Transforming Bus Investment in Wales: Interventions Toolkit

A Report to the Welsh Government's Bus Policy Advisory Group
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Executive Summary

Introduction

- The TAS Partnership Limited ('TAS') has been commissioned by the Welsh Government's Bus Policy Advisory Group to provide consultancy advice on approaches and investment required to transform bus services in Wales.
- This Report focuses on the interventions – both 'hard' and 'soft' measures – that are proven to support and stimulate bus patronage growth and the financial sustainability of bus services.

Factors Influencing Demand for Bus Services

- Demand for bus services is dependent on the complex inter-play between several factors: competition; journey purpose; population; levels of car ownership; and generalised (Time) costs;
- Identifying the barriers to bus use can assist in developing strategies aimed at improving the attractiveness of the bus 'product' overall;
- A thorough understanding of customer needs - through detailed market and consumer profiling - enables the efficient planning and use of valuable bus resources;
- Time, Price and Quality are determinants of a traveller's mode of choice - although passenger research confirms "time" to be the most important factor;
- Time affects the cost of providing bus journeys; the choice that travellers make; and productivity; and can be measured in minutes or monetary terms;
- The bus faces considerable competitive disadvantage against the private car; and
- Reducing the Time Costs of bus journeys can support Government transport policy - economy, society and the environment.

Planning for Successful Bus Services

- Planning for successful bus services requires consideration of the "policy jigsaw" (the various components of transport – and non-transport policy) which interwork in any given area;
- An eleven-step planning process for sustainable bus services (and public transport generally) accommodates local partnership working aimed at delivering the most appropriate scheme for an area based on local circumstances; and

- An assessment of the relative funding (revenue and/or capital) and costs is key to ensuring effective and efficient investment in public transport projects.

The Interventions Toolkit

- The Interventions Toolkit – devised by TAS – aims to guide bus industry stakeholders towards the most appropriate bus intervention measures for their area;

- The toolkit is based on an assessment of the Generalised (Time) Costs and modal share;

- A series of case studies – covering bus corridors and networks – for three types of area (predominantly urban; predominantly rural; and mixed/inter-urban) are presented to demonstrate key features including investment;

- Research from BCR assessments of bus-related schemes identify most interventions scoring above 2.0 – rated by the DfT as representing 'high' or 'very high' value for money; however

- BCR scoring is very much dependent on local circumstances – including an assessment of bus demand.

Conclusions/Recommendations

- Good bus services can improve the quality of life for everyone in our community – and facilitate a huge range of economic, social and environmental benefits; however

- Good bus services cannot be created in isolation - partnerships between a range of industry stakeholders are essential to ensuring medium to long-term success and a return on financial commitments.

Introduction 1

1.1 Background

1.1.1 Since 1989, The TAS Partnership Limited (TAS) has monitored the performance of the UK bus industry. This has formed a critical part of our business, since a consultancy firm has to fully appreciate its market to be successful. Over the past 25 years, we have provided advice to many clients, from both the public and private sector, and at local, regional and national level, on the various interventions that promote, and lead to, the operational and commercial sustainability of local bus services.

1.1.2 We firmly believe that the advice we provide, and the analysis we undertake, informs and helps all stakeholders within the bus industry to provide better bus services than would otherwise have been the case.

1.1.3 We are pleased, therefore, to have been commissioned by the Welsh Government's Bus Policy Advisory Group to provide consultancy advice on approaches and investment required to transform bus services in Wales.

1.2 Our Approach

1.2.1 Our commission focuses on two specific aspects aimed at improving bus services in Wales:

- The interventions – both 'hard' and 'soft' measures – that are proven to support and stimulate bus patronage growth and the financial sustainability of bus services; and
- The funding schemes – either revenue- or capital-based – targeted at improving the quality and reliability of the Welsh bus fleet.

1.2.2 This Report focuses on the former: the interventions available to improve bus services. It showcases the good practice that exists elsewhere in the UK, in promoting bus services – and draws upon our own research and analysis work, including:

- Catch the Bus in Wales (2015) – a report to the Confederation of Passenger Transport (CPT);
- Making Buses Better (2015) – a report produced by the TAS Policy Exchange think-tank which focuses on a partnership approach to promoting bus services;
- PSV Vehicle Procurement Guidance (2014) to the Welsh Assembly Government; and
- TAS Business Monitor database, analysing the overall performance of the industry.

1.3 Report Structure

1.3.1 Following agreement with the client, this Report has been structured to provide practical guidance to those interested in how the bus industry in Wales could be developed, rather than represent a traditional literature review.

- The factors influencing the demand for bus services, the barriers to greater bus use and the importance of time and cost in driving demand (Section 2);
- An outline process for industry stakeholders on how to plan for success in the bus industry (Section 3);
- An assessment of the costs and benefits of a range of interventions, and likely outcomes (Section 4); and
- Our general conclusions and recommendations (Section 5).

Factors Influencing Demand for Bus Services 2

Section 2: Key Points

- Demand for bus services is dependent on the complex inter-play between several factors: competition; journey purpose; population; levels of car ownership; and generalised (Time) costs;
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- Reducing the Time Costs of bus journeys can support Government transport policy – economy, society and the environment.

2.1 Welsh Bus Industry: The Context

2.1.1 In 2014, TAS was commissioned by the Confederation of Passenger Transport in Wales (CPT Wales) to undertake an assessment of the market for travel in Wales, utilising an analysis of trends in supply, demand and performance.

2.1.2 To put this into context for this study, the key findings were as follows:

- Bus demand in Wales reached its lowest value in 2013/14 (107 million passenger journeys p.a.);
- A 10km bus journey in Wales is three times more expensive than an equivalent car journey;
- The average fare paid over the past decade has risen by 11.8% (adjusted to 9.8% after inflation);
- Productivity within the bus industry has declined over the past decade – whilst operating costs (particularly driver's labour and fuel) have continued to rise – the cost per employee has risen by 10.3% between 2004/5 and 2013/14; and
- Operating profit margins for bus operators have remained consistent over the past six years in the range 6.6% to 7.9% - well below those required for long-term financial sustainability.

2.2 The Competitive Position

2.2.1 The nature and extent of demand for local bus services is highly dependent on the complex interplay of a number of factors, as shown in Figure A. Thus, in order to have any effect on volume of patronage and revenue, it is necessary to act in one or more of these areas.

2.2.2 Like all transport modes, demand is mostly derived from the need of customers to do other things – go to work, school or college for example, or go shopping. Thus, there are times when changes in the need or desire to travel affect demand volumes in ways which operators or public authorities are powerless to change.

2.2.3 Possibly the best post war example of this is cinema attendance, which in 1946 stood at 1.6 billion, generating at least one billion bus journeys a year. By 1984, cinema visits had collapsed to 54 million – a fall of 97%, with the consequent loss of all those bus trips. Numbers have recovered since to around 170 million a year, but cinema locations have changed and car is now the predominant mode of travel, particularly during the evenings and weekends.

Figure A: Factors Influencing the Demand for Bus Services

2.2.4 Consumers often have a choice of modes when it comes to deciding how they will make their journeys. Increasingly, too, they will have enticing reasons for not making the journey at all, and – through the internet – the means of avoiding the need to make the

trip. The latest National Travel Survey (NTS) data for 2014 shows for at least the fifth successive year, that trip rates by all modes of transport continue to fall.

2.2.5 Consumers may choose to walk. For shorter journeys, this choice becomes more likely, because it is possible to reach the destination directly within the time they might have to wait for public transport to arrive. However, walking can be affected by weather, the age and mobility of the consumer and topography. Free travel passes, or network tickets such as Travelcards where there is no individual fare for the journey, also influence the choice.

2.2.6 Cycling is a potential alternative. The purchase and maintenance of a bike is a necessity, as is a general level of fitness, and it is therefore not appropriate for all journeys. However, on a point to point basis it is often faster than a bus journey when walking and waiting are taken into account. Decisions about cycling will also be affected by facilities such as cycle lanes, parking facilities at the destination and topography (for example, the Welsh Valleys).

2.2.7 In markets where the cycling culture is established – such as Copenhagen, the Netherlands and (closer to home) cities such as Oxford and Cambridge – it has proved itself to be a significant competitor to the bus – helped by their relative flat topographies. Both cycling and buses are often travel choices for those who are environmentally aware.

2.2.8 Cars remain the most significant competitor to buses, particularly when a consumer has exclusive access to one. If people have a car available for a trip, they are much less likely to choose the alternative of bus or walking.

2.2.9 Finally, as already mentioned, not travelling at all is also a choice. This is particularly true for those whose journeys are optional, such as for shopping or leisure – but also increasingly can affect commuting as well. Thus:

- Shopping trips can be switched between centres, or increasingly, to the online alternative.
- People who make leisure journeys have the alternative of staying at home, and spending their time in other ways, such as watching television, playing computer games, or surfing the web.
- The growth of the internet and particularly high-speed broadband means that working from home is an option for an increasing proportion of the workforce.

2.2.10 Whereas consumers will choose between most goods and services on their perception of the best balance between price and quality, this is not true for transport – three items have to be balanced in mode choice decisions – **time, price** and **quality**.

2.3 The Hierarchy of Barriers to Bus Use

2.3.1 Improvement to the "bus product" and its relative attractiveness should represent the central focus for efforts by the industry's stakeholders (politicians; investors; planners; and operators) in developing an efficient and sustainable bus operation.

2.3.2 Table 2.1 illustrates a potential hierarchy of barriers to bus use. This may form a logical outline assessment of the process of choosing various improvement interventions, as described in later sections of the report, and provides a useful framework for considering the relative importance of barriers.

2.3.3 Individual circumstances will need to be considered in order to assess the importance of each barrier – for example, the perception of barriers in urban Wales may differ hugely from those in the rural parts of Wales. This can be addressed through:

- detailed market analysis and/or consultation;
- relating to stakeholders perceptions; and
- trial and experimentation – where a high risk approach is adopted to bus improvement.

2.3.4 The hierarchy may be adapted to consider many of the drivers of customer satisfaction – or indeed – those that influence the perceptions of non-users – identified above.

Table 2.1: Hierarchy of Barriers to Bus Use

Barrier Level	Aspect	Explanation
Basic (Low)	Difficulty in understanding the service	Most infrequent or non-users perceive the bus product to be 'difficult' to fully understand (74%) and greater simplicity in services, timetables and fares is felt to be necessary
	Long waiting times	The majority of potential users (81%) believe that a 'turn up and go' level of frequency (at least once every 10 minutes) is needed to secure their custom
	Service unreliability	Buses are particularly vulnerable to adverse effects of urban traffic congestion - perceived unreliability of service (63% of respondents)
	Poor waiting environment	The waiting environment for buses is frequently exposed, poorly positioned and lacking in facilities. 80% of infrequent passengers regard their bus stop waiting environment as 'poor' or 'very poor'
	Old buses and/or poor condition	Although 'mid-life' buses (5-10 years) are not necessarily perceived as unacceptable, provided they are in good condition, poor bus age or condition is identified by 53% of potential users as a barrier
	Poor value for money	37% of surveyed passengers felt that their existing fare was 'value for money' although higher for 'promotional fares'
	Personal security considerations	27% of all adults (and 39% of women) identify personal security as a reason for preferring car to bus use
Moderate	Difficulty in accessing buses	Low floor buses permit much easier bus access, particularly when accompanied by young children and around 38% of existing users report some difficulty with high floor buses
	Low standards of customer care	Almost 90% of existing bus users have experienced or witnessed an unsatisfactory performance by a member of the bus operators staff and, despite sympathy for the difficult job of bus driving almost 30% do not feel that customer care standards are acceptable
	Poor speed compared to car	Slow passenger boarding/ticketing and lack of traffic priority are felt by 42% of infrequent users to result in poor bus vs car speeds
	Low standards of publicity and presentation	Only 18% of bus users feel that publicity standards and the presentation of the bus product is 'reasonable' or 'good' compared with products with a similar sales value
Advanced (High)	Inferior standards of comfort compared to car	Comfort standards within a bus are regarded as inferior to that of a car by 88% of infrequent users
	Perceptions of environmental performance	Although 74% of adults accept that bus use is more 'green' than car use 52% identify bus noise, emissions and visual intrusion as detracting from the product
	Failure to adopt new technology applications	31% of infrequent users believe that bus operators have not properly embraced new technology and refer to information and ticketing deficiencies in this area

2.3.5 A process of ranking the relative importance of barriers may be useful in determining priorities. One approach is to score each of the barriers. The more important the barrier the higher the score. So, for example, the two most important factors might be scored as 10, with a secondary factor scored 5. This should be expressed as a percentage of the total of all the scores, the percentage barrier score. For example 10+10+5=25, so the first two factors would be 40% each, and the secondary factor 20%. Available QBP resources could then be allocated in proportion to the percentage barrier score.

2.4 Customer Satisfaction

2.4.1 It should be noted that 'customers' firstly means those who travel on buses and pay a fare to the service provider. This is the classic retail situation which allows the provider to engage directly with the customer and build a business model accordingly, particularly in a competitive market situation. However, this relationship is less clear inasmuch that some services are procured by a local authority which therefore becomes the formal customer whilst the fare-paying passenger becomes an indirect customer.

2.4.2 A further complication arises with people who do not pay a fare (bus pass holders) and who may not react to the service provider in the same way as a fare-paying customer.

2.5 Understanding Customer Needs

2.5.1 Our understanding of customer needs and desires has been aided by the progressive development of other tools such as the NTS and the annual Bus Passenger Satisfaction work conducted by Transport Focus in England.

2.5.2 Attitudes on matters such as climate change and environmental issues have also been tracked. As well as understanding people's travel needs and behaviour, their perceptions of and experience when using bus services are vital parts of the jigsaw and much progress has been made here too.

2.6 How Buses are Perceived

2.6.1 Bus travel has historically suffered from a perceived negative image when compared with other forms of transport and such attitudes can deter people from using the bus. Valuable work to improve the position has been done by operators, authorities and campaigning partnerships, such as Greener Journeys.

2.6.2 Developments such as smart ticketing, new environmentally friendly buses and better information can all help although each needs to be promoted appropriately. Thus, understanding what the public thinks, and why, is particularly important and here the DfT survey Public Attitudes to Buses: Great Britain is invaluable. It looks at the attitudes of both bus users and non-users and was last undertaken in March 2013.

