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Buses and Economic Growth

Main report

Peter Mackie, James Laird and Daniel Johnson
Institute for Transport Studies

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1 INTRODUCTION

1.1 Study objectives

The bus is a familiar part of everyday urban life. Bus service receives a fraction of the attention given to rail and car which perhaps provide better photo opportunities. Yet despite being taken for granted, bus service is a vital cog in the wheel of the economy.

Because the bus is a cog in a larger wheel, facilitating access to jobs, shops and recreational activities, it is not easy to quantify the contribution bus service makes to the wider economy. This study aims to fill that gap. Our focus is therefore on the indirect contribution of bus to the economy. We do not look at the direct contribution of the bus industry as an employer and creator of output in its own right, as this is covered elsewhere in the literature. The Department for Transport for example estimate that in 2010/11 124,000 people were employed in the local bus sector in Great Britain, whilst in England the turnover of the sector was £5.3 billion. Of this £5.3 billion, £2.8 billion is derived from fare receipts, £1 billion in local government support to services or individuals, £1 billion from government to support concessionary travel and £420 million in Bus Service Operators Grant¹. Bus industry employees spend £2.1 billion in the economy, whilst the bus sector spends £2.5 billion in its supply chain². Through its supply chain the bus industry supports a further 83,000 jobs³.

Various policy interventions are available to government (central and local) which would impact on the quality/price of public transport service and hence the level of accessibility for users. These include:

- The taxation and subsidy arrangements for the industry (BSOG etc)
- The infrastructure arrangements (bus priorities, busways etc)
- The competitive environment (road user charging, workplace levies and other parking policy etc)

Many studies have been undertaken which have sought to measure the direct benefits of such policy interventions. These go back at least to the Glaister model of the early 1980s and include work on Quality Bus Partnerships (2003) and for CfIT(2002) by ITS⁴

¹ DfT (2012) Tables Bus0501 and Bus 0701b. Available at:
<http://www.dft.gov.uk/statistics?series=buses&tag=buses-and-coaches> [downloaded 16th May 2012]

² TAS Partnership (2010) The value of buses to the economy. Report to the Confederation of Passenger Transport.

³ EKO GEN (2010) Employment in sustainable transport.

⁴ ITS and TSU Oxford (2003) Quality Bus Partnerships and Market Structure. Report to Department for Transport ; Commission for Integrated Transport (2002) Obtaining Best Value for Public Subsidy for the Bus Industry (see especially Appendices 3 and 9)

This study takes this literature forward by looking at the indirect economic benefits of bus travel. We therefore focus on the economically active part of the population and on bus users within that. We aim to identify and evaluate the contribution bus service makes to the efficient working of the labour market and of cities and towns ability to deliver services to their resident populations. The implications of these effects for public policy towards the bus and the appraisal of policy measures are discussed.

1.2 Structure of report

The structure of the report is as follows. First, the pattern of usage of bus service is reviewed in terms of volume of tripmaking, trip purposes, distribution across socio-economic groups, by income and car ownership. Then in Section 3 we examine the evidence on how bus service impacts on the economy looking specifically at effects on the labour market, on access to education and training and in supporting towns and cities as economic entities. In Section 4, we make estimates of the economic impact of the bus sector through its indirect effects on employment and on the retail and leisure sectors. Then an attempt is made to assess whether good bus service makes a difference in Section 5. Finally, in Section 6 we draw out the implications for public policy towards buses including the appraisal of bus infrastructure schemes and support for bus services through public funds.

Three supporting pieces of work have been undertaken in order to fulfil the brief and these are reported separately from this main report.

- A review of the results of the National Travel Survey as it relates to bus use. This is the source of the material on who uses buses and provides a control against which to consider the sample survey work below
- An Internet based survey designed to elicit information about bus users' choices, how bus services affect their lives, in particular through access to jobs and to education and training, and the value they place on having a bus service available to them
- A survey of stakeholders and large employers in specific case study areas with supporting data analysis. This provides insight into their attitudes to the bus and their perception of the contribution bus service makes to employers and other customers. Comparisons between the case study areas and the rest of Great Britain are also made.

We are very grateful to Claire Haigh and Katie Allister of Greener Journeys for their support and encouragement, to the Steering Committee who have advised at key points in the study, to those who participated in the stakeholder and employer interviews and to Research Now through whom the Internet survey was conducted expeditiously. Darren Williams of the DfT provided valuable help on the NTS analysis.

2 THE DETERMINANTS OF BUS TRAVEL

2.1 Analysis at the national level

As a basis for considering the impact of bus services on the economy, a starting point is to develop a picture of the level and pattern of usage of the bus. The obvious source for this is the National Travel Survey (NTS), which is a household based survey commissioned by the Department for Transport (DfT 2011)⁵. The combined 2009 and 2010 surveys contain data on the travel patterns of over 42,000 individuals. This is a large, reliable sample against which we can benchmark our much smaller but more in depth internet survey.

There were 5.16 billion bus trips in Great Britain in 2010, 7 per cent of total trips including walk or 6 per cent of total trip kms. Nearly three times as many trips are made by bus as by surface rail and underground combined. There was an increase of around 14% in bus trips over the last decade. Within that, there have been some large shifts in market composition. If frequent users are defined as those using the bus at least once a week, according to NTS, the proportion of frequent bus users in the population increased by around 7% since 2003. However, excluding those over 60 who have benefitted from the improved concessionary fare arrangements, the growth curve is flat. If in addition London is removed, the proportion of frequent bus users under 60 in the rest of the country has fallen from 23.8% in 2003 to 21.5% in 2010. Nevertheless, over a fifth of the working age population outside London uses the bus at least once a week.

Looking at bus use by socio-demographic characteristics and defining frequent bus use as at least once a week and never as less than once a year, the following patterns emerge

- 30% of people are frequent bus users – a quarter of men and a third of women. Half of men never use the bus and a third of women never do so.
- Over half of 16-19 year olds and over a third of 20-29 year olds are frequent bus users; this drops to a fifth for 40-60 year olds.
- Around 20% of full time employed, 30% of part time employed and over 50% of students aged over 16 are frequent bus users.
- Among those in employment, frequent bus use is most common amongst the lower skilled occupations namely manual workers and occupations such as sales, customer service and personal services.
- 70% of those with no car available use the bus frequently compared with 20% of those with car available.

The pattern of bus usage by household income quintile group is shown in Table 2.1 below. Bus use is inversely related to income level, but there is appreciable

⁵ National Travel Survey 2010, Department for Transport,
<http://www.dft.gov.uk/statistics/releases/national-travel-survey-2010>

bus use at all income levels. This pattern is quite different from that found for car or rail and suggests that supportive policies for the bus are likely to be favourable in distributive terms.

