



The Chartered
Institute of Logistics
and Transport



BUS & COACH POLICY GROUP

Factors affecting local bus demand and potential for increase

STUART COLE & PETER WHITE
UNIVERSITY OF SOUTH WALES AND UNIVERSITY OF WESTMINSTER

CONTENTS

1. OVERALL TRENDS IN THE LOCAL BUS MARKET IN BRITAIN	3
Trends since 2004/05	3
2. FACTORS AFFECTING RIDERSHIP	5
Fares	5
Service frequencies	6
Journey time	6
Car ownership and use	7
Competing or complementary relationships with other modes	7
Overall user experience	8
3. THE TARGET MARKET	9
Targeted Market Segmentation – Identifying a specific market segment	9
Other factors affecting ridership and their potential in Wales	10
Evidential basis for increasing public transport use – case studies in Wales	11
Case Study 1: Abertawe Bro Morgannwg Health Board (ABMHB) Morriston Hospital	12
Case Study 2: Federation of Small Businesses Cymru Wales	12
Case Study 3: TrawsCymru Free Travel Weekend Trial – Impact Assessment Study	13
Impacts of Covid-19	14
4. REFERENCES & BIBLIOGRAPHY	15

ABOUT THE AUTHORS

Peter White is Emeritus Professor of Public Transport Systems at the University of Westminster, and was primarily responsible for the review of overall trends and research evidence on factors such as price elasticity.

Stuart Cole is Emeritus Professor of Transport (Economics and Policy) at the University of South Wales, and was primarily responsible for the target market for passengers and the analysis of buses in Wales.

1. OVERALL TRENDS IN THE LOCAL BUS MARKET IN BRITAIN



The local bus market in Britain has experienced considerable fluctuation in recent years. Whilst an overall decline has been observed, there have been encouraging signs of positive developments in some sectors of provision, and there is evidence of the extent to which users as a whole respond to changes in service characteristics. This paper draws on evidence regarding overall demand factors, and cases where additional demand has been attracted. It primarily describes the situation 'pre-Covid', but effects of the epidemic are considered at the end of this paper. It is worth noting, however, that bus had recovered ridership considerably better than rail, up to October 2020 (about 55% of previous ridership, compared with about 35% for rail). This may be associated with less scope for teleworking by bus than rail users, the role of school travel, and also a shift to more local travel patterns. The bus industry has also been able to change service levels very quickly in response to changes in government policy re 'lockdowns' etc. Due to effects of Covid-19 on ridership in March 2020, annual data below are shown up to the year 2018/19 inclusive.

Trends since 2004/05

Overall changes between 2004/05 and 2018/19 in passenger numbers have been as follows:

	Total	Trips per head
London	+22%	+2%
Metropolitan areas in England	-14%	-21%
Rest of England	+ 3%	- 8%
Scotland	18%	-22%
Wales	18%	-24%

Source: DfT Table BUS0103 'Passenger Journeys on local bus services by metropolitan area status and county: Great Britain, annual from 1970' last updated 28 October 2020

During this period, substantial growth took place in London, to reach a peak in 2013/14, which despite later decline still retains a large net increase. A small net increase is also shown in the rest of England. To a lesser extent this also occurred in the other regions and countries, with a peak in 2008/09, but offset by later decline. A major contributory factor in the initial aggregate growth outside London is likely to have been free concessionary travel for older people, introduced in England in 2006, and somewhat earlier in Scotland and Wales. A further factor is population growth, especially in London – hence trips per head show only a small rise in there – and somewhat greater losses elsewhere than in total trips, with the lowest drop being in the rest of England.

Within England, there is evidence of considerable regional variation. Areas of traditionally high bus usage, such as industrial conurbations in the north have experienced growth in car ownership from a lower base, and also been affected by economic change. Conversely, greater stability or growth has been seen in parts of Southern and Eastern England (Le Vine and White 2020), notably Reading and Brighton & Hove. Within Scotland, less decline has occurred in the south-eastern part, associated with high levels of bus use in the Edinburgh area: between 2007-08 and 2017-18 total bus use fell by 20%, but only by 10% in the South East, while 68% of the aggregate absolute decline occurred in the South West and Strathclyde (Transport Scotland 2018).



The table below shows the percentage split within the bus market by purpose from the 2019 National Travel Survey (NTS) for England, with a comparison for rail.

It can be seen that rail use is much more focussed on commuting (52%) than bus (22%). When education trips are added as proxy for peak demand, the combined totals are 42% for bus and 58% for rail. The other striking difference is that shopping forms 20% of all bus trips, but only 3% for rail. Bus demand is thus less peaked than for

rail, but within this the education share is almost as important as commuting. Furthermore, these data are averaged over the year as a whole, but education (i.e. mainly school) travel is concentrated within a shorter part of the year (about 190 days compared with an adult working year of about 220 days), and a narrower peak on weekdays than adult work travel. Until 2018 inclusive, shopping formed a higher percentage of bus trips than commuting, but it has been falling for some years.

Trip purpose	Bus	Rail
Commuting	22	52
Business	2	9
Education (inc escort)	20	6
Shopping	20	3
Other escort	4	-
Personal business	10	6
Leisure	20	24
Total	98	100

Source: National Travel Survey 2019, Table 0409a 'Average Number of trips (trip rates) by purpose and main mode, from 2002'. Note that data therein are rounded to whole numbers. 'Bus' above comprises a total for 'Bus in London' and 'other local bus'; rail 'London Underground' and 'Surface Rail'. Percentages are calculated from absolute numbers shown in table 0409, and may not sum to 100 due to rounding in source data.

2. FACTORS AFFECTING RIDERSHIP

Considerable evidence is available from the Demand for Public Transport Study (Balcombe et al 2004), hereinafter abbreviated as 'DFPT'. Although published in 2004, there is no reason to believe that radical changes have taken place since then in underlying elasticities. In some cases, later studies are available, which generally confirm these values or suggest relatively small change. In contrast to the 'hard' factors (i.e. those readily quantified from aggregate data) an important role may be played by 'soft factors' such as low floor accessibility, improved passenger information, and personal security (DfT 2009).