It shows that 75% of users rated bus services as good or very good. 52% of respondents said they used the bus at least once a year, but the remainder said they never used this mode. The main reasons quoted for not using bus services are summarised in Figure B.

2.6.3 Non-users rated bus services less highly than those who have experience of the product and had a marked preference for car travel; only 45% rated the quality of bus services positively. In short: bus travel needs to be more frequent, cheaper and quicker, with information easier to access and bus stops nearer to home in order to rival car travel in the eyes of non-users.

2.6.4 The survey also looked into the sort of public policy interventions that would make buses a more attractive prospect. The questions encompassed car parking availability, car parking charges and some form of road pricing or congestion. Over a third of non-users acknowledged that each intervention would make a difference to their behaviour. The key findings are illustrated in Figure C.

Figure B: Top Ten Reasons for not using the Bus

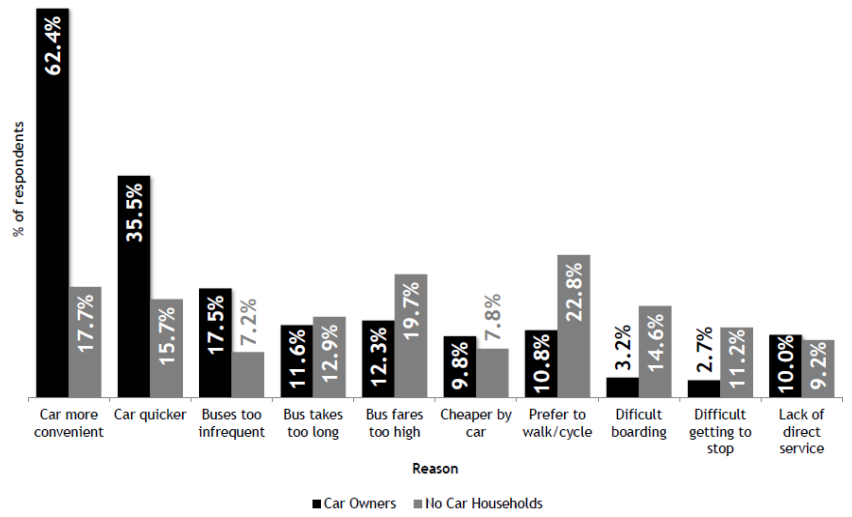
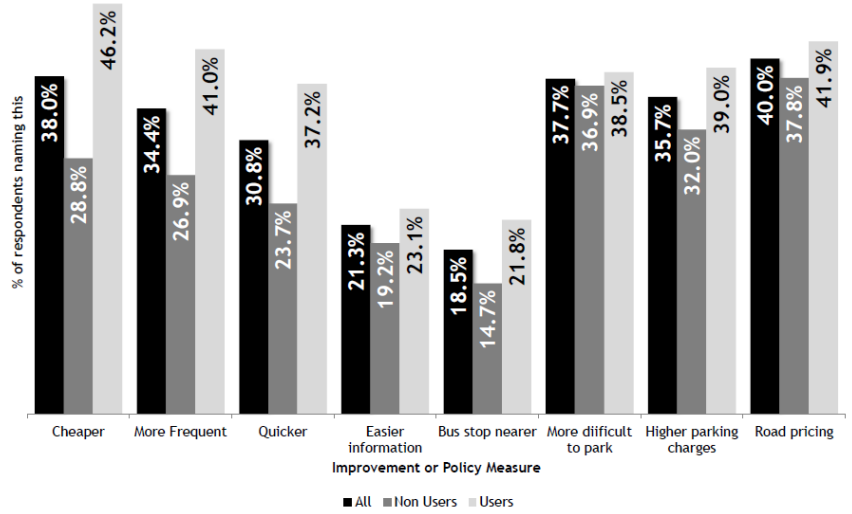


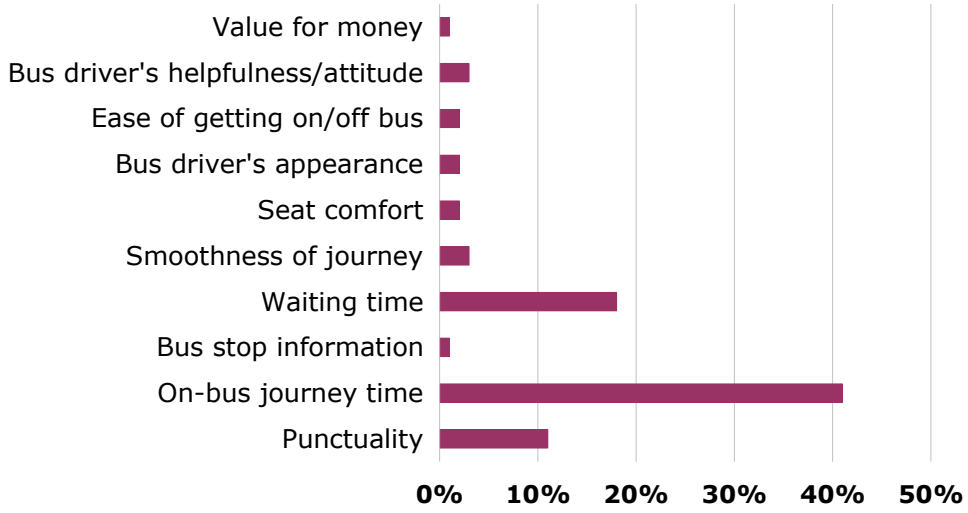
Figure C: Factors to Encourage Greater Bus Use



2.6.5 The regular survey work amongst bus passengers carried out by Transport Focus gives us a much greater understanding of what drives customer satisfaction. Passenger priorities do vary quite widely across the country (particularly between urban and rural areas), but it is clear that in the overwhelming majority of cases, it is the time-related issues of the duration and predictability of the journey and the reliability of the service which count most in passengers' eyes.

2.6.6 We can see an example of this in Figure D below, which shows the drivers of satisfaction with bus services in the city regions in 2013.

Figure D: The 'Drivers' of Bus Customer Satisfaction



2.7 The Importance of Time

2.7.1 It is clear from the above that **time is the most important factor in the delivery of successful public transport policies**. In fact, it is key to the successful delivery of a transport policy which seeks to achieve modal shift from private to public transport and active modes.

2.7.2 Time is important in three ways:

- It determines the cost of providing the journey, since the time that a bus, train or tram takes to get from one end of its journey to the other will determine the number of buses, drivers, engineers and depots and the amount of fuel used to provide the service;
- It influences the choice that consumers make between different modes of transport: generally speaking, consumers will choose the mode that has the least cost in terms of time and price combined; and
- It is a key measure of economic efficiency, since time wasted through congestion impairs economic growth and prosperity.

2.7.3 Reducing bus journey times will deliver benefits and improvements across four key policy areas, as summarised in Table 2.2.

Table 2.2: Public Policy and Bus Journey Time

Policy Area	Policy Objectives	Benefits through Reducing Journey Time
The Economy	The facilitation of economic growth and provision of access to employment opportunities	Improve economic efficiency by reducing people's journey times, cutting stress levels and boosting productivity
Society and Welfare	Access to services (e.g. education, health, leisure), improving social inclusion overall, and providing health benefits through promoting active travel	Cutting the cost of service provision will enable more services to be provided so improving accessibility, network coverage and reducing social exclusion
Finance	Enabling value for money for taxpayers and a return on capital for investors	Reducing operating costs reduces the cost of tendered services, lowering public spending and improving value for money. Growing commercial revenue delivers higher investment levels and facilitates service improvement. Both cost savings and revenue growth reduce the need for unpopular fare rises.
The Environment	Improved local air quality and reduced carbon emissions	Reducing congestion will improve local air quality, reduce consumption of fuel and lower carbon emissions
The Customer	Provision of quality, reliability and value for money when purchasing transport services – important electorally as well as commercially	Making services faster and journey times more predictable will improve customer satisfaction levels – encouraging further growth in bus use and changing public (non-user) perceptions.

2.7.4 The precise balance of policy objectives will vary, both in terms of overall policy imperatives at central government level, and specific local circumstances (for example, rural vs. urban, areas of high deprivation vs. prosperous areas etc.). At the same time, the overriding financial objectives can act as a constraint on the interventions available to both the public and private sector in response to the challenges they face in a declining bus market.

2.8 Monitoring and Measuring the Importance of Time

2.8.1 In order to monitor and measure the time taken for a journey – and to adopt policies to reduce the time cost, the journey is broken down into its component parts. The typical bus journey will involve four such components:

- **Walk time** - from home to the bus stop to join the service
- **Wait time** - time at the stop waiting for bus to arrive
- **In-vehicle time [IVT]** – the time actually spent on the vehicle
- **Walk time** – from the alighting stop or station to the final destination.

2.8.2 These basic "Time Cost" components are illustrated in Figure E below.

Figure E: The Components of Time Cost for a Public Transport Journey

2.8.3 In more complex journeys, other components can also be involved, such as the time taken to change (from one bus to another or from bus to train, for example).

2.8.4 We can measure the total cost of a passenger journey either in:

a) monetary terms; or

b) minutes.

2.8.5 Under (a), the time elements are converted into a money cost, again calculated by reference to a value of time. Under (b), the money cost elements (the cost of the bus fare or the petrol and parking charges needed for a car journey) are converted into minutes by reference to a Value of Time (VOT).

2.8.6 Either approach is equally valid and the measure used will generally depend on the nature of the modelling work being done.

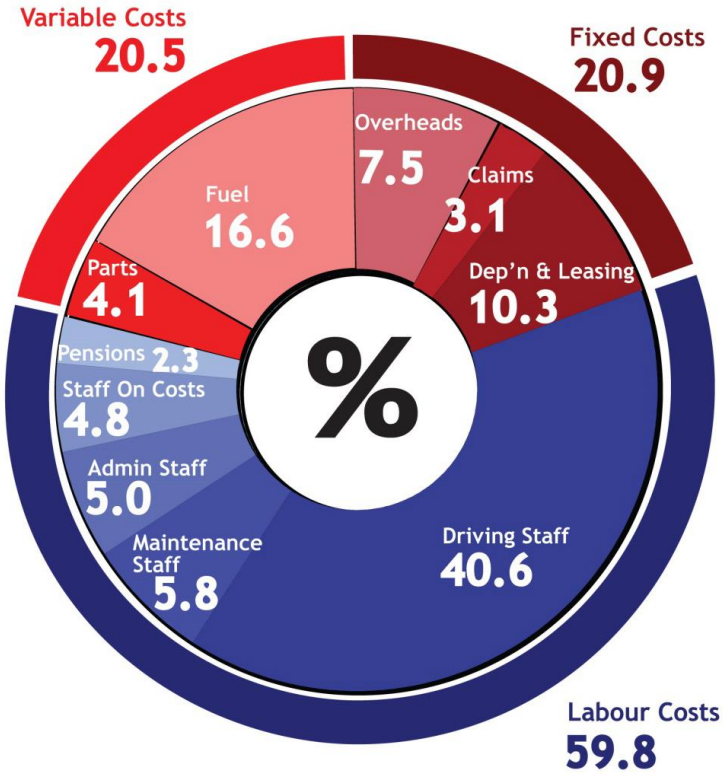
Monetary Valuation

2.8.7 The costs of providing a journey are a function of three elements:

- The level of service provided is typically measured by the miles operated, though in practice the majority of industry costs are time-based rather than mileage-based, so that a measure of bus hours is more useful for costing purposes;
- Input prices determine unit costs for day-to-day items such as wages, fuel and spare parts; also for the larger cost items such as engine, gearbox and rear axle and indeed the vehicles themselves. In turn, the cost of vehicles will influence the levels of capital employed to run the business; and
- Asset utilisation is driven by the industry's ability to use resources wisely and efficiently; this is primarily a function of the speed at which the buses can operate.

2.8.8 Figure F below provides a breakdown of a typical bus company's costs. This is based on the analysis of the TAS Bus Industry Monitor database, in conjunction with the regular cost indices and analysis published by the Confederation of Passenger Transport (CPT).

Figure F: Breakdown of Bus Industry Operating Costs, 2014



2.8.9 The principal element of cost is labour which accounts for almost 60% of total costs. Though labour costs have fallen during the recession – as they have throughout the economy – the long term trend in wages is upwards, reflecting the growing prosperity of society and competition for labour. This cost effect is accentuated by traffic congestion, which reduces bus speeds and adversely affects labour efficiency.

2.8.10 The remaining elements include fuel (16.6%), overheads including premises costs (7.5%), insurance and claims (3.1%) and maintenance materials – spare parts (4.1%). Charges for the depreciation of fixed assets, together with other ownership costs such as operating leases, account for a further 10.3%. Given the importance of driver costs to the whole equation, it will be appreciated that the efficient use of driving staff through scheduling is essential to the cost effective operation of a bus company.

2.8.11 The time that a bus takes to get from one end of its journey to the other has a crucial influence on the cost of operating the journey. Journey time will dictate:

- the number of buses needed to run the service; and
- the size of the depot and the number of engineers needed to maintain them.

2.8.12 The time will also dictate:

- the number of drivers needed; and
- the number of managers, supervisors, payroll clerks and other support staff and equipment such as computers and ticket machines.

2.8.13 In addition, the speed at which the bus can go during its journey will have a decisive effect on the amount of fuel consumed. This in turn influences the local air quality and the carbon emissions.

Time Valuation

2.8.14 Values of time (VOT) are a matter of extensive research undertaken in the UK by the Department for Transport as part of its Transport Appraisal Guidance (TAG) documentation, and adopted by Welsh Transport Appraisal Guidance (WelTag).

2.8.15 Values can vary by journey purpose and by mode. Although agreeing with the need for this DfT Guidance, we do have some concerns that the values attributed to bus travel might be failing to recognise the increasing ability to use time spent travelling on a bus productively which will affect the comparative values.

2.8.16 Table 2.3 summarises the current values.

- **Working Time:** journeys that take place during the course of employment. Businesses are willing to pay for quicker journeys which provides benefits in terms of improved access to suppliers and customers and increased productivity;
- **Non-Working Time:** journeys made during the traveller's own time – will trade a cheaper, slower journey against a faster, more expensive one. An individual's willingness to pay depends on income; journey purpose; and urgency.

