Maximising the benefits of local bus services

A report commissioned by Greener Journeys for the Transport Knowledge Hub

July 2020

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Executive summary

Objective

The objective of this work is to explore broad strategies to maximise the wider economic, social and environmental benefits associated with investment in local bus networks.

Context

In February 2020, the Department for Transport announced £5 billion of new funding over the next five years for bus services and cycling. Of this total, £2 billion has been allocated to 'active travel' and £3 billion to buses. A key question for the Government is how to allocate the new funding for buses in order to maximise wider economic, social and environmental benefits.

There are two important contextual considerations influencing this choice:

— Firstly, the Government has set a target of net zero carbon emissions by 2050. As at 2018, the transport sector accounted for 28% of all greenhouse gas emissions in the UK.[1] Decarbonising the transport sector through the introduction of clean technologies and more efficient use of resources is therefore a policy imperative.
— Secondly, prior to the COVID-19 crisis bus use in Britain was falling at a rate of between 1% and 1.5% per year. During the initial phases of the COVID-19 crisis, bus use fell to less than 20% of pre-crisis levels. Whilst there has been some increase in passenger numbers as the lockdown has eased, there is significant uncertainty surrounding the shape and speed of patronage recovery. Both operators and local authorities anticipate some longer lasting changes to passenger behaviour.

Going forwards, once demand has recovered to a new steady state, there will be little benefit in investing in zero-emission vehicles if the vehicles become stuck in traffic and are not fully utilised. Whilst new vehicles will support decarbonisation, they will do little to increase patronage. To do this you will need to improve fares, frequencies, journey times and service reliability. This in turn will potentially help to improve the financial sustainability of local bus networks, creating an environment which supports capital investment in infrastructure and vehicles.

Benchmarking bus use across local authority areas

As a starting point to our analysis, we developed a set of new econometric models to compare levels of bus use between local authority areas across Britain. The models allow us to benchmark observed levels of demand in each local authority area against levels of demand that we would expect to see given the socio-economic characteristics of those areas. Through this benchmarking exercise, we identify a 'patronage frontier' which includes local authority areas with the highest bus use per capita, after making an allowance for differences in the socio-economic characteristics between areas. This 'frontier' shows the level of patronage that is potentially achievable with effective investment and market conditions.

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[1] Department for Business, Energy and Industrial Strategy, 2020, 2018 UK Greenhouse Gas Emissions, Final figures

Case studies of local authority areas with relatively high levels of bus use

Using the benchmarking analysis, we identified three local authority areas for more detailed case study analysis. The three areas are all on the 'patronage frontier' with levels of bus use per capita greater than expected by more than 10%. The case study areas are Bristol, Hull and Cornwall, representing metropolitan, urban and rural area types.

Case study 1: Bristol

Levels of bus use in Bristol increase from almost 10% under benchmarked levels in the mid 2000s to a little over 30% higher than benchmarked levels in 2018/19. The reason for this improvement started with a £70 million programme of investment in the Greater Bristol Bus Network between 2009 and 2012. The programme was delivered as a partnership between four local authorities and the local bus operator. It led to substantial improvements to the speed, quality, reliability and attractiveness of bus services across 10 corridors. This initial investment was further supported by operator-led policies to simplify and reduce fares, to invest in new vehicles and introduce digital ticketing. This success provided the confidence for a further £230 million capital investment in Metrobus in 2018, the benefits of which were starting to be seen prior to the COVID-19 crisis.

Case study 2: Hull

Levels of demand in Hull in 2018/19 were 15% higher than benchmarked given the socio-economic characteristics of the area. The story for Hull is similar to that for Bristol in that following a period of under-performance, services were transformed with extensive investment in bus priority, park and ride and interchange facilities in the mid-2000s. More recently, bus patronage in Hull has increased at a rate close to 7% per year as a result of operator-led investment in new vehicles and rationalisation of the network and fares to present a more effective customer offer.

Case study 3: Cornwall

Our case study for Cornwall provides a set of different lessons to those from Bristol and Hull. Levels of bus use per capita in the County were almost 20% higher than benchmarked in 2018/19. The growth has arisen through partnership working between the authority and operators. Building on the platform created as part of its Growth Deal, Cornwall Council has developed a common Transport for Cornwall brand and implemented a vision and strategic approach to the provision of quality bus services, including continued investment in supported services.

Policy objectives

We have reviewed a wide range of economic, social and environmental public policy objectives and considered how improvements to local bus services can contribute to their attainment. The public policy objectives relate to economic growth and the distribution of economic growth (i.e. levelling-up), the strengthening of communities through the provision of new housing and the promotion of individual health and wellbeing, and the reduction in strategic and local environmental emissions.

These policy objectives can be supported by strengthening economic connectivity and social accessibility (i.e. network coverage and service quality) and by encouraging the use

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of clean technologies (i.e. zero-emission vehicles) in an efficient and financially sustainable way.

There are clearly different ways to pursue these objectives and policy makers face important and complex choices. For the purpose of this analysis, however, we adopt a relatively straightforward approach, identifying possible strategies to increase bus use in local authority areas whilst providing a balance of investment between local authority areas within a budget constraint.

Maximising benefits from investing in bus networks and services

Taking as a starting point the initial allocation of funding by the Department for Transport of £1 billion to support investment in 4,000 zero-emission vehicles, we explore how the remaining £2 billion could be used to transform services in England outside of London.

For the purpose of this work, we construct a Do Minimum scenario that reflects alternative assumptions on the demand of local bus services which in turn reflect assumptions on the impact of COVID-19 on different parts of the economy and different sections of the community. There is clearly significant uncertainty surrounding the Do Minimum scenario and following discussions with operators and local authorities we examine scenarios in which patronage levels are between 10% and 20% lower than pre-COVID-19 levels.

Using information from our case study analysis together with evidence from a review of value for money studies of different types of investment in local bus services, we have discussed a set of stylised packages of initiatives to potentially improve bus services in metropolitan, urban/semi-urban and rural areas. In addition to providing a benefit-cost ratio for each investment package, the analysis provides evidence on typical levels of patronage growth per £1 invested.

Armed with estimates of the size of the patronage gap between observed demand and the 'patronage frontier', together with information on typical levels of patronage growth per £1 of investment, we explore the scale and distribution of investment potentially needed to meet key policy objectives.

There are of course different ways that this allocation of funding could be done. In our analysis, we adopt an approach based on the economic principles of efficiency and equity, pursuing twin objectives to maximise growth in passenger journeys for each £1 of new investment and 'levelling-up' services to allow each local area to reach its potential in terms of patronage per capita.

Following these twin objectives, we estimate that the efficient allocation of £1.5 billion of capital and revenue expenditure would generate enough demand to 'level-up' patronage levels between areas. This would enable all local authority areas to reach patronage levels currently only observed in the best performing areas - after taking account of the socio-economic characteristics of each area. An additional £500 million of investment would enable those local areas that are currently performing well in terms of their patronage per capita to grow demand further, shifting the 'patronage frontier' to new levels.

Taken together, investment to 'level-up' patronage in underperforming areas and 'shift the patronage frontier' in high performing areas would mean that all local authority areas in England outside of London could expect to see at least a 20% increase in patronage relative to our post-COVID-19 Do Minimum scenario.

Our analysis suggests that this would involve allocating 44% of the £2 billion for transforming services to metropolitan areas, 44% to urban and semi-urban areas and 12% to rural areas. The investment mix between capital and revenue will vary between areas and will be influenced by the speed and shape of the recovery to COVID-19. That said, achieving a balance between economic efficiency and equity would mean that on average between 60% and 70% of the £2 billion would be spent on infrastructure and between 30% and 40% on supporting fares and additional services.

Conclusions

We have considered, at a strategic level, how to allocate £3 billion new funding for local bus services to contribute to wider economic, social and environmental policy objectives.

Of the £3 billion of new funding for buses, the Department for Transport has suggested an initial allocation of funding of £1 billion of the funding to support investment in 4,000 zero-emission vehicles. We have focussed our analysis on how best to use £2 billion to transform services. This analysis considers the scope and scale of investment by local authority area in England outside of London.

We estimate that the efficient allocation of £1.5 billion to bus-related infrastructure and services would generate enough demand to 'level-up' patronage levels between areas. This would enable all local authority areas to reach patronage levels currently only observed in the best performing areas - after taking account of the socio-economic characteristics of each area. An additional £500 million of investment, would enable those local areas that are currently performing well in terms of their patronage per capita to grow demand further, shifting the 'patronage frontier' to new levels.

Efficient investment of £2 billion of new funding on a mix of capital and revenue expenditure would see bus use grow overall by approximately 425 million journeys per year in 2024/25 - an increase of 23% relative to the Do Minimum scenario. Given relatively stylised assumptions on the balance of capital and revenue spending for each local authority area, we estimate that for each £1 invested you could expect to see an economic return of £4.48.

It is important to note that within these broad scenarios, the Department for Transport will need to ramp-down the special payments to operators to run services during the COVID-19 crisis and ramp-up funding to local authorities to pay for an expected increase in 'supported services' before the benefits of capital investment in new infrastructure and vehicles take hold. It will also need to help strengthen the capacity and capabilities within local authorities to support the redevelopment of networks and services to meet changing passenger needs.

Given the importance of good public transport networks to local communities, the focus of operators, local authorities and central government will be on making the right investments in the short and medium terms to support decarbonisation, improve economic connectivity and social accessibility and strengthen the financial sustainability of the sector.

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1 Introduction

1.1 This report

This report presents the findings of new analysis to explore broad strategies to maximise the wider economic, social and environmental benefits associated with investment in local bus networks. The work was funded by Greener Journeys[2] and the Department for Transport and independently undertaken by KPMG LLP between March and July 2020.

1.2 Objectives of the study

The COVID-19 pandemic and the subsequent national lockdown has highlighted the key role that buses play in providing necessary connections between homes and jobs and to essential services for vulnerable groups and key workers who depend on these connections. This essential role has been recognised through additional revenue support to retain services during the crisis where, at this point in time, they are not commercially viable.

Following the recommendation of the House of Commons Transport Committee last year, the Department for Transport (DfT) has committed to produce a National Bus Strategy for England. For the first time, this will set out the Government's vision for local bus services in England and the way in which that vision will be achieved. In so doing, it will be vital that the DfT find the right balance between implementing meaningful improvements for existing and potential passengers in a diverse set of operating circumstances, whilst respecting the roles and responsibilities of local transport authorities and public transport operators.

This National Strategy presents a major opportunity to plan to fully harness the potential benefits of local bus services. The strategy will need to reflect a broader set of economic, social and environmental policy aims and be relevant to a diverse range of areas.

This study aims to consider some of the options to allocate new funding for buses to deliver key policy objectives.

1.3 Retain and build

In the short-term there is an imperative from the Government to ensure the bus sector continues to be retained and that services continue to run to support key elements of the economy, without losing its overall potential total capacity and reach.

Over the medium-term, there will be a need to ensure that the sector is sufficiently positioned to deliver against the emerging National Bus Strategy, and also to ensure that any strategies and industry plans clearly incorporate the importance of bus networks for providing benefits to individuals, businesses, and communities; and for meeting key national policy objectives. These benefits are set out in greater detail in Section 4. Policy areas where bus services have the biggest potential to deliver positive outcomes include:

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[2] Greener Journeys is a campaign dedicated to encouraging more sustainable travel. Its research enables positive and evidence-based decisions about how people travel. Through its initiative the Transport Knowledge Hub it works with local and central Government and the transport community to encourage investments that will facilitate inclusive and sustainable economic growth.

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— **Meeting targets for decarbonisation and emissions reduction**. If the UK is to achieve the ambitions of its emerging local carbon plans and national net zero carbon emissions target, then improving the relative attractiveness of local bus services as a transport option is arguably one of the quickest, cheapest and most effective ways to improve the trajectory of emissions from transport. This applies both over the shorter-term in terms of enabling modal shift away from higher emissions per head forms of transport, as well as over the long-term as fleets are electrified.

— **'Levelling-up', reduced inequality and good growth.** Major regional differences in productivity exist, principally between London and the South East and the rest of the UK, but also between major cities and non-urban. Bus services help to boost the connectivity essential for productivity by reducing traffic congestion overall and (where appropriate infrastructure is in place) transporting higher volumes at higher speeds. Additionally, they ensure that economic growth is inclusive by ensuring that accessibility-to-jobs exists for the widest number of people possible, which in turn broadens labour markets for employers and further compounds productivity effects. Consideration of these benefits will be an important part of a holistic approach to 'levelling-up' the UK economy.

— **Improving health and wellbeing**. With the correct infrastructure and service provision in place, bus routes can connect individuals and communities to local amenities, and social and recreational opportunities. For many people the bus provides them with access to key services including healthcare and education. The role of the bus market in relation to well-being has the potential to be significant, especially for elderly and disabled users and those without access to other modes of travel.

Balancing competing objectives to dramatically reduce local and global emissions whilst enhancing connectivity and social accessibility to economic opportunity present a policy challenge for local and national policy makers. The solution to these challenges arguably lies in making better use of new technologies and more efficient use of available assets and resources, such as zero-emission fleets, bus priority infrastructure, and integrating planning for sustainable transport into new developments. Additionally, simply increasing the attractiveness of bus as a service through quality, breadth of provision, marketing, and price determinants will help encourage modal shift.

1.4   Structure of the report

The remainder of this report is structured as follows:

— In Section 2 we describe key market trends in bus use and identify key drivers of change. Importantly, the key drivers including fares, journey times and service reliability are things that operators and local authorities can potentially work together to improve.

