thereby help decision-makers understand priorities across a much wider spectrum of options than might be informed by the cost–benefit-based economic case. This is a very positive development when it provides an opportunity to present initiatives and impacts in their context.

2 In October 2000 four passengers died and over 70 people were injured when an InterCity 225 from King's Cross derailed at over 100 mph near Hatfield, Hertfordshire.

5. The Challenges for Policy and Appraisal

In this section, we set out what we think are the principal sources of challenge to policy formulation and appraisal as presently conducted. The forces for change are political, economic and institutional, and they are woven together in a tapestry.

By political we do not mean party political so much as the sphere of imperatives which face any government. For the last seven years, government has been operating under the fallout from the global financial crisis, and this has brought into sharp relief the question of the relationship between transport and economic performance. Although prefigured to a degree by SACTRA (1999) and Eddington (2006), it is in the last few years that we have seen a much stronger emphasis on the question "What will doing X do for the economy, whether at national, regional or local level?" We also observe a political desire for strategic interventions in transport infrastructure, which places demands on the capability of the appraisal system to provide the right outputs for decision-makers in a timely manner.

These demands spill over into a whole raft of technical issues which include modelling the macroeconomic effects of transport interventions; representing the interactions between infrastructure, land development and the economy; and considering behaviour change created by a mixture of technology, lifestyles, preferences, household formation and raw economic forces such as part-time employment and self-employment. We detect a greater importance attached to reliability and resilience, partly because modern life requires systems to work consistently when operated ever closer to capacity, and partly because threats from high winds, flooding and other phenomena appear to be on the increase. A combination of forces, including the desire for healthy living, brings new factors into play. This adds up to significant new demands on the knowledge base underpinning appraisal and also the presentational styles required.

Overlaid on all of this is the apparent will for fundamental institutional change in the direction of decentralisation of decision-making to the Local Enterprise Partnerships (LEPs) and combined authorities, together with placing infrastructure providers at arm's length from government. The appraisal system was created for a highly centralised environment within which central government controlled the rulebook and funding, and in many cases directly owned the operating agencies. Within that organisational structure, precisely how and to whom the benefits would materialise was secondary to estimating their magnitude. In future, life may not be quite like that – and appraisal will need to find its place within a multiagency world where the objectives and incentives under which different agents operate may vary.

We consider the issues which this cocktail raises under a series of headings.

5.1 The need for a strategic narrative

By and large, transport policy has been run in a rather tactical way. Strategies have been defined at certain points – the Motorway Programme, the Railways Acts of 1974 and 1993 for example – and these have provided the environments within which sector policy has operated. Attempts to enunciate broad strategy, such as the transport policy White Papers of 1977 (ACTRA, 1977) and 1998 (DETR, 1998), have enjoyed only modest success in influencing action on the ground. More recently DfT has clearly struggled to create a National Policy Statement which provides real overarching direction and content. Within this context, appraisal has been a useful tool for supporting tactical decisions – see for example an analysis of the pattern of decisions in the 1998 Roads Review (Nellthorp & Mackie, 2000).

But now, things have changed. As one witness put it, "the zeitgeist requires a strategic narrative". Why are we even thinking of doing X? What contribution does it make to economic performance goals at the local level, and what does it do for UK GDP? These questions are encapsulated in the adoption by government of the five-case TBC (HM Treasury, 2013).

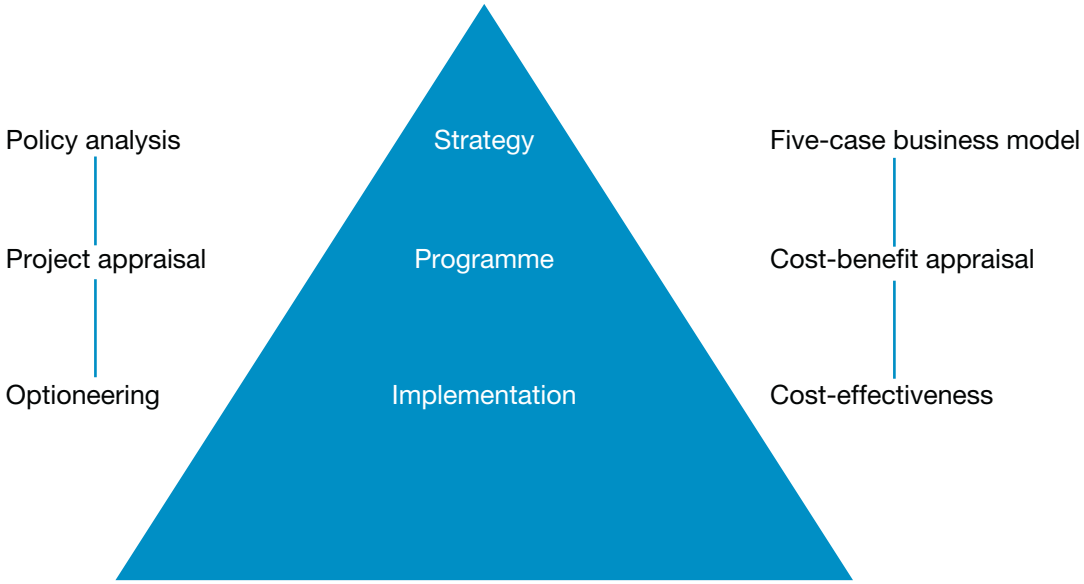
In reality, four of the five components of the TBC are codification of previous requirements. For example the economic case requirement is essentially to deliver an appraisal which is compliant with WebTAG, the appraisal guidance manual, so no change there. The requirement to state how the project will be funded, financed and delivered is really nothing substantively new for transport, although specifying this as a formal requirement might reduce abortive spending on the appraisal and modelling of schemes which cannot be funded. But the strategic case is conceptually different from what had gone before, because it requires the assessor to write down the high-level case for doing something. This is a challenge for CBA and the appraisal framework in various ways. The framework is good for addressing how a predetermined intervention performs against a set of policy objectives. It is not yet so good at helping to answer the more open question – why do this scheme, rather than any other? Perhaps a cause célèbre in this regard is HS2, where the appraisal framework following WebTAG has been internally consistent, yet this has not helped government to articulate what the project is actually for. There has been too much of a gap between the technical analysis process and the policy process. Never has the premium on quality interpretation and translation skills needed to elucidate the meaning of technical results been so great.

Even more fundamentally, CBA and the Framework is not good at answering the question – what difference will doing X make to economic performance? Yet one would expect the strategic case to demonstrate that performance will improve in these ways, via these economic channels, to broadly this extent, if X is done. As we will discuss further below, doing this properly is difficult.

The reaction of some commentators and reviewers of the scene is that the strategic case requirement is a mistake, confusing aspiration with reality, is bound to be politicised, and is not subject to the evidence-based approach which is used for the other four strands of the TBC. But we take the other view – the strategic case forces the system to examine, and be subjected to cross-examination of, the basic reasons for spending public money in particular ways, which is why it should be a public document. Done well and honestly, this approach could shine a light on real policy choices. We see the strategic and economic cases as complementary expositions but at different levels.

Our view is set out in Figure 5.1. There are three broad levels. At the top is the case for doing something, how it fits with social goals and the overall rationale. In the middle is some sense of value for money, priority and deliverability. At the bottom is the multiplicity of technical and design choices which need to be made. The middle level is pivotal because it needs to be capable of ‘talking’ both to the upper and lower levels.