2.8.17 For DfT valuation, working time is generally measured by the perceived costs of travel, whilst non-working time is measured against the market price.

Table 2.3: Values of Time (VOT) by Bus Journey Purpose: 2015 Prices[1]

Journey Purpose	VOT	Reference
Business: Passenger	**£16.16/hour**	Perceived Cost
Business: Driver	**£14.25/hour**	Perceived Cost
Commuting	**£7.88/hour**	Market Price
Education incl. Escort		
Leisure		
Personal Business		
Retail		

2.9 Generalised Cost Model

2.9.1 The Generalised Cost model measures the total cost of a journey including both the price and the time taken from door to door. The theory holds that:

- For any given journey, the choices that consumers make about how to travel will be determined by comparing the Time Costs of the different modes available.
- Consumers may be expected to choose what they perceive to be the cheapest alternative.

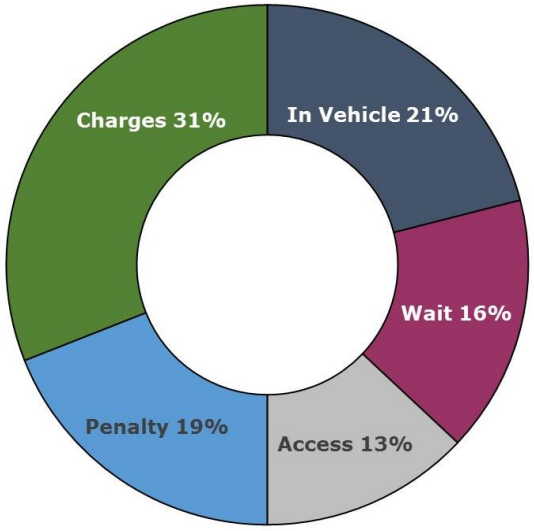
2.9.2 **In order to calculate the total cost of a journey, the Monetary Cost (the fare or the cost of petrol and parking) has to be added to the Time Cost.**

[1] *Extracted from Table A1.3.1, Values of Working/Non-Working Time, DfT WebTAG Databook*

2.9.3 The chart at Figure G shows the breakdown of the Time Cost elements of a typical local bus journey of around four miles, with a bus journey time of 28 minutes, a 10-minute frequency and a single fare of £2.40 (converted from a money cost to a value in minutes by reference to the Department for Transport's calculations of the value of time).

2.9.4 Only about a fifth of the total Time Cost is the time spent on the bus, whilst the fare makes up just under a third of the total. Most of the rest is spent in walking to and from the bus stops and waiting for the bus to arrive. The balance, known as the 'penalty', represents the hassle factor of using the bus and is derived from customer research.

Figure G: The Components of Generalised Cost



2.9.5 Guidance suggests that the qualitative elements of the journey (or 'soft measures') can also be included in the generalised cost calculation.

2.9.6 Table 2.4 summarises the calculation principles for each component of the generalised cost equation, and the applied weightings.

Table 2.4: Generalised Cost Components and Applied Weightings

Generalised Cost Component	Calculation of Actual Time	Traditional Weighting Factor	Remarks
Walking time: home to boarding bus stop	Average walk time from catchment limit to bus stop	**2.0**	In a 400m catchment area, the average time assumed would be 2.5 mins.
Waiting time	Traditionally half scheduled frequency	**2.0**	See revised factors in Appendix B.
Excess Waiting Time	Difference between scheduled wait and actual average wait time.	**1.5**	DfT gives 1.55 minutes but may be adjusted to reflect better or worse reliability.
Boarding Time	Average time x average number of boarders	**2.0**	May be higher if ticketing regime is complex. Perception of lower time if passengers appear to 'stream' onto the bus
Journey time	Scheduled journey time plus a 'variability' element	**None**	Public perception of journey time will be affected by the variability of the advertised journey time.
Fare	Actual in £s or pro-rata split of pre-paid ticket	**None**	If GC is in minutes – convert to a time value
Interchange penalty	Usually a fixed time between 5 and 8 minutes	**None**	Note that a second waiting time and excess waiting time would also apply
Walking time: from alighting bus stop to destination	Average walk time from catchment limit to bus stop and from bus stop to catchment limit	**2.0**	the actual time assumed would be 2.5 mins but varies according to local circumstance
Destination Cost	Nil for bus	**None**	Will include parking charges for car journeys

2.10 Bus vs. Car: The Competitive Disadvantage

2.10.1 Analysing the Time Cost of a journey helps to understand how bus travel compares with the car and, therefore, why the car is such a strong competitor with the bus. Table 2.5 expands the definitions of Time Cost elements we have already given and compares the bus and car experience.

2.10.2 Research has shown that non-users often over-estimate the time that a bus journey would take whilst car users often under-estimate the time taken for their own journey. This poses particular challenges. In looking at policy priorities, the measures offering the greatest improvements in Time Cost for the least monetary cost would, in our view, provide a very good value for money test.

2.10.3 Few people undertake journeys for their own sake: travelling can be stressful, particularly if it is unreliable or unpredictable and subject to congestion. However, there is an increasing tendency to use the time spent on a public transport journey productively by preparing for work, catching up with e-mails, etc. This gives public transport modes, including buses, an advantage over the car driver whose sole focus is (or ought to be) on driving the car.

Table 2.5: The Competitive 'Disadvantage' of the Bus versus the Car

Time Cost Component	Bus Journey	Car Journey	Comments
Walking Time	Distances to bus stops are typically 5-10 minutes' walk, compared to cars parked outside the home. This component also needs to consider walk from stop to ultimate destination.	Assume no time – car parked outside the home. Only consider time from car park to ultimate destination.	▪ *Walking can be affected by issues such as weather, topography or personal security. This results in walking times to/from bus stops being perceived typically as twice the actual time.*
Waiting Time	The time spent waiting at the stop can be a significant proportion of total journey times, particularly when services are relatively infrequent or journey times are short.	Does not apply – no waiting time for car journeys	▪ *Waiting can be affected by issues such as those above as well as uncertainty about bus arrival times. In considering these costs, waiting time is taken as half of the service frequency; however, perception is that waiting time is longer, so time is valued at twice actual.*
In-Vehicle Time	Factors which lengthen bus journeys include frequent stops; boarding and alighting time; fares collection; and traffic congestion en route.	Taken as the time taken to travel from A to B. Congestion significantly lengthens journey time.	▪ *Unpredictable congestion will cause higher perceptions of journey time: people will plan their journey to take account of the 'worst case', in order to avoid being late for work or missing a connection.*
Journey Cost	Fares are payable for all journeys, with discounts for regular travel and concessions. Bus fares need to take account of all bus operating costs (fuel, maintenance, drivers labour etc.)	The cost is usually perceived as the fuel consumed and the parking charge. Other ownership costs (MOT, servicing, parts etc.) are not usually considered for individual journeys.	▪ *Journey Costs are converted to values of time (VOT) using DfT factors (£/hour) for different journeys.* ▪ *Importantly, car costs are shared by all of the vehicle occupants, whereas each bus user pays their own way.*
Mode Penalty	Reflects the 'hassle' factor of using the bus, including perception of the product and interchanges.	Not usually considered.	▪ *Focus on the 'soft measures' which influence user perceptions.*

2.10.4 There can be little doubt, therefore, that bus services can be at a significant disadvantage when competing with the private car. There are several reasons for this:

- **Convenience:** the car offers door-to-door journey opportunities for most destinations. The vehicle is sitting outside or in the garage and is therefore available on demand, offering 'near infinite frequency' in public transport terms. By contrast, public transport entails a walk to the bus stop or station, followed by a wait for the next departure, and a walk to the ultimate destination;

- **Price:** once a family has taken the step of purchasing a car, the cost of an additional journey is perceived to be marginal (based on fuel only) or even free (since the petrol is already in the tank). To use public transport – particularly when two or more members of the family are travelling – entails an outlay of cash for non-regular users;

- **Journey time:** even with some degree of congestion, journey times by private car are usually faster (particularly in the absence of bus priority measures);

- **Interchange:** for complex, non-radial journeys, where a change of public transport service or mode might be required, this can be:

    - Stressful and time consuming, especially where timetables are not coordinated; and

    - Expensive – since, without through ticketing, a change will entail the payment of a second fare.

- Non-radial journeys are very easy by car and usually unattractive by public transport, largely because public transport finds it difficult to service the sort of highly diverse trip patterns which have evolved with changes in land use over the last twenty years;

- **Comfort and space:** the private car offers an increasingly comfortable personal or family space, equipped with personal entertainment, good heating and ventilation systems and so forth. By contrast, particularly at busy times, the environment of a public transport vehicle cannot match these conditions.

2.10.5 Acknowledging that there can be occasional misunderstandings, we do nevertheless believe that the key concept – the total cost in time and money of a door to door journey – is a simple one. It follows that it is possible to communicate how the components of cost fit together to provide a coherent whole and how both operators and authorities can act together in order to effect improvements and reductions.

2.10.6 The result is both an ongoing agenda for a process of continuous improvement and a means of measuring progress on a consistent basis over time.

Planning for Successful Bus Services 3

Section 3: Key Points

- Planning for successful bus services requires consideration of the "policy jigsaw" (the various components of transport – and non-transport policy) which interwork in any given area;
- An eleven-step planning process for sustainable bus services (and public transport generally) accommodates local partnership working aimed at delivering the most appropriate scheme for an area based on local circumstances;
- An assessment of the relative funding (revenue and/or capital) and costs is key to ensuring effective and efficient investment in public transport projects.

3.1 The Policy Jigsaw

3.1.1 An understanding of the nature and extent of existing transport demand is vital, along with an assessment of how this is likely to change over time.

3.1.2 Such changes can include alterations in social attitudes – in the number and density of the population – and shifts in the reasons for people making journeys: this is where land use and planning decisions become an important factor in demand, as clearly major developments such as new employment centres, educational facilities or housing developments will have a major impact on the transport system.

3.1.3 At the same time, the quality, nature and extent of existing transport provision can influence the pattern of land use development, as sites with existing facilities will (or should) be more attractive than green field locations where new transport services have to be funded.

3.1.4 In assessing the potential for public transport improvement, or for the need to develop new modes, the various pieces of this jigsaw need to fit together into a coherent plan – both complementing and extending the efforts of the National Transport Plan for Wales.

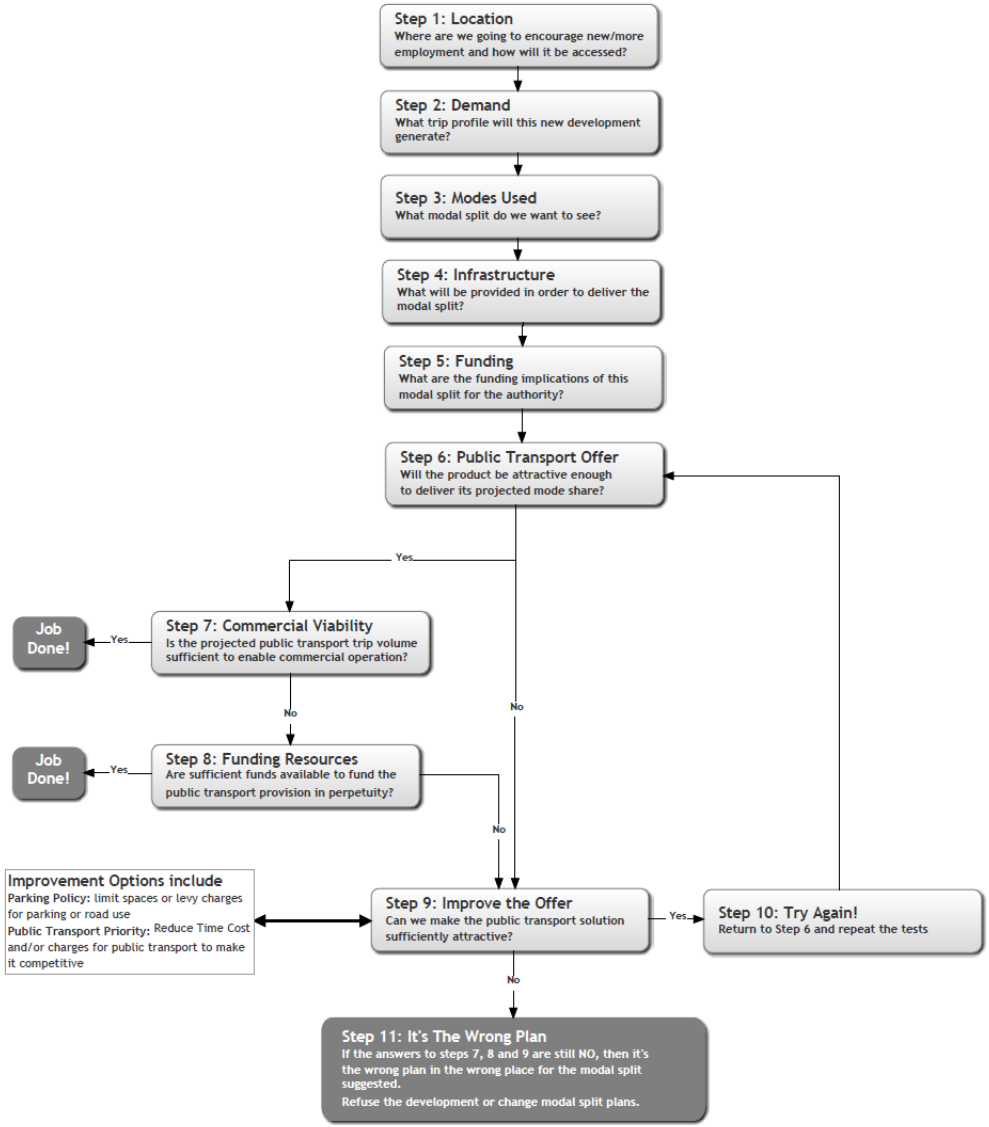
3.2 The Eleven Steps to Sustainability

3.2.1 TAS has devised an eleven-step process (Figure H) which provides a logical process to deliver a sustainable public transport policy at any level of government. At its core is the belief that such an approach can promote – and deliver – economic growth.

3.2.2 The key issues of Time and Cost come to the fore in determining the appeal and the competitiveness of the public transport product. We advocate the use of a 'top-down' approach to modal share, on which the sustainability and integrity of the process depend, where protagonists are encouraged to create a target modal share, rather than the traditional bottom-up approach to achieving modal share through a continual process of iteration and uncertainty.