Fares

A short-run elasticity of about -0.4 is observed, i.e. in simple terms a 10% real fare increase would produce a 4% drop in ridership. However, a net gain in revenue will result, since the remaining 96% of passengers pay a 10% higher fare. A very similar value of -0.36 was found in a subsequent study by Molnar and Nesheim (2010). 'Short run' is taken here to mean a period of one year. Variations around the average are found, with very short trips (for which walking and cycling are substitutes) and longer trips (e.g. on interurban routes) showing higher elasticities. In the medium to long term, much higher overall elasticities are found, as users can find more substitutes for bus travel when fares are raised in real terms. Note that the elasticity defined here is an 'own mode' value, i.e. assessing changes in bus travel in isolation (for example, from ticket sales data), the resultant changes being a mix of modal transfer and generation or suppression of trips.

There is also evidence for cross-elasticity values, i.e. the effect of changes in bus fares on use of other modes. These are of much lower magnitude than the 'own mode' elasticities, around 0.05 for the effect



of bus fares on car demand (DFPT tables 9.1, 9.12 and 9.15). Hence very large reductions would only have a small effect on total car demand if low fares were pursued as a policy in isolation, also requiring a very high level of public funding.

A further update to some aspects of DFPT was produced in 2018 (Dunkerley et al). Little further evidence was found for price elasticities since DFPT, but range of 'diversion factors' was assembled from recent studies, i.e. when changes occur in demand for one mode (such as bus) the components of that which comprises a shift between modes, and also generation or suppression of trips. These suggest substantial elements of diversion to or from bus (ranked by mean diversion factor) by rail, car, light rail/metro and walk, with smaller shifts to/from taxis, cycle, and 'no travel' (the diversion to or from rail will of course depend on presence of parallel bus and rail services). The implication is that when use is attracted to buses through improvements it would be reasonable to assume a substantial proportion from car, subject to local conditions. This is supported by the role of park & ride

services, and some specific case studies – for example, in the case of the Lincolnshire Interconnect service between Lincoln and Grantham, of diversion from other modes 71% came from car, and 39% of an on-board sample were making trips previously done by car (Luke et al 2018, page 62).

Fare structure may also be an important factor. There is evidence that simpler structures may help to attract ridership, in the form of flat or zonal fares for single journeys, and travelcards for period travel. Many operators have shifted away from the single fare as a basic product, toward day tickets, period tickets and pay as you go smart cards or contactless bank cards with daily and/or weekly capping. Such changes are convenient not only for the individual users, but also help to reduce dwell time at stops, with resultant savings of in-vehicle times for all users and savings in operating costs due to fewer drivers and vehicles being needed to maintain the same frequency (see section on journey time below). However, a 'short hop' fare may still be needed for occasional users making only short trips.

Promotional pricing may be used to attract demand. The lower prices for some travelcards introduced in the 1970s (subsequently raised with little effect on demand, within certain price ranges) could be seen as an example of this. However, it is important to identify the net impacts and allow, for example, for the effect on parallel services from which traffic is diverted as result of price offers on just one service.

Service frequencies

The DFPT indicates a short-run value of about +0.4 for passenger trips with respect to bus-km run, i.e. a 10% increase in km run will produce about 4% more trips. Where a fixed network is offered, this will correspond to an increase in average service frequency. Higher values may be found in the medium to long-term, as for prices. A value of around +0.4 was supported from the extensive introduction of high-frequency minibus services in the 1980s. As in the case of pricing, a simple increase in frequency, at given cost per bus-km, will incur a much greater increase in cost than revenue, hence substantial financial support would be needed. However, where bus-km can be increased at a lower unit cost, an increase may be commercially worthwhile, or at an acceptable BCR when user time savings are taken into account. Examples include improved off-peak services at low marginal costs, and use of smaller vehicles. Reintroduction of the minibus concept on a commercial basis at current wage levels is generally not feasible, but should automated vehicles become practicable this could change.

In addition to effects of varying frequencies within periods already served, provision of service at times not previously covered or served at low frequencies is important. For example, provision of service after 1800 in many areas is low. Improved services not only generate more return trips wholly within that period, but create more user choice over the day as a whole. Passengers are making 'trip chains' (i.e. travel between home and one or more activities), not single trips, and hence the ability to make the return leg of a journey after 1800 will affect daytime ridership as well.

Journey time

From the users' perspective, this has several components:

1. Walks to/from bus stops
2. Waiting time at the stop
3. In-vehicle time

This factor may be particularly sensitive in modal choice.

Walking time may be affected by stop and route spacing. As walking distance to stops rises, demand will fall. More direct and secure pathways to stops may assist in this. Reducing spacing between routes may involve very high costs, and

be largely impracticable on a commercial basis. If existing frequencies are split between more routes, the inconvenience of lower frequency will deter use.

Waiting time at stops is a function of service frequency, but also of reliability. Reduction in variability and uncertainty in waiting time will also assist this, and be of particular benefit to users. A general assumption may be made that for very frequent services, passengers arrive independently of the timetable, hence their wait will, on average, be half the headway plus an element of 'excess waiting time' (EWT) associated with variability around this. For less frequent scheduled services passengers are likely to consult a timetable and allow a margin of waiting time at the stop. In the case of London, where services run at a least 5 times an hour (i.e. a 12-minute headway) passengers are assumed to arrive independently of the timetable, but for lower frequencies to plan their journeys by the published timetable. This is also consistent with evidence from a study of conversion of a double-decker 20-minute headway service to a 10-minute minibus service in which user behaviour was directly observed (White et al 1992).