— In Section 3 we develop an econometric analysis of the variation in patronage levels between areas. The analysis benchmarks areas with higher and lower patronage levels after allowing for their socio-economic characteristics.

— In Section 4 we look closer at three areas with higher than expected levels of bus use and undertake a case study analysis of each to identify what investments have been successful in increasing demand.

— In Section 5 we review the broader economic, social and environmental policy contexts and consider how changes to local bus networks can support a broad range of policy goals.

— In Section 6 we set out a potential approach to allocating new funding for bus services in England outside of London, considering the allocation of funds to support the take-up of zero-emission vehicles and to transform services. This includes consideration of the split of investment between infrastructure and fares and services, and the distribution of funding between local areas.

In developing this report, we have produced an analysis from a range of publicly available data sources and reports and consulted with operators and government officials at local and central levels.

2   Recent trends in bus use

## 2.1   Introduction

This section explores recent trends in bus use in Britain. The aim of the analysis is to develop a framework to explore the impact of different demand drivers on patronage levels. This framework is used further in Section 3 to look at differences in bus use between local areas and in Section 4 when assessing the factors contributing to successful outcomes in a series of three case studies. The section concludes with a discussion on the impact of COVID-19 on bus use and the outlook for the sector. Without intervention, patronage levels have been falling at a rate of between 1% and 1.5% across Britain over the last five year. These background trends are included in the Do Minimum scenario in Section 6.

2.2   Recent trends

Over the last five years the total number of journeys per head in Britain has declined by 6.7% - approximately 650 million fewer trips per year. Following a period of sustained growth in the early part of the millennium, demand in London has fallen at a similar rate to Britain as a whole over the last five years of published data. Demand in Scotland has fared a little worse than the average for Britain whilst demand in Wales has remained relatively stable (see Figure 1).

Figure 1: Bus journeys in Great Britain (2014/15 – 2018/19)
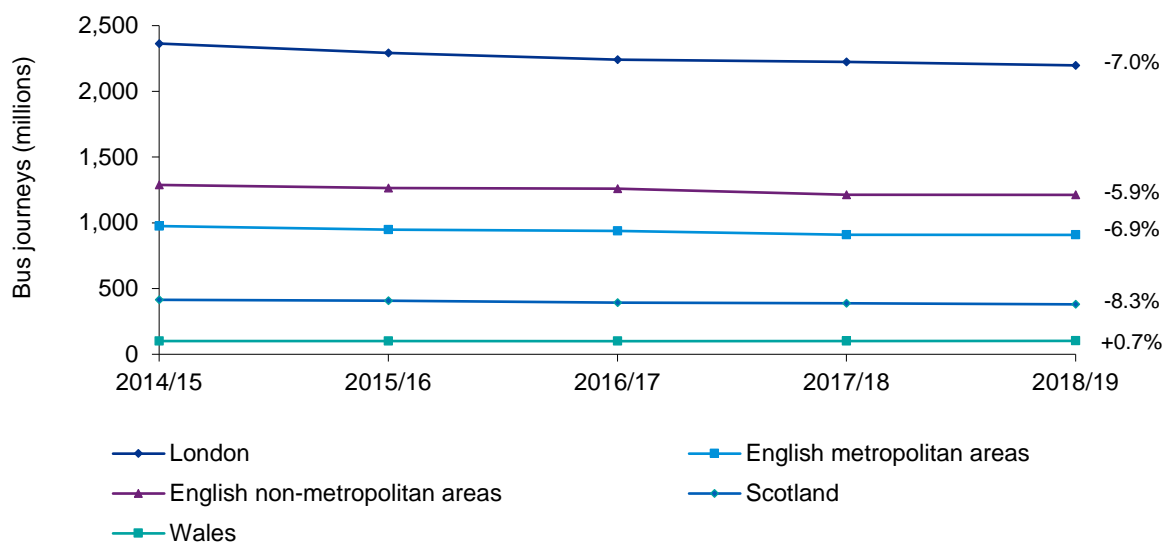
Source: DfT, Transport Scotland and Welsh Government Bus Statistics.

2.3   Drivers of recent trends in bus use

Changes in patronage can be explained by changes in passenger needs and choices. We have identified six themes below to help explain these. The analysis builds on earlier work undertaken by KPMG for the Confederation of Passenger Transport.[3]

— **Theme 1: Changes in socio demographic factors.** For example, the proportion of the population within a given bus market who are relatively more likely to use buses such as the 16-24 and 65+ age groups.

— **Theme 2: Changes in the structure of the economy.** For example, the changing proportions of jobs by type and nature which determine the travel demands of workers. In particular, the proportion of workers travelling to work for jobs in areas well served by buses (e.g. town centres) versus jobs located in less accessible areas. Or, the overall impact of the changing nature of work in some sectors as it determines travel demand, such as the increased pattern of homeworking in some sectors

— **Theme 3: Alternatives to travel/ongoing digitalisation.** Reflecting changes in travel demand in addition to travel-demand for work (as captured in theme 2) because of changes in society and in particular increased digitalisation. For example, the increased patterns of online retail and the decline in physical trips to the high street.

— **Theme 4: Changes in the price, quality and availability of transport modes.** In general, reflecting all areas of competitiveness with other modes that are internal to the bus market, such as relative journey price, frequency and reliability of service, comfort and experience of service, availability of journey choice and route provision.

— **Theme 5: Integration between modes.** Reflecting the ease of integrating bus travel with other modes, such as rail/light rail, and between bus operators within a bus market. This is a key incentivising factor in public transport use generally, for which bus transport is a key impacted sub-set.

— **Theme 6: Policy and regulation.** How local and national Government interventions support or hinder any of the above factors.

Further details of the influence of changing needs and choices on bus use are presented in Table 1 below.

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[3] KPMG, 2018, Trends in English Bus Patronage, Report for the Confederation of Passenger Transport, September 2018

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Table 1: Drivers of changes in bus use between 2014/15 and 2018/19

Theme	Commentary	Regional differences	Market impact
Theme 1. Changes in socio-demographic factors	Population has been growing right across the UK as a result of immigration and increased life expectancy, offset by lower birth rates. In addition to the population getting bigger, it is also getting older and more concentrated in larger cities where land use patterns and higher population densities generally help to promote higher rates of public transport use. At the same time car ownership has risen throughout the period buoyed by the strength of the economy and an increase in consumer credit. Those households with access to a car have much lower propensity to use public transport.	Population growth has been highest in London compared to the rest of the UK. London has seen lower growth in car ownership relative to other metropolitan areas.	We estimate that the overall impact of changing population levels, changing population structure and changing car ownerships has driven an increase in bus use of 1.3% across the period.
Theme 2. Changes in the structure of the economy	Demand for travel depends closely on the volume, type and location of economic activity. In turn these determine the level and type of employment, the activities workers engage in and the journeys they make. The labour market is changing, not just in terms of changes to employment levels but also in terms of changes to the mix of full and part-time work, changes to the number of people in self-employment and use of zero-hour employment contracts. The increase in the number of people in self-employment in particular, is linked with the increase in the number of people who regularly work from home or work in more than one location. These changes increase the likelihood of commuters owning a car and reduce the likelihood of them using the bus.	Employment has risen in all areas with the highest rise in London. Flexible working trends are focused in more highly skilled jobs which make up c60% of the workforce in London compared to c40-45% in other areas. All areas have experienced a growth in highly skilled jobs, especially metropolitan areas.	We estimate that changes to the structure of the economy has led to a reduction in bus use of 0.6% across the period.
Theme 3. Alternatives to travel/Ongoing digitisation.	New online businesses and retail opportunities are attractive for customers as they are often able to access a wider range of products and services more quickly and/or at a lower cost. The increase in the digital economy and remote working technology has also increased the share of people where home is the main place of work. Both factors have contributed to reductions in bus use prior to	All regions have seen an increase in home working and at the same time internet sales have increased from around 5% in 2008 to around 20% in 2020. These trends are assumed to be	We estimate that changes to online retail and remote working has had a negative impact on bus use equal to 1.9% across the period.

 Theme	 Commentary	 Regional differences	 Market impact
	COVID-19. A key question is the extent that these trends have been accelerated during the lockdown period.	consistent across regions as data is not broken down regionally.	
Theme 4. Changes in price, quality and availability of transport modes.	The attractiveness of bus services relative to other modes of transport is influenced by fares, service frequency, journey times and service reliability. — Bus fares have risen faster than inflation, increasing in real terms between 2014/15 and 2018/19. — Bus service miles, impacting service frequency, have fallen by close to 10% over the period, driven mainly by the continued reduction in supported services. — Journey times and service reliability have also declined, driven by increasing levels of traffic congestion. Rail, taxis and walking/cycling have all seen increases in use over recent years. The cost of car use has also fallen in real terms, although car journey times have increased.	Bus fares have risen across all regions over the last five years, this rise has been most sharp in English Metropolitan areas and London, which may drive higher rates of switching to other modes including car, taxi and walking or cycling. In specific local areas, enhancements to rail and light rail services have had a significant negative impact on bus use.	We estimate the worsening of the competitive position of bus relative to other modes due to increase in fares and reductions to journey times and service reliability is 5.5% over the period.
Theme 5. Integration between modes.	Transport modes are becoming more integrated with the introduction of integrated travel planning, ticketing and payment methods. Integration improves customer choice and makes it easier to undertake more complex multi-stage journeys. More than 90% of vehicles are equipped with ITSO enabled smartcard readers, 75% have cEMV and many operators and customers use mobile ticketing.	Multi-modal integrated ticketing and data provision on services also varies across regions.	Likely positive impact in all markets but difficult to meaningfully quantify as the benefits are linked to simplification of fares.
Theme 6. Policy and regulation.	There have been changes to market regulation through the 2017 Bus Services Act and Transport (Scotland) Act 2019. The change to the legislation provides operators and local authorities to work together to improve networks and services.	To date, limited use has been made of new powers although some areas are developing proposals.	Likely positive impact in all markets where supported by increased funding.

2.4 Discussion of trends

Changes in societal and economic factors are clearly important in explaining the trends in the bus market. Population growth and changing demographic structure have contributed to increases in bus use but these increases have been almost exactly offset by reductions in bus use driven by increasing car ownership. Changes to the structure of the economy and labour markets have had a relatively small negative impact on demand. There have also been increasing negative pressures on bus use arising from increased digitalisation, including increased digital retailing and remote working. These trends are likely to accelerate in response to the COVID-19 crisis. The biggest driver of change, however, has been a relative worsening of the competitive position of local bus services. Increases in fares, reductions in journey times and service reliability have contributed to a 5.5% reduction in bus use. These drivers have been strongly influenced by increases in traffic congestion.

This last point is important because a large part of the negative impact of traffic congestion on bus use can be mitigated by interventions that are within the joint control of bus operators and local authorities. Indeed, despite external factors having put downward pressure on demand, some markets have seen growth in patronage. We explore this variation in demand between markets in Section 3 and Section 4.

2.5 COVID-19 considerations

COVID-19 places new challenges on the UK economy and society. Whilst the long-term impacts won't be fully understood for many years there are some initial insights relevant for consideration of the current situation in the bus networks.

The specific issues associated with COVID-19 and the subsequent lockdown within the bus sector include:

— **Low demand**: Significant reduction in demand whilst retaining services has created financial challenges for those holding revenue risk in the sector.
— **Operational limitations**: Additional operational challenges associated with running socially distanced services which may reduce capacity limits in the medium-term even when short-term lockdown restrictions are lifted.
— **Investment uncertainty**: Funding uncertainty for the public and private sectors regarding future investments given less confidence in revenue streams, customer demands and potential greater reliance on central government funding settlements that are yet to be determined.
— **Relative competitiveness**: Relative competitiveness of public transport compared to other means of travel such as car, bike and walking due to the safety implications of using public transport may mean a longer-term shift away from bus.

There are also potentially longer-term societal changes which were already underway, but have since accelerated, that could impact on the bus sector, such as increased levels of working from home in some sectors and increased use of online retail. At the same time there may be potential opportunities such as a smoothing of demand on busy routes to reflect more flexible working patterns.

At this point the ability to understand the relative importance and significance of these impacts is challenging and difficult to quantify but they should be reflected upon at this early stage because it is likely to cause ramifications in the bus market for several years to come.

During the lockdown the capacity of local bus services across Britain has largely been retained through additional revenue support from the government. In England, this includes specific bus sector support in the form of the COVID-19 Bus Services Support Grant (CBSSG) and other more general support such as the Coronavirus Job Retention Scheme (CJRS), with similar packages provided in Scotland and Wales. The continued shortfall in farebox revenue coupled with operational limitations and increased costs associated with enhanced health and safety measures means that some form of revenue support is inevitable as the sector recovers from the pandemic.

If public transport is to play a prominent role in contributing to pressing economic, social and environmental objectives, longer-term solutions to the revenue gap will be needed. This will require shifting the balance of funding from the government to the customer as soon as possible to strengthen financial sustainability and provide confidence to customers and investors that service levels can be maintained in the long-term.

For the purpose of this work, we construct a Do Minimum scenario that reflects alternative assumptions on the demand and supply of local bus services which in turn reflect assumptions on the impact of COVID-19 on different parts of the economy and different sections of the community. There is clearly significant uncertainty surrounding the Do Minimum scenario and this will need to be subjected to sensitivity analysis.

