



Usability Review of DfT's 2005 WEBS Discussion Paper

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Usability Review of DfT's 2005 WEBs Discussion Paper

Final Report

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Disclaimer

The quotations referenced in this report represent the views of the research respondents and it has not been verified with the DfT whether or not they agree with these views.

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Executive summary

In 2005, the DfT issued a discussion paper on how wider economic benefits (WEBs) of transport schemes might be measured. The approach has been applied to a number of schemes. The DfT commissioned this research in order to explore users' reactions to, and experiences of, applying this approach to calculating the WEBs of transport schemes.

Ten qualitative interviews were carried out with respondents who had used the discussion paper to appraise specific transport schemes. They focused on the usability of the paper, including ease of understanding and application, access to data, and any improvements suggested.

Initial understanding and use of the discussion paper

The paper was recognised as an attempt to measure the WEBs of transport schemes which were not currently being captured in conventional appraisal.

A key reason for applying the paper was to improve the business case for a transport scheme; to increase the likelihood of receiving funding.

Ease of using the discussion paper

There were respondents who felt they understood the discussion paper but did not agree with particular aspects of it, notably in relation to the validity of calculating the WEBs from the specific assumptions and methods adopted in the paper, and an inconsistency with approaches used for regeneration benefits which appeared different.

There was general consensus that the calculations themselves were reasonably straightforward. However, difficulties were experienced calculating WB1 as generalised costs proved problematic. Difficulties were also experienced in calculating WB4 – especially GP3, where the discussion paper approach was perceived to be vague.

Despite concerns about inputs, respondents were generally able to measure the WEBs, though difficulties experienced related to being unable to access the requisite data and also to calculating GP3. Issues were resolved using proxy measures.

Data

The data requirements for the assessment were generally seen to be substantial and time-consuming. How onerous they were perceived to be depended on the type of model the respondent had and how easy it was to access the data.

Problems arose in sourcing data and the mismatch of categories or geographical areas between the transport model and the externally sourced data. Concern was also expressed about the robustness of the data used, particularly in relation to GDP per worker, job relocation data and elasticities of productivity.

Zones in transport models were smaller than in the externally sourced data and this meant aggregating up. However, some boundaries were inconsistent which entailed re-weighting data. Similarly, industry categories were inconsistent across different data sources.

In the absence of a land-use model, some respondents used change in commuting trip ends, or accessibility, as a proxy for changes in employment. Another approach was to create models for prediction of employment and construct a productivity index based on GDP per worker.

Assumptions

Making assumptions was reported as commonplace in carrying out a WEBs assessment. Assumptions were needed:

- to generate average generalised costs;
- to deal with employment change (especially in the absence of a land use model);
- to choose base years for calculating growth;
- for geographical scale
- and to re-categorise jobs by industry categories.

Assumptions were felt to inevitably have an impact on comparability and reliability across different WEBs assessments. Those who anticipated a limited impact on comparability and reliability had conducted sensitivity tests; however those who were not able to do so were less convinced of this limited impact.

Time constraints

The most time-consuming tasks were felt to be understanding the paper and methodology, accessing and formatting the data, and calculating WB1 – particularly with regards to generalised costs.

There was little consensus as to whether this assessment took longer than conventional appraisal, and whether the time spent on the assessment increased with the size and cost of a scheme.

Suggestions for improvements

Improvements to the discussion paper were identified in the following areas:

Presentation within the paper:

It was felt that the discussion paper could be written more clearly. Suggestions of how to achieve this included:

- Providing a simplified version of the paper
- Adopting more *user-friendly* labels than WB1 - 4, GP1-4
- Resolving the overlaps between GDP effects and welfare
- Removing the overlap among the different components of the paper
- Renaming *‘wider economic benefits’* as it was felt to be easily confused with the *‘wider economic impact’* section on webtag.

Data requirements:

Several suggestions were made with a view to alleviating the difficulties of accessing data:

- Make it clear what inputs are required, and from what source
- Provide the data required as a web-link, preferably on a spreadsheet, with data by consistent spatial disaggregation and a statement about the date of revision
- Explain how to re-weight data to fit with geographical units
- Explain what to do in the absence of certain data

The WEBs calculations

Most respondents found that they could follow the detail of the WEBs calculations, but the following suggestions were still made on improving the explanations:

- State assumptions and make it more of a step-by-step guide for non-economists
- Reduce the explanation of WB2, as this is always zero
- Offer a clearer explanation of the approach to take when making assumptions about how effective density would change as the value of time increases over time
- Provide a more comprehensive description of how to approach the calculation of GP3, particularly how to obtain estimates of the value of the output of specific categories of employees, i.e. productivity.
- Amend WB3 to take account of freight rather than just driver's time
- Provide advice for how to deal with models that only have one mode of transport
- Provide some guidance on how to quantify the land use impacts.

Carrying out the calculations themselves was not generally regarded as a significant issue. Despite this, the following suggestions were made:

- Provide software for carrying out the calculations, for the agglomeration effects in particular
- Address the steps missing, such as the absence of clear definition of the units to be used, notably generalised cost in time or money units, and how to treat the change in generalised cost over time as value of time increases over time

Correcting inaccuracies in the paper

Respondents noted an inaccurate equation on page 57 of the discussion paper that required correcting.

Use of examples:

Including examples was seen as a key way of improving the paper's usability. Suggested examples included:

- A selection of different WEBs assessments, including a range of different modes and schemes
- Some scale of benefits to expect from each WEB
- The productivity differential (WB4)

Conclusions

Respondents were aware that they had been involved in an early stage of potentially important methodological development, and evidently valued this. As consultants, they also appreciated being able to satisfy their clients with increased estimated benefits for relatively little work, but did not necessarily take these at face value.

The prevailing mood seemed to be that they felt confident they could master any complication thrown at them, would appreciate more clarity on exact definitions, units and data, and at this stage still had doubts about whether the obtained answers were accurate, due to their doubts over the paper's methodology and theory.

Introduction

1.1 Background

Transport improvements can, and generally do, affect the economy. In particular, they influence the location and pattern of economic activity and can improve productivity. Conventional transport appraisal captures most economic benefits, including much of the impact that transport has on GDP through welfare. In 2005, the Department for Transport (DfT) published a discussion paper outlining an approach for estimating the wider economic benefits (WEBs) of transport schemes[1]. The WEBs set out in the approach are those considered to be additional to conventional appraisal, arising due to the presence of market imperfections in transport-using sectors of the economy. The discussion paper identifies four sources of such additional benefits:

- Agglomeration effects
- Increased competition
- Increased output in imperfectly-competitive markets
- Improved labour supply as a result of increased labour force participation, working longer hours and the relocation of employment to more productive areas.

The discussion paper provides a full description of the various effects, the theory that underpins them and a proposed methodology for estimating each WEB.

The discussion paper is intended for use by promoters of transport schemes that are likely to deliver WEBs. The estimation of WEBs is a relatively new and developing area of transport appraisal and so it is not currently compulsory for scheme appraisers to undertake WEBs assessments. The 2005 discussion paper sets out an approach to appraising WEBs, however it has often been necessary for scheme appraisers to use their own initiative in applying the approach to transport schemes because the 2005 discussion paper is not particularly prescriptive.

The DfT is looking to build on the 2005 discussion paper to provide a more user-friendly set of WEBs appraisal guidance. The review of the usability of the existing WEBs discussion paper will inform the DfT on how best to improve the usability of the approach, how to minimise the burden on scheme promoters, and to inform how best to move forward to incorporating WEBs more formally in appraisal.

1.2 Aims

The DfT commissioned this research in order to explore users' reactions to, and experiences of, applying a new approach to the estimation of the WEBs of transport schemes making use of the DfT's 2005 discussion paper. This study, one of a series of projects related to this topic, was not intended to explore the theory underpinning the assessment, except where users felt this to impact on the usability of the discussion paper.

The overarching aim of this research was to assess the usability of the 2005 discussion paper. The specific objectives were four-fold and were to:

- assess how user-friendly and comprehensive the paper is for the intended audience, including the identification of areas for improvement;
- identify any data, assumptions and methodology that was necessary and not made clear in the paper;
- consider the time requirements placed on consultants in making use of the paper to undertake a WEBs assessment;
- set out recommendations for improving the usability of any subsequent guidance produced.

1.3 Research design

A wholly qualitative approach was adopted for this study to allow for individual experiences and views to be explored in detail. The aim of qualitative methods is to define and describe the range of emergent issues, rather than to measure their extent, thus the research cannot provide any statistical data relating to the prevalence of these views, experiences or reflections.

Ten in-depth interviews were conducted with respondents who had applied the 2005 WEBs discussion paper to a transport scheme^[2]. It was felt that in-depth interviews would allow people who had used the paper to discuss their experiences and their views on its usability in detail.

All in-depth interviews were exploratory and interactive in form and were based on a topic guide (see Appendix B). The topic guide ensured that the key themes of interest to DfT were covered whilst allowing other relevant issues to be raised by the respondents, and clarified by further questioning.

1.4 Recruitment

The respondents were recruited from a sample supplied by DfT, consisting of transport practitioners / professionals and consultants who had used the 2005 discussion paper.

All respondents on the sampling frame were sent a letter of introduction outlining the aims and nature of the study and potential respondents were then screened by recruiters for their eligibility to participate in the research.

1.5 Conduct of the research

The in-depth interviews lasted between 90 and 120 minutes and were undertaken in August 2007. They were either conducted at the respondent's place of work or in DfT offices. It is important to note that respondents were ensured complete anonymity, even if they were interviewed at the DfT.

Paired in-depth interviews were conducted in instances where the respondent named on the sample had used the WEBs discussion paper with a colleague and felt it necessary for the colleague to be present in order to be able to fully discuss the paper's use. This was the case for five of the interviews.

All interviews were audio recorded, with permission, and transcribed verbatim to allow detailed analysis.

1.6 Analysis and presentation of the findings

The transcribed interviews were subjected to a rigorous content analysis, which involved systematically sifting, summarising and sorting the verbatim material according to key issues and themes, within a thematic framework. Further classificatory and interpretative analyses were then derived from the analytic charts and these formed the basis of the evidence reported in the subsequent chapters.

The findings have been illustrated and illuminated with the use of verbatim quotations and examples. The quotations have been edited for clarity but care has been taken so as not to change the respondent's meaning in any way. Any alterations to the verbatim quotations have been made clear by using parentheses and ellipses. Where necessary the details of the contributors have been amended to protect their anonymity.

Further details of the analytical process used may be found in the Technical Appendix (Appendix A).

1.7 Report outline

Following this overview of the objectives, design and conduct of the research, the following 7 chapters discuss in detail the research findings.

- Chapter 2 describes respondent's initial thoughts on the discussion paper, their understanding of its function and their reasons for using it
- Chapter 3 explores the ease with which respondents were able to use the discussion paper
- Chapter 4 examines the issues and difficulties faced by respondents in accessing and amending data
- Chapter 5 considers where respondents have had to make their own assumptions in carrying out a WEBs assessment
- Chapter 6 examines the time needed to carry out the WEBs assessments and looks at how respondents allocated time according to task, and according to the different WEBs
- Chapter 7 explores the suggested improvements to the discussion paper made by the respondents
- and Chapter 8 reflects upon the key messages raised throughout the report and draws conclusions arising from the research.

