

Travel demand and its causes



Royal Automobile Club Foundation

Motoring towards 2050 – Roads and Reality
Background Paper No.3

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In December 2007 the RAC Foundation published its report on 'Roads and Reality' along with a supporting Technical Report. As part of this exercise a series of background papers was produced and these are to be published during the course of 2008. This is the third in the series.

The Royal Automobile Club Foundation for Motoring Limited is a charity established to promote the environment, economic, mobility and safety issues relating to the use of motor vehicles.

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Summary

Transport and the movement of goods and services has grown broadly in step with the economy for many years and, although the relationship for freight has weakened of late, future expansion of the national economy is likely to create further growth in travel demand.

Eighteen per cent more people, 60% more households and six times as many cars have fuelled a more than trebling in personal travel over the last fifty years. Now three families out of four have a car and many more women and elderly people now drive.

On average Britons spend over fifty pounds a week on private transport - nine times as much as they spend on surface public transport.

Whilst the rate at which we make journeys and the time we spend doing this has altered little, our travel *patterns* are very different from thirty or forty years ago. Shorter trips on foot, by bike and bus have been replaced by longer trips by car, and to some extent train. Air travel has ballooned. The spatial and temporal freedom of car travel, coupled with the development of the Motorway system, has allowed linkages to develop that were never practicable with even the best public transport networks; and the corresponding work, business and leisure travel patterns have become part and parcel of contemporary life.

To varying degrees business and social behaviour and the built environment have adapted to take advantage of this freer mobility. Over the last few years' rail use has grown strongly. Despite this, cars continue to dominate the market for long distance journeys except for the very longest where air travel comes into its own - especially for the rapidly growing overseas travel market.

Greater mobility has allowed the spread of urban areas, lower densities and increased travel between settlements. In large towns and cities public transport plays an important part in meeting travel needs, this is especially the case in London, but less so in the suburbs and rural areas where most people now live. Suburban traffic has been growing and is expected to increase by a quarter over the next fifteen years.

The increase in freight traffic is a result of more goods being moved over longer distances. This has been caused by several intertwined factors. The structure of British industry and commerce has changed with a marked move from agriculture and manufacturing to service industries. The decline of traditional industries - well oriented to the railway in both location and business style - has been more than matched by new economic activity, much of which is located well away from the railways, and therefore require the faster and more flexible logistics provided by road transportation.

The performance of road freight has been improved by the construction of the Motorway network, the increase in the permitted size of lorries and the introduction of modern management and scheduling arrangements. In turn this has reinforced business practices that rely particularly on the type of service that road transport provides. Other changes such as the movements of large volumes of petroleum products (and gas) have had their effect with the development of pipeline networks and coastal shipping, which has also benefited from the growth in the use of sea dredged aggregates.

The development of the service and retail sectors, along with changes in business practices has caused a rapid growth in van traffic which appears to be encouraged by internet shopping. At the other extreme international trade has expanded enormously and much of the consequent traffic is moved by road to and from ports, airports and the Channel Tunnel.

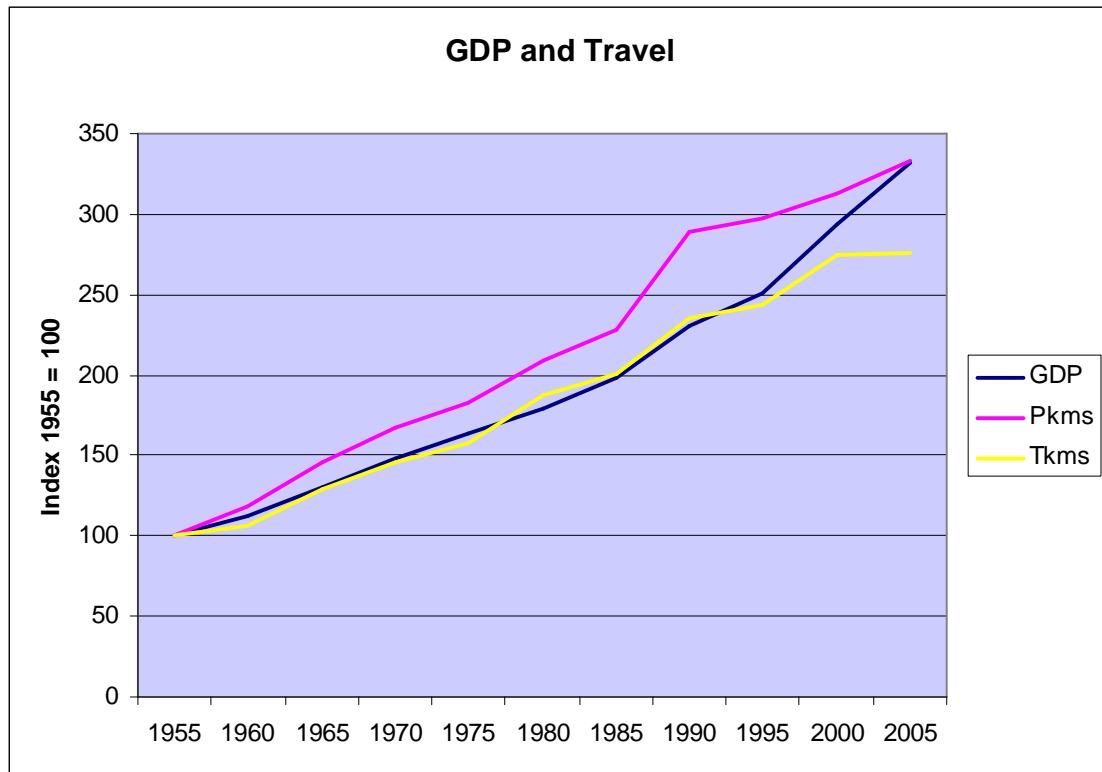
Population, households and incomes will continue to grow and stimulate an increase in travel although the rate of this may slacken. Recently we have seen the growth of the Internet, which has important and complex implications for travel. It can reduce the negative aspects associated with travel by substituting electronic for physical communications and it can also enable new and different ways of carrying out business, retail and leisure activities. These effects are still working themselves out but in the first instance do not seem likely to lead to substantial curtailment of the future travel demand growth.