3   Benchmarking local bus networks

3.1   Introduction

Whilst some of the drivers of patronage identified are universal, others have different impacts at a local level. Looking at the changes in the demand for and supply of bus services across local authorities over the last five years, it is interesting to note the large variation between areas. Figure 2 provides a map, using publicly available government data, of the change in demand and supply of all local areas. In five areas the number of bus journeys has grown by more than 20%, and there are 16 areas where patronage has declined by more than 20%. There is a similar variation in supply: five areas have seen growth in bus service miles of more than 20% and 13 areas have seen a decline in bus service miles of more than 20%.

Figure 2: Variation in demand and supply between 2014/15 and 2018/19
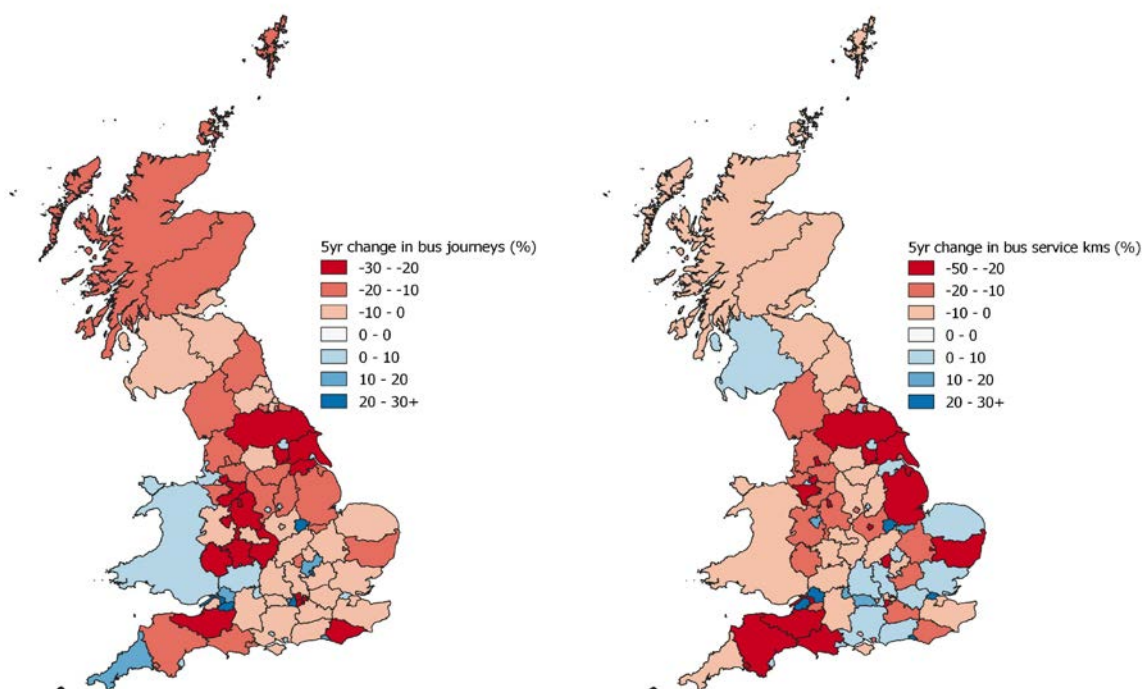
Source: DfT, Transport Scotland and Welsh Government Bus Statistics

3.2   Econometric analysis

To understand the variation in passenger demand between areas, we have developed a new econometric analysis of the changes in bus patronage across local authority areas in England, and regions in Scotland and Wales over the last 15 years. Further details of this analysis are presented in Appendix 1.

Our analysis explains the variation in bus journeys per capita between areas over years, with reference to the changing characteristics of local areas including:

— Structure of local economy and labour markets.

— Socio-demographics.

— Trends in alternatives to travel including online retail.

— Area specific variables such as urban form.

The focus of the analysis is on external drivers of demand. We therefore excluded demand drivers that are related to bus fares and service quality, and variables that are themselves driven by the attractiveness of bus travel, such as car ownership.

3.3   Benchmarking patronage between local authority areas

In addition to quantifying the strength of the relationship between bus patronage and external demand drivers, the econometric analysis allows us to benchmark the relative performance of local areas in terms of patronage per capita. After allowing for differences in demand that can be explained by external drivers, we can see which areas have higher patronage and which areas have lower patronage due to internal drivers.

Figure 3 shows the percentage difference in observed levels of bus use per capita and expected levels of bus use per capita based on the characteristics of the local area. Each bar on the chart represents an individual local authority area. Those areas which show a positive value have higher levels of demand than expected and those areas with negative values have lower levels of demand than expected.

Figure 3: Benchmarking bus use between local authority areas 2018/19
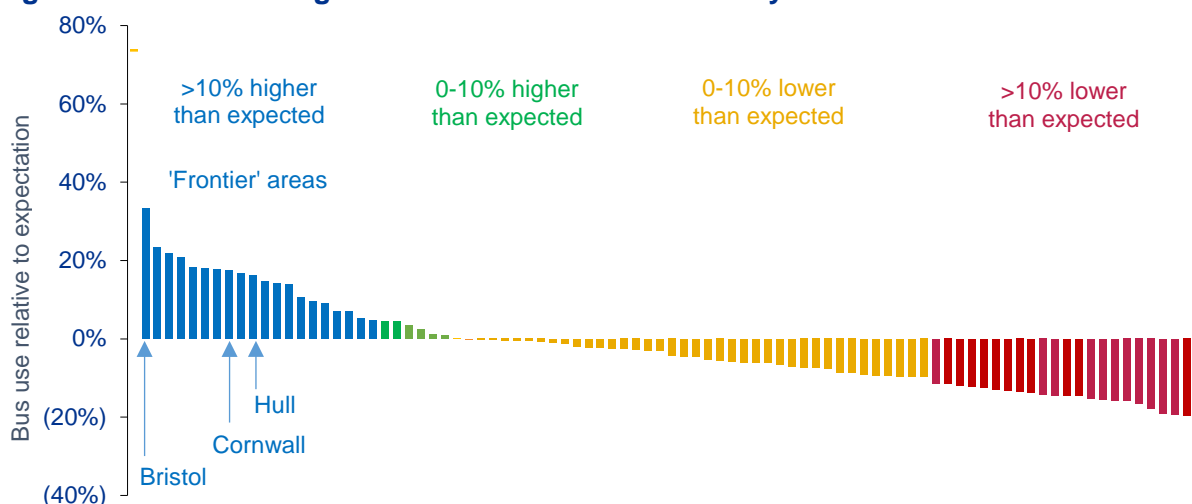
Note: Expected levels of bus use per capita determined via econometric analysis of 15 years of performance data across local authority areas, taking account of socio-economic drivers and place-specific effects.

Source: KPMG analysis based on publicly available data.

We refer to those areas which have higher levels of demand than we would expect as '**frontier areas**', as these markets show the highest levels of bus use per capita, after allowing for external drivers of demand.

To understand how the 'patronage gap' between frontier areas and other local authority areas could be closed, we take a closer look at three frontier areas to identify the factors driving high levels of patronage. The areas include a metropolitan area (Bristol), an urban area (Hull), and a rural area (Cornwall).

4 Case studies

4.1 Introduction

In this section we provide case study evidence to show the factors contributing to high levels of performance in Bristol, Hull and Cornwall. The case study areas represent a metropolitan, urban and rural area. They all belong to the group of local authority areas identified in Section 3 as 'frontier areas' whilst also providing geographic variation across England.

In developing the case studies, we have used evidence from our econometric analysis, a literature review and our consultation with local government officials and major operators in the area to understand the drivers of success. It is important to note that these areas have likely benefited from multiple interacting factors and we have sought to draw out those of most relevance. These case studies represent our interpretation and have not been endorsed or approved by any of the respondents.

4.2 Bristol

4.2.1 Market structure and network performance

The analysis shown in Figure 4 uses the econometric analysis described in Section 3 to benchmark levels of bus patronage per capita in Bristol against levels of bus patronage that we would expect to see based on the socio-economic characteristics of the city. It shows that following a period in which patronage levels were lower than expected during the mid- to late-2000s, patronage levels began to grow in 2012/13 to a point approximately 30% above expected levels in 2018/19.

Figure 4: Network performance in Bristol
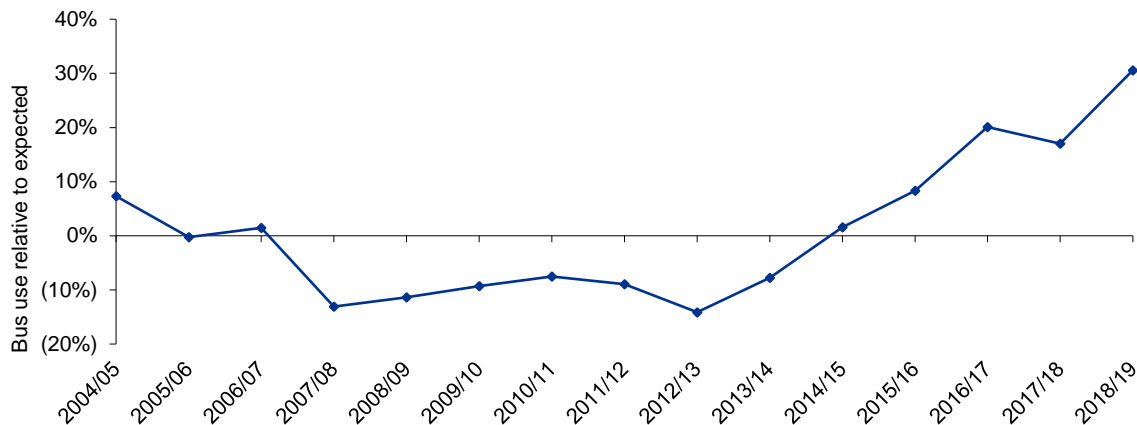
Source: KPMG Analysis based on publicly available data

Table 2 shows a summary of discussions with local stakeholders on the reasons behind recent growth in bus use in Bristol. The summary is structured using the six patronage drivers identified in Section 2. It is important to note that whilst bus use has been influenced by broader socio-economic changes such as population growth and increase in car ownership, Figure 4 shows the impact of changes net of the drivers in Theme 1, Theme 2 and Theme 3.

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Table 2: Key drivers of bus use in Bristol

Theme	Commentary
Theme 1. Changes in socio-demographic factors	Bristol's population has seen significant growth of 13% over the past 15 years, with specific growth in the 18-24 age group. During the same period, car ownership has decreased by 2%, with a more significant decline from a peak in 2012/13.
Theme 2. Changes in the structure of the economy	The employment rate in Bristol has risen by 6.2%, with 45,000 additional jobs in the local area over the last 15 years and the bus market notably receives high demand from commuters at peak times. As part of this, the economic centre of Bristol has evolved and there has been increases in business park activity and out of town shopping which is traditionally challenging for buses to service.
Theme 3. Alternatives to travel	The share of employment in financial services, IT, and professional services are significantly higher than national averages – all industries with relatively high potential for homeworking. From a retail industry perspective, Bristol's relatively young population suggests a higher proportion of residents are likely to shop online rather than on the high street.
Theme 4. Changes in price, quality and availability of transport modes	**Bus services** The West of England received a significant £70 million programme of investment as part of the Greater Bristol Bus Network between 2009 and 2012. This focussed on improving 10 bus corridors, benefitting up to 70 bus routes as well as helping to advance the technological offer. This has been supported by a further £30 million invested in the form of 142 new buses in Bristol and 179 buses across the wider West of England. The new buses meet the Euro VI emission standards[4]. The reliability of bus services in Bristol can be impacted by the continued high levels of congestion in the city, particularly at peak times and this is seen as a key challenge. In 2019, Inrix rated Bristol the third most congested city in the UK.[5] **Bus fares** The Fairer Fares scheme was introduced in 2013 following a public consultation with local users and the wider public. This scheme overhauled fares and introduced a simpler, more uniform zonal system within Bristol. An estimated 70% of journeys witnessed a price reduction with adults, children and young people all benefiting. **Metrobus** Further investment of £230 million has been made by the Government in Metrobus introduced in 2018, with dedicated lanes aimed to improve bus prioritisation and ease congestion. Insights from the first year of operation show largely positive outcomes with a significant number of users having transferred from commuting by car to Metrobus. The impacts lie outside the dates shown in Figure 4.

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[4] First Bus, 2019, Bus Deal
[5] Inrix, 2019, Inrix Global Traffic Scorecard. https://inrix.com/press-releases/2019-traffic-scorecard-uk/

![Theme icon] Theme	![Commentary icon] Commentary
	Availability of other transport modes
	There are a number of heavy rail stations and services which are currently seeing high levels of investment. However, the existing location of stations is not seen to directly compete with local bus journeys.
	The total number of taxis has increased by 27% over the last 14 years but is not seen to detract from bus use significantly.
	Cycling in Bristol has the highest modal share of any metropolitan area outside of London. Despite its popularity, the network has limitations due to the availability of road space and therefore for many journeys, it is not seen as a direct comparator with bus.
Theme 5. Integration between modes	There are limited opportunities for integration between modes other than at interchange points between rail and bus.
	The process of integrating payments via a smart card for all modes was started last year, and by the end of the project in 2025 people will be able to use their bank cards or mobile phone to pay for any journey on public transport.
Theme 6. Policy and regulation	The council and operators have worked together constructively on a range of improvements on the network, most recently on Metrobus. The West of England Combined Authority has recently published its Bus Strategy consultation document which outlines the following aims[6]:
	— To maximise bus service reliability and reduce journey times.
	— To provide simplified ticketing which allows all bus users to travel on a single ticket (on one or more buses), with a daily fare cap.
	— To address congestion and delays due to car travel by attracting car users to bus for some or all of their journeys.
	— To improve passenger satisfaction with services and value for money.