2 Initial understanding and use of the discussion paper

This chapter describes respondents' initial thoughts on the paper, and their understanding of its function. It goes on to explore their reasons for using it, and what they felt was expected of them.

2.1 Awareness of the paper

Respondents had become aware of the paper in different ways. One group was closely involved in the development of the methodology, having been involved at an early stage, or approached to test it out on their transport scheme.

‘We were called into a discussion with DfT initiating people into it and [and we] discussed the methodology asking us to test it with our model.’

(Interview 07)

‘[We were] asked to do a scoping study, commissioned to work out how to implement the calculations with some of the models we had available.’

(Interview 06)

Others had been asked to implement it by clients, had found it by routinely looking at the DfT website, been signposted to it by colleagues, or heard it mentioned at a seminar.

2.2 Initial thoughts on the paper

The paper was generally welcomed by respondents, who saw it as an opportunity for interesting work, stretching themselves mentally, or perceiving it to fill a gap in theory.

Most found it daunting at first and used terms such as ‘*complicated*’, ‘*repetitious*’, with a ‘*fairly involved methodology*’ in describing their reactions to it. It was also felt that some of the calculations were not clear. Respondents reported having to read the paper several times before making sense of it.

‘I wouldn’t say it was particularly easy, it did take a bit of time, application. [I] had to read through twice, come back to it - concepts not easy to pick up, always trying to work out if it was right or was there double counting in there, what exactly does that mean.’

(Interview 03)

Respondents also identified how their colleagues had struggled with it, including some that had given up trying to understand it.

‘[It had] an interesting mix, quite comprehensive in trying to explain and describe benefits and then tried to go a step further in setting up an approach to quantify benefits. [The] theoretical equations [were] OK for me, [I am] used to seeing them as I studied engineering recently, but some colleagues struggled to interpret them.’

(Interview 09)

2.3 Perceived function of the paper

There was some awareness of the background to the paper, with respondents citing the transport scheme Crossrail, the Eddington Review, and the 1999 SACTRA report on transport and economics. Reference was also made to the focus on productivity and GDP impacts in Transport Innovation Fund (TIF) applications for which the DfT had specifically required analysis of expected wider economic impacts.

There were felt to be two main functions for the paper. First, the paper was recognised as an attempt to measure the WEBs of transport schemes not currently captured in conventional transport appraisal, to get a more complete picture of the impacts of transport schemes which had not been quantified before.

â[It] corrects an enormous area that was missing from the scheme appraisal, in the case of Crossrail, WEB[s] treble or quadruple the case for the scheme.â

(Interview 04)

âItâs answering a question which has been outstanding for a long time, of the impact of transport on the economy in total â! [Iâm] very pleased to see this coming out as a fairly graphical form of guidance to put these things into operation.â

(Interview 06)

It was seen as a way of making transport decision-making by the DfT more consistent (if it became mandatory to apply the discussion paperâs approach), and to remove uncertainty across potential projects.

âI think itâs presented a methodology, which in theory allows appraisers to - without double counting - come up with a number, which captures broader welfare effects or economic impacts in terms of â! the schemeâs contribution to â! net national welfare, which in theory can be applied consistently to all schemes. And I think thatâs a good thing.â

(Interview 03)

Secondly, it was seen as a device to increase the estimated benefits, or benefit-cost ratio, of the transport schemes to which it was applied, thereby making it more likely that they would *âimpressâ* the DfT and attract Government funding, and perhaps increase the overall budget.

âAs long you have higher benefits you are more likely to get funding for the scheme.â

(Interview 02)

Respondents also referred to the political aspects of the paper. By demonstrating a direct link with productivity, it could be used to interest other parts of the government in transport schemes for example Regional Development Agencies and the Treasury.

2.4 Reasons for using the paper

There was a range of reasons cited for deciding to use the discussion paper. Some respondents, as mentioned above, had been approached to test out the methodology, and regarded their work as a research exercise. However, these respondents had generally gone on to apply the WEBs analysis to other schemes thereon. A key reason for applying the paper was to improve the business case for the transport scheme, which would make it more likely to get funding. As discussed in section 2.3, they reported that clients were particularly interested in this aspect.

â[The] client was happy â' [with] what came out in terms of numbers â' I think they were happy that weâd included this, weâd done the assessment, weâd followed the guidance and it hadn't â' taken months and months and months to do. And it's showing a benefit.â

(Interview 08)

However, respondents also cited wanting to carry out a more comprehensive assessment of the impact of the scheme, thereby including measuring the WEBs, particularly on large-scale investments.

â[We] wanted to improve the business case but more than that, [we] wanted to understand what was the real impact, the rounded impacts of the scheme bearing in mind the scale of investment.â

(Interview 05)

Several identified that demonstrating productivity and GDP impacts were a requirement of the Productivity TIF funding scheme and similarly a specific objective of one scheme being appraised was regeneration, including increased GDP and employment. One respondent used the discussion paper to look at different kinds of interventions to see which one would generate the biggest productivity GDP impact to close the productivity gap.

2.5 What respondents felt was expected of them by using the paper

Those who did not have specific remit to use the paper seemed confused about whether using it was a requirement of TIF funding, and some were uncertain about whether to apply this or the existing advice on Economic Impact assessment. There were also respondents who were not clear about how to incorporate the results into a conventional appraisal:

âBefore â' saying we have calculated this number or these numbers, how do we incorporate them? Where do we put them within the summary table that is a standard output of an appraisal?â

(Interview 5)

This was reflected in a difference of opinion about whether the results should, or should not, be incorporated within an amended benefit cost ratio.

âWe didnât add them together because we thought this would be double counting... the paper says they âcanât simply be added togetherâ. But Eddington did add them together.â

(Interview 08)

Chapter Summary

This chapter describes initial reactions to the discussion paper and reasons behind its use.

The paper was generally welcomed by respondents. It was recognised as an attempt to measure the WEBs of transport schemes that were not currently being captured in conventional transport appraisal. It was seen as a potential way of making decision-making by the DfT more consistent, if applied to all transport schemes.

The paper was felt to be a daunting first read, and sometimes had to be read several times before sense was made of it.

A key reason for applying the paper was to improve the business case for a transport scheme; to increase the likelihood of receiving funding and therefore of the scheme going ahead. Having a more comprehensive assessment of impact and fulfilling productivity requirements of TIF funding were also cited as motivations for using it.

3 Ease of using the discussion paper

This chapter explores the ease with which respondents understood the theory behind and descriptions of the WEBs in the discussion paper, and how easy it was to follow the methodology, in general and for each particular WEB. It goes on to describe how accurate respondents felt their interpretation of the methodology was. The ease of using the discussion paper is compared with use of webtag. Finally any assistance that respondents needed and where they sought this help from is examined.

3.1 Ease of understanding theory behind assessment approach

Some of the respondents had been actively involved in the early stages of preparation of the WEBs discussion paper, and claimed some credit or shared responsibility for its creation. These were outspoken in supporting the general intentions of the paper, but had quite strong differences about its scope or application. Others, though considering themselves well informed about the theory, had doubts about its validity, though in general did not express this to the DfT.

Various colleagues of mine worry about the potential double-counting I have colleagues who do [understand the theory and] they tend to perhaps be more sceptical [than those who do not].

(Interview 01)

There seems to be really quite a lot of questions being asked about the credibility of the outputs. I think I totally buy into the concept, but I can understand people's concerns as to the credibility I think it still seems a bit of a black box in terms of the way that the employment elasticity and the links with generalised cost changes have been put forward.

(Interview 05)

Having a background in economics was considered useful in understanding the theory. There were respondents who felt that they broadly understood the theory, but did not have budgeted time to delve too deeply into it and relied on the calculations given in the discussion paper.

â[We] didn't pay too much attention to the theory behind it, [we] applied the calculations â' On a budget to do the work, [we are] not going to spend too much time delving into theory.â

(Interview 08)

One respondent found that although they thought they broadly understood the theory, they found it very hard to explain it to their clients.

There was mixed feelings about the usefulness of understanding the theory. For one respondent, having a good understanding of the theory was felt to help identify where the gaps were in the methodology, or where assumptions needed to be made.

âKnowing the theory allows you to understand where there are some gaps in the notes.â

(Interview 05)

Others did not really understand the theory, or feel they needed to as they did not feel that this had an impact on their ability to apply it. Therefore they raised technical questions with the DfT but did not raise doubts about the underlying theory itself. However, concerns were expressed about working with the paper without fully understanding it.

â[I had] a general understanding of what the concept is, that was fine. [We] had an economist on the team who understood it - always a bit uncomfortable if you're doing something and you don't fully understand it.â

(Interview 10)

Difficulties in understanding the theory were resolved by re-reading the paper several times, discussing with colleagues, and particularly relying on economists in their team to explain it. One team reported that the process of trying to explain the theory to their client helped them understand it themselves.

The issue of understanding the theory behind the paper was closely related to the issue of agreeing with it. There were areas where although the respondent felt they understood the basic concept, or intention, of the paper, they were less convinced that it was right; notably regarding employment elasticity, the value of time, location of employment changes, the robustness of evidence on agglomeration, and a number of other related issues. Respondents arrived at these from different directions, and it is a question of interpretation whether their doubts related to the same core issues, but it has been possible to distinguish three general issues, as follows[3].

The first group of issues related to concern that the empirical basis of agglomeration benefits mainly resided in a comparison of the difference between town centres and everywhere else, and should not therefore be interpreted as a continuous relationship at all levels of density.

“The agglomeration effects have been observed in city centres, as I understand it, where you have high productivity and output, but is that the same as a notional small increase in accessibility for lots of zones?” [4]

(Interview 09)

Thus while there was broad understanding of the potential for benefits in town centre conditions, this led to doubts when considering suburban, or inter-city, applications.

“I don't want to discredit agglomeration by it being applied to a load of stupid schemes in the middle of nowhere who suddenly start claiming enormous agglomeration benefits.”

(Interview 04)

It is worth mentioning that one respondent explicitly mentioned a doubt even in relation to town centre effects.

“Increased productivity simply due to proximity is harder to understand – I don't know if it's fully explained - I mean in the GLA paper examples are given but – you wonder why having an office block with the same sort of people 300 yards away should be significantly different from having the people at home on the internet in the modern age.”

(Interview 01)

The second group of concerns related to presumptions about productivity gains said to result from people moving their place of work. One aspect of this was the presumption that the average observed productivity (however measured) was a valid indicator of the productivity of new entrants. Agglomeration benefits were felt to be plausible as a result of very large differences between town centres and everywhere else, but were thought not to be credible as a result of small changes in travel costs in suburban or inter-urban areas.

“If you're assuming a large productivity differential then you're assuming large job relocations - that could be – a huge impact, which could be skewed. For the regeneration argument I think that opening up new areas and encouraging job relocations – in terms of analytical tools available, it's the area that's weakest at the moment. That was always acknowledged I think in the original document.”

(Interview 03)

A related point suggested that that the assumption was dubious because one did not really know where the employees had come from, this being modelled data.

“Job relocations are a tricky one – How can you say that transfer scheme is going to move jobs from here to there? You might say that it would generate jobs in x, but how do you know where those jobs come from? They could come from some place completely outside the model or whatever. So I do think that attaching a benefit that's related to productivity differential between those jobs is very – dodgy I suppose would be the word.”