Table 2.1: Frequency of bus usage by Household income quintile

	3 or more times a week	Once or twice a week	Less than once per week, more than twice a month	Once or twice a month	Less than once a month, more than twice a year	Once or twice a year	Less than once a year or never
Lowest real income	27.1	25.3	8.7	5.4	3.1	4.1	21.0
Second level	22.1	18.9	6.4	5.5	4.0	4.8	23.6
Third level	16.3	13.1	5.6	5.4	4.0	5.4	28.8
Fourth level	13.0	10.1	4.9	5.1	4.1	6.2	31.5
Highest real income	10.2	8.3	5.5	4.4	4.6	6.7	33.1

Source: National Travel Survey

As is to be expected, bus use differs systematically by area type. Table 2.2 shows that under 20% of Londoners rarely⁶ or never use the bus while for rural areas the corresponding proportion is 70%. For urban Britain outside London, broadly a third are frequent users, a third occasional and a third never use the bus. There is a strong correlation between this pattern and the service frequency.

Thus, area type determines the frequency which can affordably be offered and frequency is the prime determinant of service quality and level of use. Customer satisfaction ratings reported in the NTS are also found to be correlated with frequency. Overall 75% are very or fairly satisfied with the bus service ranging from 87% in London to two-thirds in the more rural regions of Southern England.

Turning now to journey purpose, of the 5.16 billion bus trips in 2010, analysis of the NTS finds 22% were journeys to/from work, 26% were shopping trips and 21% were leisure trips (Table 2.3). The journey purpose splits differ between London and elsewhere, so the estimated total bus trips by journey purpose are as below.

⁶ This includes those who use the bus twice a year or less.

Table 2.2: Frequency of bus usage by area type

	3 or more times a week	Once or twice a week	Less than once per week, more than twice a month	Once or twice a month	Less than once a month, more than twice a year	Once or twice a year	Less than once a year or never
London Boroughs	41.5	17.4	6.8	9.8	6.5	5.3	12.7
Met built-up areas	21.7	14.0	4.6	9.0	5.9	8.2	36.5
Other urban over 250K	17.0	13.3	4.4	11.0	7.1	9.1	38.0
Urban over 25K to 250K	13.0	11.5	4.6	8.7	6.8	9.2	46.2
Urban over 10K to 25K	9.9	9.8	4.5	8.7	6.9	10.5	49.7
Urban over 3K to 10K	9.0	9.1	3.3	8.2	6.7	10.8	52.8
Rural	7.1	5.8	2.3	6.5	5.9	9.0	63.4

Source: National Travel Survey

Table 2.3 Total Bus Trips by Journey purpose (millions pa)

	Total trips (Millions)		
	London	Non-London	Total
Commuting	479.0	646.3	1125.3
Business/Other work	77.6	60.4	138.0
Education/escort	253.6	546.2	799.8
Shopping	314.9	1012.6	1327.5
Other escort	39.3	102.7	142.0
Personal Business	181.3	342.9	524.2
Leisure	353.3	749.9	1103.2
Total	1699.0	3461.0	5160.0

Source: National Travel Survey

On this basis, around 2.5 million jobs are accessed each day by bus. More people travel to work by bus than by all other forms of public transport combined. Bus is the usual means of travel to work for 8.5% of commuters. Within this cohort, noting the likely correlation between some of these points,

- Women are more likely to commute by bus with 10.7% reporting bus as their usual mode versus 6.0% for men
- Use of bus for commuting is much higher for younger age groups; up to 19% for 16-19 year olds
- Part-time workers are more likely to use the bus

- Bus use for journey to work is highest for SEGs based on manual/other occupations
- 34% of commuters with no car available use bus as their usual means of travel to work.
- 43% of regular bus commuters do not have a car available, and 59% of bus commuting trips made by those with no car available are of 3 miles or more.
- Use of bus for commuting is lower at higher income levels
- Over a fifth of those living in Greater London commute by bus.

Turning to shopping, overall, 8.5% of trips for food shopping are made by bus. The patterns are predictable—it approaches double this proportion for 16-19 year olds and the over 70s, for people on lower incomes, for the economically inactive and for residents of Greater London. In the Metropolitan built up areas other than London, 12% of shopping trips are made by bus.

Overall, the bus is an important facilitator of economic activity in urban Britain and there are large sub-groups within the population who are reliant on the bus.

2.2 Variations between places

In Section 2.1 we gave a macro analysis of the pattern of bus use. However, our perception is that buses are more successful in some cities and large towns than others. This might be because of differences in car ownership or social composition. London is a case in point. London differs from the rest of Great Britain, due to a wide range of factors including population/employment density, size of city centre, car running costs, parking and congestion, the size of the tourist industry and the regulatory environment. We therefore wanted to explore, within urban Britain outside London, what differences we could discover in attitudes and perceived success of bus services. As part of this we conducted an interview survey of fifteen employers and six other stakeholders in four areas - Brighton, Nottingham, the Medway Towns and Maidstone, and West Yorkshire. We also undertook a top up to the Internet survey adding an extra 500 responses to the national survey from those four areas.

The Internet survey is a survey of bus users, not of the general population so what is interesting is the relative responses in the four case study areas to the national sample and to London. In terms of frequency of bus usage, Brighton and Nottingham have proportions of frequent users not far off London, while the Kent towns are more representative of the national average, with West Yorkshire in-between.

Our interpretation is that in the case study areas, especially Brighton and Nottingham, there is better penetration achieved by the bus out of its core market. Specifically, buses in the case study areas as a whole capture a:

- Higher proportion of usage in the 30-59 age group

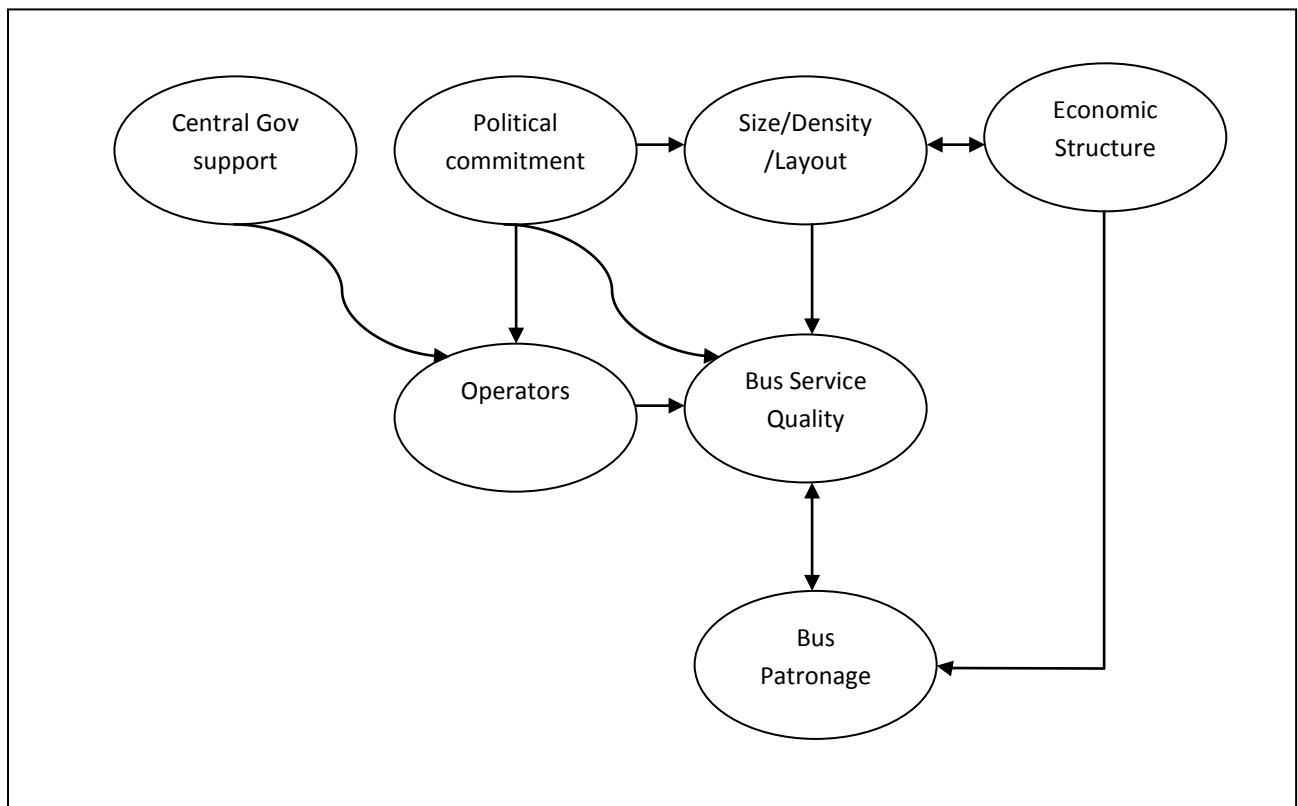
- Higher proportion of full time workers
- Higher proportion of managers and senior officials; and a
- Higher proportion of people with higher incomes

These differences are all statistically significant. Bus services in these areas also have a proportionately higher proportion of men – though this is not statistically significant. Importantly for these areas there is no statistical difference in the availability of alternatives to the bus (car or ability to walk to the city centre) – thereby implying that differences in bus use in these areas are due to differences in other characteristics of the areas.

In other words, the patterns in the data suggest that the case study areas as a whole have held on to a higher market share than a macro model based on income, car availability etc. would have predicted; there are local factors which modify the macro relationship.

The stakeholder and employer interviews were designed to explore the success factors in a qualitative way. These factors may be summarised in **Figure 2-1**.

Figure 2-1 Factors influencing bus use



The size, density and layout of towns and cities is fundamental. Larger places are associated with the development of urban corridors, district centres, longer than comfortable walking distances to the town/city centre, greater congestion and parking problems. Particular factors mentioned in the interviews included the strength of the city centre as an attractor for economic activity; the absence of competing locations such as out of town shopping centres; and the quality of the

basic road infrastructure. Wide boulevards created opportunities for bus priority schemes which were simply not available in towns with narrow streets. Over time, these land use and layout factors might only change gradually but the difference between dispersal and concentration tendencies could be significant over ten or twenty years.

The economic structure is also significant in certain respects. The relatively high reliance of young people on the bus has been noted above. Therefore bus networks in places with colleges and universities are at a relative advantage. Similarly, places with a lot of out commuting to London will be at a relative disadvantage because the proportion of local commuting on which bus can draw for its clientele is smaller. For a combination of these reasons Brighton and Nottingham are naturally better placed to foster a strong local bus sector than Medway and Maidstone.

Local political attitudes towards the bus are important. This is reflected in the balance struck in roadspace allocation, bus priorities and parking policy (including park and ride provision). Willingness to develop S106 agreements which are supportive towards public transport, (and the willingness to target the resultant revenues on specific projects), and bus related funding bids to the LSTF are a touchstone as is support for networks at unprofitable times of day/week through tendering. Strong open channels of communication between local government officials, local politicians, the business community and bus operators are a signal of the level of commitment.

The combination of spatial structure, economic structure and political will together determine the level and quality of service which commercial bus operators can feasibly offer. Service quality is a multidimensional concept but from our discussions, some significant dimensions are

- Frequency, reliability and network density offered by the operators;
- Aspects of the on bus environment including the friendliness of the drivers and the cleanliness and comfort on the vehicle; and
- The availability of real time information, supporting apps and a social media presence.

Affordability came across as a significant issue. While period tickets were often seen as good value for regular travellers and enhancements negotiated with/by local employers added further value, walk up fares for the less regular traveller were often perceived to be expensive and a barrier.

3 ECONOMIC GROWTH

3.1 Transport's role in growing the economy

Transport policies which lower the costs of business and freight travel can grow the economy by lowering factor input prices and reducing costs of production. These in turn lower output prices so that demand and economic output then increase as a consequence. Reductions in commuting costs have similar effects. Workers require compensation for their commute, and as commuting costs fall, so does their required level of compensation hence leading to a reduction in factor input prices. Commuting though has an additional impact as reductions in commuting costs can lead to economically inactive people joining the labour market. These effects occur at a national or supra-national level, as well as at a more local level.

In addition to growing a national economy, transport policies can re-distribute economic activity from one part of a country to another. This is because economic activity typically, all other things being equal, locates in the more accessible areas. Retail and tourism are classic sectors where the distribution of economic activity (i.e. in which part of the country/world money is spent) is sensitive to accessibility.

Recent developments in economic thinking have led to growth theories that emphasise spillover effects between firms as a mechanism for growth – for example New Economic Geography⁷ and Endogenous Growth Theory⁸. Spillovers are positive externalities – that is benefits received for 'free' by one firm that have arisen due to the actions of another firm or firms. Classic examples include the sharing of a large supply chain, sharing of a skilled labour force, better matching of jobs to workers, knowledge dissemination from research institutions such as universities, etc. Transport effects feature in these frameworks in their role in supporting the city. This is because a key aspect of these theories is that spillover effects are at their strongest where a large concentration of workers are in close proximity leading to higher productivity per worker. This is particularly pertinent in knowledge based sectors. Transport, and public transport such as buses, trains, trams and underground in particular, facilitate these spillover effects by helping large volumes of people access the most productive parts of the economy (city centres). These added benefits of working inside large economic centres are also known as agglomeration economies.