Introduction

Travel has grown considerably over the last few decades and this increase seems set to continue. This is as a result of a wide range of factors which give rise to the demand for travel. Of course this travel can only take place if there are appropriate facilities – roads, buses, trains, cycles etc. The presence of these, their cost and the quality of service they offer also affects how much travel takes place, where, when and by what means. The relationship between demand and supply of services and facilities is complex and a detailed analysis is beyond the scope of this paper, which concentrates on factors affecting demand and changes in accessibility and prices.

Travel and Gross Domestic Product

Figure 1: Growth of Passenger Travel, Freight Travel and Gross Domestic Product



Source: Department for Transport (2007a) tables 1.1 & 4.2 and National Statistics (2008a)

The amount of travel has grown as national wealth has increased. More economic activity has led to the increased movement of people and goods. More money has enabled people to participate in a wider range of activities outside the home requiring more travel; and more money has enabled people to buy cars to give them a convenience and flexibility of travel beyond that possible with most forms of public transport. This has been a two way process with economic growth stimulating both passenger and goods travel, which has led to improvements in travel facilities and services enabling new ways of working and patterns of leisure which, in turn, have become contributors to the expansion of the economy.

Looking back over the last fifty years, personal travel has grown at a similar pace to the Gross Domestic Product (See: Figure 1). Freight traffic also followed GDP growth until the mid 1990s since when the amount of freight shipped has leveled off for reasons which are discussed below in the section on freight.

The Growth in Personal Travel

Personal travel has grown by a factor of 3½ since 1956¹. This is for a variety of reasons. Firstly there are more people, and families: from 50 million in 1956 the population of Great Britain reached 58.8 million in 2006² - a 17½% increase. Secondly the number of households has increased even faster from 15.1 million in 1956³ to 24.2 million in 2006⁴. This growth of 60% has meant that average household sizes have reduced from 3.3 persons to 2.4 persons. As some types of journeys serve households as a whole, rather than individual members (e.g. the weekly shop), these increased faster than the population generally.

Secondly there are many more economically active Britons. In 1955 there were 24.3 million workers⁵ compared with 31.0 million in 2006⁶ - an increase of over a quarter. This is a larger increase than for the population as a whole, which means that there are now a higher proportion of people who are economically active. This increase in economic activity is largely as a result of more women working: up from 7.8 million in 1956 to 14.4 million currently⁷ - an increase of over four fifths. As well as a commensurate increase in the numbers of journeys to and from work and in the course of work this means that there are more wages to spend; and spending these often involves travel.

Table 1: Some demographic changes 1956 – 2006

Feature	1956	2006	% Change
Population	50.0m	58.8m	+17.6
Households	15.1m	24.2m	+60.3
Workers	24.3m	31.0m	+27.6
Female workers	7.8m	14.6m	+87.2

Sources: References 2 to 7 below.

Thirdly, there are more cars and drivers. The convenience and speed offered by car transportation means that most people buy cars if they can afford them and are able to drive. Real disposable household income has increased by a factor of over five since 1956⁸ and some of this increasing wealth has been spent on buying cars and travelling more. People currently spend over 3½ times as much on transport, in real terms, as they did in the mid 1950s⁹ at £62 per family per week amounting to total household expenditure on transport of £80bn annually.

¹ Department for Transport (2007a) table 1.1.

² National Statistics (2008b) table 1.2

³ National Statistics (2005) table 2.1.

⁴ National Statistics (2008b) table 2.1.

⁵ The Economist (1997) p 78.

⁶ National Statistics (2007f) table A1.

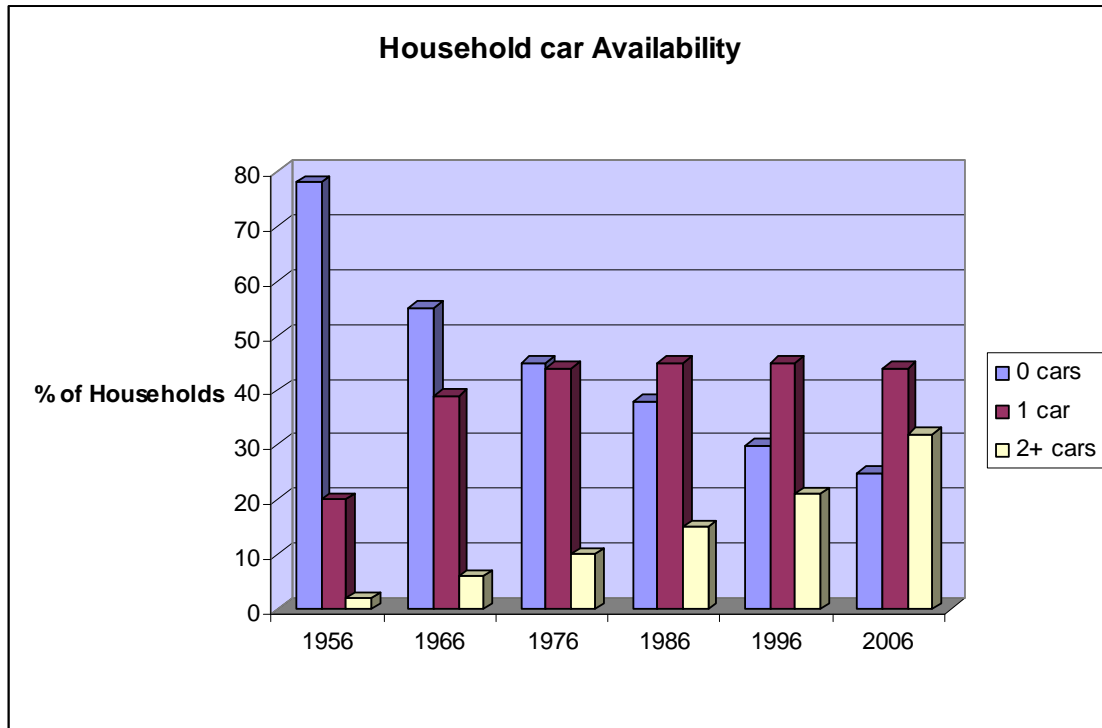
⁷ National Statistics (2007f) table A1.