(Interview 03)

Finally there is another doubt which does not fit easily into the two groups above as it related to a very specific estimation of particular relationships.

Another issue about the guidance is [that] the elasticities [are] based on highway accessibility, which is ludicrous.

(Interview 04)

3.2 Ease of understanding description of each WEB

Generally respondents had some difficulty understanding the descriptions of the specific nature of each WEB, and even those who felt they were more expert, familiar with the material themselves, felt that it would be hard for people coming to it fresh. The nature of the concepts made them hard to understand.

[The] descriptions were as good as they could be. The concepts are a bit tricky by their nature, and I don't think they are easy to explain precisely.

(Interview 03)

There were some specific issues that made the descriptions hard for respondents to understand.

- The use of economic terms and equations made understanding difficult for non-specialists, and for transport modellers who were less comfortable with such terms.
- The style in which the descriptions were written also caused problems. One respondent described how colleagues in their company had started reading it and given up as they found it too academic.
- Other respondents were confused by the potential of double counting between GDP and WEBs and also the perceived overlap between the WB1-4 and GP1-4.

There is an overlapping between the GDP effects and the wider economic benefits [5]. That is something that could definitely be more clear.

(Interview 05)

- Some of the descriptions were felt to be easier to understand than others. For example one respondent understood the description of agglomeration, but had difficulty with imperfect competition.

Some WEBs [are] more difficult than others. Once it clicked, [it] was OK but [it] took time. Imperfect competition was difficult, agglomeration more straightforward - understand about clustering of business and how it affects productivity.

(Interview 08)

In spite of these difficulties however, respondents generally felt they managed to understand the descriptions by applying them; reading them a number of times; and referring to colleagues to explain them. One respondent referred to a small group of colleagues to advise him, and another team contacted the DfT for clarification.

It took a while but we got there in the end. I think because not all of us are from an economics background, sometimes we need to read a sentence a couple of times to understand exactly what it's saying and there are some words that are used mainly in economics. But apart from that, it wasn't too bad.

(Interview 09)

3.3 Ease of following the methodology for WEBs

3.3.1 Ease of following the methodology in general

There was a general consensus that the calculations themselves were reasonably straightforward and doing them was not problematic. Difficulties were found in identifying the correct inputs for the calculations, and deciding what to do when they were unable to provide requisite data. Respondents identified missing steps in the methodology and found it hard to decide what to do; an issue that ran through the whole paper.

It is all there, just [an] occasional logical step missing, or [an] extra bit that you need to check out. Hard to try and find out the missing bits and fill them in.

(Interview 05)

In general it was OK. Couple of big gaps when we got to we thought "oh god; we clearly don't have this data" and it refers to technical work which perhaps [is] for a different audience.

(Interview 09)

Problems were also linked to the type of model that the respondents had. Carrying out the assessment required a land use model and it was not clear what to do in the absence of one.

We didn't have the modelling tools to do it correctly. [We] had a Saturn model [which was] inappropriate for it.

(Interview 10)

The calculations were felt to be very *data hungry* and one respondent did not have sufficient processing power on his computer to handle this. There were also respondents who could not calculate the benefits for each year so had to choose a base year for the model and then interpolate and extrapolate from that (see section 5.1.3).

3.3.2 Calculating WB1 - Agglomeration Economies

WB1 was considered one of the more difficult WEBs to calculate; problems related to generalised costs, the annual calculation of benefits and the need for a land use model.

Problems with generalised costs related to the need to find a single measure when most models produced different measures for different types of passengers, purpose of travel, and the absence of freight.

â[The] difficulty of using [a] single measure of generalised cost: almost any transport modelling exercise will have different measures of generalised cost for different passengers, freight.â

(Interview 06)

Another issue identified was that the output per head numbers come in big geographical regions, generally inappropriate for applying to transport schemes, and the discussion paper does not state what to do to overcome this. One respondent dealt with this by using sub-regional output values and adjusted it by earnings by borough.

There was also some confusion about which calculation to use for agglomeration economies. One respondent described using the wrong one (the formula for each successive year) in his proposal, which was corrected by the DfT before being submitted.

âThe main difficulty was in calculating â' the agglomeration benefits themselves â' And there were two forms of equation given and thatâs where I happened to select the wrong one, that happened to be an approximation for use in successive years rather than a step change best value for exponentiating to future years. And thatâs where we were helpfully corrected by DfT.â

(Interview 01)

3.3.3 WB3 â Increased output in imperfectly-competitive markets

This was considered a very easy calculation as it was 10 per cent of a figure they had from their model, and took seconds to compute. This was reported in a tone that suggested the result could not really be credible if it was so easy.

3.3.4 WB4 â Economic welfare benefits arising from improved labour supply

Much difficulty was reported in calculating WB4. Problems included trying to derive the productivity index, elasticities of productivity, and public transport elasticities.

âIncreased productivity, increased labour supply was an equation of some degree of complexity which required some interpretation of the calculation and input.â

(Interview 01)

The discussion paper was felt to be vague with regards to calculating GP3 - relocation of jobs - and so problems were experienced in calculating this effect. Respondents did not always have a land use model to enable them to carry out the calculation, which created particular difficulties.

âUnless you have a land use model, you donât really have any data.â

(Interview 02)

One respondent described how they came up with solutions to make the methodology work with their model, for example resolving the job relocation problem by using accessibility as a proxy of job changes (see section 4.5 for more details).

Other problems noted included:

- taking some time to understand that they were looking at an appraisal which assumed the total amount of employment was fixed, the benefits arising from changing its geographical location. However, in the traffic part of the appraisal, employment was treated as fixed in both quantity and location, as discussed below.
- and estimating GDP per worker.

There just wasn't enough detail supplied on what data to use. I'll give an example. GDP per worker; it [the paper] kind of gave some suggestions about how you might estimate this. But I became aware that there are a number of different ways that you could estimate GDP per worker looking at lower spatial areas and looking at wage bills and these kind of things. And I noticed that, depending how you did it, you get quite radically different answers. So that kind of scared me initially.

(Interview 03)

Approaches to resolving such problems were discussing them with DfT; using proxy measures (such as assuming zero sum gains in terms of employment across the modelled area to deal with the job relocations) and doing sensitivity tests; or deciding not to use a particular measure (see section 3.5 below).

3.3.5 Difficulties in following the methodology specific to the transport scheme

In many cases the test of how easy it was to follow the methodology occurred because of specific difficulties relating to the type of project under consideration. The most common examples were:

- schemes where there was a regeneration objective or an equity implication;
- schemes involving road pricing;
- and judgements about what sort of schemes could legitimately be tested.

Each of these will be discussed in turn.

Link to Regeneration Policy and Equity

A recurrent theme was a problem encountered in the calculation of benefits related to location of employment. There were two inter-related issues, firstly the validity of the assumption that moving jobs was associated with an increase in productivity measured by the richer area, and secondly, that if this was true, then what followed for project selection.

Both appeared in a stark form in two projects, one that concerned calculations for two neighbouring counties and the other for two nearby cities. It is noteworthy that these two different projects, carried out by different respondents, expressed the problem in almost the same language.

Any scheme that we tested which had the effect of moving jobs from (County X) to (Neighbouring County Y) produced additional benefits, and anything that moved jobs in the opposite direction produced disbenefits, and that seems kind of subtle.

(Interview 06)

â(Big City C) and (fairly close Big City D) are both trying to capture the same jobs. Both are accorded the same benefit ... How does this fit in with regeneration policy? If unemployment leads to low wages, then this will be interpreted as low productivity ... then there were higher benefits in (the richer City C) because of the better economic base there â' [that this] is not mentioned at all is a bit disconcerting.â

(Interview 09)

Respondents sometimes expressed these concerns on their own behalf, but they were also particularly sensitive about the effect on their clients, especially when the clients' policy objectives included regeneration of run-down, high unemployment, and / or low income areas. By definition, these would tend to appear in the calculations as 'low productivity' areas, and therefore encouraging jobs to move there would seem to be an economic loss rather than an economic benefit.

âWe did run into the problem of seeming to select areas that were doing relatively well over areas that weren't doing well. And that wasn't always to [the] client's liking.â

(Interview 07)

A quite different issue was raised in connection with the implications for traffic modelling of job location changes brought about by the transport scheme. If these did indeed take place, there would be consequences for the traffic flows in the comparison between the do-minimum and do-something case, which would change the benefit calculations and also have a feedback effect on whether the job location changes would happen to the same extent. In this case the result could be very sensitive to changes in the assumptions or inputs.

âChanges in (small City A) seemed to lead to agglomeration benefits in (small City B) ... If there is relocation of employment there would be feedback effects with a different volume of traffic or flows. We do not calculate this. It would halve the benefit I think. We calculated the distributional impact but it was not included in the report. It should have been.â

(Interview 05)

Another case where the results were sensitive to the inputs related to zone size and / or boundary effects:

âThe overall result can change significantly depending where you draw your boundary - then you've got a kind of ecological fallacy effect coming in.â

(Interview 01)

Finally, one criticism is noted which broadened the problem out into questions of equity, on top of the issue of regeneration.

âAlthough the guidance encourages the widest possible area to look at agglomeration disbenefits as well as benefits â' people tend to focus their studies in one particular area, so the collateral damages as it were that happen elsewhere might not be captured, so â' it will tend to produce results, as far as we can see, that lead to regressive policies in terms of social equity â' If you make an infrastructure scheme that is a benefit to the richest and most productive people and allows them greater accessibility to each other

and to places of work vis-à-vis improving their employment prospects [then] that will produce a very large wider economic benefit figure and any disadvantage or not catering for larger numbers of less affluent people is completely outweighed by the calculation.

(Interview 01)

Taking this group of concerns as a whole, it is fair to say that there was very considerable disquiet about the implications of the proposed approach, but that concern was divided into two potentially different criticisms – those who accepted the relationships but were concerned about whether the consequence was an undermining of the viability of regeneration policies, and those for whom the policy implications led them to a type of scrutiny which made them doubt whether the relationships were valid in the first place.

Projects involving road pricing

Respondents reported some initial difficulties with the modelling when trying to correctly model the user benefits from road pricing. These problems lead to the findings of negative wider economic impacts. Respondents doubted these results and reported that they would expect re-design of the model and iterative modelling to produce a road pricing scenario and modelled output with a positive estimate. Respondents offered a number of explanations for the doubted negative results:

- that the road pricing scheme they tested had not been designed properly;

We couldn't make it work for road pricing; there were huge negative agglomeration benefits. It didn't quite make sense, it gave what seemed a ludicrous answer ... we think it's because the scheme was not optimally designed, it needs iterative redesign.

(Interview 09)

- that they had modelled orbital journeys incorrectly.

Respondents also noted areas of analysis where it would be important to demonstrate the positive benefits expected. These included DfT WEBS guidance and advice on how to weight the contribution of different journey purposes to the agglomeration and wider economic impact. Comments also included consideration of the use of revenues from road pricing to support economic benefits. The observations were as follows:

- the wrong definition of generalised cost had been used;

Congestion charging doesn't work because, well perhaps in particular it doesn't work in London because there's no journey purpose in the guidance. So you say what is the change in travel costs and you have to do that change as an average of all journey purposes, and it comes out as congestion charge is a big negative because the generalised cost of travel - including the charge - goes up. And for people with high values of time, that charge is outweighed by the time saving, but at the average value of time, the charge is much larger, it's significantly larger than the time savings. Which is why you get the falling demand.