4.2.2   Lessons learnt from Bristol

Levels of bus use in Bristol have increased from almost 10% under benchmarked levels to a little over 30% higher than benchmarked levels given Bristol's socio-economic characteristics. The reason for this improvement started with a £70 million programme of investment in the Greater Bristol Bus Network between 2009 and 2012. The programme was delivered as a partnership between four local authorities and the local bus operator. It led to substantial improvements to the speed, quality, reliability and attractiveness of bus services across 10 corridors. This initial investment was further supported by operator-led policies to simplify and reduce fares, to invest in new vehicles and introduce digital ticketing. This success provided the confidence for a further £230 million capital investment in Metrobus in 2018, the benefits of which were starting to be seen prior to the COVID-19 crisis.

4.3   Hull

### 4.3.1   Market structure and network performance

The analysis shown in Figure 5 uses the econometric analysis described in Section 3 to benchmark levels of bus patronage per capita in Hull against levels of bus patronage that we would expect to see based on the socio-economic characteristics of the city. The figure

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[6] Travelwest, 2020, West of England Bus Strategy Consultation Document

shows that Hull experienced a significant increase in patronage in the mid-2000s, which remained steady for the five years from 2010/11, before starting a further upward trend in 2016/17.

Figure 5: Network performance in Hull
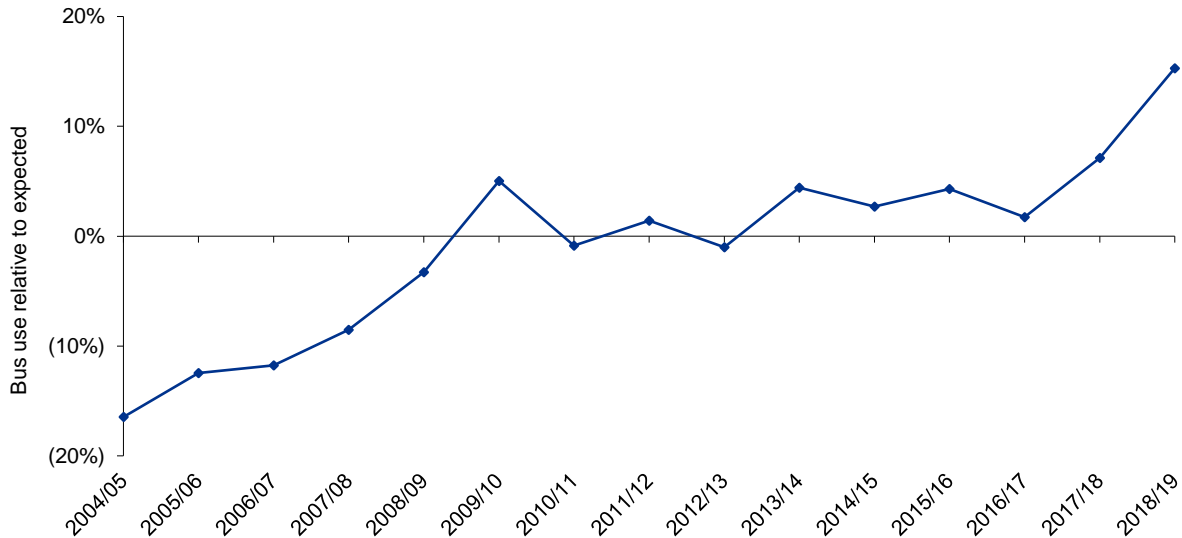
Source: KPMG Analysis based on publicly available data

Table 3 shows the findings of engagement with the local authority and local operators on the reasons behind recent growth in bus use in Hull. The summary is structured using the six patronage drivers identified in Section 2. It is important to note that whilst bus use has been influenced by broader socio-economic changes, Figure 5 shows the impact of changes net of the drivers in Theme 1, Theme 2 and Theme 3.

Table 3: Key drivers of bus use in Hull

Theme	Commentary
Theme 1. Changes in socio-demographic factors	Hull has witnessed a 3% growth in population over the last 15 years, with a relative shift towards an ageing population. In addition, over the past 15 years, car ownership has increased relatively quicker by 13%.
Theme 2. Changes in the structure of the economy	The employment rate has risen by 4.7% in the last 15 years. Hull city centre does not have a large commuter market and as businesses move to business parks this is expected to reduce further and pose challenges to bus operators as business parks are difficult to serve.
Theme 3. Alternatives to travel	Port and Logistics, Renewable Energy, and Manufacturing are the prominent industries in Hull and therefore the majority of the workforce will be unable to work from home. The retail offering in Hull is experiencing challenging conditions with major high street closures in 2019.

Theme	Commentary
Theme 4. Changes in price, quality and availability of transport modes	**Bus services** In the late 2000s Hull saw significant investment in bus priority, park and ride and interchange facilities (i.e. Paragon interchange). These assets are still seen as making up the core of the bus network. In recent years, both of the major operators have made investment in vehicles, which have been supported by targeted branding strategies. This includes more than 40 new vehicles since 2019. Whilst operators have looked to rationalise networks, they have also increased overall commercial vehicle miles by 41% since 2013/14. The reliability of bus services in Hull can be impacted by high levels of congestion in the city. In 2019, Inrix rated Hull the tenth most congested city in the UK. **Bus fares** Bus fares in Hull are relatively low in comparison to other parts of the country. Fares are structured around three simplified fare bands based on distance travelled. There is also a range of targeted products, such as for university students, as well as discretionary concessionary support for young people. **Availability of other transport modes** Across Hull and the wider East Riding area, there is a limited local rail network, with only a few stations than tend to provide links to other northern cities. For residents working in Hull city centre, travelling to work by car is often preferable due to easy availability of car parking. The total number of taxis has increased by 22% over the last 14 years but they are not seen as a significant threat to bus usage. Cycling is not a significant form of transport in Hull currently.
Theme 5. Integration between modes	Travel around Hull is based around the Paragon Interchange which provides a single station for rail, bus and coach services. The interchange was upgraded in the late 2000s. Outside of this, there are limited opportunities for integration between modes.
Theme 6. Policy and regulation	The Council works closely with the bus operators through the Bus Quality Partnership and the Bus Punctuality Partnership to help identify issues and measures to improve the reliability of bus services. As part of the partnership, there is a prioritised list of schemes for improvement. In 2017, Hull City Council published the Hull Local Plan 2016-2032, which includes a range of policies relating to planned improvements to bus transport[7], covering a mix of infrastructure and technological improvements.

4.3.2   Lessons learnt from Hull

Levels of demand in Hull in 2018/19 were 15% higher than benchmarked given the socio-economic characteristics of the area. The story for Hull is similar to that for Bristol in that following a period of under-performance, services were transformed with extensive investment in bus priority, park and ride and interchange facilities in the mid-2000s. More recently, bus patronage in Hull has increased at a rate close to 7% per year as a result of operator-led investment in new vehicles and rationalisation of the network and fares to

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[7] Hull City Council, 2017, Hull Local Plan

present a more effective customer offer. According to transport focus data, overall journey satisfaction increased from 89% in 2017 to 93% in 2019.

4.4 Cornwall

4.4.1 Bus market and network performance

The analysis shown in Figure 6 uses the econometric analysis described in Section 3 to benchmark levels of bus patronage per capita in Cornwall against levels of bus patronage that we would expect to see based on the socio-economic characteristics of the county. The figure shows that Cornwall experienced steady growth in bus usage, which had levelled out after the financial crisis in the late 2000s, but since 2015 has begun to follow a positive trend again, pushing the market above expected usage. Notably, satisfaction with punctuality increased from 72% to 83% between 2016 and 2019.

Figure 6: Network performance in Cornwall
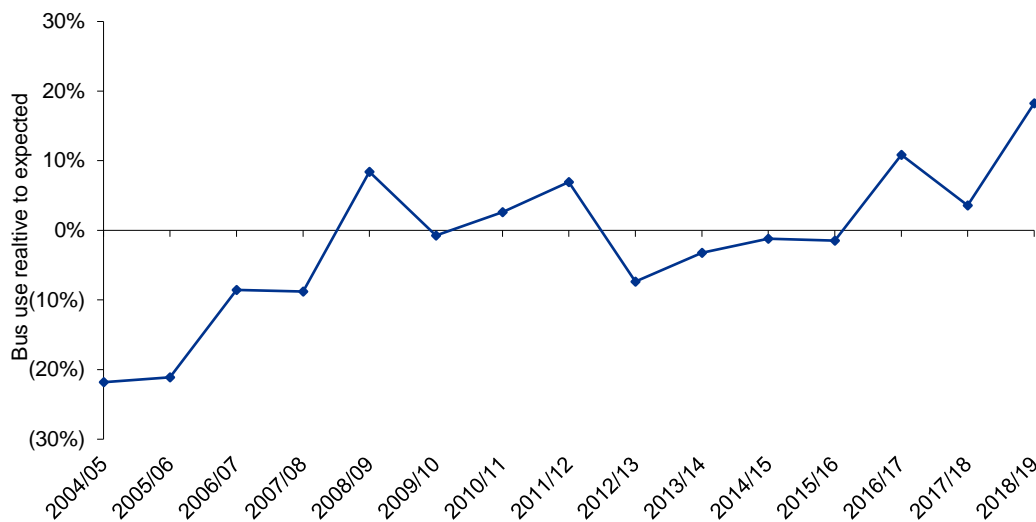
Source: KPMG Analysis based on publicly available data

Table 4 shows the findings of engagement with the local authority and local operators on the reasons behind recent growth in bus use in Cornwall. As with Bristol and Hull, the summary is structured using the six patronage drivers identified in Section 2. It is important to note that whilst bus use has been influenced by broader socio-economic changes, Figure 6 shows the impact of changes net of the drivers in Theme 1, Theme 2 and Theme 3.

Table 4: Key drivers of bus use in Cornwall

Theme	Commentary
Theme 1. Changes in socio-demographic factors	Cornwall's population has grown by 11% over the past 15 years. Growth has been high in both the 18-24 and over 65s age groups. Furthermore, the tourist market in Cornwall continues to be strong. There has been a corresponding increase in car ownership of 11% over the same period.

Theme	Commentary
Theme 2. Changes in the structure of the economy	Employment rates have risen by 4.8% in the last 15 years, adding 24,000 jobs over the same period. The county does not have a single centre of employment but instead the economic activity is spread across a number of towns. Wages have increased by 22% in the past 15 years which gives inhabitants greater flexibility financially.
Theme 3. Alternatives to travel	Food and Beverage, Hospitality and Tourism, Construction and Farming are the major industries in Cornwall and therefore there will be a large proportion of the workforce that are unable to work from home and require transport.
Theme 4. Changes in price, quality and availability of transport modes	**Bus services** Growth Deal funding allowed Cornwall Council to invest in the fleet including Euro VI buses which have been well received by users. At the same time, both of the main operators have worked with the Council and invested in their fleets, with many of vehicles now having the latest technologies in terms of Wi-Fi and USB charging. This presented a step change given Cornwall has tended to have an older fleet relative to other parts of the country. **Bus fares** The main operator undertook a five-year rationalization of fares from 2013. This resulted in an offering that better matched the needs to the market, reflecting the difference in need between the underlying population and a seasonal tourist population. **Availability of other transport modes** The car is the main alternative to bus travel and as mentioned, car ownership in Cornwall has increased in recent years. Car parking costs are also seen to have increased in recent years. As for other transport modes, rail services are restricted to a few stations so do not provide a viable option for many journeys. The total number of taxis has increased by 29% over the last 14 years, which is 4% more than the national average.
Theme 5. Integration between modes	The Council has been developing the One Public Transport project, which aims to provide integrated public transport by joining up the bus and rail networks. As part of this, a multi-modal application is being developed which will allow users access to information on all transport options in Cornwall, including car parking costs. It is planned that this will allow users to tap on and off services in conjunction with the rail line between Falmouth and Truro, and eventually other rail services.
Theme 6. Policy and regulation	Cornwall Council has taken a proactive role in supporting the bus network. Over the last five years, supported service miles are up 5% compared to the rest of England outside of London where they are down 33%. As part of the recent supported service contract award, Cornwall Council worked with a single operator to develop the Transport for Cornwall brand, under which all supported services will operate. This builds on the powers and funding devolved to Cornwall as part of its Growth Deal.

4.4.2   Lessons learnt from Cornwall

Our case study for Cornwall provides different lessons to those from Bristol and Hull. In a largely rural area, bus use per capita is almost 20% higher than expected given the socio-

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economic characteristics of the county. Part of this success can be attributed to Cornwall Council's continued proactive support for the market, including the joint development of the Transport for Cornwall brand, under which all supported services operate. This builds on the powers and funding devolved to Cornwall as part of its Growth Deal.

4.5   Case study summary

The aim of this section has been to explore the performance of frontier bus markets and identify key insights. The three case study areas have presented different insights but broadly demonstrate that effective investment in assets, bus priority and vehicles supported by fares strategies and network rationalisation can deliver strong performance. In less densely populated areas investment in supported services has been key.