⁸ National Statistics (2007g) figure 5.1 & The Economist (1997) p50

⁹ National Statistics (2008c) table 6.1 & The Economist (1997) p188.

Of this, less than 8% goes on public transport fares and over 84% goes on the purchase and operation of private vehicles¹⁰ (mainly cars). Moreover the wealthier people are spending the most on transport, with the richest 10% of households spending almost 16% of their income on transport compared with only 9% for the poorest 10%¹¹.

Figure 2: Household Car Ownership Trends in Great Britain, 1956 to 2006



Source: Department for Transport (2007a) table 9.14 & NTS 2006 table 2.1

The result of years of this growing expenditure on transport – mainly private transport - is the widespread ownership of cars. From just over 3.4 million cars in 1956 (itself a 74% increase over the figure in 1950) there are 26.5 million today¹² and three quarters of households have regular use of a car. In 1956 the situation was quite different with only a fifth of households with access to a car and four fifths without. Despite households getting smaller on average, the proportion with more than one car has increased from 2% in 1955 to 31% today¹³. The number of qualified drivers has also grown more than fourfold – from 7.52 million in 1958¹⁴ to 33.7 million in 2006¹⁵.

¹⁰ National Statistics (2008c) table A1.

¹¹ National Statistics (2008c) table 3.3.

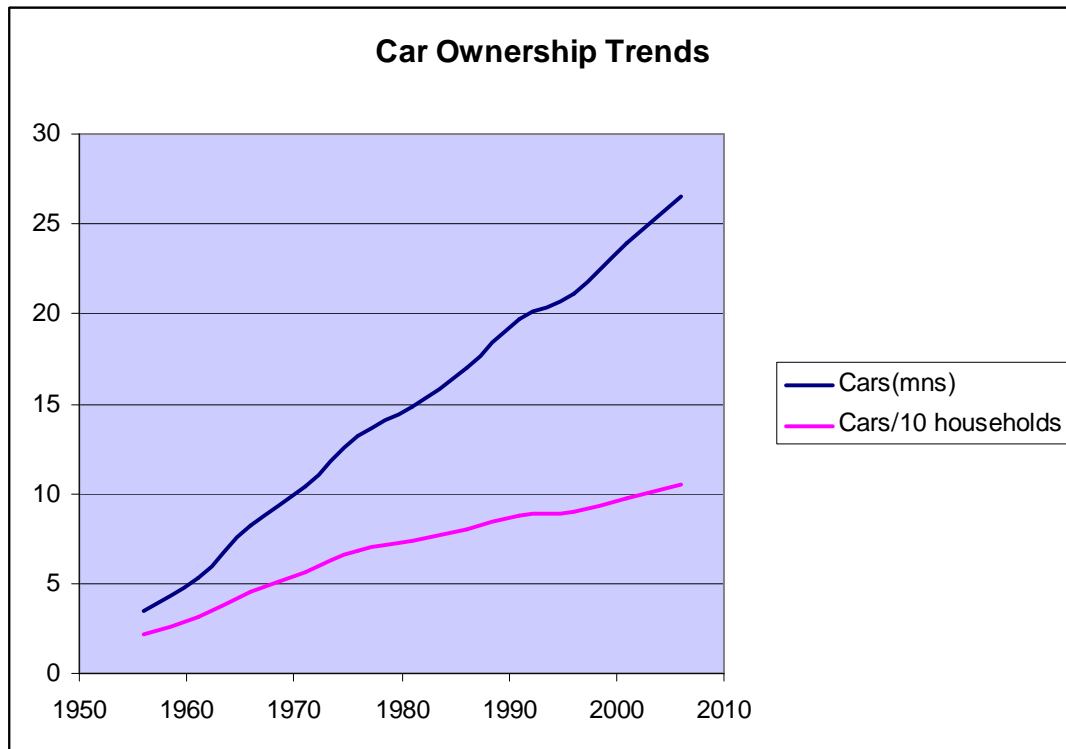
¹² Department for Transport (2007a) table 9.1.

¹³ Department for Transport (2007a) table 9.14.

¹⁴ Department of Transport (1975) table 57.

¹⁵ Department for Transport (2007a) table 9.16.

Figure 3: Car Ownership Trends in Great Britain, 1956 to 2006



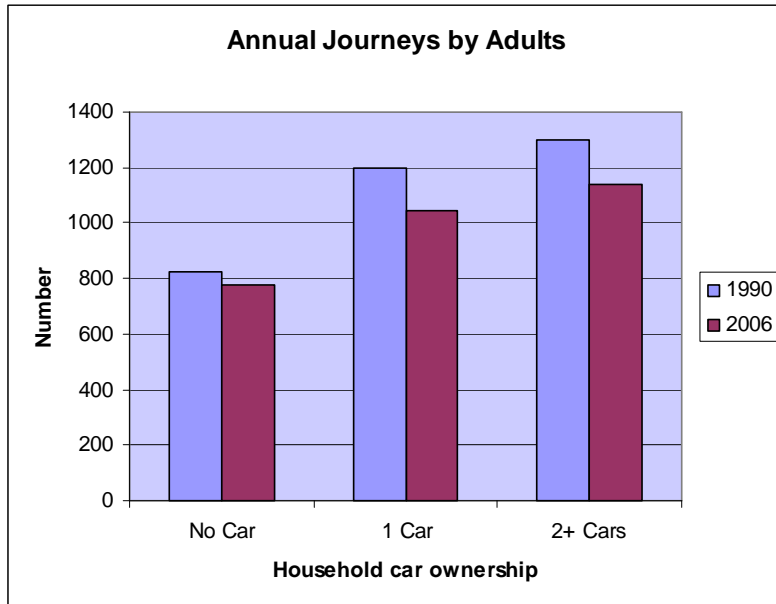
Source: Department for Transport (2007a) table 9.1 and DfT (2007b) table 2.2

The transfer from non-car owning to car owning status has two important effects on travel behaviour. Firstly it increases the distance travelled each year and secondly it reduces the reliance on, and use of, other forms of transport. Adults in households without cars make about 15 trips per week compared with those in car owning households who make about 20. Those in multi-car owning households make about 22. When distance travelled is taken into account the contrast is even more marked with a change from 95 kms to 200 kms to 300 kms per week in multi car owning households¹⁶. These differences reflect both the additional mobility provided by car ownership as well as the fact that higher car ownership correlates with higher incomes – which are also associated with more travel. Thus in 2006 the wealthiest 10% of households spent £255 a week on recreation & culture, restaurants & hotels and miscellaneous goods and services, access to which usually requires travel, compared with £58 for the poorest 10% – 4½ times as much¹⁷.