These theories also emphasise the significance of human capital development (i.e. knowledge and skills) as an important driver of economic growth. Access to an educated workforce is therefore important, as is the need to ensure the workforce can access the appropriate skills.

⁷ Krugman, P. (1996) What is new about the New Economic Geography. *Oxford Review of Economic Policy*, 14(2) pp7-17.

⁸ Aghion, P. and P. Howitt (1998) *Endogenous growth theory*. Cambridge, Mass. ; London : MIT Press

Another recent economic growth framework which has some resonance with transport is that of the ‘creative class’⁹. In this framework the creative class are an important and quite large subset of the population who are in the main responsible for driving forward economic growth. It is argued that in a post-industrial economy these people no longer locate where the jobs are, but instead seek out places where they are happiest. They therefore look for particular cultural, social and technological environments. By supporting city centres, public transport can create a valued cultural environment by providing the economic mass that will support a range of arts and sporting events, educational activities, cafes, restaurants, etc. These in turn make the city attractive to the ‘creative class’.

Each of these frameworks – classical, new economic geography, endogenous growth and creative class – offer insights into the role that transport plays in facilitating growth. All, of course, have their weaknesses and critics, and none offers an all encompassing theory that explains all facets of economic performance. Whilst there is no general theory, the individual frameworks between them identify particular economic channels by which bus services can influence the growth of an economy. These are:

- Labour market efficiency;
- Labour market participation; and
- Supporting the vitality of city centres.

Our survey work has therefore focused on these three principal economic channels by which transport affects economic growth.

3.2 Labour market impacts

From an economic growth and economic output perspective we are interested in labour market impacts as bus services:

- Improve job – worker matches, thereby maximising worker productivity and output as well as increasing labour market participation; and
- Increase skill levels of the workforce through increased training;

Improving job matching and labour market participation

To gain an understanding as to whether bus quality currently aids or inhibits efficient job matching in the labour market we asked respondents to the internet survey¹⁰ if they had ever turned down a job because the bus services were too inadequate to access it, whether they would be able to access a better job with

⁹ Florida, R. (2002). *The Rise of the Creative Class: and how it's transforming work, leisure, community and everyday life*. New York, NY: Basic Books.

¹⁰ Our sample is random in bus users, but is not a random selection of the workforce. This is because regular bus users comprise 90% of the sample. These results whilst representative of bus users, particularly those fully immersed in the labour market, should not therefore be used to interpret the behaviour of non-bus users in the general population.

improved bus services, and whether bus services are essential to them maintaining their existing job. The question on whether bus services are essential to them maintaining their existing job also sheds some light on labour market participation. In our employer interviews we also explored the role that bus services have in labour recruitment and retention.

TURNING DOWN AN OFFER OF EMPLOYMENT

With respect to the first of these questions, Table 3.1 presents a cross-tabulation of the results against the role of bus by the respondent in accessing work. As can be seen from this, 214 people (19%) of the workers in our sample have turned down a job due to the quality of the bus service at some point in time, and 91 (8%) have turned down a job in the last year. Focusing on those who normally or reasonably often use the bus to commute to work we find that 11% of them (66 from 584) have turned down an offer of employment in the last year. Clearly the ability to access employment can be problematic, and is therefore a source of potential labour market frictions and inefficiencies.

Looking more closely at those who are more likely to turn down a job, we find that they are more dependent on the bus than other workers – they do not have access to the car and do not live within walking distance of the city centre. These differences are statistically significant at the 5% level. Though not statistically significant, the data indicates that young people and those with technical and elementary occupations are also more likely to turn down job offers due to inadequate bus services, as are part-time workers.

ACCESSING A BETTER JOB

The corollary to having to turn down work due to an inadequate bus service is being able to access a better job with a better bus service. Almost half the sample, and more than half of those who normally use the bus to commute to work, felt that a better bus service would give them access to a better job (Table 3.2). We also find that respondents who consider that better bus services would give them access to a better job consistently experience bus services that are lower in quality compared to those who do not think that they would get a better job if bus services were improved. These differences are statistically significant.

Table 3.1: Rejecting employment offers due to bus service quality (those in employment or self-employed only)

		Frequency of bus use for commuting						Total	
		Normally or reasonably often travel by bus as part of journey to work		Use bus as a back-up mode for journey to work		Never use it to commute			
		Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %
Have you ever been offered a job which you have had to turn down as the bus service was too inadequate for you to use?	No	444	76.0%	210	84.7%	249	87.4%	903	87.4%
	Yes - in the last 6 months	39	6.7%	8	3.2%	6	2.1%	53	2.1%
	Yes - in the last year	27	4.6%	7	2.8%	4	1.4%	38	1.4%
	Yes - in the last 2 years	16	2.7%	6	2.4%	6	2.1%	28	2.1%
	Yes - more than 2 years ago	58	9.9%	17	6.9%	20	7.0%	95	7.0%
Total		584	100.0%	248	100.0%	285	100.0%	1,117	100.0%

No. of cases 1,117

Table 3.2: Desired improvements to bus services to improve new job accessibility

	Count	Count	Proportion of those saying bus would give access to a better job
No	596	---	---
Yes	521	---	---
Yes - if the bus was faster/more direct	---	320	61%
Yes - if the bus was more frequent	---	180	35%
Yes - if the bus was cheaper	---	235	45%
Yes - if the bus could get me to work on time and home again	---	184	35%
Yes - if the bus was more reliable	---	134	26%
Total	1,117	---	---

No. of cases 1,117

Another indicator of how bus services aid labour market efficiency is how many people would have to give up work and look for another job if they couldn't commute by bus. This would represent an inefficient outcome in the labour market as one would expect a person's existing job to be a better fit for them than an alternative closer to home, otherwise they would have already changed jobs to that closer alternative.

Respondents were therefore asked how they would behave if they could no longer go to work by bus. Those who travel to work by bus would in the main continue to travel to work by other means. Some may also work the occasional day from home if their job allowed and their 'new' main mode of transport was not available. However, 83 of the 584 regular bus commuters and 248 'back-up' bus commuters indicated that they would give up work but look for new employment, if they could no longer commute by bus, and a further 5 regular bus commuters indicated that they would stop work altogether. That is 11% of those who use bus to access their workplace at some point in time reported they would either change jobs or leave the labour market if there was no bus service. Clearly therefore, bus services are assisting the size and efficiency of today's labour market.

We have further analysed whether there are any other distinguishing characteristics of those who are in a better job as a consequence of the bus service. Clearly the availability of alternative travel options, particularly the car, is very evident, as is accessibility to the city centre by foot. Other than that, such people are typically low paid, have no or school only qualifications, have a sales or customer service occupation and are part-time. Those who live in the most deprived areas (lowest decile in the index of multiple deprivation) also appear more likely to give up work, though the results appear mixed across the other deciles.