3.2.3 An important element is that we know this approach can work. It was behind the decisions of the organisers of the London 2012 Olympic and Paralympic Games and the 2014 Commonwealth Games; to plan how much motor traffic could be accommodated (in many cases none for the Games venues) and then put into place the services (bus, rail, Park & Ride) required to accommodate the resulting demand. We know that this is also the model on which some local transport plans are developed although it seems that delivery has not always been exemplary.

Figure H: Eleven Steps to Sustainable Public Transport



3.2.4 Providing these plans are developed, properly costed and adhered to, the UK economy can deliver sustainable economic and land use development without coming to a halt in permanent traffic jams. There may be occasions when pump-priming revenue support is needed to overcome a time-lag between the investment in better services and financial viability.

3.3 Step 1: Location

3.3.1 Sites for both housing and economic development are often dictated by the availability of land and achieving permission for the planned developments. A site that espouses to be sustainable in the future requires close scrutiny of its transport links and options.

3.3.2 In particular, we feel that there is a need to:

- Avoid the generation of too many new journeys, especially by private car – this requires a wider consideration of access to local services and facilities – or the traditional journeys facilitated by public transport;
- Ensure that the local road network is capable of supporting the expected new trip patterns without increasing congestion and making existing public transport networks less reliable or more expensive to operate – a particular concern to the Highways Authority and impacts on the Strategic Highways Network;
- Maximise potential for access by public transport and active modes and provide space and facilities to encourage their use;
- Supporting the delivery of housing – the proportion of economic efficiency benefits attributable to trips starting or ending in large housing developments which are planned to be built;
- Enhancing regeneration areas – proportion of economically efficient benefits attributable to trips starting or ending in 'regional regeneration priority areas' (Local Enterprise Zones); and
- Reducing the regional imbalance – proportion of economic efficiency benefits attributable to trips starting or ending in each region.

3.4 Step 2: Assessing Likely Demand

3.4.1 Demand for public transport is a function of many factors, including the demographic and socio-economic characteristics of a given area. High frequency, commercial bus services thrive in areas of high population density, whilst dispersed rural communities may require consideration of alternatives to the traditional fixed route bus, through demand responsive transport or community bus services.

3.4.2 Public transport services to land use development and regeneration sites will be maximised by:

- ensuring physical accessibility for public transport vehicles and adequate routes in and out;
- locating sites as near as possible to existing public transport corridors; and
- maximising roadspace for public transport to reduce the time cost of journeys.

3.4.3 Trip generation rates for different sites will depend on the planned land use allocation – e.g. educational, retail or leisure will all have different profiles of demand for access, and this needs to be assessed against existing public transport demand and provision to ensure that capacity can be provided.

3.4.4 A key feature is always the provision of attractive public transport services at the same time as or even ahead of the first occupation of the site and that these provide links to the right places.

3.5 Step 3: Targeting the Modal Split

3.5.1 It is important to ensure that the development and appraisal of any sustainable transport-related schemes avoids subjectivity and stipulates, as a core objective at the outset of the process, a target modal split against which monitoring and evaluation of the scheme post-implementation can be assessed. This counters the traditional approaches which tend to be solution—led, rather than based on empirical evidence, adopting a 'back casting'/"what works" type approach to appraisal.

3.5.2 For example: if a transport scheme aims to increase bus patronage by 25% along a bus corridor within five years:

- Calculate current bus patronage for a specified period of time – this may include sub-analysis of temporal and seasonal factors, and the composition of current service users (e.g. through ticket type analysis);
- Forecast bus patronage (on the corridor) is 1.25 times current patronage by Year 5, which may comprise 'staged' growth in the intervening period.

3.5.3 Evidence from Kick-Start funding of bus services in Perth, for example, have suggested the following patronage growth assumptions for a doubling of service level:

- Year 0-1: +66%
- Year 1-2: +25%
- Year 2-3: +9%

noting that most growth occurs within the first year of the funding intervention and tails off in subsequent years. It cannot be assumed, however, that a "one size fits all" approach works, and to ensure that any target modal split has an appropriate evidence-base from which to reference.

3.5.4 Once target patronage levels have been established, by year, as assessment of the likely package of interventions – either 'hard' measures (supporting infrastructure) and/or 'soft' measures (qualitative, customer and journey-based measures) should be developed. Part of the success of a scheme in its first year (the 66% etc. above) may include new buses supported with a promotional marketing campaign.

A summary of potential interventions is provided in Appendix A, with supporting guidance on the TAS Interventions Toolkit in Section 4.

3.6 Step 4: The Supporting Infrastructure

3.6.1 It is important to develop an evidence base for any proposed sustainable transport intervention, including an assessment of current (and funded) capital schemes, developments and initiatives.

3.6.2 Buses and staff are only the basic costs of operation. There are other items which are integral to the provision of a high-quality well-promoted bus network. These include roadside infrastructure, stops, shelters and information displays (static or real time), and terminal facilities, bus stations and interchanges. Also of vital importance is the provision of bus priority measures such as bus lanes, signal priorities and queue relocation systems.

3.6.3 Since 1986, roadside infrastructure has typically been the responsibility of local authorities rather than bus operators. This was deemed necessary in order to promote competition and avoid giving an unfair advantage to incumbent operators.

3.6.4 Increasingly, information is provided in real-time and huge opportunities in using mobile devices have opened up in the last decade.

3.6.5 In the current climate of austerity and falling local authority budgets, this is an area which has seen big cutbacks in expenditure, despite authorities' ability to recharge a proportion of costs to operators under the 2000 Transport Act.

3.6.6 In recent years, a number of opportunities have arisen for joint funding of bus infrastructure projects under partnership agreements. Quite significant projects in the late 1990s were co-funded by the private sector – including the Manchester Road Busway project in Bradford and the similar scheme in East Leeds.

3.6.7 It is important that the experience of such schemes is revisited and the lessons learned; the benefits offered to bus passengers and bus companies by infrastructure and priority schemes can be captured in a number of ways and fed back into a virtuous circle of investment and improvement.

3.7 Step 5: Identifying Funding

3.7.1 There are essentially two funding streams for the bus industry:

- Revenue funding – through the provision of operating income, including fares, pre payment, advertising and revenue grants; and
- Capital funding – based around borrowings and grants for physical (fixed) assets – such as plant, machinery and vehicles.

3.7.2 It has been suggested that the two main stakeholders within the bus industry – the operators and local government – should play to each other's strengths with regards to funding. Thus:

- Operators lead on revenue aspects, as capital can be difficult to achieve; whilst
- Local government focuses on capital, with general access to borrowing at lower rates of interest.

3.7.3 To promote interest in developing transport schemes, a holistic approach to scheme funding should be sought – for a development that requires infrastructure, for example, we should focus on capital funding mechanisms.

3.7.4 Capital funding for sustainable transport schemes may be enhanced through partnerships with other funding partners, including:

- Central Government capital grant funding (examples include Green Bus Fund, Clean Bus Technology Fund etc.)
- Local Government;
- Lottery Funding (provided that the project meets funding eligibility criteria);
- Private enterprise;
- Section 106 (incl. Community Infrastructure Levy) developer funding;
- Third Sector organisations (ACEVO), including Community Rail and Community Transport organisations;
- Transport Operators (bus, coach, light rail, passenger rail).

A summary of Government grant funding projects and schemes that have been made available to public transport – including bus and coach services – is provided in Appendix B.

3.8 Step 6: The Offer – Appraisal and Assessment

3.8.1 Transport projects – involving hard and/or soft measures – have two aspects which can be subject to appraisal:

- Costs – such as the infrastructure costs of building a new rail line; and
- Benefits – such as the time saved for each traveller using the new rail line.

3.8.2 As many of these costs and benefits are assessed at some point in the future, we discount their impacts using today's values for comparative purposes. This gives us **present value benefits (PVB)** and **present value costs (PVC)**. In transport appraisal, two project assessments can be made:

- To assess the overall level of welfare generated by a project, we consider the **Net Present Value (NPV)** of the scheme – which is the difference between PVB and PVC. Thus, a positive NPV indicates that a proposed scheme will result in an increase in overall welfare;
- To assess the value for money under resource constraints, we use the ratio of benefits (PVB) to costs (PVC), or the **Benefit-Cost Ratio (BCR)**. This tells us how much benefit a scheme delivers per £1 of cost. The higher the BCR value, the higher the value for money.

3.8.3 Of the two measures, we recommend that transport schemes are evaluated on the basis of BCR ahead of NPV for three reasons:

- We care about value for money because we live in a world of finite resources – we want to maximise the benefits we get from available public money;
- Schemes can be prioritised on the basis of their BCR values subject to other strategic goals (prioritising schemes on the basis of NPVs favours larger projects as these generate the highest NPVs); and
- BCR provides direct comparison between small and large schemes.

3.8.4 A Value-for-money (VFM) assessment should be planned and undertaken by the operator, particularly for funding sought from central Government. Before we consider some of the evidence for BCR from bus-based interventions, we need to establish the parameters for evaluation. Table 3.1 summarises the suggested BCR VFM criteria.

Table 3.1: BCR Value for Money Criteria

BCR	VfM Rating
Less than 1.0	**Poor**
1.0 to 1.5	Low
1.5 to 2.0	Medium
2.0 to 4.0	**High**
Greater than 4.0	**Very High**

Options Appraisal

3.8.5 Table 3.2 captures the four key stages of the main appraisal process, with equal application to WelTag assessment. Note that most of the 'Criteria' – environment; safety; economy; integration; and accessibility – can be monetised for the purposes of economic appraisal of the various costs and benefits associated with a particular intervention or scheme.

Table 3.2: Summary of Four-Stage Transport Project Appraisal[1]

Stage	Element	Appraisal Requirements
Stage 1 – Pre-Appraisal		
1a	**Analysis of problems and opportunities**	▪ Essential starting point for any transport study – primary and/or secondary evidence required to inform study brief
1b	**Objective setting**	▪ Objectives and targets should be established as an outcome for any chosen intervention aimed at promoting sustainable transport
1c	**Option generation, sifting and development**	▪ Develop a series of options (including a 'do nothing' benchmark) which address the problems/opportunities presented
Stage 2 – Initial Appraisal ("Part 1 Appraisal")		
2a	**Transport Planning Objectives**	▪ Meeting Transport Planning Objectives
2b	**Transport Appraisal Guidance Criteria**	▪ Assessment of likely impacts against TAG criteria (see 3b)
2c	**Established Policy Directives**	▪ How far does option meet local/national transport policy directives?
2d	**Feasibility/Affordability/ Public Acceptability**	▪ Construction and operational acceptability, affordability and feasibility
2e	**Rationale for Option Selection or Rejection**	▪ Potential to alleviate the transport problem/s ▪ Potential to maximise the various opportunities
Stage 3 – Detailed Appraisal ("Part 2 Appraisal")		
3a	**Transport Planning Objectives**	▪ Detailed appraisal of options against Transport Planning Objectives using quantitative techniques
3b	▪ **Accessibility/Social Inclusion** ▪ **Economy** ▪ **Environment** ▪ **Integration** ▪ **Safety**	▪ Detailed appraisal of options using against five TAG criteria/goals for transport systems, using quantitative and qualitative techniques
3c	**Cost to Government**	▪ Detailed assessment of total cost to the public sector, including: ▪ Investment costs (e.g. capital expenditure) ▪ Operating costs (incl. maintenance) ▪ Grant/subsidy payments, and any other revenue anticipated within the scheme (in the case of bus schemes, this may include a forecast of on bus revenue)
3d	**Risk and Uncertainty**	▪ Risk and mitigation assessment for options
3e	**Full Scheme Report**	▪ Scheme report covering all of the items above (i.e. 1a to 3d inclusive), supported by data and the following: ▪ Options summary table ▪ Monitoring plan ▪ Evaluation plan ▪ Conclusions
Stage 4 – Post-Implementation Appraisal		
4a	**Monitoring**	▪ Assessment of scheme performance against Monitoring Plan (3e above)
4b	**Evaluation**	▪ Assessment of scheme performance against Evaluation Plan (3e above)

[1] *Adapted from Transport Scotland (2015) Scottish Transport Appraisal Guidance, Volume 1 (Introduction)*

3.9 Step 7: Financial Sustainability

3.9.1 To assess the financial sustainability of a proposed bus service or network, we adopt a system of 'route costing' as a business management tool, to:

- Determine whether a service is 'commercial' in whole or part where revenue exceeds cost;
- Set performance targets for each part of the business and target management action on parts of the business that are not performing satisfactorily;
- Benchmark services against each other to determine the relative merit of each service for the allocation of resources (marketing, new buses etc.); and
- Ensure that each part of the business makes an appropriate financial contribution.

3.9.2 Although the purposes of a route costing system may appear self-evident, all models designed to assess the financial sustainability of bus services and networks have three particular functions:

- The allocation of non-cash revenue (i.e. anything other than cash fares handed over to the driver);
- The allocation of direct costs, almost always on a 'unit cost' basis (labour, fuel, tyres etc.); and
- The apportionment of indirect costs (depot costs, supervision, marketing etc.).

3.9.3 TAS experience is that there is no single established or recognised 'standard' approach to these allocations and apportionment.

Operating Cost Allocation

3.9.4 Bus operating companies tend to allocate operating costs on the three standard bases:

- PVR (peak vehicle requirement, or the maximum number of buses operational at any one time);
- Hours (of service); and
- Miles (scheduled).

3.9.5 The UK bus industry has an historic obsession with mileage, concentrating on 'pence per mile' type Key Performance Indicators (KPI), but this seems a bizarre fixation when few operating costs really vary in line with mileage operated. We would therefore argue against miles-based cost allocation. We acknowledge that improved bus speeds make a more attractive service and that improved speeds = more miles per bus hour. Using a cost system with a mileage focus means that increasing the speed of a bus working over a standard day would simply incur more costs.