¹⁶ Department for Transport (2007b) table 5.1.

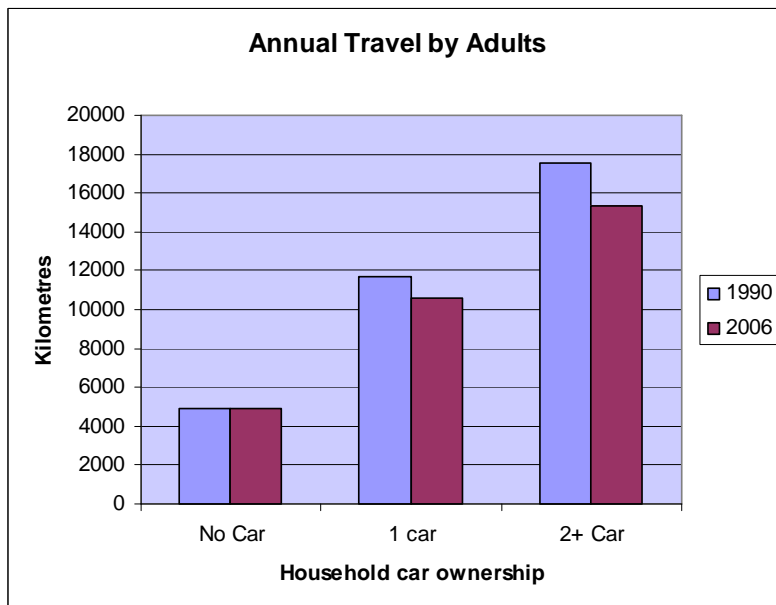
¹⁷ National Statistics (2008c) table 3.2e.

Figure 4: Annual Journeys by Adults According to car Ownership Status, 1990 and 2006



Source: Department for Transport (2006b) figure 4.3 & Department for Transport (2007c) table 5.1.

Figure 5: Annual Distance Travelled by Adults According to car Ownership Status, 1990 and 2006

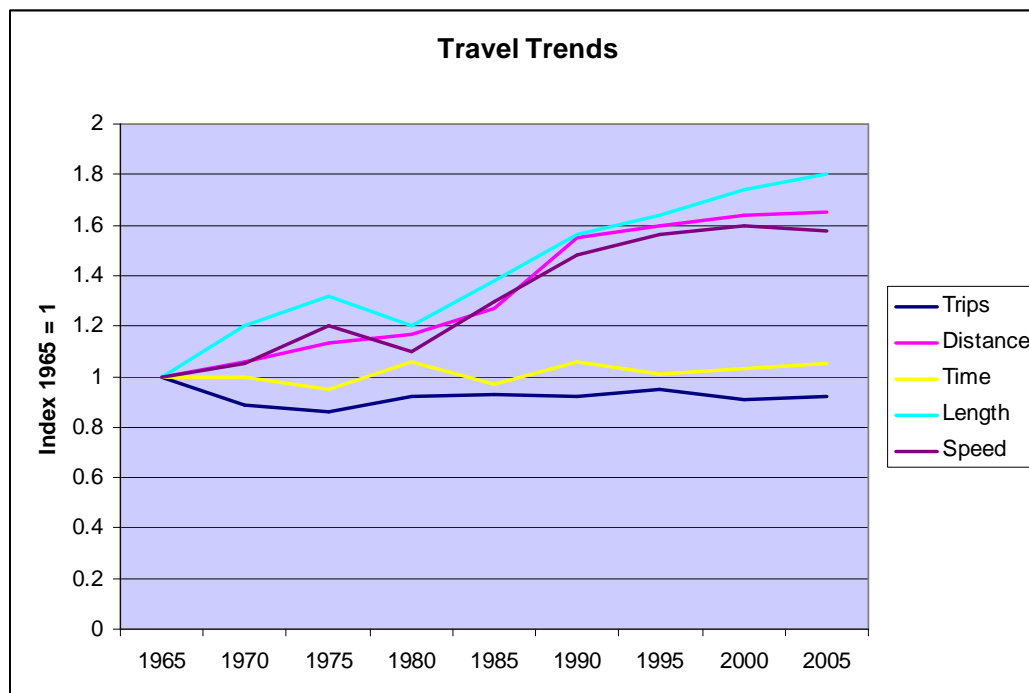


Source: Department for Transport (2006b) figure 4.3 & Department for Transport (2007c) table 5.1.

Figures 4 & 5 show how both the number of journeys and distance travelled by adults increases as households own more cars, with the biggest change coming when acquiring the first car. This also helps explain the apparent paradox that whilst rising car ownership increases trip-making rates, the total number of journeys made has changed little over the years. Whilst migration up the car ownership ranking tends to increase trip making, the trip rates for each car ownership rank have been slowly declining.

Figure 6 shows that the increasing shift towards car use has resulted in longer journeys, rather than more journeys. Because the modes of travel supplanted by car are mainly walking, cycling and bus travel – which are relatively slow forms of transport the average journey speeds have increased – from less than 20 kph in the mid 1960s to around 30 kph today. Thus the increase in car ownership has allowed those who have access to cars to travel further and faster; so increasing the range of places that they can visit within a fairly constant time budget of about an hour a day. Figure 6 is derived from National Travel Survey data and the sample sizes are such that year-to-year variations should be treated with caution but the longer-term trends are robust.