(Interview 04)

- exclusion of the consequential transport benefits of spending of the road pricing revenue.

One respondent who had modelled WEBs from a road pricing scenario and found a negative impact had simply accepted this finding. However, this was without recourse to reconsideration of the design and modelling of the scheme which, as explained above, could in fact lead to a positive estimation of the wider economic impacts of road pricing.

To what transport schemes should the approach be applied

Whilst respondents were generally happy applying the discussion paper approach to whatever transport scheme was in front of them, the argument was made that it should only be applied to *urban public transport*. This was related to several of the specific criticisms about data validity discussed above, suggesting that agglomeration benefits from highway schemes, or non town centre schemes, were doubtful.

3.4 Views on accuracy of their interpretation

The majority of respondents were happy with the accuracy of their calculations, and felt their output was as accurate as it could be. Where there was uncertainty, it was the robustness of the inputs that was of concern. Having input from the DfT and comparing the figures with the example in the discussion paper and elsewhere, increased confidence in accuracy.

[Accuracy of interpretation] was one of the issues. We did all the work and we thought the numbers looked sensible. They've been checked, but they've only been ['] checked against the formula ['] [We] decided it was sensible comparing it against the Crossrail example.

(Interview 08)

Many respondents reported the benefits they had calculated in a tone of voice indicating surprise at their size, and implying that they would have been more confident if they had expected such a big effect. They were reassured when they heard via word of mouth that other studies had also arrived at very large figures.

3.5 Inability to measure a particular WEB

Many issues and concerns were raised about inputs into the model; most of these were based on lack of data, often due to the transport model used. However, in spite of these general concerns (see section 4.3), there were few instances where respondents were unable to measure a particular WEB, or element of a WEB. Job relocation (GP3) presented the most problems. Some respondents were not able to measure this effect at all, and others had to use proxy measures: such as changes in commuting trip end, and accessibility. It was generally felt that this would not have a large impact on the overall assessment.

We found a way around all of the practical difficulties of using the equations. The one that we didn't measure was the relocation of jobs as a result of the improvements in accessibility due to the scheme, but we did actually, in the end, come up with an argument for why we thought in both instances, there wouldn't actually be any significant relocation of jobs as a result of the scheme ['] we were reasonably

confident that that was the case.

(Interview 10)

Couldn't get job relocation information. All we could do was tell them how many jobs were created, [so we] didn't do GP3, assumed it was zero - Could be quite significant as it is the largest benefit for the example.

(Interview 08)

3.6 Ease of use compared with other webtag guidance

Respondents were asked to compare the usability of the discussion paper with other webtag guidance. The discussion paper was seen as being distinctly different from webtag as it was referred to as a research paper, rather than guidance per se, and was felt to need amending if it were to be incorporated into webtag (see Chapter 7).

Respondents generally felt that the discussion paper was less user-friendly than webtag guidance. This related to the gaps and assumptions needed, the presentation, content and data. It was felt to be more theoretical, and required more understanding due to consisting of more technical description and equations. It was not seen as an easy read, but this was countered by the argument that webtag and other transport economic literature were not either.

[The discussion paper] it's not an easy read, you have to struggle your way through it, but then webtag's not a very easy read either - it's just boring; formulas and equations and the odd bit of Greek in there, it's never a good read is it? So I don't think it's easy, and most transport economics is not easy.

(Interview 04)

However, webtag, despite covering similarly complicated issues, was generally seen to be more user-friendly. There were respondents however, that felt the discussion paper was clearer than some webtag guidance, being more systematic, and that the step-by-step process at the end of the paper was very useful. One respondent identified that the data was better as it was actually contained in the paper.

[The paper is] very good and very clear because it is essentially mathematical, it's formulas to be applied and explains why and where the data comes from. It is much more systematic than some of the other webtag guidance.

(Interview 06)

3.7 Assistance

Respondents were generally in contact with the DfT to get some form of assistance regarding the paper. A core group of respondents worked very closely with the department on an ongoing basis, developing the methodology together. They had one-to-one, sometimes face-to-face contact. One team produced a technical note, to which the DfT responded after a month or two, and subsequently had a meeting on the back of it.

The issues respondents discussed with the DfT included:

- Choosing a base year
- Explaining elasticities
- Dealing with missing data
- Identifying mistakes in a proposal (using the wrong equation)
- Discussing and confirming assumptions made

Respondents generally found the assistance useful. Although the DfT were not always able to respond immediately to a query, respondents generally considered their response fast enough to mean that they were not delayed unduly. In one case, a respondent had to wait for a reply to a technical note.

â[Waiting] didn't really hold us up, quite quick, good â' [The DfT's] suggestions were all reasonable and practical, didn't make it that much more difficult for us.â

(Interview 10)

There were respondents who felt that their expertise was greater than the DfT's and only contacted them to confirm their approach, or to answer questions about how they had calculated an effect.

Other assistance drawn on was within respondent's own consultancy firms or external consultants who independently checked calculations.

Chapter summary

Understanding the theory behind the assessment approach was generally found to be reasonably easy, but some respondents found it took time to fully grasp. Understanding the theory was helpful for some in dealing with inconsistencies in the discussion paper, but others did not feel that a lack of understanding impacted on their ability to calculate WEBs.

There were respondents who felt they understood the discussion paper but did not really agree with particular aspects of it, notably in relation to the validity of calculating the WEBs from the specific assumptions and methods adopted in the paper, and an inconsistency with approaches used for regeneration benefits which appeared different.

There was general consensus that the calculations themselves were reasonably straightforward. WB1 was difficult to calculate as generalised costs proved problematic. Difficulties were also experienced in calculating WB4 â especially GP3, where the discussion paper's approach was perceived to be vague.

Despite concerns about inputs, respondents were generally able to measure the WEBs, though difficulties experienced related to being unable to access the requisite data and also to calculating GP3. Issues were resolved using proxy measures.

The DfT were contacted where assistance was required, but not to express underlying doubts about validity. A core group of respondents worked closely with the department, and received ongoing support. Response from the DfT was felt to be both useful and prompt.

4 Data

This chapter examines the issues and difficulties that the respondents faced in accessing and amending data. It goes on to describe the actions taken where respondents were unable to access the required data, and the assistance that they received regarding data requirements.

4.1 Preference for form of data

The preferred form of data was a spreadsheet either in Excel, or Excel compatible, although the argument was made that some data sets were too big for Excel to manage. Respondents would also have liked to have the data available on the DfT website, or through a web-link.

Respondents did not seem overly concerned about the issue of data format, being used to converting from one format to another and having to do so several times anyway during the course of particular projects.

4.2 Views on data requirements

Respondents recognised that the data requirements were substantial and collecting and amending the data was generally very time-consuming. The data requirements were felt to be *fairly onerous*, *very heavy indeed* and *time-consuming*. Though others felt them to be *fairly standard* and *not too bad*. Differences between these reactions depended on a number of factors: the type of model they had, how easy it was to access the data (see section 4.3) or the scale. The relative advantages of specific models were not pursued in the interviews, but a recurrent point was recognition that land use transport interaction (LUTI) models were expensive and time consuming on the one hand, but other methods of finding employment impacts were very suspect – though not all respondents considered LUTI models reliable. A particular difficulty was reported where outputs were necessary from another (unspecified) model controlled by another consultant, where the arrangements for access and understanding were very time-consuming.

[It is] heavy, heavy, heavy, very, very heavy indeed. Our model is huge, more than a million cells you're talking about, quite a bit of processing that goes in and a lot of internal calculations. The whole process [is] very data hungry. Travel costs for example we've got 19 categories of user from each zone. Averaged across them all. Lot of processing before you get into applying the methodology.

(Interview 07)

The processing power of respondents' computers was also a limiting factor in terms of being able to handle the data, and caused one respondent to decide (in consultation with the DfT) not to work at ward level.

It is important to note that the respondents did not necessarily see a heavy workload as being burdensome, since they were consultants getting paid for the work, and were quite happy to do so.

4.3 Accessing data

Problems arose in actually sourcing the data, and the mismatches of categories or geographical areas between the transport model and externally sourced data.

Data that was difficult to access, either because the respondents' model could not provide it, or the respondent could not find it elsewhere, included GDP per worker, job relocation data and elasticities of productivity. Respondents who had been given the data or requested it from the DfT felt that this meant they did not have problems with data sourcing. One respondent described that being given the data was helpful as they had been confused by two different values given in the discussion paper for what they thought was more or less the same measure.

â[There are] quite a few places where things are repeated, in WB1 there's talk about GDP per worker in each industry, and then in GP3 I think there is a reference to average national gross value added, which look similar things but I think they are different values. So it was quite useful [being given data] considering that we were applying this to a fairly very large model â' it would have been quite easy to get it wrong, to pick up the wrong data.â

(Interview 07)

The process of getting data from the DfT was felt to be ad hoc and untransparent, to the frustration of one respondent who had struggled with estimating GDP per worker on his own.

âIt was only kind of by chance that we learnt that the department had its own data for GDP per worker by sector. But â' that wasn't made public. We heard about this at a conference â' you tend to get a sense that â' some consultants got access to this data, others don't, and it's all a bit up in the air. How can you be comparing schemes with this going on?â

(Interview 03)

Another respondent went to great lengths to find GDP, including trying to apply a calculation to convert GVA provided by ONS and in the end used a factor in the discussion paper, that he queried the accuracy of. Information on geographical growth through time had to be tracked down by another respondent and productivity distribution across the different industries.

The mismatch of geographical zones between the transport model and the scale that external economic data was available was an issue for respondents. Generally the zones in the transport model were smaller than the other data and this meant aggregating up, but some boundaries were inconsistent which entailed re-weighting data. The issue of travel within zones for agglomeration was also mentioned, where transport models do not consider movement in a zone, so they had to come up with different zoning, and a formula that works for different size zones.

Similarly, industry categories were inconsistent across different data sources, for example job information could have been through *âstandard classificationâ* (which was not elaborated further) or by SIC classification (see section 4.4):

The job information we had was by standard classification of B1, B2, B8 essentially. Office, light industry and warehousing. All the data that came through from ONS was done to the SIC classification. They don't marry.

(Interview 08)

Concern was also expressed about the robustness of some of the data, for example the productivity differential used for employment relocation was seen to be relatively weak by one respondent, with broad geographical aggregation, and only current conditions, assuming that it stays the same through time.

Differentials in productivity between different areas are not known on a very fine spatial basis, so I think we ended up essentially with two values, one for (County X) and one for (neighbouring County Y). That basically meant that any scheme that we tested which had the effect of moving jobs from (X) into (Y) produced additional benefits, and anything that moved jobs in the opposite direction produced disbenefits and that seemed unsubtle.

(Interview 06)

This would mean that it would be hard to capture these benefits if looking at a relatively small study area, within which there is no data on how much more productive a job is in one place rather than another.

Another expressed confusion in how productivity elasticities were produced, especially those in the public sector, and those within the transport sector. One respondent felt that using elasticities based on highway accessibility for the effects of changes in public transport accessibility was *ludicrous*.

Other respondents commented on the difficulties of obtaining data from a third party, especially in the case where outputs from the work of another consultant in a previous study were necessary for the current study.