It is our view that this 11% proportion is a conservative estimate of the impact of bus services on job-matching and labour market participation. This is for two reasons. Firstly we asked respondents if they had an alternative to the bus that was available, but we did not explore whether this alternative was a 'sustainable'

means of accessing work in the long term. Secondly, because of the question framing, all respondents have responded as if they are the marginal person when providing their alternative means of accessing work in the absence of the bus. Thus the impact of driving to work on congestion costs, availability of parking spaces, etc. is anticipated by the respondent to be small. Clearly this would not hold in the, unlikely, scenario of all bus services ceasing to exist, or bus services ceasing in certain highly congested corridors. Then congestion in city centres would increase significantly and demand for car parking in city centre locations would most likely exceed supply at certain times of the day. Second order impacts on the labour market would then occur as those who commute by car (or would commute by car if there were no buses) experience an increase in travel costs. This second order effect would of course further reduce labour market efficiency of towns and cities.. We have not quantified the scale of this second order effect. We have also not considered the indirect impact of the existence of the bus for journey to school on labour market participation by parents in this study.

Increasing the workforce's skills

Education is important to the economic productivity of the labour force. Whilst on-the-job knowledge and experience are important attributes of any worker, qualifications consistently act as good indicators/predictors of occupation, income, labour productivity and unemployment as well as being seen as one of the mechanisms of achieving economic growth.

To understand whether buses increase participation in education/training we asked respondents what they would do if they could no longer travel by bus to their place of education/training. In the main, students would find some alternative form of transport – this would obviously incur additional costs to them, and is therefore less efficient than having the bus available. 41 of these people also recognise that they would have to miss the occasional class/training session – this represents 11.6% of those who use bus as their usual mode of transport to get to their educational/training establishment. Clearly this would have an impact on the quality of training/education they receive.

Importantly 20 people (5.7% of those who use bus on a normal basis or as a back-up mode to get to their educational/training establishment) have indicated that they would need to give up their current training/education course (but would look for another), whilst 4 have indicated that they would give up training/education completely. These 4 who are reliant on bus services to participate in training/education represent 1.1% of those using the bus either to access education/training on a normal basis or as a back-up mode.

Whilst bus services support all forms of education/training, those who are dependent on the bus service to access training/education are concentrated in Further Education college courses and adult education/evening classes. The high use of bus to access these courses appears to be affected by residential immobility. This is because there are statistical differences between those who would continue in education and those who would give up their course by type of home ownership, and who the house is rented from. Those who own their own houses or rent from local authorities or housing associations are more likely to

give up their training course. These differences are significant at the 5% level. We also find that homemakers are more likely to give up their course, whilst full-time students are not – further re-enforcing the residential mobility theme. Part-time workers seem more likely to give up their course, though this is not statistically significant.

Of those in work who have said that they depend on the bus network to attend their education/training, all are concentrated in one of three low income/skilled occupations – personal services, sales and customer service and elementary occupations. We also find that 30% of those who would give up their education/training course (i.e. of those depend on the bus service to attend the course) live in areas in the top 10% of the most deprived areas in GB.

3.3 Supporting the vitality of our city centres

We asked respondents to our internet survey about their last shopping and leisure trip by bus. This included whether the trip was to a city centre or not, the types of things or activities they spent their money on, the size of the group they were in and how much the group spend was. From this we are able to derive an estimate of the average retail and leisure spend per person shopping and leisure trip.

We found that grocery shopping and shopping for personal items dominate retail activities undertaken by bus, with average retail spend at £29.66 per person per trip in the sample¹¹. Apparent differences exist by gender, age, whether the shopping is undertaken in the city centre and by household income quintile, however, only the differences by age are statistically significant. Here, those aged 60 years and over spend less per retail trip than other bus users.

Eating, drinking and socialising is the dominant leisure activity undertaken by bus users, with average leisure spend at £26.26 per person per trip in the sample. Leisure spend is negatively skewed and it is apparent that a lot of leisure activities can be undertaken for no or minimal costs (e.g. a walk in the park or a trip to the library). As with retail spend differences appear to exist by gender, age, whether the shopping is undertaken in the city centre and by household income quintile, however, none of these differences are statistically significant.

Importantly, of this shopping activity 81.2% occurs in city or town centres, whilst for leisure 72.1% occurs in city or town centres.

¹¹ This figure is comparable to recent figures from the Town Centre Study 2011, <http://www.tfl.gov.uk/assets/downloads/customer-research/town-centre-study-2011-report.pdf>.

This report finds that bus users on average spend £32 on trips to the surveyed town centres (almost 80% of which overall are shopping trips).

3.4 The employers' perspective

From the perspective of an employer, bus services are important where they help recruit and retain a workforce with the right skills, and where they allow businesses, through some form of rationalisation, to become more efficient. Some businesses also rely on the bus to allow their customers to access their site – such as retail and leisure businesses. Universities fit into this latter category as well. This is because the students, the universities' customers, need to be able to access the university for the university to function.

Reported dependency by different businesses on the bus service is closely related to how much each company, its staff or its customers currently use the bus services. Where usage is currently high, clearly the business would be more impacted upon by the loss of bus services that serve their site specifically or all bus services in general, compared to other businesses who do not use bus services.

Whilst bus is a mode choice for some of every occupation and income, its core market is typically the low to medium skilled and low to medium paid workers. For some businesses, recruiting these types of workers does not pose too many challenges in the current economic climate. For businesses where bus has a low mode share as the preferred choice for the journey to work by employees, the relative scale of impact that buses have on workforce recruitment and retention is also small. Five of the businesses we interviewed felt, for one or both of these reasons, that their businesses were not dependent on bus services. In contrast eight of the businesses we spoke to considered bus had some role to play in recruitment and retention – but it was hard for them to quantify or elaborate. This anecdotal evidence however supports the bus user survey evidence that indicates labour market efficiency and participation is influenced by bus services.

There was also a view that with a worsening of bus services there would be a small proportion of people who couldn't get to work, though this was again felt difficult to quantify. Absenteeism would also probably be a more likely outcome from a worsening of bus services, for example on wet days. Both of these views reflect the findings in our survey of bus commuters described above.

It can often be a challenge for businesses to recruit highly skilled staff. However, these staff are not typically dependent on bus services. This is because such staff are much more mobile. They are relatively well paid and can afford expensive forms of travel (train and car) and can therefore commute long distances. Furthermore they can also usually afford to move house if necessary.

Whilst buses do not typically play a central role in business functions, three of the businesses we spoke to felt that buses were central to their business operations. These were large employers with a large existing use of bus and limited car parking capacity. Two of these had specific bus services operating for their staff, one of whom had, upon implementation of the employee bus service, developed the car parking space for business purposes. The other has an out of town site, but employs a number of low to middle income workers with limited choice of alternative forms of transport. The third business was a university. The combined size of students and staff make university campuses akin to a small city centre in terms of their travel characteristics, and it seemed inconceivable to our interviewee how their university could function without the bus.