Figure 6: Changes in Personal Travel 1965 to 2005

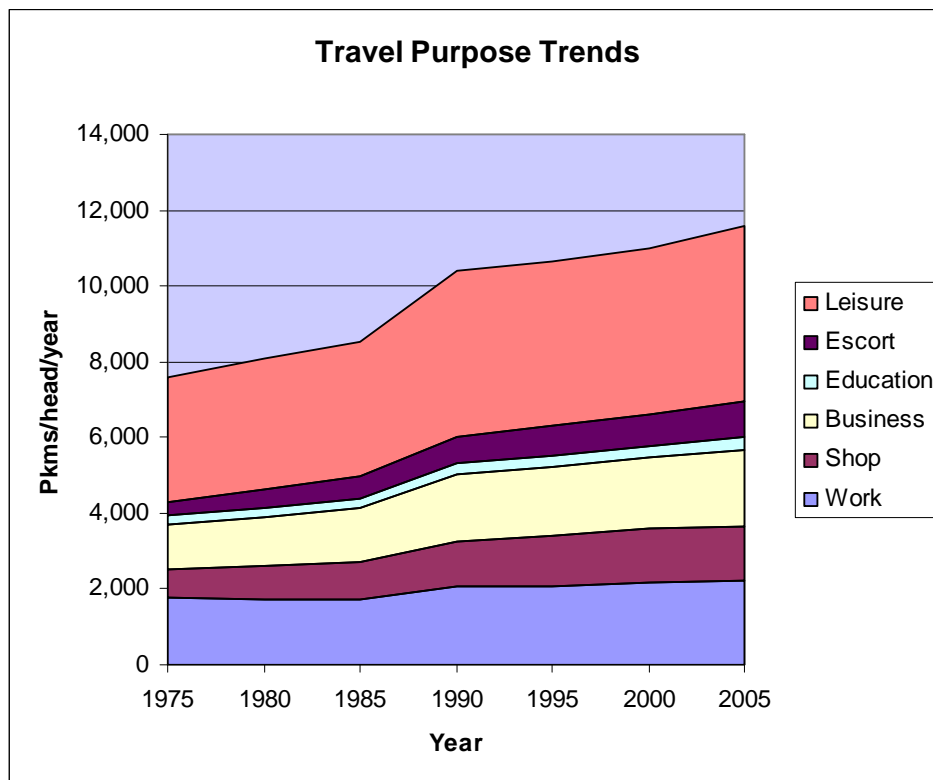


Source: Department for Transport (2007b) table 2.1. 1965 numbers are the author's estimates based on limited data in Department of Transport (1993)

Growth in Personal Travel by Purpose

The growth in personal travel has been seen across the board, with all major travel purposes contributing. Figure 7 shows that whilst escort journeys (both for education and other purposes) have grown fastest they still comprise only a small proportion of total travel. This disproportionate growth is significant however in that it indicates that the mobility of those unable to drive has increased as a result of getting lifts from drivers. In the mid 1970s there were approximately 500 kms of escort travel per non driver annually, by 2004 this had risen to over 2,280¹⁸ thus, in this respect, non drivers have benefited from the increase in auto mobility to a significant extent. Escorted travel by car was about 590kms per capita in 2006 which was more than by all forms of public bus service and three quarters as much as rail travel¹⁹. Today getting a lift from a relative or family friend is as important a source of mobility as travelling by bus for this group.

Figure 7: Changes in Personal Travel by Purpose 1975/6 to 2005 (Kms)



Source: Department for Transport (2007b) table 4.1, Department for Environment Transport and the Regions (2000) table 4.1, Department for Transport (2006b) table 1.8 & Potter s. (1997) table 3.9.

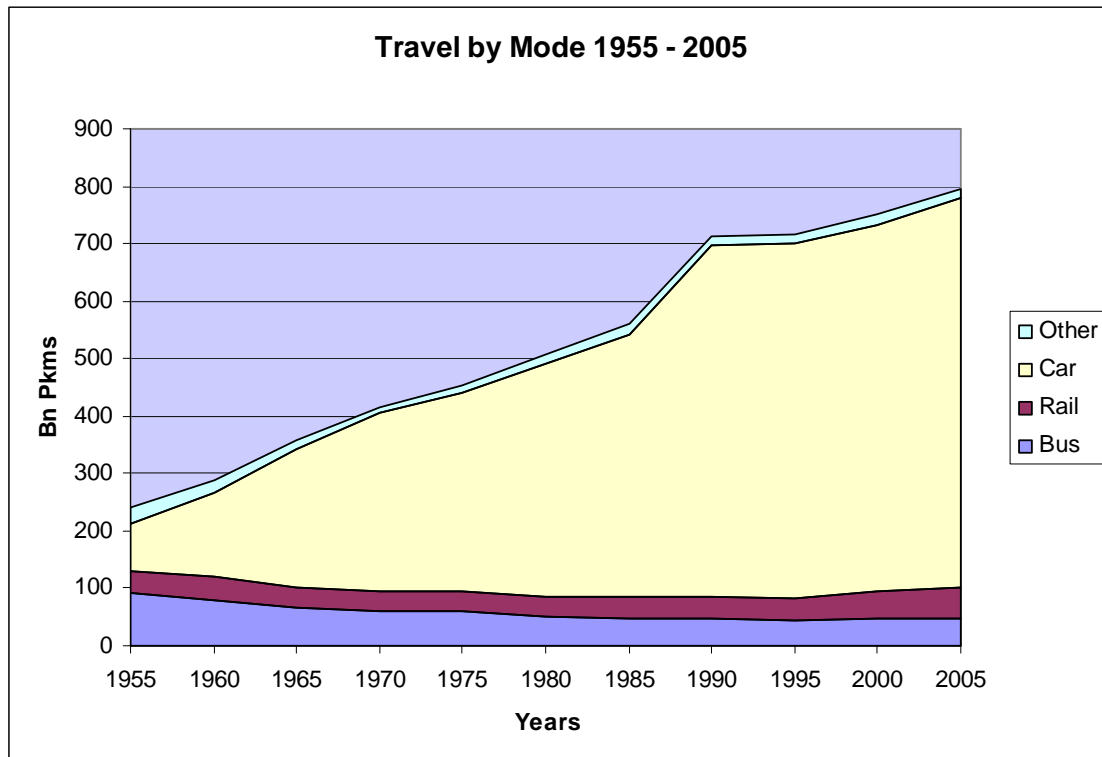
¹⁸ Potter S (1997) table 3.10 & Department for Transport (2007c) table 4.1.