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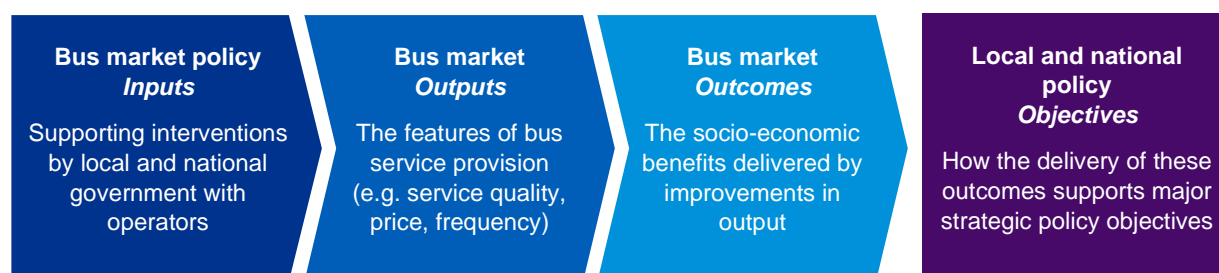# 5 Role of bus services in supporting public policy

5.1 Introduction

In this section we develop a framework to assess the contribution that investment in local bus services can make to achieving wider economic, social and environmental policy objectives.

The section:

— Considers how bus services can contribute to wider policy objectives.
— Identifies the range of policy levers available to operators, local authorities and national government.
— Reviews the value for money of selected policy levers.

The analysis, based on a desk-based review of recent government policy documents and engagement with sector stakeholders, outlines the transmission mechanisms through which specific inputs (interventions) in the bus market, may lead to a better customer experience, and therefore the achievement of socio-economic outcomes and local and national policy objectives. This is summarised in Figure 7 below.

Figure 7: Summary of the transmission mechanisms from inputs to objectives

Bus market policy *Inputs* Supporting interventions by local and national government with operators	**Bus market** *Outputs* The features of bus service provision (e.g. service quality, price, frequency)	**Bus market** *Outcomes* The socio-economic benefits delivered by improvements in output	**Local and national policy** *Objectives* How the delivery of these outcomes supports major strategic policy objectives

The analysis focuses on those areas that are most likely to have a positive impact on local and national objectives falling within the pillars of economic, social, and environmental value. The specific benefit-areas under each of these pillars are summarised in Figure 8 and are identified as falling under either national or local government objectives, or both.

Figure 8: Policy objectives

National policy objectives

Local policy objectives

1 **Economic**	**2** **Social**	**3** **Environment**
— 'Levelling-up' reducing inequality and delivering good growth — COVID-19 response and recovery — Delivering the Industrial Strategy and innovation	— Improving health and wellbeing — Housing delivery and solving the housing crisis — Increasing education and skills	— Meeting targets for decarbonisation and emissions reduction — Improving air quality — Encouraging model shift

In the following section, we consider how local bus services can contribute to attaining these economic, social and environmental policy goals.

5.2 Role of bus services in supporting public policy

5.2.1 Economic policy

The most significant economic policy goal which bus market outputs can support is 'levelling-up', reducing inequality and delivering good-growth, including via COVID-19 recovery. Economic recovery post-COVID-19 will need to be focused on 'good growth' and the Government's 'levelling-up' agenda. A key element of this will be reducing the GVA gaps between regions in the UK and ensuring that the proceeds of economic growth are more equitably shared.

Other relevant economic policy goals include:

— Delivering the Industrial Strategy/R&D/Innovation. The UK Government's Industrial Strategy is seeking to boost productivity across five key areas: Ideas, People, Infrastructure, Business Environment, Place, with local areas developing their own Industrial Strategies.
— Supporting export-led growth. The UK Government in 2018 published an Export Strategy with a long-term ambition to raise the level of exports from 30% to 35% of GDP. The Scottish Government has a specific target to increase the value of exports from 20% to 25% of Scotland's GDP over the next 10 years.

Role of bus networks in supporting economic policy

Buses are currently playing a vital role in ensuring key workers are able to access employment and will continue supporting the wider workforce as lockdown conditions are eased.

More generally, bus networks can support local economic growth by providing better connections between homes, jobs and economic centres. Buses can increase overall network capacity, reducing congestion, and increasing the overall size of the 'effective labour

market' in a given area. This effect is compounded where reduced congestion and bus priority infrastructure enable faster journeys.

Furthermore, bus services play a particularly important role in supporting inclusive economic growth by ensuring access to economic opportunity for social and economic demographics which are typically excluded – such as non-car owning households. Bus services ensure that these groups have access to economic opportunity, and at the margin, can encourage inactive labour back into the labour market and further increase the overall size of the labour market.

Any real increases to effective labour markets and 'effective density' deliver agglomeration benefits through better matching of skills and jobs, lower employment costs and better integrated supply chains and end-markets for businesses, and knowledge and innovation spill-overs amongst workers.

Additionally, the role of bus in supporting export-led growth is based on the role that bus manufacturers play within the economy.

Enhanced economic connectivity is a key output

Key outputs include the efficient movement of people between homes, jobs and economic centres. This can be measured in terms of passenger demand, especially on commuter services.

5.2.2   Social policy

The most significant social policy goal which bus market outputs can support is health and wellbeing.

The UK Government have set an ambition to ensure that people can enjoy at least five extra healthy, independent years of life by 2035, while narrowing the gap between the experience of the richest and poorest.

By 2030, the Scottish Government is aiming for a fair, smart, inclusive Scotland, where everyone can feel at home, where fair work helps businesses to thrive and create jobs, where poverty rates are amongst the lowest in Europe, and where there is genuinely equal opportunity for all.

The Welsh Government has wellbeing goals enshrined in the Future Generations Act that covers goals relating to prosperity, resilience, health, equality and cohesive communities. The Welsh Government's Prosperity for All Policy aims to build resilient communities and deliver modern and connected infrastructure.

Other relevant social policy goals include:

— The housing crisis. The UK Government has committed to raise housing supply to 300,000 new homes on average per year by the mid-2020s. The Scottish Government set a target in 2020 to deliver 50,000 affordable homes, of which 35,000 will be for social rent, over this parliamentary term. In the Taking Wales Forward Policy, the Welsh Government sets out their plans to deliver an additional 20,000 affordable homes by 2021.

— Education and skills. The UK Government has a vision to provide world-class education and care that allows every child and young person to reach his or her potential, regardless of background. This includes technical education with the aim to deliver three million apprenticeships by 2020. The Scottish Government aims to reduce youth unemployment by 40% by 2021. The Welsh Government have set a target to deliver a minimum of 100,000 high quality all age apprenticeships by 2021.

— Loneliness. The UK government published 'A connected society: a strategy for tackling loneliness' in 2018 the aim of which was to ensure that in a changing society, people are fully able to engage, with an estimated 5-18% of adults feeling lonely often or always.

Role of bus networks in supporting social policy

For many people bus provision provides them with access to core services including healthcare and education. This role of bus is especially significant for the elderly, disabled users and those without access to other modes of travel. Buses can play a vital role in connecting people to friends and family and wider social networks.

Additionally, the bus market can play a key role in supporting new housing developments if it is fully integrated within the planning of new sites. Bus infrastructure increases the sustainability of new developments by enabling greater capacity of connections possible between homes and jobs in a functional economic area. This facilitates the development management process at individual sites by supporting the transport planning elements of a site. It also supports spatial plan-making more generally by facilitating community buy-in to denser sites in local areas, reducing urban sprawl, and thereby facilitating the achievement of targets for housing.

Enhanced social accessibility is a key output

Key outputs include the efficient movement of people between homes and key services including health care, education and social activities. This can be measured in terms of passenger demand, especially outside of peak times.

5.2.3 Environmental policy

Decarbonisation and emissions reduction are identified as the key areas where the bus market and additional bus patronage can support positive outcomes. Improving air quality, modal shift, and growth in zero-emission vehicles are key sub-components of this overall key role. The UK Government has set a target of net zero emissions by 2050. The Scottish Government has an additional target to reduce emissions by 75% by 2030 and to net zero by 2045. Local areas are also developing their own emissions policies with Hull City Council developing the Hull 2030 Carbon Neutral Strategy with the aim of becoming carbon neutral by 2030, and with Greater Manchester setting a carbon neutral goal of 2038.

Other relevant environmental policy goals include:

— Air Quality. The UK Government is aiming to reduce five key pollutants by 2030 including nitrogen dioxide emissions by 73% and particulate matter emissions by 46%. In London an Ultra-Low Emission Zone has been introduced to cut the number of high polluting vehicles in central London and improve air quality.

— Electric Vehicles and Electric Infrastructure. By 2050, the UK Government is aiming for almost every car and van to be an ultra-low emission vehicle. In order to work towards this goal, the Government will end the sale of new petrol and diesel vehicles by 2040.

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Furthermore, the UK Government is committed to increasing the use of renewable fuels in road transport and non-road mobile machinery with a target of a 12.4% reduction by 2032.

— Modal shift. In order to improve the infrastructure available for Electric Vehicles and work towards the 2050 target for almost all cars and vans to be ultra-low emission, the UK Government has set a target to install 3,000 new rapid charge points across the UK by 2024. The Cycling and Walking Investment Strategy (CWIS) sets out the UK Government's ambition to make cycling and walking the natural choice for all shorter journeys or as part of a longer journey by 2040. The Mayor of London has an overarching goal to ensure 80% of journeys are made by public transport, walking or cycling by 2041.

Increased use of low and zero-emission vehicles is a key output

Investing in a greener fleet including electric, hydrogen and biogas technologies to deliver improvements in air quality and reductions in emissions. New diesel vehicles can also improve air quality in the short-term. Improving 'quality' components of bus services (to drive modal shift). Investment in green infrastructure, including charging infrastructure.

5.3 Implications for local bus networks

The bus network could support many of the wider economic, social and environmental goals at the national and local level that have been identified. The key characteristics of the bus market required to help achieve these outcomes often overlap and will deliver positive benefits across policy areas.

Nonetheless, delivering the required improvements in outputs and driving up patronage will require investments. It is important that these investments are affordable and that the sector is financially sustainable.

A financially stable bus market is one that is able to provide an effective service whilst not creating undue financial pressures for the organisation holding revenue risk. This reflects the fact that some bus services are provided by the private sector and some are based on public sector tendered or franchised based networks.

There is interplay between the funding of interventions that will achieve positive economic, social and environmental outcomes, and the operation of financially sustainable bus markets. For example, major capital investment to provide greener fleets will not achieve the intended environmental benefits unless investment is also made in wider 'quality' components of bus services, such as journey efficiency and punctuality, which mean that overall demand for bus services is strong. At the same time, if financial sustainability can be improved by investing in the quality features of bus services, greater income can be reinvested into delivering the outputs required to achieve positive socio-economic and environmental outcomes.

It may not be possible to achieve the breadth of potential positive outcomes from the bus market at any given point in time and it will be for policy makers in collaboration with stakeholders to determine the priority of different outputs at any point in light of given trade-offs, such as:

— Trade-off between revenue support to expand service levels and capital support to facilitate greener fleet or infrastructure improvements to support reliability and punctuality. This is applicable where there is a set amount of funding available which can be allocated to either revenue or capital support.

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— Trade-off between investment in zero-emission vehicles to reduce strategic and local atmospheric pollutants and improved infrastructure to promote quicker and more reliable journeys.

These trade-offs are important to consider as they help decision makers to understand the most important areas to focus on and the opportunity costs associated with certain activities, reflecting that these may vary between areas.

5.4   Policy levers

To achieve the outcomes described above, there are a range of policy and investment levers that can be used by national and local government, and operators. The main policy and investment levers are set out in Figure 9.

Figure 9: Policy levers to influence bus market outcomes

Local and national government planning and policy levers

1 National bus policy levers	2 Local bus policy levers	3 Wider policy levers
— Taxes and subsidies including Bus Service Operators' Grant — National concessionary travel — Licensing and enforcement — National bus strategy policy and funding — Best practice guidance	— Supported services — Discretionary concessionary travel — Targeted capital funding (i.e. priority, stations and RTI) — Market structure and partnerships — Municipal bus operator services (if applicable)	— Competition law — Highway demand management — Car parking policy — Planning policy — Fiscal policy

Operator investment levers

4 Capital investment	5 Operational policies
— Bus fleet — Stations — Depots	— Network planning — Fares strategy — Staff training — Maintenance — Marketing and communications

The range of policy and investment levers is broad providing options for local areas to develop interventions to suit local conditions. For the purpose of this work, our focus is on investment in infrastructure and priority measures to speed up services and increase service reliability and the use of revenue support to expand network coverage, service provision and reduce fares. We also look at specific policy and investment levers to support decarbonisation and improve air quality.

Infrastructure measures

Improvements in transport connectivity can be delivered through a range of innovative infrastructure solutions that improve the journey experience as well as performance of the transport network as a whole. The range of bus infrastructure solutions include:

— Selective priority measures, bus lanes, dynamic traffic signal control, remodelled junctions and parking arrangements to improve journey times and network reliability

— Digital busways and intelligent mobility to increase network capacity, smooth the progression of vehicles and provide customers with better information, smarter ticketing and improved safety and security for the whole journey from A to B

— Transport hubs and interchanges providing opportunities for retail and commercial development, as well as quicker connections, better network integration and more comfortable waiting facilities.

A range of local areas have made investments in segregated busways that provide a significant improvement in journey reliability and quality through allowing buses to move on an independent piece of road without other road users. Notable busways that have opened over the past decade include the Cambridgeshire guided busway in 2011, Luton to Dunstable in 2013, Leigh-Salford-Manchester Bus Rapid Transit in 2016 and Metrobus Bristol opened in 2018. In addition, further investments are planned with the roll-out of the Sprint network in the West Midlands.

Supported services

In 2018/19 there were 165 million miles of local authority bus services across Britain excluding London, representing around 14% of total bus miles. This is higher in Scotland and Wales where supported services are 18% and 26% of bus miles respectively and lower in English metropolitan and non-metropolitan areas with 12% and 13% respectively.[8] In general, tendered services tend to be more applicable in rural markets where the commercial market would not necessarily provide all the accessibility that the local areas require.