3.9.6 Table 3.3 summarises our approach to allocating bus operating costs.

Table 3.3: Bus Operating Cost Allocation

Operating Cost	Allocation	Decision
Driver's Labour	**Hours**	Driver's costs are clearly linked to the hours that they work
Depreciation	**PVR**	Why is the bus in the fleet? Any vehicle in the fleet will depreciate whether used or not. PSV Leasing charges should be treated similarly
Fuel and Tyres	**Hours**	Traditionally allocated by miles operated, but fuel consumption is a function of speed and hence, time.
Maintenance (Vehicles)	**Hours/PVR**	Maintenance costs fall into two types (a 50/50 split): Fixed – maintenance done independent of vehicle use (probably including major unit changes and refurbishment where the cost is spread over time) – linked to PVR costs; and Variable – maintenance (including labour) resulting from wear and tear on the vehicle – linked to time costs.
Overheads	**PVR**	Traditionally allocated to PVR. Certainly the majority of overheads don't increase or decrease if hours or mileage change. It is important that the core operation covers overheads and this is much better represented by PVR. To allocate overheads to mileage or hours is fundamentally inappropriate.

Revenue Allocation

3.9.7 We generally divide revenue into six categories:

- On bus cash;
- Concessionary reimbursement;
- Season tickets;
- Scholars tickets;
- Tenders and Contracts; and
- Miscellaneous (such as bus advertising).

3.9.8 These six main categories may have been sufficient ten or so years ago when the bulk of revenue was collected on bus – concessionary fares were generally half fare arrangements where on-bus cash could be directly related to the reimbursement and period tickets did not form such a major part of the market. They are now inadequate where multi-journey tickets dominate the adult fare-paying market.

3.9.9 We can assume that the majority of total depot costs are correct but cannot take the same view with revenue as allocation and apportionment methods employed centrally will influence the amounts allocated to each depot before revenue is then divided between services at the depot.

3.9.10 Table 3.4 summarises our approach to allocating all other forms of revenue.

Table 3.4: Bus Revenue Allocation

Revenue Heading	Allocated According to:
On Bus	Cash sales on bus
Concessions	Allocated by number of trips weighted by average adult income
Seasons	Allocated by number of trips weighted by average adult income
Scholars	Point to point allocated to service at point of purchase
Tenders	To service as appropriate to specific Contract
Miscellaneous	To service as appropriate to specific arrangement (e.g. advertising, challenge funding etc.)

Sustainability Assessment

3.9.11 For a bus service to be financially sustainable – usually over the medium to long-term – it must:

- Firstly, cover its hourly costs (driver's labour costs; fuel and tyres; and part maintenance);
- Secondly, cover its PVR costs (depreciation; part maintenance; and some overheads); then
- Thirdly, make a contribution to operating company/group overheads (should these exist).

3.9.12 The decision to operate a service on a **commercial** basis (i.e. where the operator takes the full revenue risk) – or a **supported** basis (i.e. where the local authority either takes full or part revenue risk), needs to take account of this financial sustainability hierarchy. For example, any service which cannot cover its hourly costs will almost certainly require some form of local authority revenue support.

3.10 Steps 8 to 11 Inclusive

3.10.1 These form a logical part of the overall sustainability assessment for a proposed bus service or network – and in short, if the proposed scheme falls short of expectations – either through anticipated demand; the imbalance between benefits and costs; and lack of funding (revenue and/or capital), it is likely to be the wrong sort of scheme and certainly not sustainable over the medium to long term.

3.10.2 Partnership working – between operators, local authorities and, in some cases, third parties (e.g. government, developers, local business and other stakeholders etc.) which develops a thorough business case based on these principles, is likely to have a better understanding of the economics and practicalities of how investment in bus interventions can work, rather than either party serving its own interests.

The Interventions Toolkit 4

Section 4: Key Points

- The Interventions Toolkit – devised by TAS – aims to guide bus industry stakeholders towards the most appropriate bus intervention measures for their area;
- The toolkit is based on an assessment of the Generalised (Time) Costs and modal share;
- A series of case studies – covering bus corridors and networks – for three types of area (predominantly urban; predominantly rural; and mixed/inter-urban) are presented to demonstrate key features including investment;
- Research from BCR assessments of bus-related schemes identify most interventions scoring above 2.0 – rated by the DfT as representing 'high' or 'very high' value for money; however
- BCR scoring is very much dependent on local circumstances – including an assessment of bus demand.

4.1 Bus Interventions Toolkit

4.1.1 The TAS Bus Interventions Toolkit has been developed to guide industry stakeholders – Government, LTAs and operators – towards the most appropriate interventions for their area which lead to revenue and passenger growth.

4.1.2 The toolkit is based on our components of Generalised (Time) Cost (Figure E). This breaks down each component, enabling each interested partner to devise a 'hit list' of potential options and measures suited to their bus corridor, route or network – as means of facilitating change, a process for monitoring continuous improvement, or for transforming investment in bus services.

4.1.3 The overall aim of the assessment should be to:

- Improve the appeal and attractiveness of the bus; and
- Increase operational efficiencies and reduce operating costs.

4.1.4 Figure I summarises the main aspects of our toolkit, together with supporting detail in Table 4.1.

Figure I: The TAS Bus Interventions Toolkit

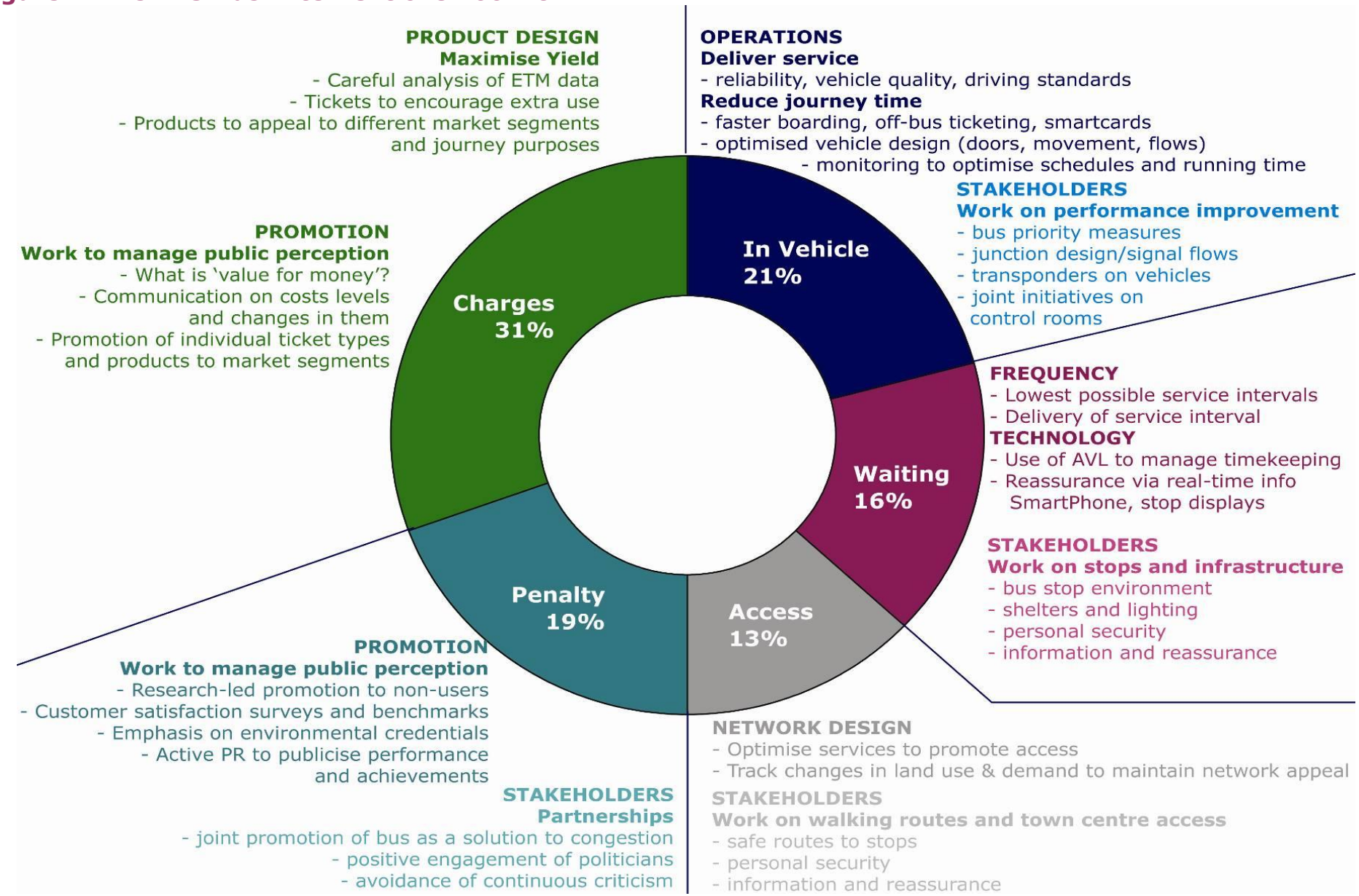


Table 4.1: Bus Interventions Toolkit (TAS)

Time Cost Element	Aspect	Comment	Potential Solutions
Access/ Walking Time	**A function of the closeness of the stop to the customer's home, but also how well suited the bus is to the customer's journey purpose**	Rapid social change enabled by the Internet; economic recession; the decline of town centre shopping; and out-of-centre employment pose particular challenges	Access will be affected by safe routes to stops with good lighting. In assessing future potential, attention needs to be paid to alternative, more attractive destinations which can be marketed to the public as well as other changes in land use and travel patterns.
Waiting Time	**The time spent waiting at the stop can be a significant proportion of total journey time – particularly when services are relatively infrequent or journey times are short**	Waiting time is largely a function of service frequency and, as such, is determined by the commercial potential of the route. Perceived waiting time can be improved by running reliably and offering information and reassurance	Real-time information at stops and via smart applications – particularly useful in less well served areas and for allowing people to plan their journeys more effectively before they leave home
		Other key factors include bus stop environment and personal security issues, especially in urban/suburban areas	Improve the bus stop environment – including adequate shelter, lighting and even help points (where appropriate).
In-Vehicle Time	**Actuality of the journey**	Actual time taken needs to be minimised so far as possible and communicated effectively. Car drivers tend to under-estimate their own journey time and over-estimate the time it would take by bus.	Improved product and network design e.g. network simplification, optimised schedules, off-bus ticketing, other measures to minimise stop dwell times (see below for more details on this). Highway measures to improve journey times
Fares	**Overall level of fares**	Difficult and controversial area – significant weakness for customer perceptions of the bus product in some areas. Often worst case (single fares) compared only with the immediate costs of a car journey (e.g. fuel and parking)	Avoid frequent increases and sudden reversals of policy. Pricing needs to be product-based and determined by local market conditions. Better information on industry costs and challenges would assist too. Local authority parking charges can help to rebalance comparative costs.
	Price elasticity	Danger of long-term elasticities exceeding -1.0, especially where fares are perceived as poor value for money, so reducing revenue after increases.	Active management of perceptions. Avoidance of frequent or large increases. Targeted reductions in fares where suppressed demand may exist.
Penalty/ Quality	**The immeasurable elements in modal choice decisions – such as public attitudes and perceptions**	There are many ways in which PR and marketing can be used as tools to influence perceptions, by both government, LTAs and operators. Modern vehicles and the in-vehicle environment can also positively change perception.	Customer satisfaction and other performance KPIs being measured and results published. Research-led promotion to non-users using environmental credentials of the bus, and destination-based marketing. All sides need to promote a positive message.
	Perceptions of the journey (linked to In-Vehicle Time, above)	Predictability of the journey time – consumers will usually take a 'worst case' view	Schedule optimisation will help. Work with Highways Authorities on tackling congestion and pinch points, particularly where there are irregular delays.
		Journeys will be perceived as longer if the vehicle is of poor quality, dirty or being driven badly. Conversely, a comfortable journey can be perceived as faster.	Cleanliness, maintenance and freedom from graffiti will always improve public perceptions. Internal noise and vibration need to be minimised. Driver attitudes and behaviour are also very important.

4.2 The Improvement Agenda

4.2.1 A useful way of establishing the priorities for improving bus services is to separate the bus product into its various components – consider the actions needed for each component – then agreeing the allocation of funding and delivery responsibility.

4.2.2 Table 4.2 offers some guidance on how to break the various elements of the bus product down.

4.2.3 The choice of topics – and priorities for improvement – will be influenced by following the eleven-step process outlined in Section 3. Appendix B provides an outline for potential improvement projects.

Table 4.2: Anatomy of the Bus Product: Identifying Areas for Improvement

PLACE		PRODUCT		PRICE	PROMOTION
Walking Time	**Waiting Time**	**The Journey**	**The Service/ The Vehicle**	**Fares/ Ticketing**	**Stakeholder Partnership/ Quality Aspects**
Appendix A	**Appendix B**	**Appendix C/Appendix E**		**Appendix D**	**Appendix E**
Safe routes	**Shelters**	**Duration**	**Network coverage**	**Fare levels**	**Branding**
Stop location	**Fixed information**	**Punctuality**	**Hours of operation**	**Ticketing products/range**	**Printed material**
Access to the regional centre (incl. towns and cities)	**Real-time information**	**Predictability/ Reliability**	**Destinations**	**Fares integration**	**Online presence**
Topography	**Safety and security**	**Vehicle safety and security**	**Interchange**		**Social media**
		Driver behaviour	**Vehicle design and quality**		**Press and other media**
		On-bus services (Wi-Fi, air con. etc.)	**Simplicity**		

4.3 What Works?

4.3.1 In July 2015, the What Works Centre for Local Economic Growth published its report on transport policy[1] and the evidence base for transport investment in stimulating economic growth.

4.3.2 In their assessment of over 2,300 transport policy evaluations from OECD countries, they found:

- Indecisive links between types of transport capital expenditure and growth;
- Little evidence of transport investment stimulating economic growth in less economically successful areas; and
- No qualitative evidence of the economic impact of public transport schemes.

4.3.3 These findings are somewhat pessimistic, given that our experience tells us that targeted investment in the bus industry can generate tangible success – as exemplified by recent research for Greener Journeys by KPMG.

4.3.4 However, TAS' experience in this area of transport economics – post-implementation evaluation of the success – and failure – of transport investment, shares some of this pessimism. In our view, there is a dearth of good quality information on appraisal and assessment of bus-based interventions.