¹⁹ Department for Transport (2007c) tables 3.1, 4.1 & chart 7.2.

Shopping and business travel has also grown faster than average and have higher than average car mode share²⁰. Leisure dominated the reasons for travel back in the mid 1970s and continues so to do. The one-third growth in this travel purpose has added eleven hundred kilometres to the average annual travel budget over the last thirty years. Although individual year entries should be treated with some circumspection it appears that growth was strongest in the 1980s, which indicated that we are working with well-entrenched travel patterns today.

Changes in Travel by Mode

Figure 8: Changes in Modal Use for Personal Travel in GB -1958 to 2005 (bn pkms)



Source: Department for Transport (2007a) table 1.1.

The result of these changes in travel behaviour is a large growth in private personal transport associated with a much smaller reduction in the use of public transport, most of which has taken place on buses and coaches as is shown in figure 8. Bus and coach use almost halved during the 1960s reflecting a doubling in the car parc²¹.

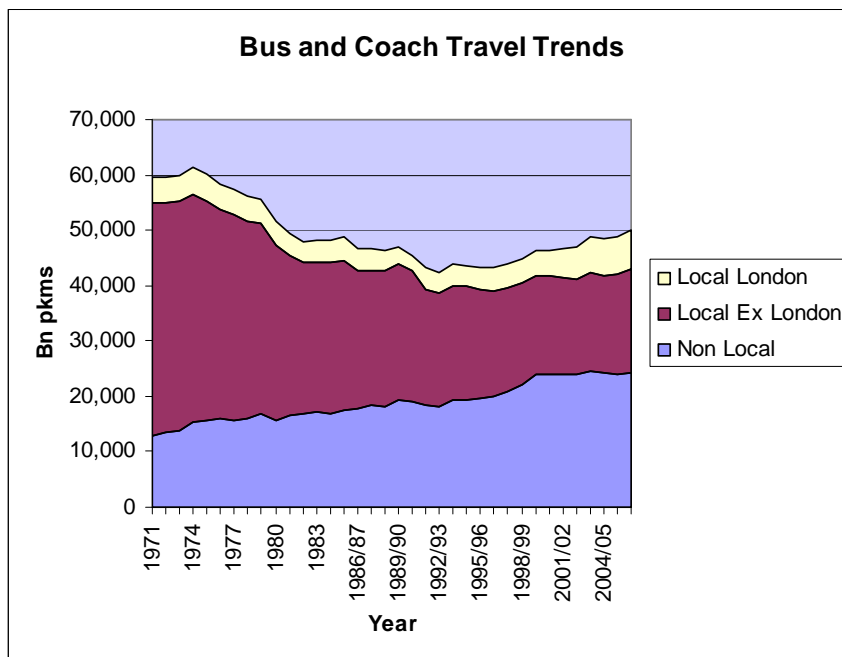
²⁰ Department for Transport (2007c) table 7.2.

²¹ Department for Transport (2007a) tables 1.1 & 9.1.

Rail use also fell during this period, but by less, and then fell further still; although it has recovered strongly since the mid 1990s. The fall in rail travel during the 1960s was certainly exacerbated by rising car ownership, but the truncation of the passenger rail network by a third as a result of the Beeching review²² was a significant factor with the number of passenger journeys and network length falling by 19% between 1960 and 1965²³.

The reduction in the use of coaches and buses since the mid 1950s appears to have been mainly on local buses, as between 1970 and 2005, local bus use halved whereas non local bus and coach use almost doubled and now non local bus and coach use travel (measured in passenger kilometres) appears to be greater than that on local buses. Between 1955 and 1990/91 (the last year for which separate local and other bus journey data is available) local bus journeys fell by 63% whilst other bus and coach use increased by 84% (although the peak was in 1978)²⁴. Non-local bus and coach traffic has grown steadily over the years – from 12½bn pkms in 1970 to 24.3bn in 2005/07²⁵. This long-term growth in non local bus and coach travel fits well with the increase in leisure travel for which it is strongly associated.

Figure 9: Bus and Coach Travel Trends 1970 – 2006/07



Source: Department for Transport (2007d) Annex A table 2, LT Annual Reports 1970 – 1988/89 & TfL Travel Report 2007

²² Ministry Of Transport/British Railways (1963).

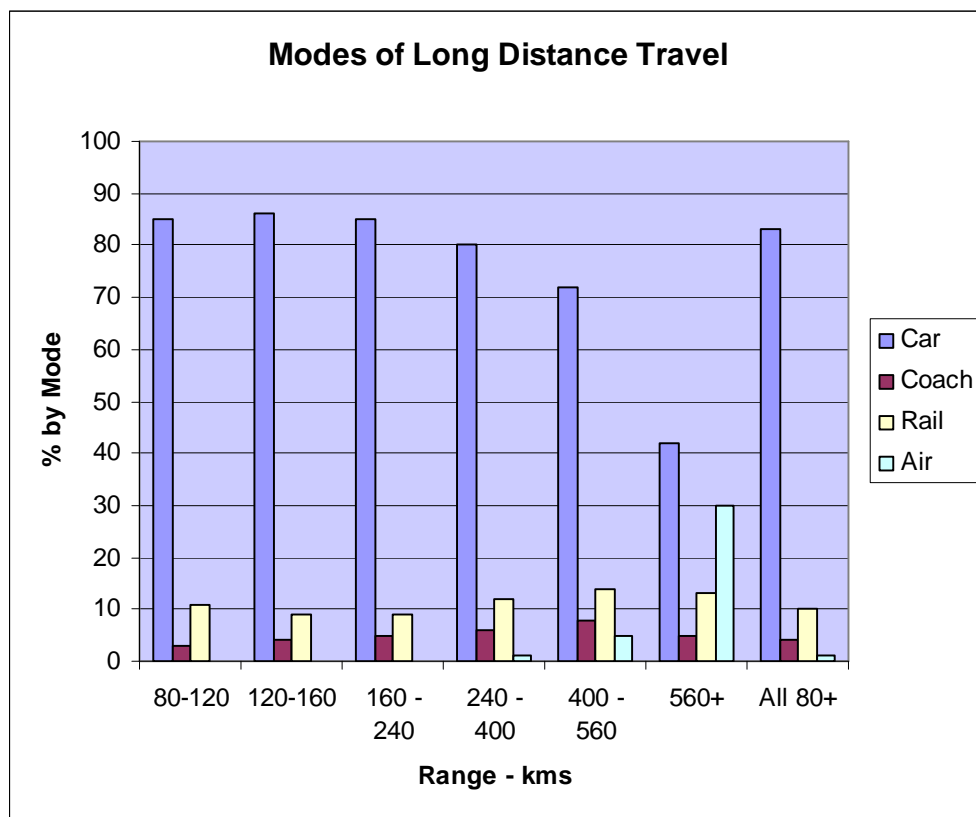
²³ Department for Transport (2007a) table 6.1 and Department for Transport (2007d) table A2.