Investment in low, ultra-low and zero-emission vehicles

A range of local areas have begun to introduce electric and hydrogen bus vehicles into their fleets. These have been driven by a mix of operator and public sector funding. Initial roll-out has focused on the larger metropolitans such as London and Manchester. In order to support this, the DfT unveiled the all-electric bus town scheme in early 2020 with the aim to provide £50 million to support a whole town transition to electric buses.

In other areas of the country there has been a greater focus on investment in biogas rather than electric buses. Since 2015, when Bristol was named the European Green Capital, local operators have explored the use of biogas buses across the West of England. This reflects significant investment by the operator in the technology, which they view as more technologically developed relative to other low emissions technologies.

Low emissions zones

In addition to direct investment in vehicles there are also other policies that can support the shift to greener fleets, including low emissions zones. In February 2020, the UK Government published the Clean Air Zone Framework which sets out the principles that local authorities

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[8] DfT Bus Statistics, BUS0205, 2018-19

should follow when setting up clean air zones in England. The first clean air zones were anticipated to launch in Bath, Birmingham and Leeds in early 2021, but COVID-19 has delayed these plans. There are also numerous other local authorities that have been identified by the Government as potentially requiring a clean air zone to address predicted illegal levels of pollution in the coming years. In 2019, the Mayor of London launched an Ultra-Low Emission Zone (ULEZ) with the aim of improving air quality in central London. This applies to all vehicles that do not meet the required emissions standards. An initial 10-month report suggests a significant impact has already been observed with a reduction of 44% in roadside concentrations of nitrogen dioxide in the central zone.[9] In Scotland, the Scottish Government committed to introducing low emission zones into Scotland's four biggest cities, Glasgow, Edinburgh, Aberdeen and Dundee, between 2018 and 2020. Glasgow's Low Emission Zone was introduced at the start of 2019 but progress on the other cities has been slowed due to COVID-19. Despite the delays, the Scottish Government remains committed to introducing the Low Emission Zones in the remaining cities.

These direct interventions to improve economic connectivity, increase social accessibility, accelerate decarbonisation, and improve local air quality can be strengthened with indirect interventions including land-use planning, taxes and charges. Our focus in this work is on the direct interventions in local bus networks.

5.5   Value for money

A key condition for benefit maximisation is to efficiently expand supply beyond market equilibrium levels where the wider economic, social and environmental benefits of doing so are greater than the costs.

These wider benefits are due to:

— Economies of scale in the provision of public transport services, especially those economies relating to service frequency and customer wait times.

— Positive economic and social externalities – areas with better public transport accessibility have lower levels of social deprivation.

— Reduced harmful emissions – modal transfer and cleaner technologies especially where modern Euro VI engines and zero-emission vehicles are deployed.

Evidence from value for money studies of capital and revenue expenditure shows that investment in local bus services can deliver strong benefit-cost ratios.

Table 5 shows the economic return for each £1 spent on bus networks and services. It ranges from £2.50 to £3.80 for revenue expenditure and £5.00 and £6.80 for capital expenditure.

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[9] London Assembly, 2020, Central London ULEZ - Ten Month Report

Document Classification - KPMG Public

Table 5: Benefit-cost ratios (BCRs) for capital and revenue expenditure

	Initiative	BCR
Revenue	Supported Services	2.5
	Bus Service Operators' Grant	3.7
	Concessionary travel (ENCTS)	3.8
Capital	Bus priority	5.0
	Interchange/ Mobility hub	6.8

Source: KPMG, 2017[10]

It is important to note that the benefit-cost ratios are estimated based on pre-COVID-19 levels of patronage. Given the importance of economies of scale to the sector, if patronage levels were materially higher or lower than current levels, the benefit cost ratios would increase or reduce respectively. This is particularly important when considering the benefits of capital expenditure in less densely populated areas.

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[10] KPMG, 2017, True value of local bus services, Report for Greener Journeys

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6   Strategies to maximise benefits

6.1   Introduction

In February 2020, the Department for Transport announced £5 billion of new funding over the next five years for bus services and cycle routes. Of this total, £2 billion has been allocated to cycling and £3 billion to buses. A key question for the bus sector is how to allocate the £3 billion of new funding between activities to enhance economic connectivity and social accessibility, and activities to accelerate the take-up of zero-emission vehicles, whilst at the same time promoting financial sustainability. The final allocation of resources will of course be for policy makers to determine.

6.2   Identifying key trade-offs

There are trade-offs and tensions to resolve with regards to allocating the £3 billion. Going forwards, once demand has recovered to a new steady state, there will be little benefit in investing in zero-emission vehicles if the vehicles become stuck in traffic and are not fully utilised. Whilst new vehicles will support decarbonisation, they will do little to increase patronage. To do this you will need to improve fares, frequencies, journey times and service reliability. This in turn will potentially help to improve the financial sustainability of local bus networks. By financial sustainability we mean that networks and services are operated efficiently, operators are able to achieve a balanced operating budget, with ability to fund appropriate levels of capital investment and withstand reasonable financial shocks, and local authorities are able to fund statutory concessionary travel, provide revenue support for socially necessary but commercially unsustainable services, and fund appropriate levels of investment in infrastructure.

These trade-offs are important to consider as they help decision makers to understand the most important areas to focus on and the opportunity costs associated with certain activities. The trade-offs are likely to have different ramifications for different area types.

— Metropolitan: Significant benefits are likely to be achievable in larger urban markets when investment in capital schemes is made. This is due to the potential benefits from reduced journeys times for a high number of users or reduced emissions in an area where air quality is poor due to congestion. More likely to be able to support a significant commercial network given higher population densities, economies of scale and less car based economic centres. As such the market should be focused on delivering financially sustainable outcomes with less need for revenue support.

— Urban: Smaller urban environments need to balance the most effective policy position for themselves reflecting the objectives they are trying to achieve. Many smaller urban markets will be able to support a commercial network however there may be need for additional support via supported services where the market is not able to offer a full commercial network.

— Rural: Provision of service which is reliable and regular is the most important objective for rural markets and as such there is a focus on revenue support to ensure this occurs. Less likely to be able to support a significant commercial network due to dispersed population centres and higher levels of car usage. Some residents are without a car and bus services are therefore the only way to provide access to education, employment and services but these bus services would not be provided if not supported by the local authority.

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6.3   Approach to analysis

Our approach to exploring the key trade-off between investment in vehicles and investment to transform local services involves consideration of:

— Outlook for the sector: How the sector could evolve without new investment. This is the Do Minimum scenario.
— Scope of investment: The package of initiatives to decarbonise the vehicle fleet and transform local bus services.
— Scale of investment: The level of funding required to 'maximise 'green' passenger journeys'.

The outlook for the sector (Do Minimum scenario) reflects the influence of changing societal needs and choices on bus use (see Section 2), as well as views on the impact of COVID-19 on demand and supply of local bus services. Given the uncertainty surrounding this scenario, we subject our analysis to a range of scenario sensitivity tests.

In terms of scope, we identify a package of initiatives which deliver a return on investment in terms of net economic benefit. For the purpose of this strategic analysis, the packages of initiatives for metropolitan, urban and rural areas are relatively stylised based on the findings of the case study analysis (Section 4) and existing evidence on value for money for bus capital and revenue expenditure (Section 5). In practice, the packages will need to be tailored for individual areas to suit local needs and preferences.

In terms of the scale of investment, we explore the costs and benefits of alternative ways to allocate the £3 billion of new funding identified by the Department for Transport. A key part of the analysis is understanding the extent to which the funding allocated to transforming services can 'level-up' demand across England outside of London – where 'levelling-up' takes account of the socio-economic characteristics of areas.

6.4   'Do Minimum' scenarios

Given the high degree of uncertainty surrounding future bus patronage levels, we have constructed a series of Do Minimum scenarios reflecting three attributes of the scenario. For each attribute, we consider two alternative levels as follows:

— Long-terms trends: (a) Long-term trends in patronage continue as now (b) Long-term trends accelerate reflecting trends in digitalisation and higher car use.
— Scale of recovery to COVID-19: Patronage levels in a new 'steady state' that are (a) 10% lower and (b) 20% lower than 2019/20 levels, all else equal.
— Speed of recovery to COVID-19: Patronage levels returning to the new steady state in (a) 2021/22 and (b) 2022/23.

Whilst there are eight possible combinations of scenario attribute levels, there is a degree of overlap between them. We therefore selected a relatively optimistic scenario and a relatively pessimistic scenario to provide upper and lower bounds to the analysis. Given the level of uncertainty surrounding the future, it is not feasible to select in any meaningful way a most likely scenario.

The scenarios are as follows:

— Do Minimum Scenario A: Long-term trends continue as now, with recovery to COVID-19 occurring reaching 90% of 2019/20 levels by 2021/22.
— Do Minimum Scenario B: Long-term trends accelerate, with recovery to COVID-19 occurring reaching 80% of 2019/20 levels by 2022/23.

Figure 10: Do Minimum scenarios
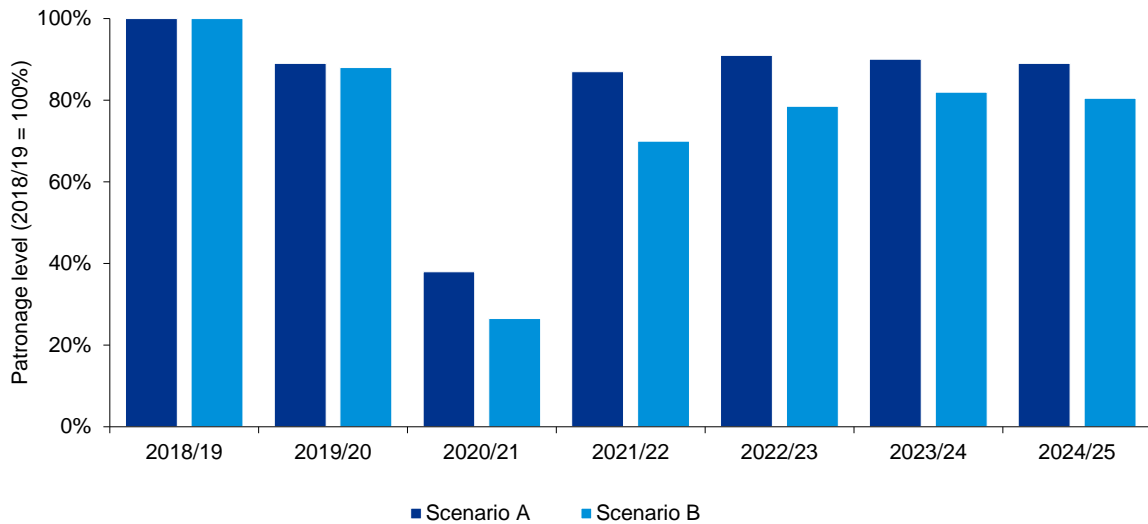
Source: KPMG Analysis

It is important to note that the Do Minimum scenarios are not forecasts of what might happen. They are simply two alternative states of the world to be used when exploring options for the 'Do Something' strategies. The Do Minimum scenarios have been shaped in consultation with bus operators.

6.5   'Do Something' strategies

Returning to the objectives-led framework developed in Section 5 we explore policies to maximise 'green' passenger journeys subject to a budget constraint. Our analysis looks at the possible allocation of the new funding available for investment in local bus services between zero-emission vehicles and transforming local services (e.g. simpler fares, higher frequencies, faster journey times and more reliable services), and the balance between capital and revenue investment.

In their announcement of the new funding for buses, The Department for Transport noted that the £1 billion earmarked for investment in vehicles will support the purchase of in the region of 4,000 zero-emission vehicles. To put this into context, in 2018/19, the latest year for which data is available, there were approximately 33,900 public service vehicles operating in England and a further 4,100 and 1,400 operating in Scotland and Wales respectively. Of those operating in England, approximately 9,700 were operating in London and 9,100 in other metropolitan areas.

Of the funding available for transforming services, the optimum strategy on efficiency grounds is to invest in schemes and services that provide the greatest economic return per £1 invested. By and large, this would mean investing in infrastructure (bus priority and

interchange facilities). It is however important to note that equity considerations, including 'levelling-up' require a broader distribution of investment, including initiatives with lower levels of economic return.

Using relatively stylised packages for efficient investment for metropolitan, urban and rural areas, we explored how far the available budget for transforming services can get towards 'levelling-up' bus use between local authority areas, after taking account of the socio-economic characteristics of each.

We then explored the extent to which bus use could be further increased to potentially shift the frontier of bus use beyond that experienced in even the best performing areas. Importantly, the 'levelling-up' benchmarks are adjusted to reflect the longer-term behavioural changes incorporated in the Do Minimum scenarios.

6.5.1 Investing in zero-emission vehicles

The UK government has set a target of net zero emissions by 2050. As at 2018, the whole transport sector accounted for 28% of all greenhouse gas emissions in the UK. Other sectors including energy and waste have implemented successful changes which have reduced their impact on the UK's emissions, leaving transport as the most significant contributor. Therefore, transport will play a crucial role in achieving the government's new zero emissions by 2050.