4.3.5 There are perhaps a couple of reasons why this may be the case:

- Confidentiality – unwillingness amongst operators to share good – and bad – news stories about projects and investment schemes in order to maintain competitive advantage over other operators; or, an unwillingness to sour political relationships;
- Timescales and Magnitude – revenue and patronage outcomes, both in time and/or in size, do not meet with the projected budget;
- Technical Ability – the industry's stakeholders cannot abstract good quality information from the data they hold; and
- Currency – for some aspects of the industry – as covered in this Report – it is difficult to monetise their impacts; for example, seating comfort on buses.

4.3.6 Using our assessment of bus services and networks, we present a summary of case studies which we feel best exemplify 'good practice' in the bus industry outside London and Wales, to provide comparison with Welsh bus operations. We have partitioned our assessment by corridor and network case studies, covering three broad areas: predominantly urban areas; predominantly rural areas; and mixed areas.

[1] http://www.whatworksgrowth.org/policies/transport/

4.3.7 For each group of case studies, we have:

- Identified the key characteristics against the Time Cost aspects of our Interventions Toolkit;
- Identified any significant achievements; and
- Provided supporting commentary on aspects of both revenue and costs (where appropriate) – including reference to any revenue support funding.

4.3.8 Note that it is difficult to precisely determine key features such as fares elasticities or BCRs due to commercial sensitivities on data. Should these case studies be of interest, we would recommend further detailed work on each (including data analysis) to identify the measures of success.

(The use of photos has been referenced by means of the appropriate hyperlink under each image).

4.4 Urban Bus Corridors

	Service 192 Stagecoach Manchester	**Service 309/310/X39** Go North East	**Service 22** Lothian Buses	**Service 5** Oxford Bus Company
	 *Source: https://flic.kr/p/edCCSU*	 *Source: https://flic.kr/p/fc3NRU*	 *Source: https://flic.kr/p/rRgo5i*	 *Source: https://flic.kr/p/vDLhCG*
Description	Hazel Grove to Manchester (A6)	Newcastle to Cobalt Business Park ('The Cobalt Clipper')	Gyle Centre-Edinburgh-Leith	Blackbird Leys to Oxford/Oxford Station (city5)
Frequency	Every 3 minutes – less frequent during peak times	At least 7-8 minutes (X39 operates peak times only)	At least every 7-8 minutes	At least every 7-8 minutes
Fares	Day (£4.10), Week (£13.50)	Day (£3.90), Week (£13.00)	Day (£4.00), Week (£18.00)	Day (£4.00), Week (£14.50)
Fleet	Diesel-Electric Hybrid Enviro 400H (double deck)	Diesel Incl. Volvo B9TL (double deck)	Diesel Volvo B9TL (double deck)	Diesel-Electric Micro-Hybrid Wrightbus Streetdeck (double deck)
Journey Time	40 minutes	Newcastle-Cobalt (309) (25 minutes) Newcastle-Cobalt (X39) (21 minutes)	Gyle Centre-Edinburgh (22 minutes) Leith-Edinburgh (13 minutes)	30-34 minutes (to city centre)
Funding	Commercial	Commercial	Commercial	Commercial
Infrastructure	Statutory QBP Corridor – traffic signals, 20 bus lanes (13 inbound, 7 outbound), at stop upgrades.	Private partnership between operator and business park. Bus-only link road installed adjoining estate areas. On site 'Travel Team' and travel centre.	Non Statutory Partnership (1997) – included 'Greenways' bus lanes, bus priority, park and ride, real-time and ticketing, emissions control	No significant investment in infrastructure by LTA. Joint operator smart ticketing introduced 2011. WiFi and next-stop AVL fitted to vehicles.
Costs/Benefits	Fleet upgrade in 2013 – 40 vehicles, £12m (Stagecoach), £4.6m (Green Bus Fund). Reported annual patronage of ca. 10 million.	Fleet upgrade from single to double deck (Feb 2014) at cost of ca. £3m – additional use of Clean Bus Technology Funding. 15% increase in patronage (Dec 2014).	Fleet upgrade in 2009 (24 vehicles) through company bus order.	Fleet upgrade 2015 (11 vehicles), plus use of other hybrid vehicles as part of Green Bus Fund investment.
Comments	Purported to be the busiest bus route in England. Stagecoach funded Park and Ride at Hazel Grove (opened Summer 2015)	Service developed in partnership with Cobalt Business Park in 2007. Investment in ticketing (including salary sacrifice scheme).	Previously operated part of West Edinburgh Busway Scheme (WEBS) from 2004, but closed in 2009 to enable tram conversion. Fleet upgraded from single to double deck.	Part of a Qualifying Agreement with Stagecoach Oxfordshire – combined timetable offering service every 4 minutes. Cowley Road corridor suffers from congestion/delay.

4.5 Rural Bus Corridors

	Service X55/X56/X57 East Yorkshire Motor Services	**Service 580/581** Kirby Lonsdale Coach Hire	**Service CH1/CH2/CH3** Stagecoach in Norfolk
	 *Source: EYMS (with permission)*	 *Source: KLCH Facebook Page*	 *Source: https://commons.wikimedia.org/wiki/File:Coasthopper_bus,_Sheringham_-_geograph.org.uk_-_1957791.jpg*
Description	Goole to Hull via Gilberdyke ('The Petuaria Express')	Skipton to Kirby Lonsdale ('The Craven Connection)	Cromer, Wells, Hunstanton, King's Lynn ('Coasthopper')
Frequency	Every 60 minutes	Kirby Lonsdale-Settle (581) (120 minutes) Settle-Skipton (580) (60 minutes)	Every 30 minutes (all routes)
Fares	Day (£12.50), Week (£26.00 Goole to Gilberdyke), (£28.35 Gilberdyke to Hull)	Return (£5.80), Day (£10.00) – no weekly tickets	Coasthopper Rover Day (£9.30), 7-Day (£33.00)
Fleet	Wright Eclipse 2 B7 (single deck), Enviro 400 Dennis Trident (double deck)	Mercedes-Benz Citaros – recently purchased second hand	Fully accessible, low emission.
Journey Time	Hull to Gilberdyke (59 mins), Hull to Goole (84 minutes)	Skipton to Settle (40 mins), Settle to Kirby Lonsdale (40 mins)	Route 1 (30 mins), Route 2 (48 mins), Route 3 (60 mins Wells-Cromer)
Funding	Commercial	Supported (to Feb 2014); Commercial 580 (from May/Jun 2014), NYCC support 581	Commercial (Summer timetable), Part-supported (Winter timetable)
Infrastructure	None	None	None
Costs	Fleet upgrade 2010 (high specification)	Acquisition of second-hand Citaros	£600,000 fleet investment in 2009. Upgrade and refurbishment (£260,000) in 2014.
Benefits	Provided a direct, express bus service between Hull and expanding villages of Brough and Elloughton. Designed to appeal to car and rail users, serving an affluent area.	Maintains link for residents along route to access regional centres across North Yorkshire.	Carried up to 586,000 passengers/year (2011).
Comments	Rebranded as the Petuaria Express in 2010, simplifying a range of subsidised services into two commercial core services (X55/X56). Good communications strategy including follow-on research. UK Bus Awards winner for marketing initiative of 2011.	Following the collapse of Pennine Bus Company in 2014, and inadequate replacement service operated by North Yorkshire County Council. KLCH Limited launched a fully commercial version of the Craven Connection.	Established by Norfolk Green in 1996 together with Norfolk Coast Partnership and Norfolk County Council. Aim to reduce car dependency for visitors and residents. Norfolk Green acquired by Stagecoach in 2013 who now operate an all-year commercial service.

4.6 Inter-Urban/Regional Bus Corridors

	Service 36 Transdev Blazefield	**Service m1/m2** Wilts & Dorset	**Service 700/701/702** First Berkshire	**Route A/B/C** Stagecoach/Go Whippet
	 *Source: https://flic.kr/p/a6nmrW*	 *Source: https://flic.kr/p/nkJ8cc*	 *Source: https://flic.kr/p/dW8KV5*	 *Source: https://flic.kr/p/c3dQW3*
Description	Ripon to Leeds via Harrogate	Poole to Bournemouth (m1) and Boscombe (m2)	London to Legoland/Bracknell (Greenline)	Peterborough/Huntingdon/St Ives-Cambridge ('The Busway')
Frequency	Every 10 minutes (peak), 15 minutes (off-peak)	Combined 4-minute headway	Every 60 minutes (702), more during peak times	5 minutes (peak), 7-8 minutes (off-peak) (Route A/B), 60 mins (Route C)
Fares	Day (£8.00), Week (£33.00)	Day (£3.70), Week (£12.50)	Day Return (£6.60 to £11.00) depending on time of travel, Week (£50.00)	Day (£5.00-£6.40), Week (£20.00-£24.00)
Fleet	Diesel – Volvo B7TL double-deck vehicles	Wright Eclipse Volvo single-deck vehicles (36)	Originally operated by coaching fleet, now features bespoke Wright Exclipse Gemini Volvo B9TL double-deck	Scania/ADL Enviro 400 (double deck) (Stagecoach), Volvo B7RLE (single deck), Go Whippet
Journey Time	Ripon-Harrogate (40 mins), Harrogate-Leeds (45 mins)	Poole-Bournemouth (45 mins), Poole-Boscombe (47 mins)	London to Bracknell ca. 2 hours	St Ives-Cambridge (30 mins)
Funding	Commercial	Commercial	Commercial Franchise (see below)	Commercial (under SQP)
Infrastructure	None – although route does take advantage of bus priority to/from Leeds city centre.	QBP corridor (Three Towns) – 72 new shelters £750k (LSTF) and £500k (Better Bus Areas) (Nov 2014).	None	Guided bus sections; high quality stops with information/ticketing; new park and ride sites.
Costs/Benefits	Product Life-Cycle approach to investment, £2.5m (2004), £3.0m (2010) and £3.2m (2015) investment in 14 new, high specification vehicles.	Original specification £4m. £5.5m investment in new vehicles (2012).	Investment in fleet not part of standard company bus order.	Budget £116.2m (guided busway sections plus construction of stops and associated infrastructure, including park and ride).
Comments	The history of the route extends back to the 1930s, and is one of the best examples of targeted marketing in the UK bus industry. Continuous development of the route brand led to patronage growth of ca. 62% (2004-2009), to 1.5m journeys/year.	Originally launched as a premium inter-urban service in Dec 2004 to replace a range of Wilts & Dorset services. Network simplification, marketing and ticketing have been key to success. Initial year on year passenger growth of ca. 15%.	'Greenline' service frachise owned by Arriva – developed from former London Country network. Introduced innovative 'Rainbow Fares' pricing – fares matched different service operational times.	The Busway opened in 2011 as the UK's longest guided busway system. Significant investment by both Cambridgeshire County Council (infrastructure); and two major operators (Stagecoach; Go Whippet).

4.7 Bus Network Case Studies

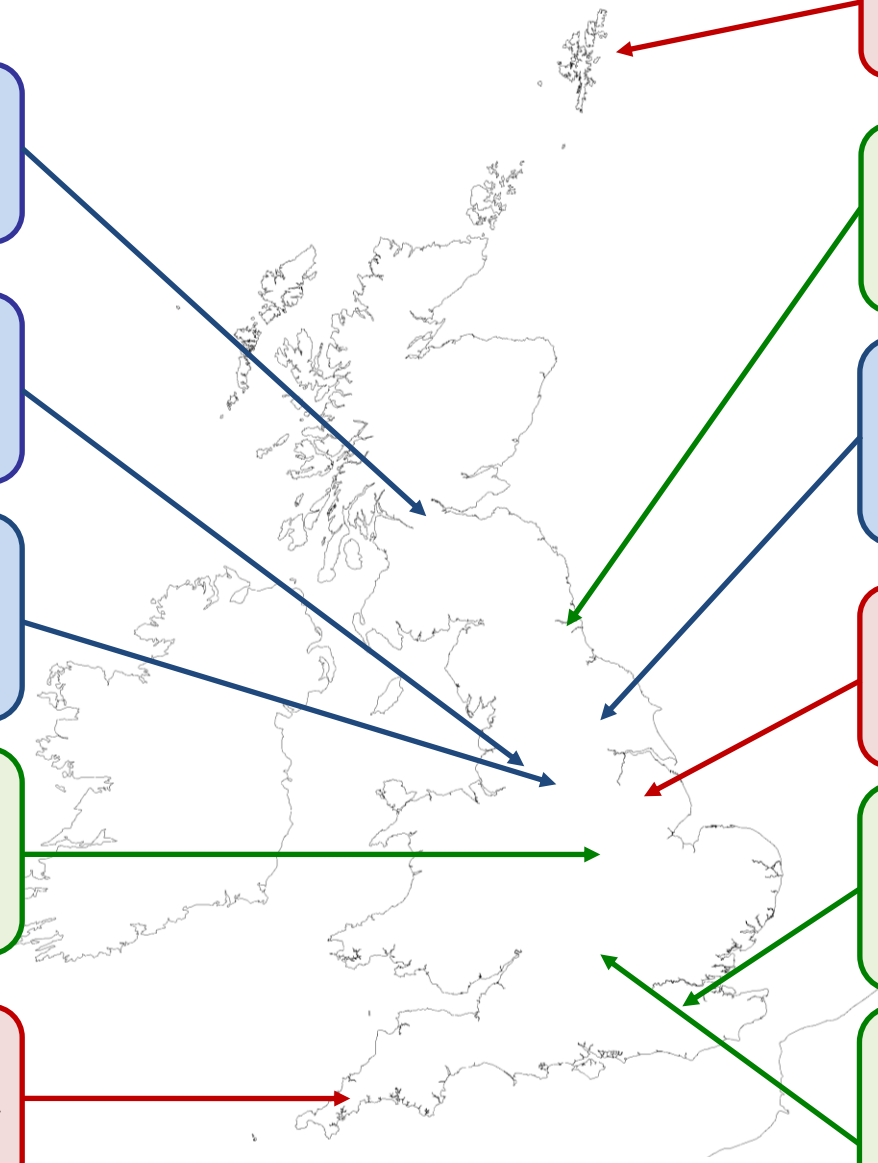
First Glasgow *(Urban Network)*
Following a network review in 2013, a revised high frequency, affordable commercial bus network was introduced for the Glasgow area. Branded as 'simpliCITY', growth has been targeted through low cost fares and network simplification.