²⁴ Department for Transport (2007d) Annex A table 1.

²⁵ Department for Transport (2007d) Annex A table 2.

It is easy to forget that the trolley bus network and all but one tram system that were operating in 1955 have been closed and invariably replaced by conventional buses. These electric systems carried 2.37bn journeys in 1955 – 18% of the bus traffic - so the reduction in local public transport use has been greater than that on buses alone. However the introduction of new light rail systems has boosted local public transport use and, if all modes are taken together, the change in local public transport journeys, excluding national rail and Underground, between 1955 and 2005/06 was a reduction of 70% over the 50 year period²⁶.

Figure 10: Modal Split for Long Distance Journeys in GB 2004-2006



Source: Department for Transport (2007c), table 3.9.

With the increase in average trip length from about 6kms/year²⁷ in the mid 1960s to 11 or so today²⁸ (See: Figure 6) Britons appear to be making more long distance journeys. It might be expected that rail and air, with their higher speeds, dominate the longer distance travel market but this is only the case for the very longest of trips as can be seen from Figure 10.

²⁶ Department for Transport (2007d) Annex A table 1.

²⁷ Department for Transport (1993) table 2.1.

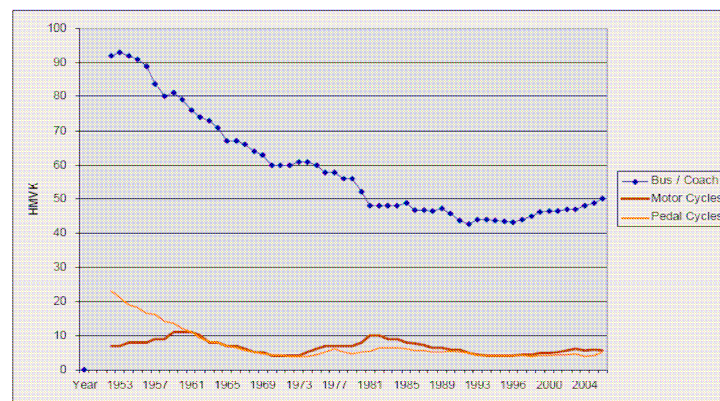
²⁸ Department for Transport (2007c) table 2.1.

The most rapid growth in personal transport has been by air. Between 1955 and 2005/06 the number of passenger journeys on domestic flights grew twenty fold from 1.2 million to 25 million²⁹. This has been because of the positive elasticity of air travel to rising incomes and, more recently, as a consequence of lower fares, which can now be significantly less than rail for some journeys. Thus air travel now exceeds rail travel by a factor of ten or so between London and Glasgow. However this must be kept in perspective, air travel is still only a fifth of that by rail (by distance) and less than 1½% of travel by car/van/taxi³⁰. The dominance of car travel for all but the very longest journeys is undoubtedly caused by the Motorway network and the speed and comfort of modern cars. Today it is possible to drive from London to Glasgow in a day³¹ whilst in the mid 1950s this would have required two.

The level of motorcycle usage has also changed over the years. The number of licensed motorcycles peaked in the early 1960s and again, to a lesser degree, in the 1980s. Since then the number of licensed motorcycles on the roads has declined, from nearly 1.4 million licensed at the beginning of the 1980s to around 0.6 million in 1995. However an upturn in registrations has been seen with a rise to 0.7 million in 1998 and 1.22 million in 2006.

Bicycle and motorcycle mileage declined significantly between 1959 and 1969. However, in the past decade, motorcycling as a transport mode has seen a sharp increase in popularity, with motorcycle traffic increasing by an estimated 37% between 1996 and 2006. Motorcycles travelled around 5.2 billion vehicle kilometres in 2006.

Figure 11: Miles travelled by powered two wheelers, cycles and bus and coach since 1952



Miles travelled by PTW, Cycles and Bus/Coach since 1952 (DfT)

Source: MCIA, 2008

²⁹ Department for Transport (2007d) Annex A table 1.

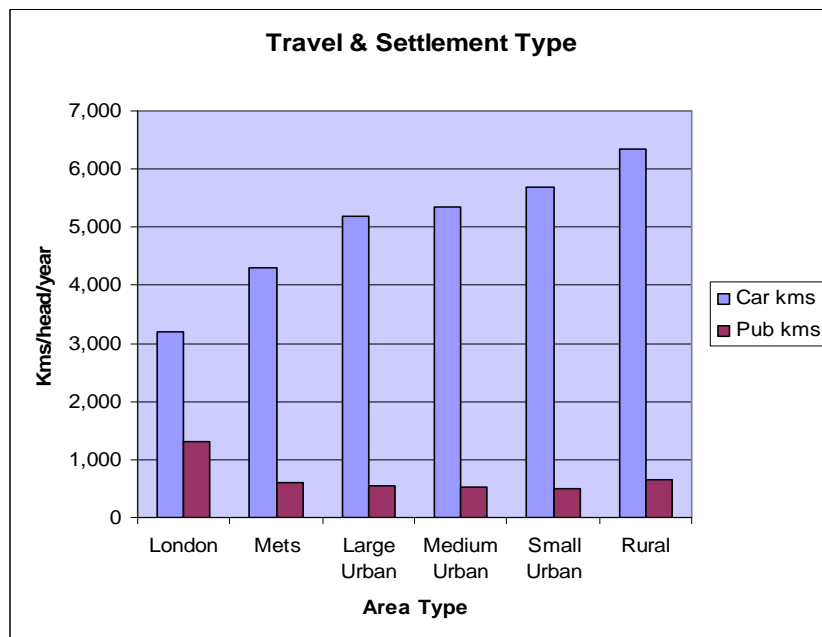
³⁰ Department for Transport (2007a) table 1.1.