Within the transport sector, cars are the greatest contributor to emissions with 55% of overall transport emissions in the UK. Improvements have been made to the efficiency of cars in the UK leading to a reduction of 5% in greenhouse gas emissions from 1990 to 2018, however this has been offset due to an increase in miles travelled by car of 22% during the same period. Conversely, buses have seen a reduction in miles travelled of 20%. Furthermore, buses had 5% of the modal share in the UK in 2018 compared to 61% for cars. These statistics highlight the potential for modal shift in the UK in order to contribute towards achieving the net zero emissions target for 2050.[11]

In its Decarbonising Transport report published in 2020, the UK Government highlighted that behaviour change of the British public is an important aspect of the decarbonisation of transport. In order to encourage this behavioural change, and shift the public from car to bus, investment in bus infrastructure is required. This will involve the replacement of buses with zero-emission vehicles and addressing the issues with declining bus patronage across the UK.

The UK Government does not have a specific environmental target in relation to buses, however the Confederation for Passenger Transport has set a target for all new buses to be ultra-low emission or zero-emission by 2025. This is something that could be considered as part of the development of the National Bus Strategy.

Despite the lack of a specific target, the UK Government has introduced several funding schemes over the past few years to improve emissions from buses. These include the following:

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[11] Department for Transport, 2020, Decarbonising Transport: Setting the Challenge

— Low Emission Bus Scheme: Introduced in 2015 and contributing £30.4 million towards low emission buses, followed up with £11.2 million in 2017, which led to the funding of a total of 479 low emission buses.

— Ultra-low emission bus scheme: The £48 million fund introduced in 2018 was allocated to 19 local authorities and enabled them to purchase a total of 263 zero-emission buses.

— All-Electric Bus Town Fund: Announced in 2019, funding of £50 million will enable the creation of the UK's first all-electric bus town.[12]

— Transforming Cities Fund: The £2.5 billion fund was introduced to tackle urban transport investment priorities to combat congestion and drive productivity through low carbon transport infrastructure investment.

— Clean Air Zones: In 2017, the Government published the UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations and is supported by a £3.5 billion investment into air quality and cleaner transport.

— Charging Infrastructure Investment Fund: In 2018, £400 million of funding was allocated to catalyse private investment in public charge-points.

As a result of the current policies in place and planned, it is predicted that bus and coach greenhouse gas emissions will fall by 25% between 2018 and 2050.[13]

Table 6 and Table 7 consider the challenges facing the bus market in transitioning to a zero-emission fleet, including the challenges associated with electric and hydrogen vehicles.

Table 6: Capital costs associated with transitioning to a zero-emission fleet

Theme	Commentary
Up-front costs	The up-front cost required for zero-emission vehicles is currently higher in comparison to their diesel alternatives. In addition, the costs associated with the infrastructure necessary for low emission vehicles is significant. For electric vehicles this includes charging facilities and replacement batteries, whilst for hydrogen vehicles, building a suitable production and storage facility for the fuel is a significant cost.
Reliance on subsidies	Due to the high costs involved in the purchase of the vehicles, subsidies are required for set up as well as in the longer-term due to the infrastructure for battery/powertrain replacements required. As a result, operators and local authorities will need a guarantee of funding continuing in order to maintain the fleet.

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[12] https://www.gov.uk/government/news/britains-first-all-electric-bus-town-to-pave-the-way-for-green-communities-of-the-future
[13] Department for Transport, 2020, Decarbonising Transport: Setting the Challenge

Table 7: Operating impacts associated with transitioning to a zero-emission fleet

Theme	Commentary
Operational strategy	Operating low emission vehicles, particularly EVs, poses issues due to refuelling the vehicles, in terms of the range they are able to travel, and the repowering time required. Electric Vehicles require longer charging time in comparison to diesel buses. For hydrogen vehicles, the fuel introduces potential risks that need to be adequately managed.
Fuel supply	Electric Vehicles require longer charging time in comparison to diesel buses and therefore consideration needs to be given for the times of day that the network can handle charging. In addition, the vehicles require different maintenance and inspection requirements, including more regular testing and temperature checking. Hydrogen vehicles require refuelling similarly to current diesel vehicles and therefore do not pose such a significant issue in comparison to electric vehicles. In addition to their longer range, this makes them a more viable option for longer journeys.
Economies of scale	It will likely be more effective for an area to have one type of vehicle so that staff are able to understand how to maintain the fleet. The technologies have different features and determining the most effective will be an important business decision.
Maintenance of recharging/refuelling infrastructure	Technology associated with charging EVs and refuelling hydrogen vehicles will need more regular maintenance than established gas pump infrastructure, as well as security due to the expensive and sensitive nature of the infrastructure.
Compatibility issues	Particularly relevant for EVs, as technology evolves, battery and charging technology will change and therefore operators and local authorities will need to ensure that the buses and charging stations can support any updates.
Urban vs. Rural networks	The introduction of zero-emission vehicles will have varying impacts across the urban and rural landscapes in the UK. For EVs, Urban networks may have better access to grid infrastructure.
Uncertain residual values	Given the uncertainty over the performance of components over time in both Electric and Hydrogen vehicles, residual and second-hand values for both types of buses remain uncertain.

Whilst vehicle technologies are advancing rapidly, operators have concerns about cost differentials between zero emission and diesel technologies. They note that without incentives to help manage commercial risks, there remain challenges to the adoption of zero-emission vehicles at this stage.

Although the Department for Transport has initially earmarked £1bn of the new funding for 4,000 zero emission vehicles the details of how incentives will be structured are still being developed. One option currently being discussed amongst operators is a government backed leasing company or partnership working with energy suppliers. Further work is needed to determine the best way that new funding can be leveraged to generate cost efficiencies and provide confidence for private sector investment. This analysis lies outside of the scope of work here.

6.5.2 Investing to transform local services

For the purpose of this strategic analysis, we used findings from the case studies, together with evidence from a range of value for money studies, to construct a set of packages of initiatives for broad area types (Table 8). The packages to transform local services include simpler fares, higher frequencies, faster journeys and more reliable services. As noted earlier, these are relatively stylised and need to be refined for individual areas.

Table 8: 'Do something' investment packages

Metropolitan	Urban	Rural
— Investment in extensive network of bus priority measures, generating improvements in services speeds and journey time reliability. — Additional commercial service miles, self-funded through cost efficiencies and revenue growth. — Rationalisation of fares, ticketing and routes to present a simplified customer offer. — Investment in package of service quality measures including passenger information.	— Investment in selective bus priority measures, generating improvements in services speeds and journey time reliability. — Additional commercial and supported service miles, funded through a combination of cost efficiencies, revenue growth and Local Authority expenditure. — Rationalisation of fares, ticketing and routes to present a simplified customer offer. — Investment in package of service quality measures including passenger information.	— Additional supported service miles funded through Local Authority expenditure. — Rationalisation of fares, ticketing and routes to present a simplified customer offer. — Investment in package of service quality measures including passenger information. — Greater use of data and technology to help aggregate demand.

The packages of initiatives build on existing expenditure on concessionary travel, the Bus Service Operator's Grant and supported services, together with specific support for the sector for COVID-19. The packages would also ideally be supported by complementary local transport and land-use planning policies. Where a more substantial shift in demand is needed, further consideration could be also given to demand management and taxation policies.

6.5.3 Optimising outcomes

Based on a review of value for money studies (see Section 5), we have calculated a cost per additional passenger for the stylised packages of interventions for Metropolitan, Urban and Rural areas. We have then applied these rates to examine the optimal investment strategy for the £2 billion 'transforming bus services' fund. We have assumed that this fund is available for bus services in England outside of London.

Optimal mix of capital and revenue funding

The best economic return on investment would likely be achieved with investment packages dominated by capital expenditure on bus priority and interchange facilities in built-up areas. Whilst this investment strategy is economically efficient, it would mean that rural and semi-urban areas, in particular, would not be able to transform services. We therefore added an

additional constraint to the optimisation process, requiring investment in infrastructure and services at levels sufficient to level-up patronage per capita across all local authority areas. Given the mix of area types, this requires a split of capital and revenue funding in the region of 60-70% capital and 30-40% revenue. It is important to note that when looking at the balance of expenditure between capital and revenue, capital investment will likely generate benefits over many years and revenue investment will need to be repeated year after year. This means that capital investments tend to deliver higher benefit cost ratios that revenue expenditure. This balance will prepare the sector for the medium to longer term, noting that networks and routes may need to be recast to improve their financial sustainability.

Funding needed to 'level-up' patronage

Under the 'optimistic' Do Minimum scenario, an investment strategy totalling £1.5 billion would be needed to level-up patronage levels across local authority areas in England outside of London. This would involve an increase in patronage levels at the end of the five-year investment cycle of 325 million journeys per year - a growth rate of 17% relative to the Do Minimum scenario.

Funding to shift the patronage frontier

This strategy to 'level-up' patronage has an advantage in that all areas are able to achieve levels of demand which are currently only achieved in the best performing areas. However, it has disadvantages in that those areas that are currently doing well would not benefit from further investment. For those areas that are currently doing well, you need to invest to 'shift the frontier'. This would involve a further increase in patronage levels at the end of the five-year investment cycle of 100 million journeys per year.

The total investment of £2 billion on transforming services results in an additional 425 million trips per year by 2024/25 – an increase of 23% relative to the optimistic Do Minimum scenario. Figure 11 provides a summary of these results. All areas are shown to benefit from at least a 20% increase in patronage per capita.
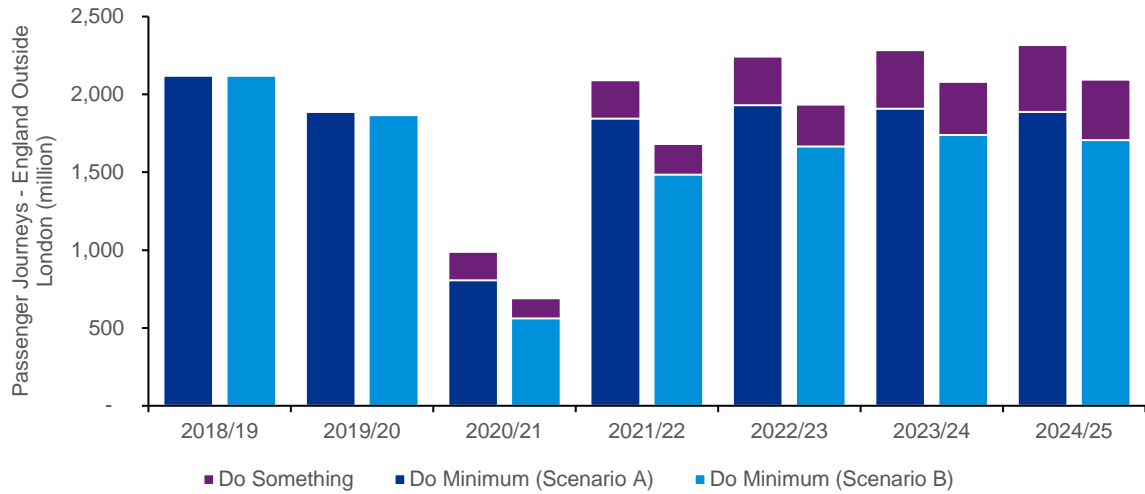
Figure 11: 'Levelling-up' and frontier shift
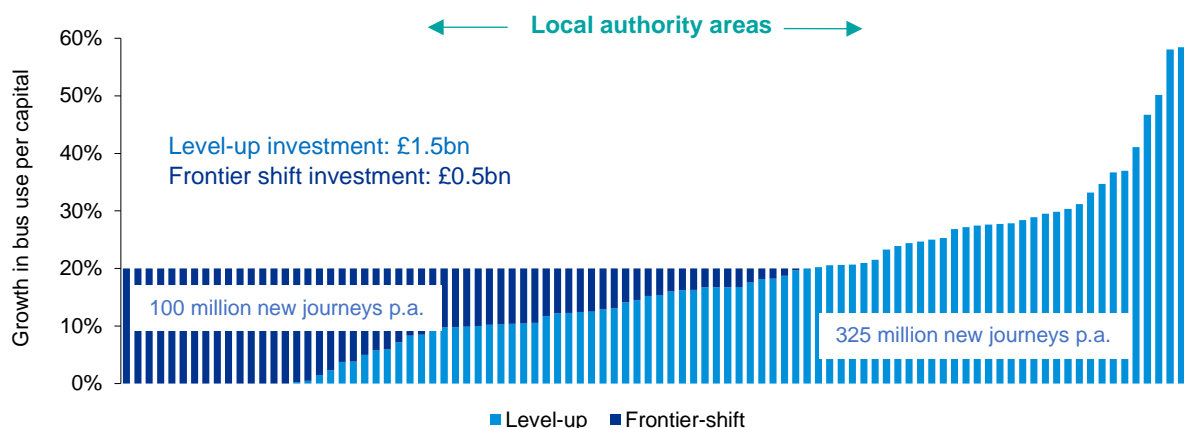
Source: KPMG Analysis

Figure 12 shows the impact of £2 billion of investment in transforming services on passenger journeys in England outside of London for alternative Do Minimum scenarios.

Figure 12: 'Do Something' strategy


Source: KPMG Analysis

Capital investment is assumed to be distributed evenly between 2020/21 and 2024/25, with revenue support ramping up during the first three years of the investment period to reflect a ramp up in local authority capacity to let contracts. During this transition period, we assume that the special payments to bus operators for COVID-19 will be maintained and ramped down in lockstep with the ramp-up in revenue support for tendered services.

The overall split between capital and revenue expenditure for transforming services is around 70:30, with expenditure in metropolitan areas (44% of the total) assumed to be almost all capital expenditure and expenditure in rural areas (12% of the total) almost all revenue expenditure.

6.6   Economic appraisal

The complex changes to local bus markets brought about by government interventions are assessed under the analytical framework set out in Figure 13. The framework includes analysis of demand and revenues, operator costs and cash flows between the government, local authorities and bus operators. The analysis is split by geography and market type (commercial, tendered) and passenger type (fare paying, concessionary). The analytical framework drives the inputs to the appraisal framework.