Greater Manchester *(Urban Network)*
TfGM and bus operators have worked in close partnership for a number of years, including previous challenge funding bids to tackle city centre congestion. Currently assessing implications for network franchising as part of devolution deal.

Sheffield *(Urban Network)*
The City of Sheffield was appointed as the pilot Better Bus Area (BBA) scheme in 2013. The project encouraged the principal operators – First and Stagecoach – to develop a coordinated network with local authority and PTE support. Revenue and patronage growth continue to meet expectations.

Trentbarton *(Inter-Urban/Regional Network)*
Successful, award winning bus operator whose portfolio of branded services has been recognised as offering the best in terms of customer service across the East Midlands. Routes designed through extensive market research. MANGO Smartcard ticketing. Use of Product Life-Cycle.

Cornwall *(Rural Network)*
Despite concerns over revenue funding constraints and the performance of larger bus operators, the Cornwall bus network is in better shape financially – and by patronage – since deregulation in 1986. PVR resources have increased by almost 85%



Shetland Islands *(Rural Network)*
Operates an integrated public transport network with smart ticketing, encompassing bus, DRT and islands ferry services. Network is entirely funded through revenue support; review completed

Go North East *(Inter-Urban/Regional Network)*
Large, regional bus operator whose routes have been transformed from a corporate network by route branding. Significant vehicle investment and close working with local authorities has resulted in several awards and achievements.

City of York *(Urban Network)*
Long standing and very successful Quality Bus Partnership arrangement between City council and operators. Investment in high quality Park and Ride network which integrates with city bus network. Challenge funding successes include LSTF and Green Bus Fund.

Lincolnshire County Council *(Rural Network)*
Faced with significant pressure on funding for rural bus services, the branded 'InterConnect' network was launched in 2001. Core 'InterConnect' services link regional centres, whilst 'CallConnect' services offer feeder DRT minibus connections.

Metrobus *(Inter-Urban/Regional Network)*
Developed very successful commercial bus network in an area deemed previously unsustainable. Close working with West Sussex County Council enabled operation of extensive mixed network linking south coast with London. Successful introduction of Fastway BRT scheme including Gatwick Airport

Oxford Bus Company/Stagecoach Oxford
Despite years of on-road competition, a 'Qualifying Agreement' between the two principal bus operators in Oxford city was agreed in 2012. This resulted in a coordinated bus network; investment in new, low-emission vehicles; and integrated smart ticketing (the Oxford 'SmartZone').

4.8 Assessing Interventions

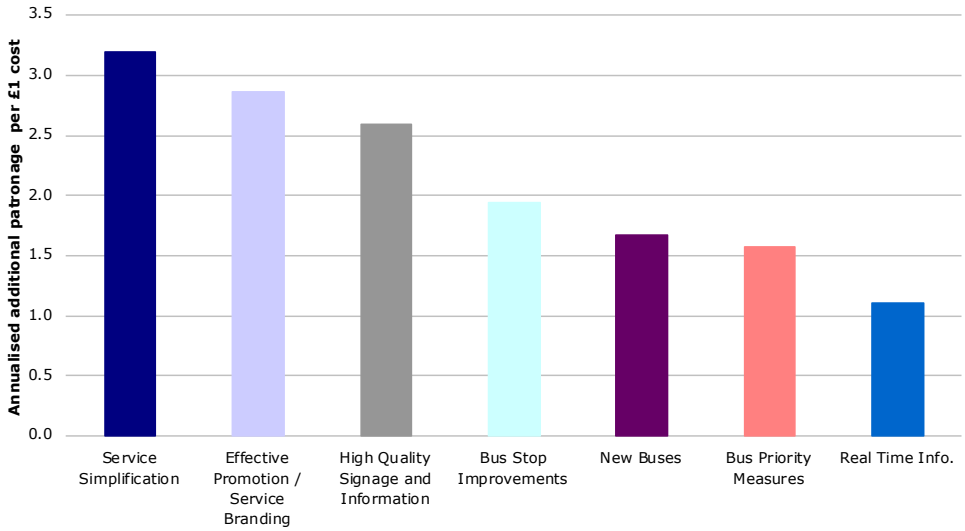
Quality Bus Partnerships (QBPs)

4.8.1 As part of a review of Quality Bus Partnerships (QBPs) for the Department for Transport (DfT) in 2002, TAS evaluated the outcomes from a small number of QBPs in detail. Where it was possible to isolate the individual spending components within the QBP, approximations of the annualised fare revenue per £1 spend were determined, from which estimated patronage growth per £1 spent could be calculated. The output is shown in Figure J.

4.8.2 This analysis clearly shows a low cost, high benefit action – such as service simplification – provides a potentially greater return on investment than bus priority measures. Some of the higher cost options (such as bus priority) might deliver huge growth if applied across a full network (although generally this is unlikely to be achievable). This analysis highlights the mix of improvements possible.

4.8.3 Given that resources are finite – for the both the private and public sector – effective allocation of resources is required. For example, it may be feasible to put bus priorities on 10% of the network; new buses on 15%; new bus stops on 20%; improve information on 50%; and promotion and branding on 75%; and simplify the entire network.

Figure J: BCR QBP Bus Interventions (TAS, 2002)



4.8.4 Subject to inflation and testing of contemporaneous data, we suggest that these BCR would remain relatively unchanged and continue to provide a useful benchmark for the evaluation of bespoke bus-based interventions.

4.8.5 It is perhaps worth noting that a successful bus network is one which remains completely objective in its targets and performance; there is little room for complacency. Given the high BCR that results from service simplification, continuous 'tweaks' to core routes only serve to undermine the longer term sustainability of the network.

Small Scale Public Transport Schemes

4.8.6 A report to the Passenger Transport Executive Group (PTEG) from Jacobs Consultancy in 2011 highlighted sample BCR from investment in small-scale public transport schemes. A total of 17 case studies was reviewed; Table 4.3 summarises the key measures.

Table 4.3: Bus BCR Case Studies: Jacobs (2011)

Scheme	Description	Cost (£m)	BCR (est.)
A65 Quality Bus Corridor Scheme	*QBC scheme from Leeds to Rawdon (A65) incorporating bus lanes with gating and pre-signalling control*	£20.6	**1.90**
Birmingham Outer Circle Quality Corridor	*QBC on outer corridor (A4040) comprising bus lanes, junction improvements, cycle and pedestrian features*	£16.8	**5.40**
Derby Road Modal Shift Project, Nottingham	*QBC improvements in partnership with bus operators – included 24-hour bus lanes; high quality bus stop waiting environment (shelters); low-floor buses with CCTV; travelcard; and information hubs*	£8.0 (vehicles) £0.5m (other)	**7.60**
Implementation of Traffic Light Priority, West Yorkshire	*GIS-detection based system at 67 junctions throughout West Yorkshire*	£2.95	**7.60**
Assessment of Priority Lanes, Tyne and Wear	*Post monitoring assessment of bus lanes and no car lanes on 12 chosen corridors*	N/A	**8.60**
Integrated Transport Knowledge Base (Centro)	*Improved data management (operators) and customer information programme*	£1.25	**9.50**
Real-Time Information Review (Centro)	*Post-implementation monitoring of ca. 160 bus stop real-time upgrades on 7 bus corridors*	N/A	**1.90**
MyBus West Yorkshire	*Scheme providing high quality home to school transport (Yellow Buses) across West Yorkshire*	£9.0 (annual)	**2.50**
Access York Phase 1 Park and Ride Development	*To increase number of park and ride sites in York from five to seven*	£25.5	**3.50**

Greener Journeys

4.8.7 Since 2013, KPMG has published a series of reports on behalf of Greener Journeys – a campaign organisation aiming to increase patronage on bus and coach services with support from the CPT, bus operators and other organisations including PTEG and ATCO. The reports have been based on detailed analysis – using formal Transport Appraisal Guidance – to produce BCR of bus-based interventions. The outcomes are summarised in Table 4.4.

Table 4.4: BCR Analysis for Greener Journeys

Intervention	BCR	Commentary
BSOG (Rebate on Fuel Duty)	**3.03**	Analysis of BSOG concluded that it provided high value for money to the taxpayer and that benefits extended beyond bus users to improvements in economic productivity; social inclusion; environmental sustainability; and public health. *(from: Report into BSOG, 2014)*
Bus Priority Measures (Overall)	**3.32**	Analysis of bus priority schemes and investment in infrastructure to promote bus use concluded that successful delivery depended on LTAs: focus on moving people rather than vehicles; improving network reliability; identifying local solutions; working in partnership with operators and passenger groups to deliver improvements; and promoting the benefits associated with public transport. *(from: Report into Bus Infrastructure, 2015)*
Concessionary Travel Schemes (Older Persons)	**2.87**	Primarily focused on older person's concessionary travel schemes, this analysis found benefits from directing benefits to those who needed them; improves access to essential services for the target passenger group; and opens up participation and opportunities otherwise unavailable. *(from: Report into Concessionary Travel Schemes, 2014)*

4.8.8 Table 4.5 summarises the key case studies used in the preparation of the KPMG 2015 report.

Table 4.5: Examples of BCR from Bus Projects[2]

Scheme	Description	Cost (£m)	BCR (est.)
Eclipse	*South East Hampshire BRT Scheme (Eclipse) – high specification, sub-regional public transport network*	N/A	**6.94**
Merseyside Better Bus Areas	*Bus schemes package including development of transport hubs; bus infrastructure; provision of real-time and mobile information*	£5.7	**5.20**
Leicester Better Bus Areas	*Redevelopment of Haymarket Bus Station, Statutory QBP Scheme*	£13.2	**4.80**
Mansfield Public Transport Interchange	*New, fully enclosed bus station building with connecting footbridge to rail station*	N/A	**4.06-4.99**
Fastway BRT, West Sussex	*Bus Rapid Transit scheme covering Crawley and Gatwick in West Sussex*	£38.0	**4.67**
Centro – Transforming Bus Travel	*Infrastructure scheme including bus shelter replacement and branding*	£1.7	**4.00**
Greater Bristol Bus Network	*10 bus corridors comprising bus priority measures, improved stops with real-time information, and new buses*	£69.0	**4.00**
Manchester Cross City Bus	*Extensive bus priority package*	£54.5	**3.20**
Somerset Better Bus Areas	*Bus stop replacement*	£0.5	**2.20**
	Bus priority at junctions	£0.25	**1.60**

4.8.9 Table 4.6 summarises the outcomes for bus-based schemes in Metropolitan areas.

Table 4.6: Key Interventions (Metropolitan Areas)

Intervention	Cost Range	Timescale	Scale	Benefit	Comments
Service Funding Enhancement (Revenue)	**Medium**	Medium-Term	Small	**High**	*Localised opportunity only.* *Restarts product lifecycle*
New Bus Investment	**Medium**	Short-Term	Small	**Low**	*Benefit is negligible in areas with high proportion of low floor buses. Higher benefit when larger vehicles replace smaller, or low floor buses replace step entrance*
Point based bus priority	**Low to Medium**	Short to Medium-Term	Medium	**High**	*Small scale interventions at known hot spots*
Line based bus priority	**High**	Medium to Long-Term	Small	**High**	*Bus Lanes or major hotspots*
Fares and Ticketing	**Low**	Short-Term	Large	**Medium**	*Developing a simple, promotable fare structure which can be applied network wide*
Promotion	**Low to Medium**	Short-Term	Medium to Large	**Medium**	*Basic promotional activity can be network wide* *More detailed activity is more costly and therefore localised*
Infrastructure	**Low to Medium**	Short-Term	Medium to Large	**Low**	*Large scale focuses on signage and information* *Medium scale would be additional or better shelters etc.*

[2] *KPMG (2015) Buses, devolution and the growth agenda: A guide to investing in local bus infrastructure: Table 1, p8; and Greener Journeys (2015) A Roadmap to Growth*

4.8.10 It is evident – from the case studies reviewed – that the blueprint for a particular measure (e.g. bus stop upgrades) cannot easily be replicated in other areas. The value of investment in individual measures can be particularly difficult to quantify, primarily because changes often cover more than one aspect at once; in our experience, quite often outcomes are influenced by a range of internal and external market factors, as identified in Figure T above.

4.8.11 In summary: whilst there is significant variation in BCR for a range of bus-based interventions, as evidenced from TAS, Jacobs and KPMG analysis, **the majority of outcomes from such investment in bus services and infrastructure are above the DfT's threshold of 2.0 – indicating high value for money**.

Conclusions and Recommendations 5

5.1 Conclusions

5.1.1 In order to begin to transform investment in the Welsh bus industry, we need to consider:

- The current performance of the industry in terms of its relative strengths and weaknesses;
- The nature of demand for bus services and the importance of time, cost and quality in modal shift;
- The process for planning successful bus services, using an 11-step framework to operational and financial sustainability; and
- Examples of various interventions – both route and network – as evidence of 'what works' elsewhere.

5.1.2 Without question, good bus services can improve the quality of life for everyone in our community – and facilitate a huge range of economic, social and environmental benefits.

5.1.3 We have demonstrated through use of case studies that, whilst outcomes may vary and depend on local circumstances, appropriate investment in bus-based interventions can deliver positive results – and where applied correctly, can support the bus and community transport priorities identified within the Draft National Transport Plan for Wales:

- Providing enhanced connectivity for communities, business and key services, particularly where that connectivity would not otherwise be provided;
- Improving the accessibility and safety of transport hubs and services;
- Removing barriers to efficient service provision by improvements to infrastructure; and
- Enabling improved access to information and integration of services, ticketing and timetabling.

Good bus services cannot be created in isolation – partnerships between industry stakeholders are essential to ensuring medium to long-term success and a return on financial commitments.

5.2 Recommendations

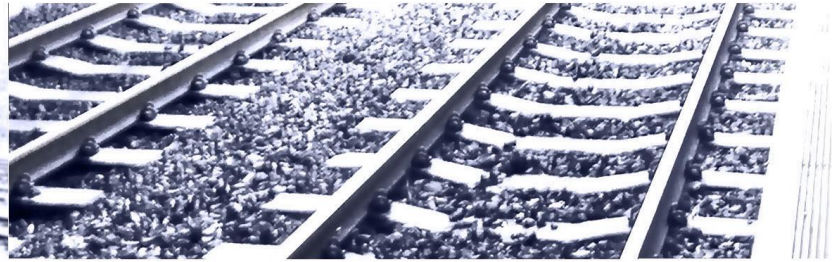
5.2.1 Given the complex range of factors and influences which affect the performance of the bus industry, it is impractical and impossible to design a "one size fits all" approach for services and networks. Using the outcomes of TAS Policy Exchange 'Making Buses Better' research, Table 5.1 summarises the roles each stakeholder should adopt to transform investment and secure a sustainable bus industry for the future – regardless of regulatory model.