However, the development of real-time information directly to users' devices such as mobile phones may have changed this. More accurate tracking of bus movements has greatly improved accuracy of predicted arrival times at stops. Users can remain at a more comfortable place than a roadside stop until shortly before their bus arrives, and also change their behaviour in response to fluctuations in service offered. The stress of uncertainty in waiting time is also reduced, as discussed in the 'soft factors' study (DfT 2009), and by Blackwood and Watkins (2019). However there is still a disutility attached to wider service intervals, since the probability of making a journey at a time convenient for movement between activities is reduced, even if some of the waiting time is not incurred at the stop itself. Where more than one operator serves the same route, it is important that users can easily access fully comprehensive information for all services.

In-vehicle time is a function of vehicle speeds, determined largely by traffic congestion and hence the degree of bus priority, but also of dwell time at stops. Ticketing systems which remove cash payment and speed up boarding may form an important element. This lies to a considerable degree in the control of the operator.

There is evidence that growing congestion has substantially extended bus scheduled running times over recent decades, shown by Begg (2016). This will affect passenger demand both through journey times as such, and increased running costs reflected in fares. However, the absolute increase in journey time from the passenger's point of view will be less than shown in scheduled end-to-end journey times, as very few passengers travel the entire length of a route.



NTS data – based on user-reported journey times – shows a fairly modest increase in journey time between 2009/11 and 2015/17 (Le Vine and White, pp34-38).

The review by Dunkerley et al supports the previous the DFPT in-vehicle time/passenger trips elasticity of about -0.6. TfL assume a value of about +0.6 for the in-vehicle speed/passenger trips elasticity (i.e. changes in speed having the inverse effect to time). The KPMG (2018) study for CPT indicates a generalised journey time/passenger trips elasticity of -1.1.

An overall review of demand trends by Cheek (2020) provides further coverage of issues discussed above, such as fares, service levels, car ownership and demographic influences, providing a detailed breakdown by year, especially from 2004/05. Trends in London, the PTE areas, shire counties, Wales, Scotland and London are analysed separately. Ridership trends from 2010 to 2019 are

broadly in line with DFPT elasticities for Wales and Scotland, but PTE and shires show a substantially better trend than would be expected from these. Conversely, London shows a much lower growth in ridership than would have been expected, especially amongst fare-paying passengers.

Car ownership and use

The impact of growing car ownership and use on bus demand is well known. Earlier evidence is summarised in DFPT (section 10). Acquisition of the first car in a household has a large and direct effect on bus use, not only through journeys made by the car driver being diverted from bus, but also trips made by other household members as passengers in the car. Nonetheless, a substantial element of bus demand may remain, as the car is not available to all members at the same time – for example, if the only car in the household is in use for the journey to work, then it may not be available for

school journeys, and inter-peak shopping and leisure trips. Second and third cars then have further impacts on bus use, especially where there is already a 'second driver' (i.e. someone holding a driving licence, but not their own car). A further effect is that a negative aggregate income elasticity is found for bus use, due to the relationship between income and car ownership.

However, where higher-quality bus services are offered, then users with cars available may be attracted – by definition, this applies to park and ride services, and may also be found for bus rapid transit and improved interurban services.

In calculating the effect of car ownership on bus use, the NTS provides aggregate cross-sectional data which can readily display this relationship, as discussed in Le Vine and White (2020, pp28-30) using NTS data from 2017. The picture may be updated to 2019 from NTS table 0702, suggesting a broadly similar picture. However, changes at the margin may not necessarily correspond to the cross-sectional average. For example, car ownership among young adults is low, along with their total trip rates by all modes. However, car ownership is rising rapidly among older age groups coming into the eligible age range for concessionary travel, hence the relationship between car ownership and bus trip rates for this group would be of particular interest.

Competing or complementary relationships with other modes

Modes such as bicycles can compete with bus for short journeys, but also act in a complementary role by acting as feeder mode to widen catchment areas of bus routes. This role can be seen in respect of rail – for example, in peak movement patterns around major rail terminals on the London Santander cycle hire scheme. An important factor may be the extent to which storage or



docking facilities are provided near stops or stations (for owned or hired bikes), or whether 'floating' hire schemes apply: some limited evidence of such an effect has been found in North America (Hirsch et al 2019). More recent developments such as e-scooters could also apply in both roles, although in Britain these are limited to hire operations only, and operate on a small scale at the time of writing.

In the case of cycling, a strong growth was observed from March 2020 under Covid-19 conditions, in some instances encouraged as means of diverting users from public transport to reduce possible crowding and maintain safe spacing. Some existing road space has been repurposed for cycling. DfT data (2021) show a rapid rise in cycle use during the summer of 2020 (most strongly at weekends), but reversion to previous levels (or lower) by January 2021, which appears to be largely consistent with evidence of seasonality from historic NTS data. In some cases, priority measures have been reduced or removed.

There is little evidence for the usage patterns of e-scooters in Britain so far, but some from elsewhere in Europe. A study by Cenex (2020) indicates that data averaged from a number of international studies showed that about 30% of their trips replace car and taxi trips, 50% walking, cycling or e-bike, 12.5% replace public transport, and 7.5% are newly-generated.

Overall user experience

A study by SYSTRA for UTG (SYSTRA 2019) showed that 'socio-emotional' factors may affect bus use, especially for current non-users. Aspects such as service information, waiting experience and 'perceived lack of control' are particularly important. An experiment in the West Midlands in 2018 showed that some perceived barriers to non-use could be reduced by accompanying non-users on a real-life bus journey.