Figure 5.1: The decision hierarchy



Source: Mackie et al, 2014

But there is much work to do. Given that there are thousands of pages of appraisal guidance on how to do transport CBA, there is in actual fact only the thinnest guidance on how to present – and, more importantly, assess – the strategic case. This suggests that if the TBC model is to be taken seriously and used as a tool to support decentralised decision-making (see section 5.7 below), much more effort will be required to codify and provide the evidence base for the strategic strand. There are risks of a proliferation of guidance, as the objectives that any single scheme or package might cover are diverse. But many key themes, such as the impact of a scheme on the level and location of investment and employment, recur often enough to merit some more formal approach to ensure effective use of the growing pool of evidence about transport's effect on economic performance. The 2014 report *Transport Investment and Economic Performance*, referred to above, is a start to this process.

In carrying out this piece of work, it came to our attention that the strategic case for national schemes is not routinely published as part of the evidence in support of the scheme. One of the reasons given is that it would be difficult, and possibly contrary to public policy interests, to publish the commercial and financial cases. While we accept this, we think that this is not a legitimate reason for not publishing the strategic case for schemes which are accepted into the programme, so as to provide the overall policy case for implementing such schemes. A number of the strategic cases for local transport schemes have been made public without the roof falling in, as have the strategic and economic cases for HS2.

5.2 The desire for big announcements

The apparatus for appraisal is most comfortable when applied in an incremental context and where decisions have yet to be taken. Most transport-sector capital decisions are like this, but HS2, the capacity of the London airports system, HS3 and Crossrail 1 and 2 are all argued to be potentially game-changing or transformational. Thus the wheel has turned full circle since the Eddington Study which advised against 'grands projets'. The political environment surrounding such projects is different in nature in a number of respects:

- There can be a degree of political commitment to an idea well in advance of the analysis of that idea. Some of our civil servant witnesses told us that deciding that something wasn't such a good idea after all is one of the most difficult things for decision-makers. The impetus for the project may come directly from ministers, but this does not necessarily mean transport ministers. Some ministers, such as Lord Adonis, feel comfortable in the mantle of visionary; others, meanwhile, are more of a steady hand on the tiller.
- The timetable for the technical appraisal may be significantly influenced by considerations of political timing, the Parliamentary timetable, the electoral cycle and so on.
- These problems arise in extreme form where the agency responsible for promoting the scheme is also responsible for its appraisal.

Appraisal works well when the opportunity cost of doing something is the failure to do something else within the sector budget. Then the concept of choice becomes real, and metrics which facilitate ranking – both of schemes against each other and options within schemes – are useful. However, megaprojects such as HS2 are by their very nature unique. It is not clear what their opportunity cost is, and it is quite possible that they lie partly or wholly outside the transport budget. Probably, major transport infrastructure is really competing with energy, water and telecoms projects rather than transport. So the comparability of appraisal across sectors – and between government and the private sector – becomes important, as does the transparency with which these large-scale public choices are made. Nor is the scale of public investment the only measure – DfT has long viewed London airport capacity as one of its most pressing policy issues, even though the amount of direct public investment will be relatively small by the standards of HS2 or Crossrail.

5.3 Transport investment and economic performance

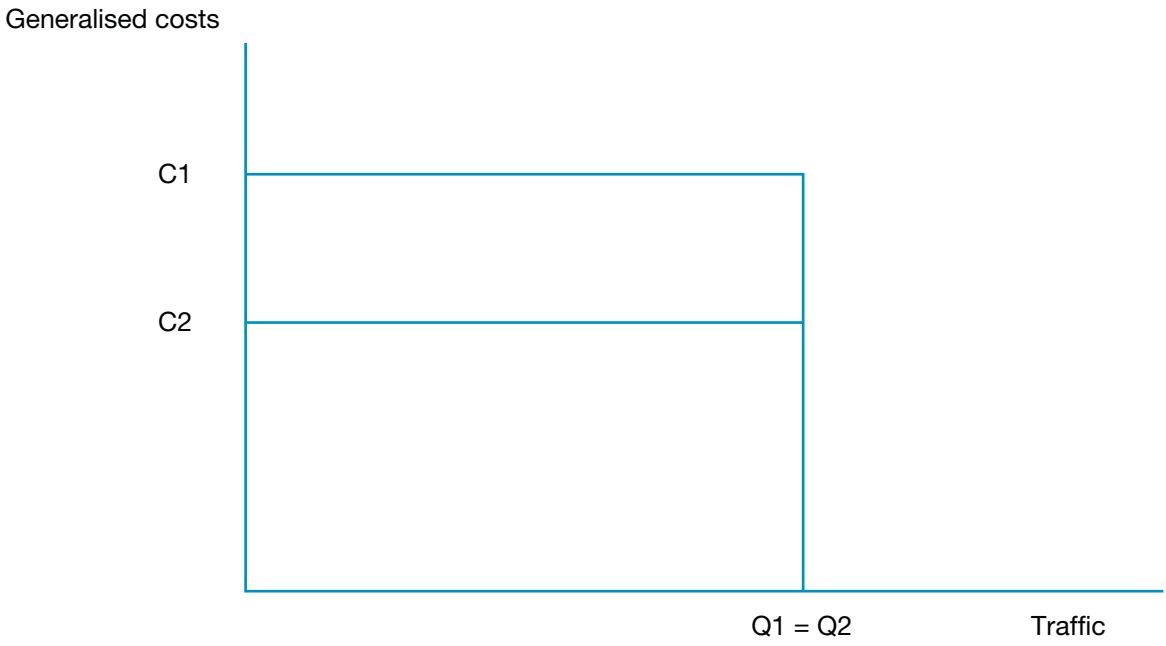
Underlying the above is the fundamental belief, almost a mantra, that improved transport infrastructure will achieve its payback in improved economic performance and through the additional tax revenues that this generates. Not unreasonably, this leads to a demand for estimates of the economic impact of doing something, which one might expect to be an output of the appraisal

process. Unfortunately, this sits rather awkwardly with conventional transport appraisal, for reasons which can be seen in a simplified exposition.

The conventional approach to appraisal has been developed from a world view in which travel demand is fixed in any given time period, varying over time with exogenous factors such as population, household structure, employment, car ownership and income per head. All the effort of modelling and appraisal is focused on estimating the difference, between the Do-Something and Do-Minimum states of the network, in the generalised cost of transporting the fixed volume of trips through the network. In this limiting case the user benefit is the difference in generalised cost associated with the changes in speeds and costs through the network. This approach was developed by DfT with Treasury approval for the specific purpose of providing decision-makers with a means of comparing a large number of roads-based options. The simplifications made were judged acceptable in these circumstances. For example, the fact that new roads caused traffic to increase was well understood, but judged to be immaterial at a time when congestion was not widespread, since any demand generated simply increased the benefits and had little effect on decisions about priorities. A different approach was applied for urban schemes, where the methods used to model and forecast demand extended the set of options facing the transport user to choice of mode and of destination.

The conventional approach to appraisal also assumes, both in the short and the long term, a world of full employment. Such assumptions do not sit comfortably alongside policies aimed at using transport investment as a means of raising employment levels in those regions experiencing long-term structural imbalances. The strategic case for HS2, in providing a description of the benefits to the economy from the jobs generated in its construction, suggests a degree of Keynesian management of the economy which is at odds with the assumption of full employment underlying the economic case. Equally controversial is how to forecast and then value the net national employment effects of providing more airport capacity in the London airport system. Assumptions about full employment are not an inherent part of cost–benefit appraisal – indeed, applications outside the field of transport frequently adopt a shadow price set at below the wage rate to reflect the opportunity cost of bringing into the labour market people who would otherwise be unemployed. The issue for transport schemes is one of consistency: if the strategic case is made on the basis of a scheme's job-creating capacity, then the economic case should price these jobs at their opportunity cost rather than at the wage rate.