4 THE INDIRECT ECONOMIC CONTRIBUTION OF BUS SERVICES

Based on the foregoing analysis, we now proceed to estimate the indirect contribution of bus services to the economy. The approach focuses on the labour market and the retail and leisure activities of bus users. The measures we estimate are the economic output of workers who:

- Either commute by bus as their main mode of transport or use bus reasonably often as part of their commute;
- Use bus as a back-up mode of transport to their main mode; and
- Would not participate in the labour market were it not for the bus.

Furthermore, we estimate the additional productivity impact of the subset of bus commuters who are able to access better jobs (in which they are more productive) because of the bus. This productivity/economic impact is related to better job matching and in terms of policy assessment has been called move to more productive jobs¹².

City centre vitality is important in attracting productive workers to an area. We have therefore estimated the contribution to the retail and leisure sectors that bus users bring to a city centre.

We have not measured the additional economic output that a more highly trained workforce would create thanks to bus services providing access to education and training activities. This is because we do not have any evidence of the increased output that students, dependent on the bus services, would create as a result of their training. Related to the education theme we also have not considered, as part of this study, the economic impact of parents who are dependent on school bus services to have sufficient spare time to participate in the labour market. We think the role of schools transport in supporting a modern flexible economy is a possible future topic for Greener Journeys.

Clearly buses are an essential element of the urban fabric and it is hard to see how land use patterns, particularly the role that city centres play within a city, could have arisen without them. To begin to estimate the changes that would occur in land use if there were no bus services would be a colossal task. Without buses, road congestion would increase and city centre accessibility would decrease. This in itself would lead to more dispersed land uses and some loss of agglomeration benefits vis a vis today. Of course without buses transport investments in rail and light rail may be brought forward as well as public policy initiatives to increase car sharing, remote working and other forms of road congestion management. How the economic landscape of towns and cities would look if there were no buses is therefore highly conjectural. Our interviews with businesses were not particularly illuminating in this regard either – due to a

¹² DfT (2005) *Transport, Wider Economic Benefits and Impacts on GDP*. London: Department for Transport.

mixture of the role buses play in supporting their businesses and the unrealism of a world without buses. As such we have not tried to estimate the additional costs to business in a no-bus world.

4.1 Economic contribution of bus commuters

Mean earnings for those who normally use the bus for commuting are £17,530, whilst for those who use the bus as a back-up mode earnings are slightly higher at £18,170 (see Table 4.1). Statistically there is no difference between these earnings levels. The use of the bus as a back-up mode is important as the number of people who use it in this way is large at just over 40% of those who normally or reasonably often commute by bus.

Table 4.1: Earnings by bus use for the commute (all workers)

		Earned income (gross) £s			
		Count	Column N %	Median	Mean
Frequency of bus use for commuting	Normally or reasonably often travel by bus as part of journey to work	584	52.3%	£17,500	£17,530
	Use bus as a back-up mode for journey to work	248	22.2%	£17,500	£18,170
	Never use it	285	25.5%	£13,750	£17,530
Total		1,117	100.0%	£17,500	£17,672

1. No. of cases 1,117

2. Based on mid-points of income categories, using lower bound of £50,000 for the open ended category (£50,000+).

These sample averages are disaggregated further in Table 4.2, which gives a breakdown by part time and full time workers. The mean full-time wage of a commuter who normally travels by bus is £22,557¹³. The median wage for full time workers using the bus is 86% of the median wage for GB¹⁴, once again emphasising that low and medium paid workers are an important component of the labour force that bus caters for.

¹³ The mean and median wages are close due to the fact that the earned income values reported here are based on mid-point estimates of each category and the highest income category (£50,000+ p.a.) has been set to its lowest bound of £50,000. The mean wage should therefore be treated as a conservative (low) estimate of the population mean.

¹⁴ Gross median pay for full-time workers in GB in 2011 was £502.60 per week or £26,135 per annum. Source: NOMIS Official labour market statistics:

<http://www.nomisweb.co.uk/reports/lmp/gor/2092957698/report.aspx>

Table 4.2: Earnings by bus use for the commute (part time and full time workers)

		Earned income (gross) (£s)							
		Part time				Full time			
		Count	Column N %	Median	Mean	Count	Column N %	Median	Mean
Frequency of bus use for commuting	Normally or reasonably often travel by bus as part of journey to work	259	54.6%	£10,000	£11,221	325	50.5%	£22,500	£22,557
	Use bus as a back-up mode for journey to work	95	20.0%	£10,000	£11,368	153	23.8%	£22,500	£22,393
	Never use it	120	25.3%	£10,000	£10,583	165	25.7%	£17,500	£22,583
	Total	474	100.0%	£10,000	£11,089	643	100.0%	£22,500	£22,525

1. No. of cases 1,117

2. Based on mid-points of income categories, using lower bound of £50,000 for the open ended category (£50,000+).

With 28.4 million people in employment in GB¹⁵, a commuting mode share of bus of 11.7% for part-time workers and 7.6%¹⁶ for full-time workers implies that 2.5 million workers normally commute by bus in GB. Based on our sample we estimate that a further 1 million workers use the bus as a back-up mode for getting to work. Taking workers in our sample by part-time and full-time as representative of these workers and using the mean earnings data from Table 4.2 means bus commuters in GB generate £45 billion of economic output¹⁷. Those who use bus as a back-up mode contribute a further £19 billion of economic output.

As mentioned in Chapter 2, our NTS analysis shows that 43% of regular bus commuters do not have access to a car. Based on our estimate of bus commuters above this implies that around 1 million bus commuters do not have access to a car. Our NTS analysis also found that 59% of bus commuting trips carried out by those with no car available are of 3 miles or more. This implies (assuming that this proportion applies to bus commuters as well as bus commuting trips) that around 600,000 regular bus commuting workers are travelling more than 3 miles. On the basis that 3 miles is probably the limit that anyone would consider to walk to work this group is reliant on the bus to get to work. The ability of these 600,000 to continue to participate in the labour market in their current location without a bus service would depend on them either having some other form of public transport available to them such as rail, underground, or light rail; buying a car; cycling or being able to get a lift from a work colleague; friend or family member or use of taxi/hire car. Many of these options will be irrelevant or too expensive.