Transport Focus (formerly Passenger Focus) conducts annual surveys of bus passengers over a wide range of areas and operators, enabling estimates to be made of satisfaction levels (on a five-category scale) for a wide range of attributes, and also how these compare between operators and areas (Transport Focus 2019). Overall satisfaction levels in England averaged 88%, but were lower at 74% for punctuality, and 'value for money' (fare-paying passengers only) at 64%. It is also possible to derive from this survey the principal driving factors in determining overall satisfaction levels¹. The most recent study indicates that factors in 'What makes a satisfactory journey?' are:

'Timeliness' 24%

'Bus Driver' 22%

'On bus environment and comfort' 20%

'Journey time' 11%

'Boarding the bus' 6%

'Value for Money' 5%

'Bus cleanliness and information on board' 4%

'Access to the bus stop' 4%

'Bus stop condition' 4%

The survey also shows that 'value for money' shows the widest variations between areas and operators covered in the sample. On-bus journey time was seen by respondents as affected most often by congestion/traffic jams, followed by passenger boarding time, although the latter has fallen slightly in percentage terms since 2017. In terms of suggestions for improvement 'punctuality' came first (19% of respondents), followed by 'bus design/comfort/condition' (18%), and 'frequency/routes' (17%), with fares mentioned by only 6%. The two top priorities for young people (aged 14-19) were 'buses running more often' and 'free wi-fi widely available', and for non-users 'buses going to more places' and 'buses running more often'. Scope was identified for non-users to make some use of buses.

1. 'Satisfied' totals comprise the sum of 'fairly' and 'very' satisfied. Data on importance of different factors in determining 'What makes a satisfactory journey?' are for England only, and are based on those components which most differentiate between 'satisfied' and 'not satisfied' customers.

3. THE TARGET MARKET

The target market segments that might be attracted to bus travel are not homogenous in terms of incomes or the origin and destination of their journeys. However, the critical mass provided by commuting into a central business district is the primary market. Exceptions have been seen in the past where a major employer such as Port Talbot steel works had a range of bus services and a bus station. For example, in the case of Wales, the morning and evening commute into the three centres (Wrexham, Swansea, and Cardiff) considered by Welsh Government (hereinafter WG) (WG 2018b) is between 0730 – 0900 and 1630 – 1800. The WG objective is to attract the greatest possible proportion of this travel market segment from car to bus/train.

When comparing direct costs, people with cars available may use them in preference to bus for differing reasons:

- They perceive bus fares as high compared with the marginal cost of car travel calculated as fuel and parking costs (the latter is often at no cost outside main towns and cities).
- Annual 'procurement' costs such as vehicle purchase, depreciation, insurance, vehicle tax, and maintenance are not included in the cost comparator.
- The perceived convenience of the car

For those without cars available, the ability to afford bus fares, the opportunity to work may be denied to them as a result. This is a significant theme in the WG strategy (WG, 2017) for the Glamorgan, Gwent and Western Valleys affected by the demise of the coal and steel industries and the need to replace them with concentrations of workplaces at strategic hubs as set out in the strategy. For higher income levels, evidence (WG 2018b) indicates that other factors are of greater importance.

Within the long-distance interurban market, yield management through market segmentation is a popular

demand targeting technique. For example, single fares on Megabus journeys between Aberystwyth and Cardiff may vary between £5 and £12 depending on the day travelled (Tuesday v Friday). However, such journeys are normally planned in advance, and demand is often more price-sensitive than for local travel.

Bus operators can learn from airlines (as Virgin Trains did) and from railways where yield management techniques also divide routes into segments either by time of day or by station to station journeys. For example, on one major inter-city rail operation over 70% of travellers now either use a railcard which gives a discount of typically 33% on the normal single or return fare or purchase discounted advance purchase tickets. However, the fares structure should not be complicated, as that presents difficulties for passengers when determining validity of particular tickets. The existence of railcards accepted by all rail operators, such as those for different age groups, contrasts with the fragmented nature of the bus network, where such cards (as distinct from free travel concessions) are usually unique to a particular operator or area. The rail discounts have also been shown to be financially worthwhile, due to high demand elasticities for some market segments and low cost of off-peak capacity.

Peak travel on many rail routes is charged at full standard fares based on the low elasticity of commuting journeys or business meetings. This applies primarily into/out of major cities with restrictions on discounted fares applied on busy sections and on busy peak times of day. Return tickets may usually be purchased for substantially less than twice the single fare for any given journey thus providing a form of 'discount'.

There have been previous schemes elsewhere in the UK which have aimed to stimulate demand through pricing mechanisms. For example, in the South Yorkshire PTE area during the late 1970s

and 1980s, fares remained unchanged during a period of rapid inflation, resulting in very low average real fares. However, this policy required a high level of subsidy where the passenger only paid around 20% of the total cost and high frequency, adequate capacity operations. The PTE also had control of fare levels on all significant routes in its area, whether the former municipal operations, or of the local subsidiaries of the National Bus Company and some smaller private bus companies.

Targeted Market Segmentation – Identifying a specific market segment

The factors affecting demand showed price to be a minor factor to most travellers. However, there are certain market segments that are more price sensitive. The under-18 (non-school travel) market is one of these. Travel to school has an inelastic demand and is usually funded by parents or education authorities. This segment, although it may have the same individuals, has a totally different level of price elasticity.

The under-18 market during weekends and school holidays has the following characteristics:

- low income and limited travel spend;
- high desire to travel;
- flexible in times of day to travel;
- considerable spare time to go out to, for example, entertainment or visiting friends;
- high price elasticity of demand;
- maximising revenue from maximum volume.

One example is the group wide FirstBus all day unlimited travel ticket at £1.50 in place of single tickets of 50p to £2.50 and the usual £1.90 under-18 ticket. Advertising throughout Great Britain targets this specific market segment on the Hit 40 UK Chart Show and Smash Hits with local advertising attractions, things to do, etc. Increasing patronage

during the school holidays is largely own price elasticity. Many other operators have also introduced lower fares for this age group, sometimes extended up to 19 or 20, or higher.

There is a view amongst larger bus companies that the dormant young person's market would increase patronage by 5 per cent if the free bus travel scheme (currently available in Wales) were applied to that under-18 market segment.