4.4 Amendments to data

Necessary amendments to the data were to match the format of the data provided by the transport model to that of the externally sourced data and addressing the problems identified in section 4.3 above. One respondent identified that data from official websites sometimes required re-formatting. A particular problem was that the occupation classification systems used in measuring salaries or other indicators of productivity can be different from the classifications used in estimating car ownership, trip making, and values of time in the transport model.

For the industrial classifications, the approaches were to:

Use average values and we had to ask for specific average values.

(Interview 07)

To assign the, I think the lowest level detail was 9 SIC classifications, so we had to break that down to essentially four job classifications we had on our modelling and sectorised down the larger traffic model to ward level.

(Interview 08)

On different geographical areas, respondents mentioned writing computer programmes to resolve the problem and having to re-weight GDP for districts that are in more than one zone; it wasn't necessarily seen to be a huge barrier, just time consuming or being *inconvenient, more than anything*.

The way we got round it, in the end, we actually used Accession, which is the DfT's accessibility programme, but Accession doesn't model congestion impacts at all so we set up separate Accession models whereby we input the different Saturn output in terms of journey time data, and coded that manually into the Accession model. So we had a series of Accession models from different years, with different journey time data. That was the simplest way we could think of to get round the problem of the model zones being entirely different to the requirement for this.

(Interview 10)

Travel costs were also an issue, as many models produced travel costs for a wider range than was specified in the discussion paper, though they argued that actually the advice should specify more precisely which cost to use, and these had to be amended, by averaging across the different categories from each zone and across modes for example:

The generalised costs of the average journey that can be quite time consuming as well. We've found that process, when you get that split into seven different user groups and different time periods and all that and you have to try and work that up into the cost of the average journey across all modes.

(Interview 03)

Although many of the respondents mentioned the problem of which generalised cost to use, in context there seemed to be two different issues. The first was simply that they are accustomed to differentiating or recalculating generalised cost by mode, person type, year and so on, and therefore advice needed to spell out which generalised cost to use. The second issue refers to the suggested impact of changes in generalised cost on agglomeration: in this case, it was felt that the agglomeration impact must have resulted from the generalised cost of all employees, by all modes (including short distance journeys, intra-zonals, walking etc), and traffic models do not always give this quantity.

(Interview 03)

4.5 Actions taken if unable to access data

Despite the problems outlined above, it was unusual for respondents to conclude that they could not measure a particular WEB (see section 3.5). Respondents took a range of actions to deal with the data problems outlined above including using proxies.

Change in employment was a key issue, especially for those without a land use model. Respondents described using changes in commuting trip ends as a proxy for this. One mentioned that they were careful not to claim huge benefits for that effect without a land use model. Another approach to this problem was to use accessibility.

Yet another approach was to create their own models to predict distribution of employment:

â[We] had to create our own models to predict distribution of employment â' [we] developed two models for relocation of jobs, a capacity constraint model, and select link analysis, both came out broadly similar.â

(Interview 04)

Another approach for dealing with not having a productivity index was to base it on an index constructed by GDP per worker.

For the productivity index, there was a choice of using wages, GVA or GDP as a proxy. One respondent used wage to compare different regions.

In terms of the changes over time, one respondent mentioned calculating for two years and then interpolating between and extrapolating after.

Chapter summary

The preferred form for data was in an Excel spreadsheet.

The data requirements for the assessment were generally seen to be substantial and time-consuming. How onerous they were perceived to be depended on the type of model the respondent had and how easy it was to access the data.

Problems arose in actually sourcing data and the mismatch of categories or geographical areas between the transport model and the externally sourced data. Concern was also expressed about the robustness of the data used, particularly in relation to GDP per worker, job relocation data and elasticities of productivity.

Zones in transport models were smaller than in the externally sourced data and this meant aggregating up. However, some boundaries were inconsistent which entailed re-weighting data. Similarly, industry categories were inconsistent across different data sources.

In the absence of a land-use model, some respondents used change in commuting trip ends, or accessibility, as a proxy for changes in employment. Another approach was to create models for prediction of employment and construct a productivity index based on GDP per worker.

5 Assumptions

This chapter considers where respondents had to make their own assumptions in carrying out a WEBs assessment, and their views on having to make those assumptions. The impact of making assumptions on the reliability of the overall assessment is also explored.

5.1 Where assumptions were made

All respondents made assumptions in the process of applying the methodology, it was seen as *non going*, *at every stage* and *effectively all the way through*. Assumptions related to *gaps* in methodology and mismatch between output from transport models and the requirement of the methodology.

5.1.1 Agglomeration & generalised costs

Respondents identified the need for assumptions when generating average generalised costs, as the methodology was deemed unclear on what effective density meant and how the calculations were to be carried out. Assumptions were necessary for how to combine commuting and business costs, and how to weight the information on costs for different modes and purposes. A key issue was whether it included freight. One respondent only used AM peak for generalised costs.

Lot of assumptions due to nature of the model, can't translate the outputs to feed into the methodology e.g. value of time, fares, charges, whether an average travel cost is weighted average of different purposes or only commuting and business costs. Does it include freight? Some were generic to transport models, some specific to our model.

(Interview 07)

5.1.2 Employment change

A notable area of assumption was that of employment change, especially in the absence of a land use model (see section 4.4). Respondents found the approach in the discussion paper on assessing relocation of jobs vague, and large assumptions had to be made to make up for this.

Respondents also described having to make assumptions of constant employment across the modelled area (an assumption required in the discussion paper); assuming no net impact in migration or overseas migration. This is sometimes expressed as assuming a *zero sum game* in terms of employment across the modelled area and assumptions about restricting the employment forecast.

Due to lack of data, there were respondents who assumed that GP3 was zero (see section 3.5).

5.1.3 Base years / growth

Assumptions were made relating to growth of economic parameters over time and taking base years rather than calculating benefits each year.

[You] make [your] own assumptions on economic data, the baseline data that you're assessing the scheme against in terms of growth in jobs, growth in GVA, that sort of information.

(Interview 10)

We had to interpolate between two years, 2016 and 2026 because the calculations are done on an annual basis and we assumed there was no benefit post 2026.

(Interview 08)

5.1.4 Geographical scale

There were two key issues around geographical scale where assumptions had to be made. One was choosing the size of zone to use, how to connect zones, and how to attribute trips where zones overlapped – this related to the geographical area that external data was available in (see section 4.4). Secondly, geographical assumptions had to be made on the study area, and how far to take economic benefits, for example London could interfere with the Midlands.

5.1.5 Other:

Other assumptions made involved:

- the categorisation of the jobs by industries, as external data and model had different classifications (see section 4.3)
- choosing not to use transport elasticity because it looks *â a bit funny*
- respondents making their own model to take into account capacity constraints, for example on public transport in London
- using average values rather than values by industrial sectors

5.2 Views on having to make assumptions

There was a range of perspectives about the acceptability of having to make assumptions. The inevitability of it was expressed, with respondents expecting to make assumptions as a normal part of their work, and as long as they were made explicit it was deemed acceptable. Indeed, there were respondents who preferred the approach not to be prescriptive, as it meant that consultants would be forced to think about what they are measuring rather than unconsciously plugging in numbers.

[It's] unrealistic to expect guidance to cover every possible question that could arise. Given the range of schemes, models.

(Interview 06)

â[You] always have to make assumptions, [I] don't like it when the Department gets too prescriptive, [I] prefer to make the most appropriate assumption and make them explicit.â

(Interview 04)

The main concern surrounding making assumptions seemed to be about the level of consistency across different schemes; that different consultants would make different assumptions and thus appraisals would not be comparable.

â[You] expect webtags would explain or be prescriptive about the process of re-weighting data to fit with [the] geographical unit [you] have your transport data at. Still an area of uncertainty, scope for discretion, which in general I don't think you want if this is going to be used as an appraisal.â

(Interview 03)

â[You] want people to make the same assumptions â' If you are applying it, [you] want to just look at guidance, don't want to spend lots of time getting into economics, [you] want to be told what the assumptions are. When the full guidance is published, if compulsory it should enable people to do the analysis without having to make too many assumptions, [or there is a] concern that it will be applied differently.â

(Interview 02)

Some respondents had approached this particular discussion paper as a research exercise, and for that purpose were happy to make assumptions, but felt that if it were to be made compulsory, or put on webtag, that it would need to be made more prescriptive; this is explored further in Chapter 7. Respondents had generally gone through a process of checking their assumptions with the DfT.

5.3 Impact on reliability of overall assessment

There were mixed views on the impact of making assumptions on the reliability of the assessment. It was acknowledged that assumptions will inevitably have an impact on comparability and reliability, as other consultants could make different assumptions. However, there were differing views on the extent of the impact making assumptions would have. Some respondents were confident that there was a limited impact having conducted sensitivity tests and used the best assumption.

â[We] always do sensitivity tests, change them and check impact, [as] part of own internal checks, [so weâre] confident [that weâre] getting reasonable results.â

(Interview 07)

Discussing assumptions with the DfT engendered confidence in some respondents as they had made the same assumptions. In some cases this seemed to address the question of confidence that the DfT would approve, rather than confidence that they were right.

âWeâre reasonably confident that we did it right but thatâs because we did regularly check with [the DfT].â

(Interview 10)

The size of the WEBs calculated led respondents to judge the impact of making assumptions on the assessment; one respondent felt that since the benefits for their scheme were relatively small, the impact of making assumptions could not have been particularly big.

âIn terms of the impact on the overall appraisal you wouldnât think it would be very big, because â' the welfare benefit [WEBs] was 7% of the conventional benefits.â

(Interview 08)

However, others who were not able or did not have the time to conduct sensitivity tests were less sure of the impact making assumptions had.

The area of most concern was around employment changes in the absence of a land use model.

âIf you don't have a land use model then [you] have to make other assumptions to get the employment changes, gives you less confidence than if had a genuine land use model. I suspect that in many other cases the wider economic impacts that relate to the redistribution of jobs have simply had to be omitted. In some cases that wouldn't matter at all, and in other cases it could be a serious omission, not necessarily an omission of benefits, it could be an omission of disbenefits â' it would be a distortion, but you can't say in which direction.â

(Interview 06)

In terms of geographical assumptions, it was noted that the size of the zone could potentially have an impact on the result, as a smaller zone would mean a higher result[6].

An example was given of an assumption on generalised costs having a large impact on the results where rail costs were used rather than average costs across all modes.

â[For example a] large underground infrastructure scheme, assessed using costs from rail, reduced cost by 5%, should have used average across all modes, becomes 0.05%, a tenth of what they found initially.â

(Interview 02)

5.4 Improvements in modelling practice

Overlapping with the question of assumptions was the question of the types of models that were to be used to express those assumptions. There were respondents who expressed support for the discussion paper not in terms of what it actually calculated (indeed as some had expressed substantial doubts) but because as an indirect consequence there would be an improvement in modelling practice related to other issues.

The three cases mentioned were:

- Multi-modal models, because you cannot estimate agglomeration without using the generalised cost of all modes;
- Land-use Transport Interaction (LUTI) models because you cannot calculate job relocation without them;
- Inclusion of very short trips (intra-zonal) because otherwise you miscalculate economic mass.

This potential advantage from the discussion paper was not pursued in the interviews.

Chapter Summary

Making assumptions was reported as commonplace in carrying out a WEBs assessment. Assumptions were needed for generating average generalised costs; to deal with employment change (especially in the absence of a land use model); choosing base years for calculating growth; geographical scale and re-categorising jobs by industry categories.