Figure 5.2: The fixed trip matrix



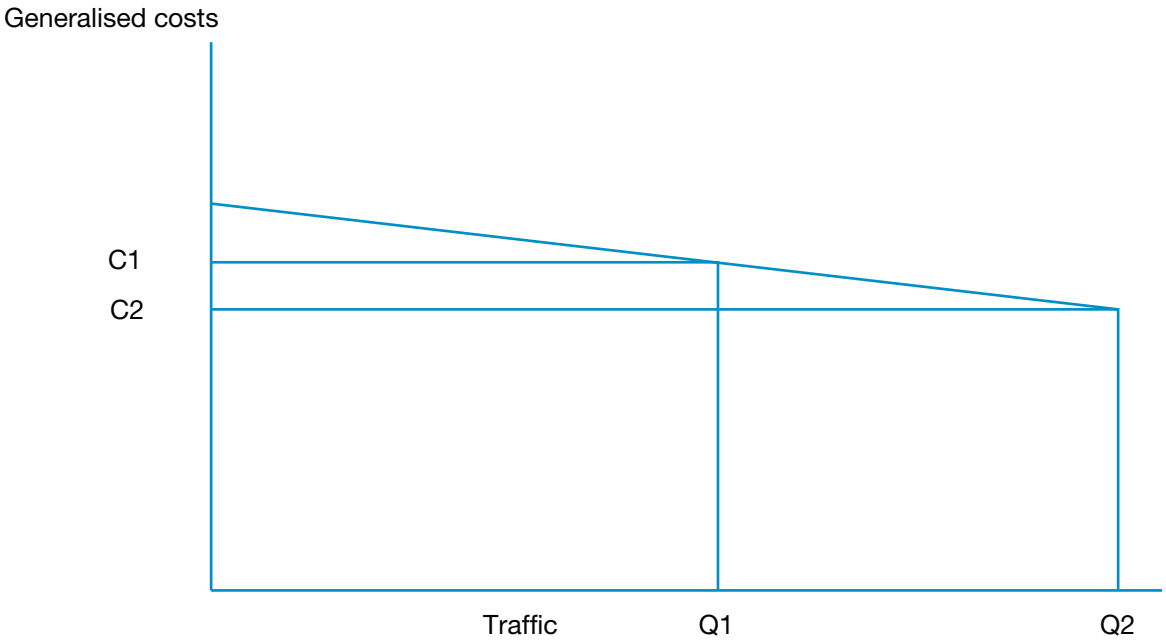
Source: based on Neuburger, 1971

Figure 5.2 shows the classic fixed trip matrix assumption which formed the basis for most transport appraisals until the late 1990s. This is Neuburger (1971) method one. A couple of points are worth noting. Since the benefits accrue to a fixed volume of traffic (Q1=Q2) in each time period, all the behavioural responses to the change in costs when networks are improved

are effectively switched off. The effect on economic performance occurs wholly through the fall in transport costs from C1 to C2 in the figure, which releases resources to be deployed elsewhere in the economy. That is the only interaction which occurs with the rest of the economy. Although in practice the variable trip matrix method is Neuburger's method two from his 1971 paper and implemented since the 1994 SACTRA report, relatively little attention was paid to the linkages between the transport sector and the rest of the economy until the SACTRA report of 1999. Even then, the chosen way forward was to find ways of bolting on specific impacts such as agglomeration benefits to the pre-existing logic structure. In many ways this was a sensible and prudent approach, but it does raise the question of whether the partial equilibrium framework of transport appraisal has reached the limits of its capabilities, at least for certain types of project.

Consider an alternative world view in which the rest of the economy is highly responsive to improved travel conditions as in Figure 5.3. Conceivably, increased capacity will be rapidly taken up by all manner of changes in behaviour – where people live, where they work, what leisure activities they choose, how firms choose to organise, where they locate, how they trade both inside and outside the firm, how the land development market responds, and so on.

Figure 5.3: Elastic demand



Source: based on Neuburger, 1971

Now in the illustrative case of highly elastic demand, most of the benefits do not accrue in the transport sector. This is primarily a capacity-enhancing scheme whose rationale is the value to the wider economy of enabling the higher volume of traffic (Q2-Q1) to flow. These benefits only arise if markets are imperfect, but there are plenty of reasons why they might be, including:

- taxation of goods or factors of production driving a wedge between resource cost and market price;
- monopoly rents to factors and firms;
- spatial imperfections, including zoning rules and physical scarcity of land, and the role of infrastructure in 'unlocking' inaccessible but valuable land;
- external economies such as agglomeration effects and coordination benefits of larger scale that is facilitated by better transport;
- dynamic effects, including possible tipping points moving the economy from one spatial organisation to another with second- and third-round effects; and
- changes in information and coordination costs of using the transport system.

These two world views may be thought of as the 'engineer's view' and the 'planner's view'. One focuses on the world as it is and the value of serving existing and forecast traffic better. The other focuses on the potential for catalytic change created by an intervention. Conceivably, reality can vary within this spectrum according to the relevant facts of the case; the relevant elasticities and response properties for the appraisal of Crossrail might be different from those for the A14 scheme in Cambridgeshire, for example.

However, if the rationale for interventions arises from a fundamental belief in a series of linkages between transport quality and economic performance, then it becomes necessary to analyse the response properties of the economic system. What happens to land development when accessibility changes? How do we get securely from estimating the increased development *potential* when accessibility is improved, to *forecast actual* development? What happens as a consequence to output and employment, prices, wages and rents? What are the costs and the benefits of the changes outside the transport sector, that need to take place for the potential to be realised? These are difficult and onerous questions, and although some excellent work has been done in some areas towards answering them, overall the technical world has not kept pace with political aspiration.

5.4 Predicting system behaviour and response

In the early days of transport appraisal, the actors within the system were either public bodies over which there was a high degree of control, or atomistic users of the system which could be assumed to behave competitively. While the market environment for road use has not (yet) changed greatly, the same is not true elsewhere. There is more emphasis now on cost recovery, either through

fares revenue or through contributions from developers or other beneficiaries, implying a need to consider the interactions between the provision of new capacity, the economic case, and the commercial environment within which the capacity will be exploited. For example:

- Urban schemes are expected, to differing extents, to be funded by a mixture of local and central taxpayer, user and land developer, all contributing to the funding envelope. This raises questions about the incidence of costs and benefits between these social groups. The economic appraisal tends to assume that this incidence is distributionally benign or does not need to be closely studied; but, increasingly, the incidence of benefits spatially, socially and by user group may need to be established in order to provide convincing evidence that a funding package can be assembled. The appraisal of Crossrail was used to demonstrate how the agglomeration benefits were spread widely across the whole of London, and it thus provided the evidence for establishing a supplementary business rate across Greater London. Comparable analysis of the distribution of Crossrail 2's impacts is now underway to inform decisions about funding that scheme.
- Rail appraisal is still conducted against a set of assumptions which belong to the BR era of an integrated railway planned as a single entity to operate in the public interest within budget constraints. It is debatable whether these assumptions hold when making the case for a new railway in today's environment. In the case of HS2, the nature of the track access charge model, the form of the franchises, the nature of fare competition, the behaviour of the regulator vis-à-vis open access services and even the ownership of the HS2 infrastructure itself are all uncertain. Yet the appraisal is somehow expected to be sufficiently robust to provide results which constitute the economic case.
- In the case of new airport capacity in London and the South East, a significant proportion of which is to be funded from air travellers, the appraisal must consider how the infrastructure owner will recover his costs through the regulated asset base; how the increased aeronautical charges will be passed through to airlines in an environment in which airports are somewhat competitive for some traffics; how airlines will choose to pass the charges to different market segments such as business and leisure with differing elasticities; and how the new capacity, the slot allocation system and the charging regime will interact with traveller preferences to produce the new market outcome. This is very demanding.