A discounted fare targeted at the 17 - 25 age group by Merseyrail / Arriva Buses Cymru was based on the operators' market research which indicated that:

- By introducing young people to buses at this age group the industry is more likely to persuade them to continue travelling by bus when they realise it can be as convenient as a car especially in urban areas, in particular where there are multi journey tickets and bus priority schemes.
- Fewer young people are taking driving tests thus adding to the potential market
- People in this age group are more environmentally aware
- The new ticketing offer can be obtained via contactless payment
- The journey can be cheaper than using a car when all costs (fuel, parking, maintenance, insurance, purchase of the car) are considered. Seeing that relatively low cost may surprise that market segment to the extent that they will continue to use the bus.
- Many young people have journeys to college or work but also have evening or weekend leisure activities. A 7-day ticket then has the added attraction of providing perceived 'free' travel. In terms of peak travel two groups were identified as part of this 17-25 market segment - apprentices and college students.
- A flat fare may give a better return than say a 10% -15% reduction across the board, carry more passengers and achieve viability or the subsidy target.

Having said this, scope for more bus travel by younger people may be constrained by the fact that cost of using their own or parents' car (or taking a taxi/uber/phv) may be lower than aggregate bus fares; a car may be convenient for dropping off passengers at different locations (e.g. their homes after nights out); buses may not be available or sufficiently frequent at desired times (e.g. late evening). Coarse bus route networks do not fit well with low density residential areas, especially the growing numbers of semi-rural, edge of town and outer suburban estates.

Other factors affecting ridership and their potential in Wales

Considerable evidence is available from the Demand for Public Transport Study, as described above.

Improving the quality of bus services will be important to attract the government's correctly perceived latent demand. Serving the business community at the times and in the locations it most needs is the recommended policy route to increase business use of both bus and train services. Research generally and recent studies in Wales (WG 2018a, 2018b) indicate the following improvements could increase demand:

- Improved punctuality / reliability
- More frequent services
- More routes offered
- More direct services not involving an interchange or alternatively easy physical interchange or integrated timetables (making the bus more convenient)
- One ticket for all forms of public transport (such as the London Oyster; Netherlands Chipkaart)
- Lower or discounted fares
- Late evening/Sunday service frequency after 1800 may generate more two-way evening trips; Swansea's SA1 - University services illustrate how successful such an approach can be (SU, 2015).

In commuter markets the journey time length and its predictability is the primary criterion. In surveys around 40% of businesses said they and their employees would be encouraged to use the bus for commuting if the above improvements were achieved. One bus director's comment was "during the morning peak, commuters from Merthyr/Pontypridd into Cardiff are prepared to struggle onto crowded Valley Lines commuter trains jammed like sardines despite X4/T4 services coming into Cardiff with spare seats because buses get caught up in congestion and arrival times are not predictable". Congestion affects reliability and timekeeping for bus operations on major commuter travel corridors where a significant increase in bus priority provision can be the solution. The impact of such a policy was shown in Dublin during the 1990s with bus lanes such as those on the Stillorgan corridor predating the present tram system. Enforcement is essential for success. These can be coupled with park & ride infrastructure at key bus stops. The Valleys Strategy (WG, 2017) saw the creation of public transport related hubs to develop jobs alongside public transport and these anticipated travel patterns should be considered.

Waiting facilities quality at bus stops vary in quality. "Arriving wet at work or school does not encourage waiting for a bus" one operator commented. TrawsCymru for example is providing high quality shelters and information screens on all its primary routes. Where passengers have to connect with other bus or train services easy physical interchange will assist in increasing bus usage. There is a perception that public transport is uncomfortable, dirty and has no private space. Image improvement and increased passenger numbers are the objectives of TrawsCymru, Stagecoach Gold, First Cymru Clipper and other brands to make the bus an acceptable means of travel. The Welsh Government invited the Confederation of Passenger Transport (Cymru) to jointly fund a marketing campaign highlighting the typically high standards of most buses in Wales.

To achieve this, bus operators have to change their approach to service level provision and consider wider economic aspects but are constrained at present by risk and profit margins required to be financial sustainable. Proposals by the Welsh Government for contracting / franchising bus operations (and taking the cost / revenue risks in the same way as trains) are likely to be included in the replacement Bus Services Bill to be put before the Senedd. This would replace the current deregulated bus market in Wales. The balance of service provision and low/free fares has to work in parallel to achieve the modal shift implied in the WG proposal. This would require integration of bus services (including timetables and ticketing on a franchised basis) and see supply side competition for contracts. The vast majority of services would continue to be operated by private companies.

Rural bus services are unlikely to be financially viable although inter town services in rural areas where local services may have suffered a cyclical decline can be effectively served by reliable and frequent services between major settlements (e.g. TrawsCymru; Aberaeron – Aberystwyth; Swansea – Llanelli – Carmarthen, both 30 min frequency). The Bill may also have provision for local authorities to set up bus companies to counteract rural Wales' loss of four important bus companies in recent years and the consequent difficulty in providing services.

In many parts of Britain, there is evidence of more positive outcomes in interurban services, where operators have taken the opportunity to greatly improve the level of service and marketing, leading to strong passenger growth largely on commercially-viable routes. Examples include the Express City Connect network in eastern Scotland, the Peterborough – Kings Lynn- Norwich corridor in East Anglia and Ripon – Harrogate – Leeds (Luke et al 2018). Public funding has been used to support networks such as TrawsCymru in Wales, again with strong growth in ridership, at a very low cost in comparison to rail services.

This document was finalised before data on ridership after 11th January 2021 was available, and prior to the publication of the government's *Bus Strategy for England*.

Evidential basis for increasing public transport use – case studies in Wales

Several recent studies into public transport demand determinant factors have been carried out in Wales. These put the discounted fares proposal into a wider context of other factors.

Overall journey experience (journey time, reliability, timekeeping, frequency) and price remain the main comparators made by travellers (especially commuters) currently using their cars. In two of the surveys, it was clear that some car users would not consider using the bus for commuting. This, as suggested to us by First Cymru, might indicate market saturation as a ceiling for transfer to bus. However, those same surveys and from the TrawsCymru survey suggest there is a significant number of people who might consider the bus if the journey experience was right. It was also suggested by the TrawsCymru survey that many in the sample were not aware of the high quality many bus services provide.