From the results of our internet survey we estimate that a minimum of 400,000 workers are either in a job or in a better more productive job, than they would otherwise have access to, as a result of the bus network. This is, in our view, a conservative estimate due to the question framing in the survey – which did not take into account second order effects on say traffic congestion, on rail and underground overcrowding and car parking supply. Furthermore the survey did not explore whether short term alternatives to the bus to access the workplace could be sustained in the long term. The additional economic output that they

¹⁵ NOMIS Official labour market statistics:

<http://www.nomisweb.co.uk/reports/lmp/gor/2092957698/report.aspx>

¹⁶ National Travel Survey (see the NTS ancillary report

¹⁷ This is based on a simple multiplication of the number of part-time and full-time workers who usually use the bus to access their workplace by the average wage these workers are paid. We have also used a 69%:31% full-time part-time split in the GB workforce in this calculation. Source: Annual Population Survey October 2010-September 2011 accessed via NOMIS www.nomisweb.co.uk. An alternative estimate is 68%:32% source: Business Register Employment Survey, 2009 revised accessed via the ONS <http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-235485>. The difference between these estimates does not alter the GVA calculations made.

produce by being in more productive jobs, or in employment at all, is, we estimate, around £400 million per year¹⁸.

4.2 Supporting the vitality of city centres

With 1.4 billion (single) shopping trips per year¹⁹ and an average spend of £29.66^{11,20} this gives a total estimated retail spend by bus users in GB of £21 billion²¹. For leisure, there are 471 million trips²² at the GB level. At an average spend of £26.26 per trip we estimate the annual spend on leisure activities facilitated by bus is £6.2 billion. The combined total retail and leisure spend is £27.2 billion of which £21.5 billion is spent in town or city centres. Such expenditure clearly supports the vitality of the town/city centres as the majority of the retail expenditure is spent on food and personal products and the majority of the leisure expenditure is spent on eating, drinking, socialising and entertainment.

¹⁸ 10% of those who commute by buses or use bus as a back-up mode have a better job, which we take to be a more productive job, as a consequence of the existence of the bus network. Now we take it that such people would, at the minimum, require compensation for their out of pocket costs to commute by bus rather than the alternative of working closer to home. That is we assume the time costs of accessing a different job on foot and accessing their existing job by bus (access/egress time plus in-vehicle time) are equivalent in generalised cost terms. If we further assume that all commuters hold a travelcard at the average cost of a travelcard in our sample (£672.15) and that 75% of the trips made using the travelcard are commuting related then an estimate of the minimum additional wage these workers would require to be paid to commute further by bus to a 'better job' is about £500 per annum. That is the additional economic output such workers produce is £500 per annum per worker. 0.9% of regular bus commuters only participate in the labour market because of the bus. Their median gross wage in our sample is £6,250.

¹⁹ Source: National Travel Survey Table NTS0409

²⁰ Whilst there is a difference in the spend profile by age group we do not find any significant difference in the spend profile by household income quintile. On this basis we have treated the £29.66 average as representative for GB.

²¹ This is estimated by taking the number of single trips, dividing by 2 and multiplying by the average spend. For trips for which either the outward or return mode of transport is not bus – this approach effectively attributes half the spend to bus portion of the shopping/leisure trip.

²² In the NTS Table NTS0409 leisure trips include visiting friends and family as well as sport, holiday and day trip (see also Table 2.3 in this report). From our Internet survey visiting friends and family comprise 56% of these trips, with the remaining 44% of trips associated with other leisure activities. We have used this latter proportion to derive the number of leisure trips that may be associated with expenditure.

5 POLICY AND APPRAISAL

Public policy towards buses can usefully be considered at two levels – the project level and the policy level. The former could apply to the assessment of bus infrastructure projects and to the case for supporting particular services from the public purse through tendering. The latter could apply to more generic questions such as the case for supporting the bus sector through Bus Service Operators Grant.

At the project level, value for money assessment of infrastructure such as bus priorities or busways or bus stations is in the hands of the ITAs or local authorities as promoters who need to make a case for grant support to the Department for Transport. Clearly the support or otherwise of the local bus operators evidenced by their willingness to participate in the scheme on the basis of revenue and/or cost saving effects is likely to be important to the fate of the scheme. For the larger schemes at least, cost-benefit analysis following DfT guidance is the assessment tool.

Among the well established components of the assessment are :

- Modelling and appraisal of the direct first round effects of improvements on journey times, demand and user benefits
- The second round effects of changes in demand on quality of service through frequencies offered and hence on patronage (the so-called virtuous circle or Mohring effect)
- The environmental and congestion impacts of modal transfers, particularly from car

All of the above are capable of inclusion in project appraisals and have been implemented at least at demonstration level (ITS/TSU (2003); CfIT (2002)). Values for service quality attributes have been studied and reported (Accent for CfIT (2002); Balcombe et al (2004); AECOM (2009)²³).

Our survey results show that frequency, access/egress times, journey times, real time information availability and comprehensiveness of service (first and last bus) all affect demand for bus travel. The importance of reliability as a quality attribute also comes out loud and clear in the survey work. This confirms the requirement in modelling and appraisal work on bus priority schemes to take account of reliability impacts. Hollander and Liu (2008)²⁴ provide a simulation methodology for doing that which both predicts the impact on reliability over and above average travel time changes and provides values of enhanced certainty of arrival time. As well as reliability, our survey results show that frequency, access/egress times, journey times, real time information availability and comprehensiveness of service (first and last bus) all affect demand for bus travel.

²³ Accent for CfIT (2002) op cit, Appendix 6 ; R. Balcombe et al (2004) The Demand for Public Transport : A Practical Guide TRL Report 593 ; AECOM (2009) The Role of Soft Measures in Influencing Patronage Growth and Modal Split in the Bus Market in England. Report to Department for Transport.

²⁴ Hollander Y and Liu R (2008) Estimation of the distribution of travel times by repeated simulation. Transportation Research C 16 (2) pp212-231

As previous studies have found (Bristow et al, 1991)²⁵, bus users and non-users do have an option value associated with the availability of a bus service. This is the value placed on having a service over and above the use value. Why might people value something they don't necessarily often use?

First of all, car owners may value the availability of a back up mode in the event of breakdown or inclement weather or the need to share the car with a partner. Secondly, people may have an altruistic community value, seeing the bus as significant for others in the community and potentially themselves in the future or if circumstances change. The bus is a form of social insurance.

We asked our internet sample how much they were willing to pay, over and above their fare, to ensure a bus service existed for them. We found that non-users had a mean willingness to pay of £1.20 per year; infrequent users were willing to pay £38.09 and frequent users £59.61. These values are statistically significant. We believe these are conservative estimates – viewed from a methodological perspective and in relation to the fares these groups are paying per annum. However, taking these results at face value, the total willingness to pay above fares paid extrapolated to the Great Britain level would imply an aggregate 'option value' of over £700 million per annum. This needs to be incorporated in the appraisal of bus support policy following the Department's WebTAG draft guidance.²⁶

Turning to the broader issues of public policy towards the bus industry, the policy stance needs to be considered within the framework of the Government's five business case model and in the context of our work, the Strategic and Economic cases. There is a paradox here. Buses are so familiar and humdrum that it is difficult to see bus service as strategic. But it is. On the basis of our work we consider there are some respects in which transport cost-benefit analysis of the style described above does not fully reflect the wider contributions which the bus makes to the smooth running of the economy.