Broadly, therefore, there is a challenge to the appraisal in terms of the increasing complexity of the commercial environment with which the appraisal needs to be consistent. The five-case TBC provides a credible framework within which the commercial, financial and economic trade-offs could be analysed; but as yet the content of the modelling, forecasting and appraisal fails to address these changes to the way in which transport infrastructure is provided and funded (HM Treasury, 2013).

5.5 Technical challenges within the cost–benefit analysis framework

We have noted above that appraisal has broadened out considerably over time to encompass not just travel time, safety and operating costs but also environmental and wider-economy impacts. Probably the most important challenge within this framework is, rather like repainting the Forth Bridge, to keep the evidence base reasonably up to date and to maintain the expertise in government, agencies and consultants to use it.

Beyond this, the policy environment calls for some further broadening of capability both in modelling and appraisal. For example, the case for the managed motorway programme depends largely on improvements in reliability, yet modelling the impact of an intervention on changes in the travel time variability of each affected journey and appraising this has proved notoriously difficult. Aspirations for healthier lifestyles imply a need to forecast and evaluate the health benefits of increased cycling and walking, where the evidence base seems to us a bit on the thin side, being based as we understand it on a single Danish study. Infrastructure failures, such as the railway at Dawlish which was washed away in winter 2013/4, or the road bridge which collapsed at Workington in 2010, and the vulnerability of exposed bridges and overhead lines to high winds, suggest a need to find ways of valuing improved certainty and security of supply. In a recent review (Wardman et al., 2014) we did not find many examples of studies in transport of the value of reducing the return risk of an event such as Dawlish from, say, once in ten years to once in fifty. On the modelling and forecasting side, the question of how virtual communications change the shape of demand for travel, and how this feeds through into appraisal values, in particular the value of time savings, remains open.

5.6 Economic welfare or gross value added?

More important still is the higher-level proposition that the CBA framework is itself outmoded and fails to deliver answers to the questions which decision-makers typically ask. The most extreme example of this is the discourse:

Decision-Maker: What impact will doing X have on the economy?

Analyst: Actually, we use a value-for-money metric based on the foundations of welfare economics.

Decision-Maker: Oh, I naively thought economists knew about the economy. I'd better find someone else who can answer my question.

What are we talking about here? A starting point is to set out the differences between a CBA metric, such as net present value or BCR, and the gross value added (GVA) equivalent. Some of these differences are inherent in the definitions while others are more matters of practice.

- The CBA approach includes some elements not in GVA, such as the value of non-working time savings to leisure travellers and the value of changes in non-market goods/bads such as environmental impacts and part of the safety impacts. Right on the boundary are commuters, for whom travel time benefits may pass through partially into wages and hence final competitiveness, depending on assumptions about the operation of labour and housing markets and their elasticities. On the other hand the GVA approach considers the *gross* value of incremental output created as a result of induced employment change as entirely additional (no value being attached to leisure forgone by those induced to join the labour force), whereas CBA considers only the *net* social value of such effects.
- CBA uses at least some averaged values, such as the standard value of employers business time by travel mode, which do not necessarily reflect the market value in particular applications (HS2 being an example). The GVA approach at least in principle uses market values.
- CBA usually assumes full employment in the economy and an opportunity cost of resources equal to their price: it seeks out the net gain from doing something relative to doing something else which earns the marginal social rate of return. GVA methods often tacitly assume that both the investment itself and the downstream employment effects are net additional relative to the base case, so that a stimulus is provided via a multiplier effect.
- The CBA method relies predominantly on modelling the transport market with only the *additional* wider-economy impacts dependent on the representation of the transport–economy linkages. By contrast, the GVA approach depends for its total benefits on the representation of the modelled relationship between changes in transport accessibility and final economic impact. That is a heavy load on a rather uncertain relationship. A particular issue is how to model the extent to which transport cost changes

are passed through to final consumers, thus changing wages, prices and output, and the extent to which they are converted into economic rents to factor inputs instead of being passed through to consumers, with the consequence that their total value is different.
- In a cross-sectoral world where transport is linked up with land development, there is the question of whether the appraisal should cover only the project, or the development package as a whole.
- CBA invariably drives estimates of wider impact of changes in generalised costs to transport users and providers. GVA methods may use different drivers, raising issues about the validation of the transport-change-to-economic-change relationship.
- Finally there are issues of both methodology and data in populating whatever economic model (e.g. Spatial Computable General Equilibrium) is to be used to compute the total-economy impact. The difficulty that scheme sponsors face when attempting to derive a GVA estimate is compounded by the lack of official guidance either from the Treasury or from DfT, advising on a methodology and providing the required framework and data inputs.

All this suggests that if GVA metrics are to become part of the appraisal process, there is a need for clearer codification of the methods to be followed and the implicit mechanisms and assumptions on which the methods are based. Guidance would be needed on how to compare the CBA and GVA results for a given project, and above all much more work is needed on the interpretation and translation of the technical results for use within the decision process. One part of the guidance might be to clarify the requirements for such a metric. The initial impact of transport investment on the economy is likely to be very similar to that of any other publicly funded infrastructure project, with the impact being delivered in the context of the state of the macroeconomy and of the public finances, and the extent of spare capacity in the sectors delivering the scheme.

Evidence for a longer-term impact is supported by evidence from macroeconomic studies which shows that investment in transport can lead to higher long-term economic growth (Aschauer, 1989; and many successor studies). But these macroeconomic studies provide no clues to decision-makers about which schemes from their portfolio of projects are the more likely ones to further this long-trend growth objective, let alone the magnitude of even the largest of projects or programmes. DfT took the initiative by commissioning the 2014 research study *Transport Investment and Economic Performance: Implications for project appraisal* (Venables et al., 2014), and is now following up the recommendations of this study. But this is as much an issue for the Treasury as for DfT, since DfT is not alone in seeking to demonstrate the contribution of its programme to the government's wider objectives. And while the Treasury has acknowledged the case for broadening the scope of the impacts presented to decision-makers for non-marginal effects, their guidance (HM Treasury, 2015) does no more than briefly outline a number of approaches that scheme sponsors, including Transport for

London and Transport for Greater Manchester, have followed. It falls short of recommending any specific methods, or providing any commentary on the quality of the analysis in the examples quoted.