Some business respondents indicated none of the recommended changes would encourage them to use public transport because it is not appropriate for certain types of employment or business location.





CASE STUDY 1: Abertawe Bro Morgannwg Health Board (ABMHB) Morriston Hospital

There is a significant concentration of staff home post codes on the primary routes into the city centre and the Morriston Hospital Travel Plan staff survey (MH, 2015) gives a positive view of the potential market for public transport use. In the survey when asked 'what would encourage their use of public transport', the reasons given were:

The conclusion is that more frequent and direct services would be the biggest attractors to public transport.

But the major factors given for travel by car (which accounted for 91% of commuters to the hospital) were:

- Convenience (26.6%)
- Reliable (2.3%) – which may be a reflection on the level of congestion on Swansea's roads.
- Cheap (1.2%) – where the low percentage suggests ticket price would not seem to be a serious issue
- No alternative means (40.9%)

Car sharing with priority parking currently applied to only 2% of commuters; 31.4% would consider it and 67% would not.

CASE STUDY 2: Federation of Small Businesses Cymru Wales

A survey of business travellers (both commuting and in business travel) identified the incentives from the public transport industry which would persuade them to change from car to bus/rail.

As in all the case studies referred to, travellers regard reliability and timekeeping (punctuality) as the essential bus travel quality factor which would encourage transfer from their car. This relates to the need to arrive at work at a predictable time. The most important individual factor to encourage is lower fares (FSB, 2014) but leading bus companies have indicated reliability and timekeeping as the criteria they have identified. However, fares would be the next most important (though this is when compared with alternatives). However, for the FSB respondents reflected in Fig. 1, factors such as integrated ticketing and timetables, frequency and wider area of route coverage (seen often as convenience) are almost equal as criteria for modal change. The survey was based on multiple-response questions and a sample of about 50 businesses.

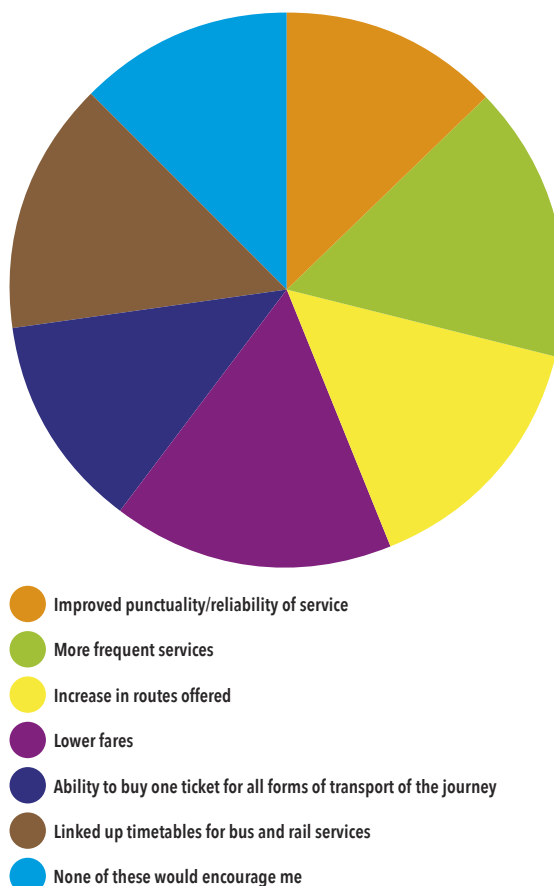


Figure 1: Factors identified in FSB survey as leading to modal change

CASE STUDY 3: TrawsCymru Free Travel Weekend Trial – Impact Assessment Study

Discounted and free bus fares are generally successful in specific market segments – students and over 60's as the success of Welsh Government schemes already in place has shown. Family groups take up discounted offers commercially introduced by bus companies. In the TrawsCymru pilot, which began in July 2017 the majority of passengers were travelling alone (56%) but the remaining 44% were travelling in a group (family or friends) which made this an infrequent move in bus travel.

Overall, the TrawsCymru network weekend demand increased by 58.4%, with a 53.3% increase on Saturdays, which accounted for the majority of passengers and service departures (WG 2018a). Sunday passenger loadings increased by 84.5%, but this was from a considerably lower base passenger figure (Table 1).

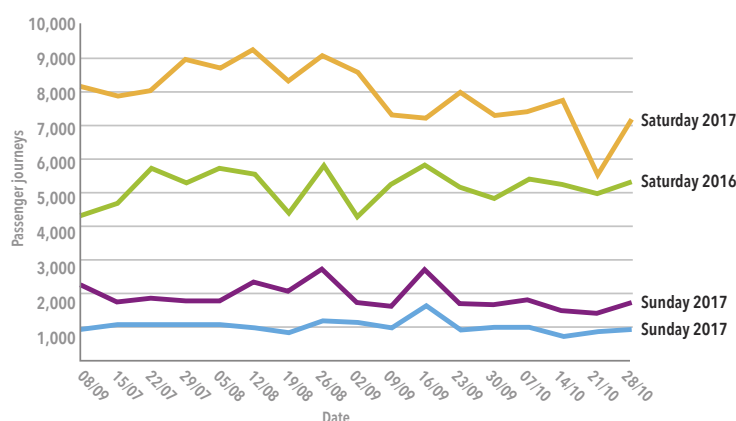


Figure 2: TrawsCymru Daily Passenger Totals (by week of year)

There have been some extremely high rates of growth recorded on particular days during the pilot scheme. The largest Saturday increase in passenger journeys was 2nd September with an additional 4,313 passenger journeys (101% growth) compared with the same weekend in 2016. The largest Sunday rise was of 1,227 journeys (144%) on 20th August. These form a part of the Tables 3 and 4 totals.