There was a range of perspectives about the acceptability of having to make assumptions, with some respondents expecting and finding it acceptable to do so. The main worry surrounding making assumptions concerned the level of consistency in carrying out WEBs assessments across different schemes.

It was pointed out that assumptions would inevitably have an impact on comparability and reliability. However, there were differing views as to the extent of this impact. There were respondents who anticipated a limited impact having conducted sensitivity tests; however those who did not conduct such tests were less convinced of this limited impact.

6 Time Constraints

This chapter examines the time required to carry out the WEBs assessments and looks at how respondents allocated time according to task, and according to the different WEBs. It goes on to explore whether the total time spent on the assessment depends on the scale or cost of the scheme or size of the WEBs calculated. Finally it discusses the question of whether increased use of the paper has an impact on the time spent doing the assessment.

6.1 Time needed to carry out the assessment

There was some variation in the amount of time taken to carry out the assessments. Respondents generally felt that it would get, or had got quicker after the first use (see section 6.3) and estimated that it had taken three to four months to conduct the assessment, with some respondents taking longer, and others less. For some this involved full-time, but generally it was felt to take 15-30 working days. There were respondents who felt they would have liked to have had more time to do a better job.

Variations in time taken depended on a range of factors, but it was clear that initially understanding the paper and working out how to carry out the calculations was time-consuming. One respondent identified that it took three months to produce the agglomeration benefits and then extended the deadline for a further two months to complete it; another took only a month, but it was for a relatively small scheme, and they did not calculate GP3 as part of the assessment.

'How long it takes depends on how much you want to use and what is coming out.'

(Interview 05)

The time taken was generally not in excess of what had been anticipated, although some respondents expressed surprise at how much needed to be done as part of the assessment.

â[We] didn't expect it at all on the [the first WEBs assessment carried out], we originally thought it was applying a few formulas to our model outputs.â

(Interview 07)

6.1.1 Acceptability of time needed and impact on workload

The amount of time taken was acceptable to the respondents and their clients, although one noted that they had lost a bid as a result of doing it too slowly â despite feeling as though they were rushing it. Some respondents had become specialists in this area, and were spending substantial - or all - of their time on WEB analysis. It was perceived as additional workload, but also an extra stream of work for them as long as clients were happy to fund it.

6.2 Allocation of time by task and WEB

The process identified for conducting the assessments involved reading and understanding the paper and methodology, accessing and amending data, building the model, carrying out the calculations, checking them, adjusting and testing outcomes, interpretation and report writing. One experienced respondent outlined how much time they allocated for each task:

â[It takes] 2-3 days [for a] transport modeller to take model outputs and do whatever needs to be done with them. Change the zones: 4-5 days. 5 days to set up spreadsheet, gathering economic data, re-weighting data, setting up spreadsheets â' for calculating your effective density and your agglomeration benefit, getting your elasticities, 5 days for that. [A colleague] spent a couple of days checking the calculations â' Because it's very easy to do something wrong in the spreadsheets, it's very easy. You definitely need somebody to check it, somebody who understands it.â

(Interview 03)

â[It takes] a week to do model outputs â' A week to get output values and stab at the change in employment, without a model. Then a week to check it and make sure it's alright and turn the numbers into pounds and incorporate it into T tables and scheme appraisals. [That is] assuming that you don't find a mistake and have to start over.â

(Interview 04)

Respondents identified that actually calculating the WEBs did not take much time as long as the data was available. The most time-consuming tasks were understanding the paper and methodology, and accessing and formatting the data. Each of these will be discussed in turn.

Understanding the paper and methodology

A substantial amount of time was spent understanding the paper. One respondent identified spending most of their time reading and re-reading the discussion paper and trying to understand what they needed to do, another spent just under a week understanding it himself - in addition to a colleague reading it - and one dedicated half the total time allocated to understanding it.

âI think in total it took us a month. But it took 2 weeks to get in my head what I was doing.â

(Interview 08)

Finding and amending data

Finding and amending the data was also time-consuming, given the problems outlined in 4.4. One respondent identified spending a third of the total time accessing the data:

â[We spent a] third getting the data, third building the model and doing calculations and a third interpreting and writing the report.â

(Interview 02)

There was also the process of going over the results, running sensitivities, interpreting the outcomes, and checking the calculations made, often by involving an external consultant or colleague.

âTesting results, sensitivities, discussions about which outputs to use, alterations. You have got this continual adjustment, interpretation of the output, don't want to take it on face value. Discussing with client and going back to model. This tends to give you a different perspective, interesting alternative angles and views in terms of what the thing is saying, so can be informative.â

(Interview 05)

Although WB4 - specifically GP3 - seemed to present the most problems in terms of accessing data, it was WB1 that was the most time consuming to calculate, particularly relating to generalised costs. This was mostly because of the amendments necessary to get the transport model output into the format for the calculation. WB1 was described as the *âmost difficultâ* to do, and most *âdata hungryâ*. Some respondents set up software to take into account the movement within zones, and dealing with the scale of the generalised cost matrix. It was also noted that agglomeration was most sensitive to any assumptions made.

Respondents also identified WB4 as being relatively time-consuming, calculating GP1, GP2 and GP3.

6.2.1 Time spent compared with conventional appraisal

There was no consensus about whether the WEBs appraisal took longer than conventional appraisal. If a conventional transport model was being developed from scratch, to add the WEBs assessment would mean a relatively small increase in time spent. However if a model is already set up, it was felt to add to the timetable more considerably. In addition to this, it depends on how the transport model is constructed.

There were respondents who felt a WEBs assessment took longer than conventional appraisal due to its complexity. Others felt they were broadly similar and one respondent considered it modest compared with an environmental survey.

6.2.2 Time proportionate to size / cost of scheme

There was no consensus on whether the time spent on the assessment increased with a larger, more expensive scheme. In support of this was the view that if a scheme is more complicated it will take more time to set up, and have a larger area of impact and more zones to deal with. One of the schemes discussed here was a small local project which applied to 37 wards, and this only took one month to complete - two weeks of which were invested in understanding the paper although they did not calculate GP3. However, it was noted that the time taken on the assessment was largely the same irrespective of the size of the scheme, unless a land use model had to be created.

â[I] donât know if we had a scheme twice the value if it would take twice as long, probably not. [It] depends on the area.â

(Interview 08)

In fact it was felt that the nature of the transport scheme, or the type of model being applied was more significant to the time taken on the assessment than the scale. Interestingly there were some strong views expressed that WEBs assessments were not relevant for small schemes at all, unless productivity was a key outcome for the project, and it was questioned whether the DfT should make a lower cut off limit to the size of scheme the assessment should be applied to. This was related to the robustness of the methodology at a smaller scale and a feeling that the work is proportionally more of a burden for a small scheme.

â[I] think there is a bottom cut off below which benefits won't make sense. [WEBs assessments] should only apply to ones over Â£100 million or Â£200 million.â

(Interview 07)

Respondents were generally dealing with large schemes, and felt that the time (and therefore cost) of the appraisal was minimal in relation to the cost of the scheme overall. One respondent who had applied it to a smaller scheme did so as it was a requirement of the funding.

6.2.3 Time proportionate to scale of WEB

There seemed to be little link between the time required to conduct the assessment and the scale of the WEB calculated; the same amount of time could be used to come up with a limited benefit or even disbenefit. However, this concept did generate discussion about whether it was worth carrying out the assessment for particular schemes. It was generally felt to be justifiable and representing good value for money as the benefits were high.

'Within a month I'd doubled the benefits that added 50% onto the benefits, plus another 50% for GDP.â

(Interview 08)

âI think it's very good value for money. I think you're getting much more benefit for your hour spent on wider economic benefits than you do on a transport appraisal.â

(Interview 04)

Others considered the possibility of making a judgement on whether to apply the assessment approach to a transport scheme if they did not feel that it would be worth it, and perhaps taking other action instead.

âIf there is limited economic impact, e.g. time, modest time saving on a route, [I] think there isn't any point really, do a little qualitative analysis instead.â

(Interview 03)

6.3 Impact of time spent with increased use of paper

Respondents had generally carried out the assessment more than once, and they all felt that they got faster at doing so after the first time. For example, one respondent initially took three to four months but took six weeks carrying out subsequent assessments. Those who had only applied it once also felt that it would be quicker a second time.

â[It] gets easier, first time you go through you have to try to understand what the hell it's saying and make those assumptions and get hold of data and process data. [The] second time you have made the assumptions, know how to get there and what is needed. Copy and paste data from original model, for lots of reasons it gets easier as you do it more times.â

(Interview 02)

Reasons for the process becoming easier with experience were:

Increased confidence in understanding the methodology

As noted above, respondents spent a substantial amount of time reading through the paper. Once familiar, with an understanding of the concepts, they felt more confident that they were doing what they were supposed to, and understood the requirements. One respondent felt that this meant that they would set up a subsequent traffic model differently in future.

Knowing where to find the data

One of the key problems was understanding what inputs to use and where to find data.

âSubsequent ones [assessments] were quicker and easier, more confident. [The] main difference was [we] knew exactly what input we were going to [use], we knew about the data sets.â

(Interview 07)

Developed software

Respondents developed software, and standard databases to do the calculations, which automated some of the processes.

When guidance first came out, time consuming bit was new aspects of involving generalised costs from transport model weighted by the number of jobs in each zone but we've automated that now

(Interview 04)

However, there was seen to be a limit as to the extent that familiarity could speed up the assessment process. For example, some respondents felt that would only be faster in carrying out an assessment for a similar scheme and location, but that the same level of data collection and analysis remained.

Chapter Summary

There was some variation reported in the amount of time taken to carry out a WEBs assessment. The amount of time taken was acceptable to most of the respondents and their clients. The most time-consuming tasks were understanding the paper and methodology, and accessing and formatting the data.

WB1 was the most time consuming WEB to calculate, particularly with regards to generalised costs.

There was little consensus as to whether this assessment took longer than conventional appraisal, and whether the time spent on the assessment increased with the size and cost of a scheme. Whilst more complex schemes would take more time to set up, have a larger area of impact and more zones, the majority of the analysis would take a similar length of time irrespective of the size of the scheme. In fact, it was felt that the nature of the scheme was more influential than its size.

There seemed to be little link between the time required to undertake the assessment and the scale of the WEBs calculated. This led to discussion about whether it was worth applying the discussion paper to particular schemes.

Where respondents had applied the paper to more than one scheme, they had become quicker at carrying out the assessment. This was due to increasing understanding of the paper, knowing how to access the data, and having developed software to automate some of the processes.

7 Suggestions for improvements

This chapter examines the suggested improvements to the discussion paper made by the respondents. The suggestions made relate to the following areas; presentation, data, the WEBs calculations, inaccuracies in the paper, adding clarity and use of examples.

7.1 Presentation

It was felt that the discussion paper could be written more clearly, as respondents reported having difficulties understanding it. Suggestions of how to achieve this included:

- Providing a simplified version of the paper. This was suggested by respondents who found it difficult to explain the discussion paper particularly agglomeration economies - to their colleagues and clients, especially those who did not have technical expertise or come from economic backgrounds
- Adopting more *user-friendly*, intuitive labels than WB1-4, GP1-4, as the current presentation was

felt to be confusing

- Resolving the overlaps between GDP effects and welfare
- Removing the overlap among the different components of the paper
- Renaming 'wider economic benefits' as it was currently felt to be easily confused with the 'wider economic impact' section on webtags.