5.7 The challenges of the devolution agenda

Conceptually at least, the devolution agenda shifts the boundary line of responsibility between central government and local interests as represented by relevant local authorities and the LEPs. This raises numerous questions about the policy and appraisal process, such as:

- What should local interests be responsible for, and how much freedom of manoeuvre should they have in making policy?
- How should local objectives be formulated, and what guidance is required to support scheme modelling and appraisal against local objectives?
- What capability and resources do local interests require in order to deliver their responsibilities, and do they have the right capacity? And what is required at the centre to provide guidance, facilitation and holding-the-ring skills?
- What is the intended balance of funding, both on average and at the margin, between central taxpayer, local taxpayer and other (e.g. user, developer) sources?
- How is a programme to be assessed if it includes projects other than transport, for which no established appraisal guidelines exist?
- Who is to be held to account for the performance of transport projects and programmes, and the value for (public) money from their delivery?
- How are legitimate local and national interests to be mediated, particularly in the context of the road and rail networks which cross boundaries and serve a mixture of local and longer-distance traffic?
- How might those central government policies which can only be delivered through local interventions, such as the promotion of cycling and walking, be implemented?
- What are the implications for the appraisal regime, which in its present form takes the national interest as paramount?

The answers to these questions depend on the objectives and intentions of the devolution agenda, which we see as a spectrum of possibilities. At one end, local interests are free to determine their own priorities and decisions to invest using predominantly local sources of funding conferred by devolved powers, and accountable both to public audit and the local electorate. Consistent with this would be a high level of discretion both in policy and appraisal. To a fair degree it would be a “let a hundred flowers bloom” policy stance. Proponents of this position believe that the benefits of competition between local authorities to attract employers and people, and so to promote growth of the local economy, outweigh the costs of any investment which turns out to have been wasteful on those occasions when the anticipated jobs locate elsewhere.

The current position in England is a long way from that, being more akin to decentralisation than devolution. A greater local freedom is intended at the project generation and prioritisation stages, but funding still comes largely from central pots (even if allocated via dedicated funds), and central government retains a strong policy interest and a high degree of accountability.

Overlaid on this is what has been described to us as the mosaic of geographical, economic and institutional circumstances across the country. At one end of the spectrum lies London, which has very major opportunities, institutional infrastructure in the Mayor and Transport for London, revenue-raising powers, very limited interface with the Highways Agency network, and a relatively high degree of control over the local public transport market. Next to that lie the city regions, with in some cases a legacy of inter-authority working, but fewer funding powers, less control over the public transport market and more interface problems with the national road network than are found in London. Then there are some very important and successful cities such as Bristol and Nottingham which are not (yet) in city regions. Finally there is 'town and county England'. Particularly for transport, the answers to the questions above are not going to be the same across the mosaic. One size does *not* fit all, and the model that best fits transport might not apply to other local services. And the model needs to take into account the structure and capacity of the local and regional governance.

What are the implications for the role of central government? Our witnesses were split, but the majority considered that unless and until there is significant devolution of funding (i.e. genuinely local revenue-raising from local taxpayers and transport users), the central role will remain strong. A number of reasons for this were adduced:

- Ministers would continue to want particular things – sustainability, safety, growth – all desirable in some absolute sense, and part of a national policy objective which can best be delivered at a local level. They would want to be seen to be in the fray, active, moving things along. Consider the recent activity surrounding HS3 and the Northern Transport Strategy as an example.
- Given the accountability position, an assurance framework between central and local, which effectively sets the governance arrangements, is needed – and such a framework has now been established (HM Government, 2014). DfT has also issued guidance to local authorities about the use of WebTAG and the Department's value-for-money guidance in drawing up the business case for local transport schemes. Local authority officials told us that they had interpreted this advice as a requirement to demonstrate that any scheme in their Local Transport Plan should deliver at least 'medium' and preferably 'high' value for money when assessed against the Department's criteria. The issue is whether this apparent requirement to meet an objective set by central government constrains local authority choice and behaviour.
- Past experience has suggested the need for strong top-down controls over the allocation of the national forecasts of population and employment

between regions, and at a more local level, to avoid unrealistic over-forecasting of transport demand and a waste of infrastructure capacity as a result. Unless this view were to change, government will want to maintain credible control totals through the National Trip End Model, while possibly accepting a more flexible approach within the regions where local evidence can be brought to bear. The policy question is whether this control will conflict so seriously with the ambitions for, and rhetoric of, local dynamism that it will cease to be an acceptable approach to the local modelling and forecasting in the context of these ambitions.

- Whatever the institutional arrangements, there remains the awkward interface between local and national networks encapsulated in the arguments about land development in the vicinity of motorway junctions.

Our view is that as a consequence, we will move towards a two-fence approach to project generation and appraisal. Decentralisation will mean that local interests are free to determine their own priorities based on locally set criteria and appropriately evidence-based. However, the major projects which local interests wish to put forward will need to demonstrate good value for money using government appraisal guidelines and WebTAG. The successful horses will need to jump both fences. At present DfT calls in for scrutiny schemes over £20 million, except in a few cases where further delegation to £50 million has been agreed.

The evidence we have gathered is that, in relation to the first of the two fences, local interests place very strong weight on local/regional-economy impact. This means that all the questions raised earlier about GVA methodology have enhanced significance in this context. In particular, the ability to predict competitive behaviour between authorities, and displacement of economic activity both within the region and between regions, becomes important – yet is acknowledged to be difficult. The robustness of the estimates of employment and output impacts, and the valuation of those impacts, are key topics for the first hurdle.

In this context, we see an important role for government. The evidence base on how to carry out economic impact studies and what a convincing case looks like is really rather thin. Who is incentivised to collect this evidence in a decentralised world? We think there is more to do in the area initiated by the London School of Economics project 'What Works Centre for Local Economic Growth' (2013).

At the policy level, there remains the issue of balancing objectives of promoting economic dynamism against considerations of redistribution between prosperous and less prosperous areas. The mooted HS3 is a classic example. Is it better to invest in enabling the most dynamic locations in the North to compete more effectively with London? Or is it preferable to invest in improving accessibility more generally within the trans-Pennine corridor? Quite different schemes might emerge depending on the answer.

Considerations of redistribution, in this case in terms of fiscal imbalances, also dominate the extent to which a model of increased funding from local sources might replace the existing system of central government funding. The extent to which retained local taxes might fund local authority spending varies between places, and local authorities in the less prosperous parts of the country will need to rely on central government for the majority of their expenditure if broadly current levels are to be maintained. So the model of local interests being free to determine their own priorities and decisions to invest, on the grounds that they rely largely or exclusively on local sources of funding, is not deliverable in many parts of the country.

5.8 Arms lengthening

In parallel with the devolution agenda, there is the policy initiative to place the Highways Agency at greater arm's length from central government, in a similar place to Network Rail, with the new organisation, Highways England, working to a five-year planning cycle equivalent to Network Rail's HLOS. This is not the place to review the case for this initiative, but it is appropriate to make a few points about the consequences.

Unlike the situation in London, national roads are an integral part of the regional road network. Most of the residents of Leeds or Manchester live within two or three miles of a national road. So the triangular relationship between central government, Highways England and regional interests is going to be very important, and the fuzzy boundary line between the interests will have to be accepted. Consider, for example, the recently announced study of the Sheffield–Manchester corridor. The A628 Woodhead Route is a national road running through the Peak District National Park in a corridor of economic interest to the Manchester and Sheffield city regions. So questions arise, such as who should be the lead client for the study, what weight should be given to regional as opposed to national appraisal criteria, and how will the decision to implement any resulting proposal in any particular Road Investment Strategy

period be arrived at? Joint working is going to be needed at every stage and level, and this will require capacity on all sides.