Table 5.1: Transforming Bus Investment into Success: Key Roles

The Role of Transport Policy	The Role of Partnership
• Central objective should be to the reduce the **time** and **cost** of using bus services – both in absolute terms and relative to the private car; • Almost everywhere, it is not physically possible – or affordable – to 'build' our way out of congestion – better use of existing resources is needed; • Increasing bus patronage by modal shift from car to bus will contribute to reducing kerbside, local and regional pollution; • Ensuring that bus services play a pivotal role in facilitating economic development and growth (through access to employment) – with inherent social value.	• Partnership is **essential** to progress successful bus services and networks – including central and local government intervention; • The need for all stakeholders (below) to work together to identify the most practical, affordable and sustainable bus-based interventions remains whatever the regulatory framework; • Formal arrangements are conducive to "locking in" commitment, trust and ensuring success over the medium- to long-term; • Measurement of success (patronage per capita; time cost of local bus journeys; growth; financial performance) are important for benchmarking and monitoring progress.

The Role of Planners	The Role of Highways Authorities	The Role of Operators	The Role of Other Agencies
• Have regard to impact on travel patterns avoiding – where possible – developments that cannot be provided for by public transport; • Create areas which can easily be served by local bus services; • Avoid generating more trips by private car; • Incorporating the needs – and understanding the impact on – existing bus services in any planning decision; • Work with developers and operators on incentive packages to use bus services.	• Develop progressive policies on bus priority; car parking provision; and parking charges; • Integrated approach can encourage modal shift from car to bus and therefore reducing congestion and pressure on roadspace; • Policies such as congestion and road-user charging may have a future role in managing scarce roadspace; • Traffic Management Officers should work with bus operators to identify areas for priority and journey time improvement.	• Provide high quality and affordable bus services • Provide appropriate investment in vehicles to meet environmental needs and aspirations • Support ticketing and information systems appropriate to customer profile using latest technology • Ensuring staff make bus services safe, easy, friendly and attractive to use; • Local managers proactively engage with planners and other agencies	• Understand and support the motivations, behaviours and attitudes of specific consumer groups towards using the bus (including non-users); • Central government to provide guidance on monetary and temporal valuations of service investment; • Ensure the industry operates in accordance with its' regulatory framework and duty of care; • Highlight good practice from the industry to motivate and inspire confidence in future investment decisions.

TAS



Appendix A: Intervention Projects

Intervention Projects

Appendix A

Key Points: Access/Walking Time

- Identifying changes to land-use and understanding precursors to changes in bus demand forecasts;
- Importance of planning system and how to make representations beneficial to bus operations (e.g. GIS);
- The importance of stop location, based on bus demand catchment area, relevance to journey origin and destination (purpose); and the impact on other road users;
- The condition of walking routes to/from stop to be considered alongside gradient – both of which can determine the size of the potential stop catchment area;
- Consultation with stakeholders, including the local community, on changes to bus stop arrangements;
- Undertaking route risk assessments to improve perceptions of accessibility and personal safety – and to identify any required improvements;
- Appropriate investment in at-stop facilities based on boarding use and demand;
- Maintenance of at-stop facilities to a designated quality standard.

Key Points: Waiting Time

- A local 'bus network strategy' is important in the context of preparing to develop bus services within an area over the short- and medium-term;
- Both operators and local transport authorities can benefit from a joint approach to bus network planning;
- There is no template or guaranteed formula for a successful bus network for urban, inter-urban or rural areas – however, there are some basic principles around simplification; reliability; interchange; scheduling; and 'add-on' features that are inherent in other successful bus networks in the UK;
- Resource deployment can be measured in terms of operating hours and vehicles required – time is an important determinant of utility;
- Service frequency determines the perceptions of Average Waiting Time (AWT); and Excess Waiting Time (EWT) for bus services – both of which directly influence intending passenger behaviour, and the monitoring of service performance.

Key Points: In-Vehicle Time

- The productivity (economic efficiency) at which bus services can perform is largely a function of travel time and speed;
- Improvements to bus service productivity create a virtuous cycle of improvement to bus passengers – whilst productivity is diminished through reduced average speeds and delays in all aspects of the journey;
- Establishing the causes of delay enables both bus operators and LTAs to address concerns related to poor productivity;
- Boarding times can be a substantial internal cause of delay for bus operators – and the 'hardware' and 'software' aspects of ticketing both influence boarding times;
- 'Smart' ticketing does not necessarily require technological innovation or investment;
- Substantial time savings can be achieved through upgrading passengers from single fares to multi-journey tickets;
- Traffic delays are a substantial externality to bus operators, which can be addressed through use of bus priority measures sympathetic to the operating environment;
- Park and Ride has been proven to successfully encourage modal shift from car to public transport.

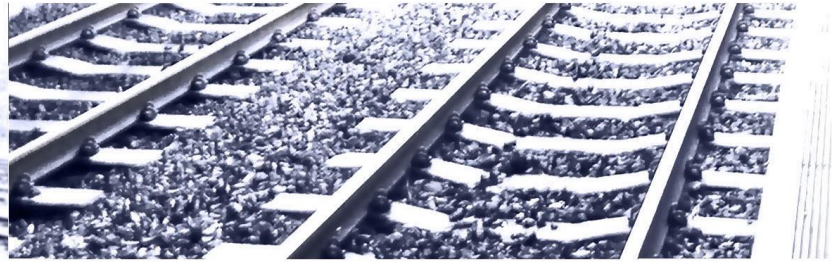
Key Points: Revenue, Fares and Ticketing

- Profitability is an important concept in the financial performance – and sustainability – of the bus industry;
- Profit is a mechanism that helps to fund the purchase of new vehicles and equipment; to repay the cost of business loans or leases; and to finance an operator during period of stress on the business;
- Shareholders have a vested interest in the performance of the industry – drawn from both the public and private sector;
- Bus industry revenue comes through three main sources – fare paying passengers; public sector revenue support; and other income such as advertising, grant funding and private hire;
- EU State Aid rules apply to most public sector spending on the bus industry, including challenge funding;
- Fares elasticities measure the change in demand following a change in price (fares) – which is typically a negative correlation;
- Period – and multi-operator – tickets offer significant benefits to users through discounts, trip rates and flexibility.

Key Points: Qualitative Factors

- Quantitative research is an important tool in identifying underlying trends in satisfaction with bus service delivery;
- Qualitative research is critical to understanding the attitudes and behaviours of bus service users and non-users;
- An ongoing programme of market research – and the use of 'Big Data' datasets – can proactively enhance the planning and delivery of bus services to better meet consumer demand;
- Marketing and communication are important tools in raising the awareness and profile of bus services in comparison to other personalised modes of travel;
- The 'Bus Product Life-Cycle' aids the design of bus services to meet specific market segments, and the allocation of revenue funding;
- Vehicle design and quality are important attributes in attracting new passengers to using buses – and whose external and internal presentation requires regular monitoring;
- Individual professional and organisational competence – delivered through training and development, can deliver a step-change in customer service within the industry.

TAS



Appendix B: Government Transport Funding Schemes

Government Transport Funding Schemes Appendix B

Grant	Year/s	Sponsor/s	Value	Revenue/ Capital	Function and Market Effect
New Bus Grant	1968-1984	UK Government	Initial £7m p.a., increasing to £16m p.a. (1972), then ca. £3m p.a. early 1980s	Capital	• Funding towards cost of new vehicles for stage carriage bus services – aimed at introduction of one person operation (OPO) vehicles with entrance alongside driver • Initial 25% funding for seven years; New Bus Grant Order (1971) increased funding to 50% and extended to 1980.
Transitional Rural Bus Grant (TRBG)	1986-1990	UK Government	£50m (est.) (total)	Revenue	• Payment (flat rate per bus mile) for bus services that operated in 'rural areas', defined as being areas outside metropolitan counties and the larger towns as measured by data provided by the Office of Population Censuses and Surveys (OPCS).
Rural Bus Challenge	1998-2003	UK Government	£110m (total)	Revenue/ Capital	• Annual competition for local authorities to bid for scheme funding that stimulated innovation in provision of rural public transport. • Supported introduction of over 300 schemes.
Rural Bus Subsidy Grant	1998-2008	UK Government	£50m p.a.	Revenue	• Payment to support provision, and target accessibility, of non-commercial bus services in rural areas (ca. 10,000-25,000 resident population not well served). • Moved into pool of area-based funding for local authorities.
Rural Transport Fund	1998-Present	Northern Ireland Executive	£4m p.a.	Revenue/ Capital	• Scheme to support transport services that improve access to services for those living in rural areas, to reduce social isolation. Two forms of assistance available: a) support for new rural services which are socially necessary but economically unviable; b) funding for Rural Community Transport Partnerships (RCTPs) that offer complementary services to the public transport network

Grant	Year/s	Sponsor/s	Value	Revenue/ Capital	Function and Market Effect
Public Transport Fund (PTF)	1999-2002	Scottish Government	£245m (total)	Revenue/ Capital	• Encourage use of all forms of public transport, including cycling and walking. 106 schemes approved during three-year period.
Urban Bus Challenge	2001-2003	UK Government	£49m (total)	Revenue/ Capital	• Support improvements to bus services to enable better access to work, health care, schools and shops in areas with resident population over 25,000
CIVITAS (City Vitality Sustainability Initiative)	2002-Present	European Union	€200m (total; EU-wide)	Capital	• Joint EU-funded initiative to support introduction and promotion of sustainable urban transport policies and strategies. • Bristol, Preston and Bath have previously benefitted from CIVITAS funding.
Kick-Start	2003-2010	UK Government	£25m, reduced to £15m (total)	Revenue	• Provide funding to support new services or improve frequencies on existing bus services, with a view to longer-term financial viability. • Three-year funding period. Pilot scheme introduced in 2003, followed by full scheme launch in 2007. Cancelled as a result of 2010 comprehensive spending review.
Bus Route Development Grant (BRDG)	2005-2013	Scottish Government	£22.0m (total)	Revenue/ Capital	• Scheme that provided financial support to aid development of new/existing local bus services with potential for growth. Three-year funding period. Partnership required with operators. Objectives: to improve access to public transport; encourage modal shift; and reduce congestion. • Replaced by Bus Investment Fund and incorporated into general funding for Scottish local authorities
Transport Innovation Fund (TIF)	2005-2010	Central Government	Potential £9.5bn – no significant awards made	Revenue/ Capital	• To encourage local authorities to generate modal shift and better bus services through introduction of local road charging schemes in response to traffic congestion and poor air quality. • Two elements to TIF: "Congestion TIF" (local authorities bid for funding); and "Productivity TIF" (schemes of 'national importance').

Grant	Year/s	Sponsor/s	Value	Revenue/ Capital	Function and Market Effect
Low Carbon Emission Bus (LCEB) Incentive	2009-Present	UK Government (England only)	£9.7m (2010/11-2014/15	Revenue	• Enhancement to BSOG payment to encourage purchase of certified low-carbon buses – paid at rate of 6p per km operated (extracted from BSOG).
Local Sustainable Transport Fund (LSTF)	2011-2015	UK Government (England only)	£600m (total) (additional £65m revenue funding awarded 2015/16)	Revenue/ Capital	• Challenge fund competition aimed at local authorities investing in small-scale initiatives to promote more sustainable ways of travel – to cut carbon emissions; and to create growth. • Total of 96 schemes awarded funding for a range of major (>£5m) and minor(<£5m) schemes.
	2015-2016		£100m (total)	Capital	• Provision of funding through Local Growth Fund
Green Bus Fund	2009-2014	UK Government (England only)/ Scottish Executive	£102m (total)	Capital	• Contributory funding to support the purchase of alternatively-fuelled vehicles (specifically low emission vehicles e.g. hybrid diesel-electric; full electric; biogas etc.). • 1,165 buses purchased over four rounds (England), and 269 buses over five rounds (Scotland) (total 1,434 buses).
Better Bus Areas (BBA)	2011-2013	UK Government (England only)	£70m (total)	Revenue/ Capital	• First round (2012) comprised challenge funding for various bus-related improvements. Bids submitted by local authorities with support from operators; • Second round (2013) focused on specific 'area' scheme where local authority and operators work in partnership to deliver increased patronage. BSOG payments to operators gradually transfer to local authority with 20% DfT top-up.
Clean Bus Technology Fund (CBTF)	2012/13	UK Government (England only)	£5m (total)	Capital	• Pilot scheme to encourage reduction of emissions (nitrogen oxide, NOx) on older buses outside London. • Fund local authorities to introduce small-scale retrofit technology improvement projects – total of ca. 400 upgraded.
Clean Vehicle Technology Fund (CVTF)	2013/14	UK Government (England only)	£5m (total)	Capital	• Extension of CBTF to encompass all forms of road transport. Bus industry received ca. 73% of funding resulting in ca. 660 buses being retrofitted (including 400 London buses).

Grant	Year/s	Sponsor/s	Value	Revenue/ Capital	Function and Market Effect
Bus Investment Fund	2013-2014	Scottish Government	£3m p.a.	Revenue/ Capital	• Scheme to enable development of projects (revenue/capital) that can potentially deliver bus service improvements and infrastructure through partnerships between operators, LTAs and other parties. • Funding capped at £500k per bid, available for a period of two years.
Local Pinch Point Fund	2013-15	UK Government (England only)	£170m (total)	Capital	• Remove pinch points/congestion hot spots on the highways network that impede movement of goods and people. • Targeted at schemes which can be delivered quickly and effectively. Four tranches of schemes announced to date.
Total Transport Pilot Fund	2015	UK Government (England only)	£7.6m (total)	Revenue/ Capital	• Pilot fund to enable local authorities to try new/ better ways of integrating rural transport • 37 from 42 bids successful in gaining funding to run concurrent for 2 years, during which time, successful bidders will be encouraged to pool ideas and share good practice