7.2 Data

One of the key problems respondents reported was accessing data, and dealing with missing data. Several suggestions were made with a view to alleviating such difficulties:

- Make it clear what inputs are required, and from what source. These should be categorised into ideal inputs, and alternatives to cope with different transport models
- Provide the data required as a weblink, preferably on a spreadsheet, with data by consistent spatial disaggregation and also the date of revision to ensure users are accessing the most up-to-date data
- - In particular, provide data on GDP per worker by sector
- Explain how to re-weight data to fit with geographical units

I would imagine if there was like a webtags equivalent of this [the discussion paper] that it would tell you - or be prescriptive I guess - about the process of re-weighting data to fit with a geographical unit that you have your transport data at. Because that to my mind is still an area where there's a lot of uncertainty, and a lot of scope for discretion, which in general I don't think you want if this is going to be used as an appraisal [method].

(Interview 03)

- Explain what to do in the absence of certain data
- Provide advice for how to deal with models that only have one mode of transport (either Highway or Public Transport), though some respondents felt that the paper should recommend not using uni-modal models
- Provide elasticities and central databases, which could be used to show what local economic impacts are made
- Provide some guidance on how to quantify the land use impacts to start with. Some respondents were clear that a land use transport model would solve this problem - albeit with a hint of caution about whether to believe their results. However, there was a real problem if one did not have such a model. There was speculation about whether one could infer changes in land-use, especially employment, from changes in the attractiveness of different zones derived from a distribution model (if not doubly-constrained), that is use a distribution model as a sort of land-use model. If this were to be done, guidance would be necessary from DfT about how to do so, and whether it would be acceptable

7.3 Explanations of the WEB calculations

Most respondents found that they could understand the WEBs in broad conceptual terms and follow the detail of the calculations. However there were still some suggestions made on improving the explanations of the calculations:

- State assumptions and make it more of a step-by-step guide for non-economists
- Reduce the explanation of WB2, as this is always zero. The level of detail currently given was thought to be *à pretty pointless*
- Offer a clearer explanation of the approach to take when making assumptions about how effective density would change as the value of time increases over time, which appears to produce agglomeration disbenefits without any other change in the actual speeds or costs[7]
- Provide better explanations, and more examples of how the different effects work, which could help in increasing confidence, and to convince people that this is a real effect that needs to be taken into account
- Provide a more comprehensive description of how to approach the calculation of GP3, particularly how to obtain output values
- Amend WB3 to take account of freight rather than just driver's time

7.4 The calculations themselves

Carrying out the calculations themselves was not generally regarded as a significant issue. Despite this, the following suggestions were made:

- Provide software for carrying out the calculations, for the agglomeration effects in particular. Although how easy this would be to do given the different circumstances it is applied to was queried
- Address the steps missing. One example given was the absence of clear definition of the units to be used, notably generalised cost in time or money units, and how to treat the change over time. One respondent strongly stated that the only valid use of generalised cost for agglomeration must include a trip weighted average for all modes, distinguishing the main journey purposes.
- Revisit the calculations and assumptions, and reconfirm the parameters suggested are the most appropriate ones.
- Make clear in forthcoming WEBs guidance, the DfT advice that exists on road pricing scheme design and road pricing modelling requirements to ensure these are considered as factors driving part of the WEBs estimate[8] and provide advice on the handling of different journey purposes in the WEBs calculation for a road pricing scenario.

7.5 Correcting inaccuracies

It was highlighted that there was an inaccurate equation on page 57 of the discussion paper that required correcting. One respondent was made aware of the error by DfT.

7.6 Use of examples

Including examples was seen as a key way of improving the paper's usability, as doing so would help with providing some scale of benefits to expect from each calculation, and understanding what the effects are and what lies behind them. This was felt to be important to improve users' confidence in applying the paper. It was also raised how it was particularly important that the examples given should be consistent with the guidance. It was suggested that some of the examples given actually seemed to be in conflict with the discussion paper and relied heavily on assumptions, but this was not defined. The following suggestions were made:

- A selection of examples of different WEBs assessments should be given, including a range of different modes and schemes, for example infrastructure, basic interventions, public transport frequency, behavioural change and charges
- Provide some scale of benefits to expect from each WEB

'When you go through all these processes and you've got these complex equations, you've written your own programme to do it all and then you get a number out at the end' and you're still thinking 'is that right?' - I've no idea' because you don't really know what to expect, so again, I suppose, some detailed some results from previous schemes, what sort of figures you might expect, would probably be useful.'

(Interview 10)

- Include an example for the productivity differential (WB4)
- Have summary tables of example data and simple calculations like webtag

7.7 Other

A range of issues about the robustness of the methodology was raised and addressing these would be key to improving people's confidence in the overall appraisal approach. These issues have been more widely discussed throughout this report; however some were specifically suggested as improvements:

- Deal with the problem of moving jobs from less productive to more productive areas, provides extra benefits
- Generalised costs need to take into account the reliability of travel times
- Change the length of the appraisal period to about 30 years, as the current 60 years is too long; this point was made explicitly in reference to WEBs appraisal

In addition, addressing the uncertainty of how this appraisal fits with other government policy, webtag guidance and Economic Impact Reports was suggested. For example, the implication of moving jobs from less productive to more productive areas provides extra benefits while other policy might be to actively move employment to less productive areas.

A further suggestion was to consider restricting the types, and scale of transport schemes to which WEBs assessment should be applied. There was a strong sense that there should be a firm cut-off size of project, so that schemes would not have to use it unnecessarily.

Well I think limiting it to specific scales of projects and maybe even locations wouldn't make it easy to use, but it would mean 80% of schemes never had to look at it, or something like that. So I'm not sure that you can make it very simple, but I think you can stop people wasting time pursuing it when it's not relevant.

(Interview 04)

Chapter Summary

Improvements to the discussion paper were identified in the following areas:

- presentation within the paper
- data requirements
- the WEBs calculations
- correcting inaccuracies in the paper, and
- the use of examples.

8 Conclusions

In 2005, the DfT issued a discussion paper on how wider economic benefits (WEBs) of transport schemes might be measured. This has been tried out in a number of applications. At the request of the DfT, BMRB and the Centre for Transport Studies, UWE Bristol, carried out ten qualitative interviews with 15 respondents from eight consulting companies who had been involved in specific project appraisals using the methods outlined in the paper. The focus of the interviews was the usability of the discussion paper, including ease of understanding and application, access to data, and any improvements suggested. We did not pursue technical questions of the content of the paper, but report these where they were raised by respondents.

Respondents included some who had worked on the assessment approach since its inception, and others who were introduced to it in the context of a specific transport scheme. They saw its usefulness as being two-fold: to improve understanding of an important area which had not been part of established practice, and / or to improve the monetised value of a project.

In most cases respondents initially found the paper difficult to read and understand, but after a reasonable amount of work felt that they could readily understand it enough to carry out the required calculations. This work, and that involved in carrying out the appraisal, was not resented; respondents felt it to be interesting and not an unwelcome burden, given that they were getting paid for it. They broadly divided into two groups, those who felt they did not need a deeper understanding, and were happy to follow unambiguous detailed advice on how to do the calculations, and those who wanted to probe more deeply into the evidence base and theory. The latter seemed to be more critical.

All had found a significant number of technical issues of data and definition which most had resolved by discussions with the DfT, or with colleagues inside the firm, or both. They also raised a range of concerns about the validity and implications of the approach which they had mostly not raised with the DfT. Agglomeration benefits were understood well at a conceptual level, and calculated reasonably easily, though with doubts about application outside the best-established town centre conditions. Calculation of benefits from changes in workplace location caused problems in the absence of land-use transportation

models, and in their apparent inconsistency with regeneration objectives which troubled their clients. Other WEBs were less regarded.

It was felt that the DfT could usefully give more detailed help in ensuring that relevant data were available, preferably online, in Excel or similar format. It was considered necessary to give particular attention to the level of geographical detail needed, and consistency between the different classification systems used in transport modelling and in economic statistics, for example in socio-economic group, journey purpose, local productivity measures, mode used, values which grew over time (including value of time, and productivity). Respondents were divided about whether the guidance should become more prescriptive. Some felt that this would aid consistency and avoid the risk of being challenged, for example at public inquiry, and others that the current state of the art did not justify detailed rules, and more discretion and careful thought would be necessary.

Overall, respondents were aware that they had been involved in an early stage of potentially important methodological development, and evidently appreciated this. As consultants, they also appreciated being able to satisfy their clients with increased estimated benefits for relatively little work, but did not necessarily take these at face value. The prevailing mood, in our judgement, seemed to be that they felt confident they could master any complication thrown at them, would appreciate more clarity on exact definitions, units and data, and at this stage still had doubts about whether the obtained answers were true.

Appendices

Appendix A: Technical Appendix

A brief outline of the research design and conduct is given in chapter 1 of this report. This appendix provides further details of the research methods used in this study. A copy of the topic guide used can be found in Appendix B.

Research Design

The research was qualitative in design, adopting in-depth interviews in order to explore users' reactions to, and experiences of, applying the 2005 discussion paper to estimating the WEBs of transport schemes. A qualitative approach to the research enabled respondents to raise issues of importance in their own words and vocabulary, in the context of their own circumstances and, with probing by the interviewer, ensured issues were explored and examined in full.

The sampling frame of those who had experience of using the discussion paper was supplied by the Department for Transport (DfT) and consisted of transport practitioners / professionals and consultants. All respondents on the sample were sent a letter of introduction outlining the aims and nature of the study prior to recruitment.

The recruitment was managed by BMRB's internal field team who used one recruiter to select the respondent sample. The field manager was fully briefed on the project and provided with detailed recruitment instructions and a screening questionnaire in order to assess respondents' eligibility to participate in the research. Respondents were recruited using telephone recruitment. The recruiter was a member of the IQCS (Interviewers Quality Control Scheme) at the time of recruitment.

Conduct of the interviews

The in-depth interviews were carried out by two qualitative researchers who have extensive experience of conducting qualitative research and have been trained in the techniques of non-directive interviewing. The researcher was accompanied by a transport academic who followed-up on the more technical issues raised by respondents.

Each interview was exploratory and interactive in form so that questioning could be responsive to the experiences and views of the individual respondent. Interviews were based on a topic guide (see Appendix B), which listed the key themes and sub topics to be addressed and the specific issues for coverage within each. Although topic guides help to ensure systematic coverage of key points across interviews, they are used flexibly to allow issues of relevance for individual respondents to be covered through detailed follow-up questioning.

The wording of the questions and the conduct of interviews were designed to be appropriate to the circumstances of the people being interviewed. All members of the research team took part in a briefing to ensure the interviewing approach was consistent across the interviews.

The interviews were conducted at the respondent's place of work or DfT offices. All interviews were digitally recorded and transcribed verbatim.

Analysis

Material collected through qualitative methods is invariably unstructured and unwieldy. Much of it is text based, consisting of verbatim transcriptions of interviews. Moreover, the internal content of the material is usually in detailed and micro-form (for example, accounts of experiences and inarticulate explanations). The primary aim of any analytical method is to provide a means of exploring coherence and structure within a cumbersome data set whilst retaining a hold on the original accounts and observations from which it is derived.