Another issue concerns the performance indicators which will be used to assess whether the national network is 'improving' or not. If the prime objective of Highways England is to keep the traffic moving, while the prime objective of the city regions is to boost the performance of the regional economy, there is potential for conflict at the margin. Induced traffic from additional economic activity may be welcome to one party but a problem to the other. The performance indicators will need to be clever, especially if senior remuneration is to be partly performance-related. The need for cooperation and coordination is recognised in the performance specification, but how is this to be assessed alongside operational indicators such as availability, reliability and speed?

Finally, there is the interface between service delivery of the road system and national policy. To a great extent, the market environment within which Highways England will be operating is dictated by external forces such as population, employment, income, car ownership and energy price trends, and government policy both on funding for investment and maintenance and on taxation. Although motorway tolling and national road user charging proved infeasible in the 1990s and 2000s, we predict that a combination of fiscal pressures, improved fuel efficiency, congestion and better technology will compel this issue to be revisited sooner or later. Effective working at arm's length will then be essential.

The problems faced by local government when negotiating with an arm's-length transport provider are not insurmountable. Network Rail has a good reputation for working with its local partners, although its record on delivery to time and budget is more open to question. In this case there is a well-defined approach, through the Network Rail planning process, for reflecting local needs. Where there is a good business case for enhancing capacity, any potential conflict between local and long-distance rail traffic is resolved during the planning of the scheme. The risk of train services aimed at meeting local requirements compromising the performance of other services is managed by Network Rail alone, through their responsibility to ensure that the investment plan delivers the outputs specified by central government, and their control over the allocation of capacity on the railway.

6. Conclusions

We have argued in this paper that economic analysis has played a significant role in transport policy and decision-making over the last half century. Tracing the stages of policy from formulation through policy development, to implementation, to delivery on the ground, it is at the implementation stage that appraisal has been the most influential.

Appraisal has developed substantially to a state of maturity over the period. This is partly because methods, data and computing power have improved so that, for example, stated preference has achieved a degree of credibility as a method for eliciting values. The range of impacts to which values can be attached has been broadened out to cover noise and pollution, carbon, reliability, crowding and comfort, and wider-economy impacts. Much greater codification of the treatment of impacts which cannot be valued in money has been achieved through the approach taken in the Appraisal Summary Table and supporting evidence. Developments in appraisal have generally been policy-led: to take one example, the increase in policy importance of carbon emissions has led to a series of investigations of the marginal social cost of carbon for use in appraisal. We anticipate three main working needs going forward: a need to continue the review the usefulness of some parts of the appraisal framework; a commitment to maintenance and updating of the values in it; and further work to respond to issues of social concern as they arise – for example, resilience to climate, security and resource availability.

In our paper for the Department for Transport (DfT) two years ago (Mackie & Worsley, 2013), we noted that countries such as Netherlands, Sweden, Germany, Australia and New Zealand all have appraisal methods and research programmes whose similarities far outweigh the differences. We found that the results of scheme appraisals often influenced the choices made by politicians and officials in these countries. In a world where Sydney is no farther away from London than Leeds by Internet, we think there is scope for greater pooling of knowledge and experience across countries with broadly similar social democratic cultures.

At the marginal project level – should we spend £50 million on X or Y within a programme? – we think that provided the working needs are attended to, the appraisal regime will remain fit for purpose as a tool for assessing national value for money. As long as road and rail infrastructure continue to be taxpayer funded, this will remain important for public policy. Indeed, we think that one area of debate is the extent to which the appraisal regime should be a hurdle to jump and the extent to which it should provide the basis, together with the other strands of the Transport Business Case model, for a ranking order of schemes so as to maximise value for money.

The main challenges will come from the changes in the institutional environment into which appraisal and decision-making plays. Setting the bodies responsible for the delivery of national transport infrastructure at arm's length from the Department has many potential advantages. But it does not resolve how best these bodies might weigh up the performance incentives that they are set against the more comprehensive list of impacts identified in the Appraisal Summary Table. The devolution agenda is particularly difficult for transport, because transport infrastructure provides for a mixture of national, regional and local purposes, while economic geographies vary so much even from one metropolitan area to another. But we think that if devolution is to mean anything at all, it must mean city regions developing their own priorities for transport in conjunction with Highways England and Network Rail, undertaking their own prioritisation, and putting their plans to Whitehall for approval. So there will have to be a two-fence system – does the plan pass the local test, and then does it pass the national test of net worth?

Inevitably this raises the question of what the local test should comprise. Clearly it is likely to be some form of economic impact test, possibly modified to include local environmental impact as well. An issue of great current importance is the quality of the various economic impact methods, their consistency both with each other and with national appraisal guidance, and the robustness of their relative scheme performance indicators. We are entering a new world where a lot of work is done by and for combined authorities and Local Enterprise Partnerships, and the role of DfT in providing expertise and guidance is a significant issue.

Arguably the Department was slow off the mark in providing guidance, allowing each of the combined authorities to develop its own approach for estimating local economic impacts, before commissioning *Transport Investment and Economic Performance* (Venables et al., 2014), which provides a comprehensive review of the mechanisms through which transport, productivity, investment and employment are linked. But much still needs to be done to develop a framework which meets the standards set by Department for its analytical methods, accounts for the many uncertainties in these relationships, and identifies the jobs created in one place that are displaced from elsewhere.

The devolution agenda is almost certain to revive questions about the appraisal of strategies and plans as well as schemes. Whereas on the national inter-urban road network, schemes may be viewed as freestanding entities, city transport plans are much more likely to involve considerations of synergy and balance. This means moving away from the detailed economic appraisal to a higher-level logic map or narrative:

- What are the problems being addressed?
- How fast are they going to get worse?
- Are they binding constraints on the performance of the city?
- What is the range of solutions under consideration?
- What are the key linkages they are likely to affect?
- How do they perform in transport, labour market, land-use and development terms?

Are visions of a transformed future simply hype, or is there a clear evidence base to support them?

Our critique of appraisal is that it has never been successfully developed to routine application at a higher level than the scheme. This leaves a gap. For a big project like HS2 we have a vision statement and we have a network model and WebTAG-compliant (Web-based Transport Analysis Guidance) appraisal with some treatment of behavioural shifts between modes. But there is relatively little in between, covering the ground of what difference the project can be expected to make. For city plans and national programmes and megaprojects this is what the strategic case should be all about. In what is

bound to be a partnership exercise between local and central government and delivery agencies such as Network Rail and Highways England, it could be a very useful tool around which the various interests could come together.

Finally, the Department will need to be a guardian of good practice, evidence base, methods and the research agenda. The transport planning capacity of local government outside London is an issue. DfT will have a role to play as friend, advisor and reservoir of knowledge and expertise. The applicability of different overlapping guidance manuals such as the Passenger Demand Forecasting Handbook and WebTAG will need to be sorted out. The Department will need to ensure that the experience gained from working with decision-makers in this new environment feeds back into the appraisal guidance. In the past, the system has responded successfully to changes in the direction of national policy interests: it now needs to reflect these new demands. New institutions will mean a change of role, sometimes a painful one, for central government.

References

ACTRA (Advisory Committee on Trunk Road Assessment) (1977). *The Leitch Committee Report: Report of the Advisory Committee on Trunk Road Assessment*. London: HM Stationery Office.