A breakdown of the growth on individual TrawsCymru services shows that all services have experienced significant increases in demand (See Table 4).

The impact of free bus travel indicates that fare levels do have an impact on travel. However, fares discounts have, as in all price offers, a ceiling under which the TrawsCymru free weekend travel outcomes should be seen.

The survey also indicated other benefits (other than passenger growth) from the free weekend travel on TrawsCymru:

- Made more people aware of the TrawsCymru network and to where they may travel on it.
- Indicated that 94% of respondents would recommend TrawsCymru services to friends / family / colleagues.
- Indicated that the experience they have had on TrawsCymru would encourage 57% of respondents to travel more by bus in the future. In addition, 38% were people who already travelled frequently by bus.
- Led to 37% of the sample making more use of TrawsCymru since the pilot began; 53% the same amount which reflects the regular usage above; but 3% had used it less. Many of those were older people who found the Saturday buses too full and changed to a weekday using their concessionary fare pass.
- Persuaded 29% of passengers interviewed to change their travel arrangements to take advantage of the free weekend travel offer. This could indicate a part of the potential new growth in demand.
- Identified little impact in terms of spend at their destination with 82% spending about the same and only four percent spending more. However, the longer – term impact cannot be quantified at this stage.

	2016	2017	Change	% Change
Saturday Only	87,825	134,594	46,769	53.3%
Sunday Only	17,540	32,353	14,813	84.5%
TOTAL	105,365	166,947	61,582	58.4%

Table 3

	2016	2017	Change	% Change
T1	18,449	28,028	9,579	51.9%
T2	9,460	14,883	5,423	57.3%
T3	*9,969	22,335	12,366	124.0%
T4	22,874	34,409	11,535	50.4%
T5	27,025	39,122	12,097	44.8%
T6	**9,328	15,298	5,970	64.0%
T9	8,260	12,872	4,612	55.8%
TOTAL	105,365	166,947	61,582	58.4%

Table 4

*No data available for weeks 28 & 29 2016 due to the service not being in operation.

**Data from 30/07/16 to 18/09/16 2016 uses average loadings as supplied by the operator, not based on actual data as none is available for that period of operation.

Note that the 58% overall increase shown above was in all passengers, including those already receiving free concessionary travel. For passengers who previously paid fares the totals were 54,999 before free travel was introduced, rising to 105,169, i.e. an increase 91.2%.

Impacts of Covid-19

The picture is changing rapidly, but some reference to this subject is essential in discussion of the future of bus travel. Commentary below is based on the situation at early December 2020: subsequent trends have been affected by emergence of a new variant of the virus with marked effects on ridership.

The rapidly-growing impact of Covid-19 resulted in some drop in bus travel even before national lockdown in March 2020. Travel in general was discouraged, with specific advice to avoid public transport (although based little hard evidence of infection risk). Closure of schools resulted in a further drop in demand by all modes. Relaxation of restrictions during the summer resulted in some recovery in demand, more strongly for bus than rail – a contributory factor is the greater propensity for rail commuters to shift to home-working, whereas the occupations of bus users make the less feasible for many of them. A further boost to demand resulted from return to schools in September. The subsequent further lockdown in England from 5 November to 2 December inclusive reversed this, except for school demand (following the first UK-wide lockdown, restrictions have varied between constituent nations of the UK, and also between regions within England, and Scotland).

The supply of bus services in terms of bus-km run was reduced to about 30% of previous levels during the first lockdown. This subsequently recovered during the summer to around 80%, and now an almost full pre-Covid service level is now offered in most cases. Recent data from the Transport Technology Forum ('Covid-19 Local authority travel and transport data, weekly digest for week commencing 30 November 2020', fig 5.1) show combined bus and coach vehicular traffic at or above pre-Covid levels, despite the continued absence of almost all excursion and private hire work. In terms of passenger spaces, 'safe spacing' restrictions were initially

very severe, with no standing passengers and only about one quarter of seats available for use. This was subsequently relaxed to about 50% of seats (typically one passenger per forward-facing double seat). However, buses were in many areas running at low off-peak load factors prior to Covid-19, so this is generally sufficient for demand, except at some peak periods. The demand for school travel from September has been met by running separate school journeys which are not subject to the lower seating occupancy limits. Where these duplicate the all-day public services, this may explain the overall recovery in total bus-km run.

Demand for bus services fell to around 12-15% of equivalent previous levels in April and May, recovering to around 20% in June, and about 50% by early September, reaching around 60% after schools resumed, but at a lower relative level during weekends. A slight drop occurred during the second lockdown period, but it regained a level of around 55% by early December. In contrast, cars were at around 85% at that stage but national rail only and London underground around 32% (DfT 2021). The better performance of bus than rail is striking.

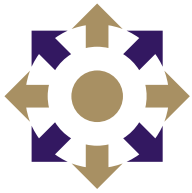
Travel by older people using free concession passes may have been more badly hit than demand in general given trends in shopping travel and health concerns for this group: members of the 'Ten Per Cent Club' reported that when total passenger trips on commercial services had attained 60% of their pre-Covid level in September, this was only 44% for concessionary travel (Coach and Bus Week 10 Nov 2020, p11). Evening travel in general has been reduced generally where bans on leisure activities have been applied. A consequence for the bus industry is that overall demand recovery is uncertain. The distribution of trips by time of day may also be changing, as shopping and off-peak travel is reduced, whilst peak commuting and school travel largely remains.