Firstly, in chapter 3 above, we reported our findings on the ways in which bus services can improve labour market efficiency and increase labour market participation. These are not new points in terms of the Department's guidance for assessing the welfare benefits of wider impacts but in the case of the bus sector it may be more feasible and credible to consider them at the level of policy analysis towards the bus sector rather than (or as well as) at individual project level.²⁷

Secondly, there is the issue of the treatment of unemployment in economic appraisal. In an underemployed economy, the creation of additional employment can have an economic benefit greater than that captured through changes in the

²⁵ Bristow A.L. et al (1991) Use and Non-Use Benefits of Public Transport Systems Proc 2nd Conference on Privatisation and Deregulation in Passenger Transport

²⁶ WebTAG unit 3.6.1 <http://www.dft.gov.uk/webtag/documents/expert/unit3.6.1d.php>

²⁷ The Department's draft guidance on wider impacts is at WebTAG unit 3.5.14 especially section 4, see <http://www.dft.gov.uk/webtag/documents/expert/unit3.5.14d.php>

cost of travelling to work. The employment benefits of transport schemes are explicitly recognised in the EC's CBA guidance and in the transport appraisal practices of countries such as Germany. The Treasury position in the UK is being challenged further in the context of economic conditions which are leading to unemployment rates in places and parts of the market (youth) which cannot be described as arising for frictional reasons. Moreover there appears to be inconsistency between the treatment of transport schemes and regeneration schemes in this regard since cost (or cost saving) per generated job is frequently used as an appraisal indicator.

Unfortunately, our survey did not illuminate the role that bus services can play in reducing unemployment. This is because the focus of the survey is on bus users not unemployed people and there is insufficient variation in the data to generate a statistical relationship between bus service quality and probability of (un)employment. Our survey of those in work and supporting discussions with employers and stakeholders, however, demonstrates that a proportion of the workforce is dependent on buses to access work. We interpret this as saying that a decline in bus service quality/availability to users would cause some people to have to drop out of the employment market. We also believe the economic welfare loss of this is not captured in the Department's guidance. Again, in the case of the bus sector this is best considered at the policy analysis level.

Thirdly there is the distributive impact of policy towards bus services. We have described in Chapter 2 the pattern of utilisation of bus services across the income distribution. This pattern makes it much more likely for bus services than for policy towards rail or car that the impact of subsidy policy change, whether positive or negative, will fall disproportionately on less advantaged groups in society. While the over 60s are protected by the concessionary travel scheme, there is no equivalent protection for people of working age in the lower deciles of the income distribution. Indeed, part-time workers are also unable to take advantage of the best fare offers such as weekly or monthly tickets and are more likely to be caught in a 'poor pay more' trap. The Green Book (2003)²⁸ states that the distributive impact of policy should be taken into account. The best indicator of likely distributive impact is given by the pattern of existing use.

Fourthly, in our view there is a range of efficiency and distributive advantages of strong town and city centres. The agglomeration externalities discussed above are obtained by bringing together large numbers of people to participate in local labour markets. For those without access to a car, the town centre served by the bus is an efficient way of ensuring accessibility to a wide range of shopping, leisure and other services to all. Without a land use model it would be difficult to predict the impact of a 'no public transport' scenario on the layout of a British city, but a range of efficiency, distributive and environmental quality benefits would be at serious risk.

In order to conform to Treasury and DfT guidance, appraisal of policy and projects which influence bus service levels needs to capture the impacts discussed above in an appropriate way. For small schemes this may be through the use of qualitative descriptors in a multi-criteria analysis. For major schemes a

²⁸ HM Treasury (2003) The Green Book. Appraisal and Evaluation in Central Government. London TSO

cost-benefit analysis approach is required. For analysis of large scale changes to support measures such as BSOG, we would expect to see a full assessment of the above impacts, quantified as far as possible.

6 SUMMARY AND CONCLUSION

The bus is woven into the fabric of urban Britain. Over 5 billion bus trips are made every year and over a billion are to/from work. 2.5 million commuters depend on the bus to get to work, while a further one million use bus sometimes as a back up or occasional mode. This is around 12 per cent of the working population accounting for £64 billion of gross value added.

The bus is rather democratic in nature being available to a wide range of society. But within that, as shown in our analysis of the NTS, groups such as young adults and those with no car available tend to be frequent bus users.

Within the overall picture, there are significant variations across urban Britain. For example, Brighton and Nottingham are two places where the bus has been comparatively successful. As our case study analysis showed, this is due to a mix of factors including city layout and land-use, local socio-economic and employment mix, supportive policy mix on bus priorities, parking and strong dialogue between local politicians, officers, bus operators and other stakeholders. The result is there to see in our internet survey in terms of positive ratings across a range of service quality indicators, enabling retention of market share of the working age population through a virtuous circle.

It is clear from our work that the bus supports the modern urban economy in the following ways:

- By getting large numbers of people to work. Of the 2.5m regular commuters by bus, around a quarter have no car available AND are travelling three miles or more. This group is reliant on the bus.
- By facilitating better matching between people and jobs and increasing labour market participation. We estimate that a minimum of 400,000 workers are either in employment or in a better more productive job than they would otherwise be able to access as a result of the bus network. The additional economic output associated with this is estimated at £400 million per annum.
- By improving the accessibility to education and training, especially for people from deprived areas
- By supporting the vitality of urban centres. People use the bus to make shopping and leisure service trips to a value of £27 bn of which around £22bn is in town and city centres. This is the gross spend ; we are not able to say what the net contribution is from the existence of bus services.
- Those who depend on the bus network to participate in the labour market or are in a better more productive job tend to be lower paid, live in areas of deprivation, are part-time workers and work in technical occupations, sales or customer service occupations or elementary occupations.
- By acting as a form of social insurance. People are willing to pay over and above their fares to have a bus service available to them as part of the urban fabric. In our survey, infrequent users are willing to pay £38/year for this option value while frequent users are willing to pay £60/year. If this

were to be aggregated to GB level , the gross option value would be £700 million, which we think is conservative in relation to the industry turnover of £5bn.

At the level of appraisal of individual projects, these impacts need to be taken into account in accordance with Treasury and DfT guidance in an appropriate manner. At the strategic policy level, these are real wider benefits of the bus system which need to be fully taken into account when considering the case for supporting the bus through BSOG and through the allocation of capital funds to bus infrastructure projects.