Aschauer, D. A. (1989). *Is Public Expenditure Productive?* Journal of Monetary Economics, 23: 177–200. Retrieved 12 April 2015 from http://idrc.znufe.edu.cn/czx/html/xinxipingtai/jdwx/Eng/12%20Is%20Public%20Expenditure%20Productive.pdf.

Brent, R. J. (1979). *Imputing Weights behind Past Railway Closure Decisions Within a Cost–Benefit Framework*. Applied Economics, 11(2): 157–170.

Coopers & Lybrand & Great Britain, Department of the Environment (1973). *The Channel Tunnel: A United Kingdom transport cost benefit study; report presented to the Secretary of State for the Environment, 31st May 1973*. London: HM Stationery Office.

Dargay, J., Last, A., Goodwin, P., University of Leeds, Institute for Transport Studies, Great Britain, Department for Transport, University of the West of England, Bristol & Centre for Transport and Society (2010). *Concessionary Travel: The research papers (a report to the Department for Transport)*. Leeds: Institute for Transport Studies, University of Leeds.

DETR (Department of the Environment, Transport and the Regions) (1998). *A New Deal for Trunk Roads in England*. Retrieved 12 April 2015 from www.norfolk.gov.uk/view/ncc145473.

DETR (2000a). *Transport Ten Year Plan 2000*. Retrieved 12 April 2015 from http://webarchive.nationalarchives.gov.uk/+/http:/www.dft.gov.uk/about/strategy/whitepapers/previous/transporttenyearplan2000.

DETR (2000b). *Tackling Congestion and Pollution*. Retrieved 12 April 2015 from http://webarchive.nationalarchives.gov.uk/20031015075419/http://www.odpm.gov.uk:80/stellent/groups/dft_transstrat/documents/page/dft_transstrat_503947-02.hcsp.

DfT (Department for Transport) (2004). *Feasibility Study of Road Pricing in the UK: Full report*. Retrieved 12 April 2015 from http://webarchive.nationalarchives.gov.uk/20090903104234/http://www.dft.gov.uk/pgr/roads/introtoroads/roadcongestion/feasibilitystudy/studyreport/feasibilityfullreport.

DfT (2005). *Transport, Wider Economic Benefits, and Impacts on GDP*: Discussion paper. Retrieved 12 April 2015 from http://webarchive.nationalarchives.gov.uk/+/http:/www.dft.gov.uk/pgr/economics/rdg/webia/webmethodology/sportwidereconomicbenefi3137.pdf.

DfT (2007). *Towards a Sustainable Transport System: Supporting economic growth in a low carbon world*. Retrieved 12 April 2015 from www.gov.uk/government/uploads/system/uploads/attachment_data/file/228953/7226.pdf.

DfT (2009). *NATA Refresh: Appraisal for a sustainable system*. London: DfT Publications. Retrieved 13 April 2015 from http://tramstore21.eu/sites/default/files/knowhow/documents/24_nata_refresh_appraisal_method_2009.pdf.

DfT (2012). *The High Level Output Specification (HLOS) 2012: Railways Act 2005 statement*. Retrieved 13 April 2015 from www.gov.uk/government/publications/high-level-output-specification-2012.

DfT (2013a). *Value for Money Assessment: Advice note for local transport decision makers*. Retrieved 12 April 2015 from www.gov.uk/government/uploads/system/uploads/attachment_data/file/267296/vfm-advice-local-decision-makers.pdf.

DfT (2013b). *Understanding and Valuing the Impacts of Transport Investment*. Retrieved 13 April 2015 from www.gov.uk/government/uploads/system/uploads/attachment_data/file/253860/understanding-valuing-impacts-transport-investment.pdf.

DfT (2014). *Understanding and Valuing the Impacts of Transport Investment: Progress report 2014*. Retrieved 13 April 2015 from www.gov.uk/government/uploads/system/uploads/attachment_data/file/389960/understanding-and-valuing-the-impacts-of-transport-investment-progress-report-2014.pdf.

DfT (no date). *Value for Money Assessments*. Retrieved 12 April 2015 from www.gov.uk/government/uploads/system/uploads/attachment_data/file/255126/value-for-money-external.pdf.

DfT (March 2015) Percentage of DfT's appraised project spending that is assessed as high or very high value for money https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/421810/vfm-indicator-jan-dec-2014.pdf.

Dodgson, J. S. (2009). *Rates of Return on Public Spending on Transport*. RAC Foundation. Retrieved 12 April 2015 from www.racfoundation.org/assets/rac_foundation/content/downloadables/rates%20of%20return%20-%20dodgson%20-%20190609%20-%20report.pdf.

DoT (Department of Transport) (1989a). *Roads for Prosperity*. London: HM Stationery Office.

DoT (1989b). *National Road Traffic Forecasts (Great Britain) 1989*. London: HM Stationery Office.

DoT (1993). *Paying for Better Motorways: Issues for discussion*. London: HM Stationery Office.

Eddington, R. (2006). *The Eddington Transport Study: The case for action.* The Stationery Office Retrieved 12 April 2015 from www.thepep.org/ClearingHouse/docfiles/Eddington.Transport.Study%20-%20Rod.pdf.

Foster, C. D. & Beesley, M. E. (1963). *Estimating the Social Benefit of Constructing an Underground Railway in London*. Journal of the Royal Statistical Society, Series A, 126: 46–93.

Harrison, A. J. & Quarmby, D. A. (1969). *Theoretical and Practical Research on an Estimation of Time-saving. Report of the sixth Round Table on Transport Economics held in Paris on 13th to 14th November, 1969*. Paris: European Conference of Ministers of Transport.

HM Government (2014). *LEP Assurance Framework*, December 2014. Department for Business, Innovation & Skills. Retrieved 12 April 2015 from www.gov.uk/government/uploads/system/uploads/attachment_data/file/386642/bis-14-1241-local-enterprise-partnership-LEP-national-assurance-framework.pdf.

HM Treasury (2003). *The Green Book: Appraisal and evaluation in central government*. Retrieved 12 April 2015 from www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf.

HM Treasury (2013). *Public Sector Business Cases Using the Five Case Model: Green Book supplementary guidance on delivering public value from spending proposals*. Retrieved 12 April 2015 from www.gov.uk/government/uploads/system/uploads/attachment_data/file/277345/green_book_guidance_on_public_sector_business_cases_using_the_five_case_model_2013_update.pdf.

HM Treasury (2015). *Valuing Infrastructure Spend: Supplementary guidance to the Green Book*. Retrieved 12 April 2015 from www.gov.uk/government/uploads/system/uploads/attachment_data/file/417822/PU1798_Valuing_Infrastructure_Spend_-_lastest_draft.pdf.

House of Commons Transport Committee (2008). *Ticketing and Concessionary Travel on Public Transport* (HC84, Fifth Report of Session 2007–08). Retrieved 12 April 2015 from www.publications.parliament.uk/pa/cm200708/cmselect/cmtran/84/84.pdf.

Jones-Lee, M. W., Hammerton, M. & Philips, P. (1985). *The Value of Safety: Results of a national sample survey*. Economic Journal, 95(377): 49–72.

London School of Economics (2013). *What Works Centre for Local Economic Growth Launces*. Retrieved 12 April 2015 from www.lse.ac.uk/newsAndMedia/news/archives/2013/10/WWCFLG.aspx.

Mackie, P. & Worsley, T. (2013). *International Comparisons of Transport Appraisal Practice: Overview report*. Department for Transport. Retrieved 12 April 2015 from www.gov.uk/government/uploads/system/uploads/attachment_data/file/209530/final-overview-report.pdf.