The analysis of the in-depth interviews was undertaken using a qualitative content analytic method called 'Matrix Mapping', which involves a systematic process of sifting, summarising and sorting the material according to key issues and themes.

The first stage of 'Matrix-Mapping' involves familiarisation with the data (in the form of verbatim transcripts) and identification of emerging issues. Based on this preliminary review of the data, as well as the coverage of the topic guide and the researchers' experiences of conducting the fieldwork, a thematic framework is constructed.

The subject headings that made up the thematic framework used for this research were as follows:

- 1) Background
- 2) Awareness and understanding of the 2005 discussion paper
- 3) Use of the 2005 discussion paper
- 4) Ease of using the 2005 discussion paper
- 5) Methodology
- 6) Assumptions
- 7) Data requirements

- 8) Time constraints
- 9) Overall usability
- 10) Impact of using the 2005 discussion paper
- 11) Suggestions for improvements
- 12) Technical issues raised

The analysis then proceeded by summarising and synthesising the data according to this thematic framework that comprises a series of subject charts displayed in Excel.

Data from each interview transcript was summarised and transposed under the appropriate subject heading of the thematic matrix. The context of the information was retained and the page of the transcript from which it came noted, so that it was possible to return to a transcript to explore a point in more detail or to extract text for verbatim quotation. Once the data had been sifted a map was produced which identified the range and nature of views and experiences, sought associations and patterns within them and provided explanations and underpinning factors.

The mapping process is similar regardless of the topic being considered. The analyst reviews the summarised data; compares and contrasts the perceptions, accounts, or experiences; searches for patterns or connections within the data and seeks explanations internally within the data set. Piecing together the overall picture is not simply aggregating patterns, but weighing up the salience and dynamics of issues, and searching for structures within the data that have explanatory power, rather than simply seeking a multiplicity of evidence.

Appendix B: Topic Guide

DfT 2005 WEBS Discussion Paper - Usability Review

Topic Guide

Research aim: to advise DfT on **how best to improve its 2005 WEBS discussion paper**, making it more user-friendly and practical for users.

Specifically, these interviews aim to:

- assess how **user-friendly** and **comprehensive** the 2005 WEBS discussion paper is for the intended audience, including the identification of areas for **improvement**
- identify any **data, assumptions** and **methodology** that were necessary and **not made clear** in the paper
- consider the **time constraints** placed on users in making use of the discussion paper to undertake a WEBS assessment
- set out **recommendations** for improving the usability of the WEBS paper

1) Introduction

- About the research
- Commissioned by DfT
- BMRB are an independent research agency working on behalf of DfT

- Length of interview â between 1 ½ and 2 hours
- Highlight involvement of transport academic (respondents to flag any technical questions during the interview and these can be discussed at the end)
- Confidentiality and anonymity - recordings are confidential and available only to the research team
- Stress that DfT is conducting other research on WEBs which focus on strengthening the methodological approach, theory and evidence base underlying the 2005 discussion paper. Therefore this will not be explored in the interview. If respondent asks to discuss these other work streams give Vicky Cadman's contact details: vicky.cadman@dft.gsi.gov.uk - 0207 944 5230

Researcher Note: Where the topic guide refers to the three components of the Wider Economic Benefits, these are as follows:

- **WB1; GP4 Agglomeration Economies** â agglomeration benefits arise because some firms are more productive when located close to other firms
- **WB3; GP6 Increased output in imperfectly-competitive markets** â reductions in price and increases in output are expected when production costs decrease, due to transport improvements, for example
- **WB4 Economic welfare benefits arising from improved labour supply** â the response of employees to decreased commuting time and costs, based on three separate effects:
 - *GP1* More people in work
 - *GP2* People choosing to work longer hours
 - *GP3* Relocation of jobs to more productive areas

2) Background

- Explore respondent background; job title, type of consultancy they work for
- Role and responsibilities within the consultancy
- How long they have been in their current position for
- Their background (*briefly*)

3) Awareness and understanding of the 2005 discussion paper

- Explore how they became aware of the 2005 discussion paper, when
 - What information was given to / obtained by respondent
- Explore what they thought of the 2005 discussion paper at this stage
- Explore their knowledge surrounding the 2005 discussion paper
 - **Probe:**
 - How the discussion paper came into being; history / background
 - Purpose of the discussion paper
 - What the discussion paper consists of
 - Who the discussion paper is aimed at
 - How the discussion paper should be used
 - What is expected of them with regards to the discussion paper
 - For each explore where this understanding came from

4) Use of the 2005 discussion paper

- In relation to how many transport schemes have they used the 2005 discussion paper
- For which transport schemes have they used it
 - Brief description of each transport scheme
- - **Prompt:**
 - Mode of transport scheme related to
 - Cost

Use the rest of section 4 in relation to all transport schemes that the 2005 discussion paper has been used for

- Reasons for using the 2005 discussion paper in relation to developing the transport scheme
- Any benefits / disadvantages predicted â **probe** for details
- Explore how they used the 2005 discussion paper - alone, or with a colleague(s), reasons
- Ease of finding / accessing the 2005 discussion paper
 - Any problems experienced; how were these overcome

Ease of using the 2005 discussion paper

- Views of how easy it was to understand the **description** of the effects of each of the three WEBS
 - Explore any difficulties experienced; how were these overcome
- Views of how well they understood the **theory** underlying the assessment approach (***Researcher note: Highlight to respondent that this is being examined in detail in other DfT research. Therefore will only be explored very briefly here***)
 - Whether theory impacted on usability of 2005 discussion paper
 - Explore any difficulties experienced; how were these overcome

Methodology

- Views of how easy it was to follow the **methodology** proposed for estimating each of the three WEBS - **probe** on the methodology for each WEBS component separately
 - Explore any difficulties experienced; how were these overcome
- Views on the accuracy of their interpretation of the methodology
- Any assistance needed to understand methodology proposed by the 2005 discussion paper - **probe** on the methodology for each WEBS component separately
- Whether this assistance was sought
 - **Probe:**
 - Who from
 - **Prompt:** DfT
 - Awareness of who they should contact
 - On how many occasions
 - In relation to what specifically
 - How helpful was the source in advising on methodological issues, in what way
- Explore whether any issues related to methodology meant they were unable to measure a particular benefit, in what way â **probe** for details

- Impact on the overall assessment
- Explore whether they needed to use their own initiative to complete a WEBs assessment
 - At what stage of the assessment
 - Why; in relation to what part of the assessment â **probe** for details
 - Views on this
 - Whether this was expected, reasons
 - Whether this was acceptable, reasons
 - Any benefits / disadvantages
 - **Prompt:** Impact on reliability of assessment

Assumptions

- Explore whether they had to make their own assumptions to be able to undertake WEBs analysis
 - At what stage of the assessment
 - Why; in relation to what part of the assessment â **probe** for details
 - Views on this
 - Whether this was expected, reasons
 - Whether this was acceptable, reasons
 - Any benefits / disadvantages
 - Impact on reliability of assessment
- Explore whether any assumptions were difficult to follow or not obvious from a theoretical grounding
- Explore whether they received any advice regarding the assumptions they made â **probe** for details
 - Who from
 - **Prompt:** DfT
 - Awareness of who they should contact
 - How useful was this advice, in what way â **probe** for details
- Explore whether any issues related to making assumptions meant they were unable to measure a particular benefit, in what way â **probe** for details
- Impact on the overall assessment

Data

- Views on the data requirements for WEBs analysis
 - Explore what they understand these requirements to be
- Explore how easy they found it to access the data
 - Whether receiving help / information on data would impact on time required to carry out the assessment; in what way
 - Explore issues surrounding what data source to use if a range available
 - What did they do if they could not access the data
 - Explore use of proxies (*e.g. earnings as a proxy for GDP*)
 - Adequacy of these
- Preference for what form the data should come in
 - **Prompt:**
 - Datasets
 - Links
 - Reasons for preference

- Whether dependent on type of data needed
- Explore whether it was necessary to amend / adjust / extrapolate the data, beyond the description in the 2005 discussion paper â **probe** for details
- Explore whether any issues related to accessing the data meant they were unable to measure a particular benefit, in what way â **probe** for details
- Impact on the overall assessment

Time constraints

- Explore how much time was spent undertaking the WEBs analysis
 - How this compared with time expected / allowed at outset of task
 - Acceptability of this length of time, reasons - **probe** for details
- Explore how the total time spent was allocated
 - **Prompt:**
 - Finding the data
 - Getting the data into a usable format
 - Understanding the methodology for estimating each WEB
 - Extracting the method and assumptions
 - Testing the results for different sensitivities / scenarios
 - Which sensitivities / scenarios
 - Liaising with advice source, if applicable
 - WB1: Agglomeration economies
 - WB3: Imperfect competition
 - WB4: Improved labour supply
- Views about how using the 2005 discussion paper will impact on how they conduct WEB assessments in the future, in what way
 - **Prompt:**
 - Length of time taken
 - Resources required
- Explore how the amount of time spent on the WEBs assessment compared to other assessments
 - **Prompt:** Conventional appraisal
- Explore how the amount of time spent on the WEBs assessment compared to the size of the transport scheme - **probe** for details
- Explore whether amount of time and resources spent were felt to be proportionate to the size of scheme
 - **Prompt:**
 - Cost of transport scheme
- Explore whether the amount of time spent on the assessment depended on the scale of WEBs identified, in what way â **probe** for details
- Views on how seeking advice about the 2005 discussion paper impacted on time taken to complete the analysis
 - **Prompt:** waiting for advice source to respond to communications
- Views on how acting on the advice impacted on the time taken to complete the analysis
 - In what way â **probe** for details
- How worthwhile was receiving the advice compared to any delay incurred

Overall

- Explore whether they were satisfied with the output produced as a result of the assessment, in what way â **probe** for details
- (*Note to researcher: refer back to respondent's original expectations*) Explore how overall experiences compare to original expectations â **probe** for details
- Usability of 2005 discussion paper compared to other webtage guidance
 - **Prompt:**
 - Methodology
 - Assumptions
 - Data
 - Time constraints
- Explore whether the experiences above have altered due to increased use of the 2005 discussion paper (*If they have used the 2005 discussion paper for more than one transport scheme*)

5) Impact of using the 2005 discussion paper

- Explore what happened as a result of using the 2005 discussion paper
 - Impact on transport scheme under analysis
 - Impact on their workload
 - **Prompt:**
 - Any amendments to assessment necessary

6) Suggestions for improvements

- Explore what would make the 2005 discussion paper easier to use
 - **Prompt:**
 - Additional information / explanations
 - Clearer explanations - examples
 - Information / advice relating specifically to the **methodology**
 - Additions
 - Revisions
 - Information / advice relating specifically to the **data**, including the **availability** of data
 - Additions
 - Revisions
 - Information / advice relating specifically to **assumptions**
 - Additions
 - Revisions
 - Other
- Explore which particular improvements would help reduce the appraisal burden
- Explore their confidence in explaining how they applied the 2005 discussion paper
 - What could be done to the 2005 discussion paper to increase this confidence
- Would they recommend using the 2005 discussion paper to other transport professionals
 - Reasons

7) Any other comments / questions for the researcher

8) Any comments / questions for transport academic (allow up to half an hour)

Thank respondent and close discussion