Figure 13: Analytical framework
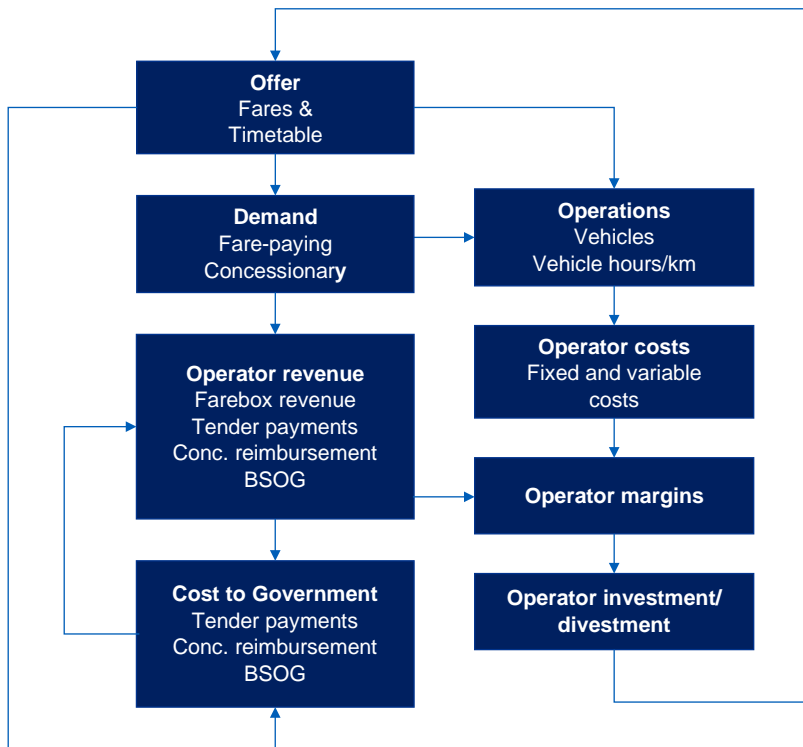
Whilst frequent, reliable and affordable local bus services are not an end in themselves, they do enable individuals to take employment, participate in education and take better care of themselves – activities which are clearly important to individual and community wellbeing.

In taking a holistic view of the relationship between local bus services and economic, social and environmental outcomes, we can begin to understand the wider social implications of transport policy and investment decisions. To that end the appraisal framework includes the following categories of costs and benefits:

— Impacts on bus passengers from changes to fares and service quality.
— Impacts on other members of the community through changes to highway congestion, air quality, greenhouse gas emissions, noise and transport safety.
— Wider economic impacts in the longer-term from increased participation in economic activities with increased levels of employment and increased levels of productivity.
— Wider social impacts arising from increased participation in education, healthcare and other social activities leading to improvements to mental and physical wellbeing.
— Costs and benefits falling to bus operators in the form changes to operating costs and revenues.
— Changes to Government taxes and expenditure as a result of changes in infrastructure investment, changes in direct and indirect taxes, expenditure on concessionary travel and revenue support in the form of BSOG.

Table 9 shows the results of a value for money appraisal of the package of investment. It shows the itemised benefits from the stylised packages of capital and revenue investment to transform services across metropolitan, urban and rural areas.

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Table 9: Cost-benefit analysis of transforming services

Total	
User benefits	
From fare change	£0.10
From service change	£1.90
Non-user benefits	
Decongestion, Safety, Local Air Quality, Noise, Greenhouse Gases	£0.35
Reduced fuel tax revenue	-£0.11
Bus operator benefits	
Change in operating profits	£0.06
Wider economic benefits	
Improved labour market accessibility	£1.36
Health benefits from increased physical activity	£0.38
Health benefits from increased employment	£0.07
Volunteering contributions	£0.23
Fiscal savings from increased education	£0.14
Psychological well-being from reductions in commuting time	£0.04
Option values	£0.03
Total benefits	£4.48
Total costs	£1.00
BCR	**4.48**

Source: KPMG Analysis

The investment is expected to deliver economic benefits equal to £4.48 for each £1 invested, approximately half of the benefits going to bus users and half to the wider community through decongestion, safety and clean air benefits, as well as wider economic and social benefits relating to access to employment, education and volunteering.

It is important to note that the cost-benefit appraisal undertaken here relates to the relatively stylised packages of interventions developed based on the case study findings. In practice, local authorities will need to work with operators to develop local plans and undertake value for money assessments tailored to local interventions and investments.

7 Summary and conclusion

7.1 Context

In February 2020, the Department for Transport announced £5 billion of new funding over the next five years for bus services and cycling. Of this total, £2 billion has been allocated to 'active travel' and £3 billion to buses. A key question for the Government is how to allocate the new funding for buses to maximise wider economic, social and environmental benefits.

7.2 Benchmarking bus use

As a starting point to our analysis, we developed a set of new econometric models to compare levels of bus use between local authority areas across Britain. The models allow us to benchmark observed levels of demand in each local authority area against levels of demand that we would expect to see given the socio-economic characteristics of those areas. Through this benchmarking exercise, we identify a 'patronage frontier' which includes local authority areas with the highest bus use per capita, after making an allowance for differences in the socio-economic characteristics between areas. This 'frontier' shows the level of patronage that is achievable with the effective investment and market conditions.

7.3 Case studies

Using the benchmarking analysis, we identified three local authority areas for more detailed case study analysis. The three areas are all on the 'patronage frontier' with levels of bus use per capita greater than expected by more than 10%. The case study areas are Bristol, Hull and Cornwall, representing metropolitan, urban and rural area types.

Key insights from these case study areas are that effective investment in assets, bus priority and vehicles supported by fares simplification and network rationalisation can deliver strong improvements in patronage. In rural areas, additional direct investment in services is needed.

7.4 Policy objectives

We have reviewed a wide range of economic, social and environmental public policy objectives and considered how improvements to local bus services can contribute to their attainment. The public policy objectives relate to economic growth and the distribution of economic growth (i.e. 'levelling-up'), the strengthening of communities through the provision of new housing and the promotion of individual health and wellbeing, and the reduction in strategic and local environmental emissions.

These policy objectives can be supported by strengthening economic connectivity and social accessibility (i.e. network coverage and service quality) and by encouraging the use of clean technologies (i.e. zero-emission vehicles) in an efficient and financially sustainable way.

There are clearly different ways to pursue these objectives and policy makers face important and complex choices. For the purpose of this analysis, however, we adopt a relatively straightforward approach, seeking strategies to maximise bus use in local authority areas whilst providing a balance of investment between local authority areas within a budget constraint.

7.5   Maximising benefits

Taking as a starting point an initial allocation by the Department for Transport of £1 billion to support investment in 4,000 zero-emission vehicles, we explore how the remaining £2 billion could be used to transform services in England outside of London.

Using information from our case study analysis together with evidence from a review of value for money studies of different types of investment in local bus services, we have developed a set of stylised packages of initiatives which could potentially improve bus services in metropolitan, urban/semi-urban and rural areas.

We then explore the scale and distribution of investment needed to meet key policy objectives. In terms of economic efficiency, the best investment strategy would be dominated by capital expenditure on bus priority and interchange facilities in built-up areas. This strategy however would not meet policy objectives on strengthening communities and levelling-up growth. To meet these objectives, you need a better balance between efficiency and equity.

One potential way to do this would be to invest in services in local authority areas identified by our benchmarking analysis as having bus patronage levels lower than expected. We estimate that levelling-up demand in these areas to levels of demand in the best performing areas would require £1.5 billion of capital and revenue investment. At the end of the five-year investment period, demand would increase by 17% relative to our Do Minimum scenario. This is equal to 325 million journeys per year for local authority areas in England outside of London.

The strategy to level-up patronage between areas has an advantage in that all areas can achieve levels of demand which are currently only achieved in the best performing areas. However, the strategy has disadvantages in that those areas that are currently doing well would not receive any new investment. One potential option to counter this short-coming is using the remaining £500 million of the budget to shift the 'patronage frontier' outwards, generating a further 100 million journeys per year.

Taken together, investment to 'level-up' patronage in underperforming areas and 'shift the patronage frontier' in high performing areas would mean that all local authority areas in England outside of London could expect to see at least a 20% increase in patronage. This would involve investing between 60 and 70% of the £2 billion fund on infrastructure projects and between 30 and 40% of the fund on supporting fares and services. In terms of the geographical distribution of funding, 44% would be allocated to metropolitan areas, 44% to urban and semi-urban areas and 12% to rural areas.

7.6   Conclusions

We have considered, at a strategic level, how to allocate £3 billion new funding for local bus services to contribute to wider economic, social and environmental policy objectives.

Taking as a starting point the Department for Transport's initial allocation of £1 billion for zero-emission vehicles, we have focussed our analysis on how best to use £2 billion to transform services. This analysis considers the scope and scale of investment by local authority area in England outside of London.

We estimate that the efficient allocation of £1.5 billion to bus-related infrastructure and services would generate enough demand to 'level-up' patronage levels between areas. This would enable all local authority areas to reach patronage levels currently only observed in the best performing areas - after taking account of the socio-economic characteristics of each area.

An additional £500 million of investment, would enable those local areas that are currently performing well in terms of their patronage per capita to grow demand further, shifting the 'patronage frontier' to new levels.

Taken together, investment to 'level-up' patronage between areas and shift the 'patronage frontier' in high performing areas would see bus use grow overall by approximately 425 million journeys per year in 2024/25 - an increase of 23% relative to the Do Minimum scenario. Given relatively stylised assumptions on the balance of capital and revenue spending for each local authority area, we estimate that for each £1 invested you could expect to see an economic return of £4.48.

It is important to note that within these broad scenarios, the Department for Transport will potentially need to ramp-down the special payments to operators to run services during the COVID-19 crisis and ramp-up funding to local authorities to pay for an expected increase in 'supported services' before the benefits of capital investment in new infrastructure and vehicles take hold. It will also potentially need to help strengthen the capacity and capabilities within local authorities to support the redevelopment of networks and services to meet changing passenger needs.

Given the importance of good public transport networks to local communities, the focus of operators, local authorities and central government will be on making the right investments in the short and medium terms to support decarbonisation, improve economic connectivity and social accessibility and strengthen the financial sustainability of the sector.

Appendix 1   Econometric modelling

Expected levels of patronage per capita across local authority areas are predicted using an econometric model trained on a database of patronage levels across 89 local authority areas in England, four regions in Scotland and Wales over the last 15 years of published data from government sources.

The dependant variable consists of the natural logarithm of patronage per capita. Explanatory variables are as follows:

— Population density

— Population structure (% 0-15 years, % 18-24 years, % 65+)

— Employment rate

— Employment structure (% part time)

— Wage levels

— Alternatives to travel (% of retail online)

— Alternative transport options (taxi licences per capita, urban rail stations per square km)

The models were estimated as a 'fixed effects panel' specification, with the fixed effects accounting for differences between areas that persist across the duration of the data. These will include, for example, urban form. The variables were selected based on a mix of economic theory and data availability.

The estimated impact of each demand driver on demand are shown in Table 10.

Table 10: Summary of estimated relationships

Theme	Variable	Elasticity
Socio demographic	Young people (18-24)	An increase of 1pp in Percent 18-24year old increases number of journeys per capita by 0.06 percent.
Socio demographic	Population density	An increase of 1% in Population density increases number of journeys per capita by 0.38 percent.
Socio demographic	Children (0-15)	An increase of 1pp in Percent 0-15y old decreases number of journeys per capita by 0.03 percent.
Socio demographic	Elderly (65+)	An increase of 1pp in Percent 65+y old decreases number of journeys per capita by 0.04 percent.
Economic	Employment rate	An increase of 1pp in Employment rate decreases number of journeys per capita by 0.01 percent.
Economic	Skilled workforce	An increase of 1pp in Percent skilled decreases number of journeys per capita by 0.01 percent.
Economic	Wages	An increase of 1% in Wages decreases number of journeys per capita by 0.24 percent.

![Theme icon] Theme	![Variable icon] Variable	![Elasticity icon] Elasticity
Economic	Full time workforce	Not used as was not statistically significant
Other modes	Taxis per capita	An increase of 1% in Taxis per capita decreases number of journeys per capita by 0.08 percent.
Other modes	Urban rail stations per sqkm	An increase of 1 in Urban rail stations/sqkm decreases number of journeys per capita by 0.26 percent.
Technical coefficient	(Intercept)	N/A

Source: KPMG Analysis based on publicly available data

Using this model, we benchmark local authority areas in terms of how much higher or lower patronage levels are relative to the expected level based on the characteristics of the local area. The benchmarking shows:

— 23 areas where demand is more than 10% higher than expected levels. We refer to these areas as frontier areas.
— 12 areas where demand is higher than average but lower than the frontier.
— 33 areas where demand is 0-10% below average.
— 22 areas where performance is >10% below average.

It is important to reflect that no estimation can fully represent all relevant variables and relationships that determine exactly a bus market's potential. There are a range of risks including bias introduced from omitted variables or from correlations between variables. However, the outputs nonetheless identify bus market areas against the same weighted metrics and are therefore helpful to understand relative market performance, and for the starting point to examine the detailed factors in individual areas that might determine their performance.

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Contact us

Gerard Whelan
Director
E   Gerard.Whelan@KPMG.co.uk

Patrick Baldwin
Manager
E   Patrick.Baldwin@KPMG.co.uk

www.kpmg.com\uk