Mackie, P., Worsley, T. and Eliasson, J. (2014) Transport Appraisal Revisited *in* Research in Transportation Economics (2014) pp3-18, Elsevier

McIntosh, P. T. & Quarmby, D. A. (1970). *Generalised Costs, and the Estimation of Movement Costs and Benefits in Transport Planning*. London: Department of the Environment.

MVA Consultancy, Oscar Faber TPA & Institute for Transport Studies, University of Leeds (1994). *Common Appraisal Framework for Urban Transport Projects*. London: HM Stationery Office.

Nellthorp, J. & Mackie, P. (2000). *The UK Roads Review: A hedonic model of decision making*. Transport Policy, 7(2): 127–138.

Neuburger, H. (1971). *User Benefit in the Evaluation of Transport and Land Use Plans*. Journal of Transport Economics and Policy, 5(1): 52–75. Retrieved 12 April 2015 from www.bath.ac.uk/e-journals/jtep/pdf/Volume_V_No_1_52-75.pdf.

Richards, M. (2005). *Congestion Charging in London: The policy and the politics*. Basingstoke: Palgrave Macmillan.

Roskill, E. (1971). *Roskill Commission Report on the Third London Airport*. London: HM Stationery Office.

SACTRA (Standing Advisory Committee on Trunk Road Assessment) (1994). *Trunk Roads and the Generation of Traffic: Report of the Standing Advisory Committee on Trunk Road Assessment*. Retrieved 12 April 2015 from http://webarchive.nationalarchives.gov.uk/+/http:/www.dft.gov.uk/pgr/economics/rdg/nataarchivedocs/trunkroadstraffic.pdf.

SACTRA (1999). *Transport and the Economy*. Retrieved 12 April 2015 from http://webarchive.nationalarchives.gov.uk/20050301192906/http:/dft.gov.uk/stellent/groups/dft_econappr/documents/pdf/dft_econappr_pdf_022512.pdf.

Self, P. (1970). *'Nonsense on Stilts': Cost–benefit analysis and the Roskill Commission*. Political Quarterly, 41(3): 249–260.

Smith, J. W., Jan, A. & Phillips, D. (2011). *Providing and Funding Strategic Roads: An international perspective with lessons for the UK*. RAC Foundation Retrieved 12 April 2015 from www.racfoundation.org/assets/rac_foundation/content/downloadables/providing_and_funding_strategic_roads-arup-071111.pdf.

Venables, A. J., Laird, J. & Overman, H. (2014). *Transport Investment and Economic Performance: Implications for project appraisal*. Report to Department for Transport. Retrieved 12 April 2015 from www.gov.uk/government/uploads/system/uploads/attachment_data/file/386126/TIEP_Report.pdf.

Wardman, M., Mackie, P. J. & Gillies-Smith, A. (2014). Valuing systemic transport resilience: Methods and evidence. In A. Brown & M. Robertson (eds.), *Economic Evaluation of Systems of Infrastructure Provision: Concepts, approaches, methods* (pp. 19–41). iBUILD/Leeds Report. Retrieved 12 April 2015 from https://research.ncl.ac.uk/ibuild/outputs/9940_iBuild_report_v6.pdf.

Williams, A. (1973). Cost–benefit analysis: Bastard science? And/or insidious poison in the body politick? In J. N. Wolfe (ed.), *Cost-Benefit and Cost-Effectiveness: Studies and analysis* (pp. 30–63). London: George Allen and Unwin.

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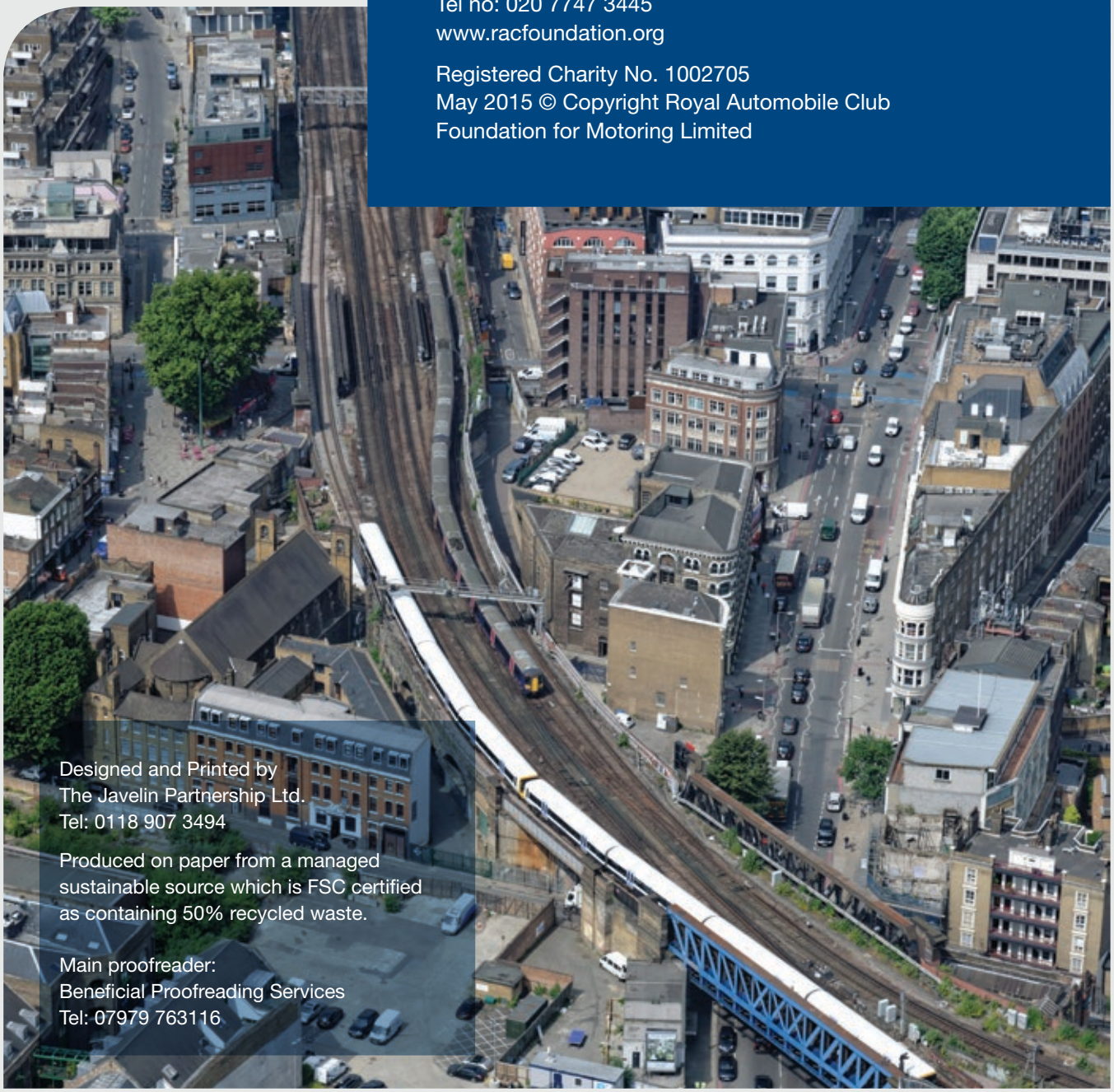

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