Experience from other countries indicates that public transport has been strongly affected, but not necessarily to the same extent as in Britain. An international review is provided by O'Donnell et al (2020) which indicates that in the case of New Zealand – which applied stricter control measures and recovered faster than most other regions of the world – at early June Auckland public transport use was down by 39%, Wellington bus use by 24% and Christchurch bus use by 19%. However, it is difficult to obtain data as up-to-date as those for GB, with the notable exception of the MOBIS data for Switzerland, which is compiled by IVT, the ETH University of Zürich and WWZ University of Basel using a GPS travel diary from a sample of respondents. This shows that by mid-September bus demand (in terms of passenger-km) was running at about 29% below the pre-Covid baseline, with a similar figure for tram and train (i.e. somewhat better than in Britain, especially for rail). The further restrictions in November brought these levels to 44% below the baseline for bus, and about 50% for rail modes. As in Britain, cycle use grew dramatically in the summer but was back to largely pre-Covid levels by October.

A range of assumptions has been put forward in Britain – for example, in an extended interview the new Stagecoach Bus MD sees eventual return of 85-95% of pre-Covid levels (Passenger Transport, 27 November 2020, pp20-23); a study by the Steer consultancy for the Urban Transport Group suggests that local public transport might recover up to 85% of pre-Covid levels by 2022 (Local Transport Today 2 October 2020, p3); a report by KPMG (2020) assumes that under 'Do minimum' scenarios post-Covid demand down would be down by 10% to 20% on 2018/19, a position reached in 2021/22 or 2022/3. These assumptions imply that a commercial approach could again be feasible for a substantial part of the network, but survival in the meantime will be dependent on government support.

4. REFERENCES & BIBLIOGRAPHY

- ABMUHB (2014), Morriston Hospital Swansea Travel Plan, Abertawe Bro Morgannwg University Health Board, Baglan, Neath Port Talbot. Report by Vectos Planning Consultants
- Balcombe, R. et al (2004) The demand for public transport: a practical guide' TRL report TRL593
- Begg, David 'The Impact of Congestion on Bus Passengers' Greener Journeys 2016
- Blackwood, C. and Watkins, K. (2019) 'A literature review of the passenger benefits of real-time transit information' Transport Reviews May (vol 39, no 3) pp 327-356.
- Cenex [UK Centre of Excellence for Local Carbon and Fuel Cell Technologies] (2020) 'E-scooters – maximising the benefits of e-scooter deployment in cities' as summarised in Local Transport Today 21 August 2020, page 8.
- Cheek, Chris (2020) The Bus Demand Jigsaw 2020. Passenger Transport Intelligence Services Ltd.
- Department for Transport (2009) The role of Soft Measures in Influencing Patronage Growth and Modal Split in the Bus Market in England
- Department for Transport (2021) Statistical table 'Use of transport modes: Great Britain, since 1 March 2020' (continuously updated, accessed for data to 11 January 2021)
- Dunkerley, Fay; Wardman, Mark; Rohr, Charlene and Fearnley, Nils (Rand Europe and SYSTRA) (2018) 'Bus Fare and Journey Time Elasticities and diversion factors for all modes' Report for DfT. See Table 16.
- FSB (2014), Business Survey, Federation of Small Businesses, Cymru Wales, Caerdydd / Cardiff
- FSB (2016), Moving Wales Forward, Federation of Small Businesses Cymru / Wales, Cardiff. Stuart Cole
- Hirsch, J.A. et al (2019) 'Roadmap for free-floating bikeshare research and practice in North America' Transport Reviews Vol 39, no 6 (Nov) pp 706-732.
- KMPG (2018) 'Trends in English bus patronage' report to CPT, September
- KPMG (2020) Maximising the Benefits of local bus services: A report commissioned by Greener Journeys for the Transport Knowledge Hub, July
- Le Vine, Scott and White, Peter (2020) 'The shape of changing bus demand in England' Independent Transport Commission 2020 [This report also summarises many other recent studies of factors affecting bus demand, notably by KMPG and UTG]
- Luke, Dylan; Steer, Jim; and White, Peter (2018) 'Interurban Bus: Time to raise the profile' Greengauge21
- Molnar, J. and Nesheim, L. (2010) 'A Disaggregate Analysis of Demand for Local Bus Services in Great Britain (excluding London) using the National Travel Survey' UCL and IFS, December.
- NAFW (2016), Bus and Community Transport Services in Wales, National Assembly for Wales, Enterprise and Business Committee Caerdydd / Cardiff.
- O'Donnell, K., Frith, W., and Cooper, D. (2020) 'Research note - COVID-19 transport behaviour changes – with update (2 of 2). NZ Transport Agency research note 002 by WSP Research, October
- SU (2015), Swansea University Sustainable Travel Plan (including the Travel Action Plan TAP), Swansea University, Abertawe / Swansea
- SYSTRA (2019) 'How people respond to the experience of bus travel and the implications for the future of bus services' Report for UTG, May
- Transport Focus (2019) 'Bus Passenger Survey 2018' as summarised in presentation by David Sidebotham to Westminster Briefing Bus Service Seminar 13 February 2020.
- Transport Scotland (2018) 'Transport Statistics no 37, 2018 edition', table 2.2b
- WG (2017) Our Valleys Our Future, Welsh Government, Caerdydd / Cardiff
- WG (2018a), TrawsCymru Free Travel Weekend Trial Assessment Study, Welsh Government by Professor Stuart Cole
- WG (2018b) Targeted discount bus travel and traffic management - on key services / corridors affected by congestion and/or poor air quality. Report for Welsh Government by Professor Stuart Cole.
- White, P.R., Turner, R.P. and Mbara, T.C. (1992) 'Cost benefit analysis of Urban Minibus Operations' Transportation, Vol 19, pp59-74



**The Chartered
Institute of Logistics
and Transport**

**For further information about the
Bus & Coach Policy Group please contact:**

The Chartered Institute of Logistics and Transport (UK)
Earlstrees Court, Earlstrees Road
Corby, Northamptonshire
NN17 4AX, United Kingdom

T: + 44 (0) 1536 740100

E: daniel.parker-klein@ciltuk.org.uk

ciltuk.org.uk



linkedin.com/company/cilt.uk



facebook.com/cilt.uk



twitter.com/ciltuk



youtube.com/user/ciltmedia