³¹ Phillips (2007) pIV.

Transport and Land Use

Growth in travel demand and changes in travel patterns have been associated with changes in land use. One is not usually the direct cause of the other but the two go hand in hand, with new patterns of accessibility enabling and stimulating new patterns of land use and activity, which in turn feed and reinforce the changing accessibility from which they derive.

Figure 12: Variation in Travel by Mode by Settlement Type 2002/03



Source: Department for Transport (2005d) charts 6.9 & 6.10.

The growth of private transport has enabled people to live in lower density suburbs and smaller settlements outside urban areas without undergoing significant mobility penalties. This is reflected in the higher use of private transport in smaller urban and rural areas (See: Figure 12).

The spread of urban areas in Britain has been controlled by the planning system but their size and structure has been changing nevertheless. The growth of 'edge of' and 'out of' town commercial and retail centres, along with extensions of suburbs into previously undeveloped peripheral land, has resulted in high dependence of cars for mobility.

Changes in the use of the different transport modes have not been uniform throughout Great Britain. For example, since 1982 bus use (passenger journeys) in London has grown by over 90% but has fallen in all other areas.

In the English PTEs this was by 44%, in the rest of England 32%, in Scotland by 30% and in Wales by 44%³². On the other hand between 1982 and 2005 the number of cars increased by 83% outside London - but only 26% in London itself³³.

Other than in London the variation in the number of *trips* made between different types of settlements is small³⁴. However the variation in distance travelled is substantial (See: Figure 11) with a steady increase as an area becomes less urban, to the extent that people living in rural areas travelling almost twice as far each year as Londoners. This means that trips in the more urban areas are shorter. Although more travel is on foot in urban areas and public transport is used more in large towns and cities, these small variations in use of different means of transport account for only a very small part of the differences in car use. The main reason for this is that in smaller and less urban areas people drive farther.

There can be little doubt that this propensity to drive further in less urban areas is the result of two interrelated factors. The first is that less urban areas are, by their very nature, less dense so it is necessary to travel further to reach the same choice of jobs, shops and other facilities and activities than in urban areas. The second is that, higher speeds (as more travel is by car) allow people to travel further to access these services and facilities within their – roughly one hour a day – travel time budget. The importance of car availability in this phenomenon is clear, with the three regions with highest travel rates also being the three regions with the highest car ownership (SE, SW & EoE)³⁵. These are also amongst the fastest growing regions³⁶.

A primary feature of land use change has been the increase in the number of dwellings needed to accommodate the rapidly growing number of households. Over the last fifty years the number of dwellings in Britain has increased from 15m to 25.7m³⁷. Many of these were built on previously undeveloped land resulting in large scale suburban extensions - although the proportion of new dwellings being constructed on previously developed land has been increasing of late, having grown from 46% in 1994 to 62% in 2005³⁸ with a government target of maintaining this above 60% in future.

³² Department of Transport Local Government and the Regions (2000) table 10 & Department for Transport (2007d) table c.

³³ Department of Transport (1984) table 2.23 & Department for Transport (2007a) table 9.5.

³⁴ Department for Transport (2005b) chart 6.9.

³⁵ Department for Transport (2007l) tables 1.2 & 1.11.

³⁶ National Statistics (20067e).

³⁷ Department for Communities and Local Government (2008).

³⁸ Department for Environment Food and Rural Affairs (2008).

However, at present, about 60% of people in England live in the car oriented suburban/rural areas³⁹ and most of the growth in population and traffic is expected to be in the suburbs/exurbs by 2021⁴⁰. Traffic in the suburbs is expected to grow by about a quarter by 2021 and this will fuel traffic congestion, which is already a problem in many suburban areas.

Improving Accessibility

These forces for greater mobility would be thwarted if the means to travel more were not available. Local bus services have reduced by 16% but non-local bus and coach services grown by 125% since 1960⁴¹. Train services have intensified by 50% over the last thirty years, with an increase in train kilometres run from 300m in 1975⁴² to approaching 460m in 2006/07⁴³ and the number of stations from 2,358 in 1975⁴⁴ to 2,520 today⁴⁵ (+7%).

The most significant factor in increasing accessibility is the growth in car ownership described above, but also the vehicles themselves have improved enormously over the last fifty years. Driving is safer, noise levels are lower, exhaust emissions are much reduced, fuel consumption has improved and on road performance is much better. Riding in cars is also much more comfortable than it was fifty years ago. The proportionately greatest improvement has been in reducing emissions followed by safety and vehicle performance⁴⁶.

The construction of the Motorway network has transformed long distance road travel. Comparative information on average journey speeds on the strategic road network in 1958 and today are not available but a comparison of inter-urban coach timetables for 1959 and 2006 shows that, of the 175 journeys analysed, only four took longer in 2006.

These were between places such as Oxford and Cambridge and Brighton and Dover where the Motorway network has little to offer. For the rest the improved travel times varied; but on average speeds were about 25 kph higher.

More recently since 1995 traffic speeds on Motorways however have fallen slightly, as have those on all-purpose trunk roads⁴⁷. In urban areas traffic speeds have changed little since 1999/2000 apart from a slight deterioration in the peak⁴⁸.

³⁹ Independent Transport Commission (2004) figure 4.

⁴⁰ Independent Transport Commission (2004) p14.

⁴¹ Department for Transport (2007d) Annex A table 4.

⁴² Department of Transport (1983a).

⁴³ Office of the Rail Regulator (2007) table 1.4.

⁴⁴ Department of Transport (1984) table 3.12.

⁴⁵ Department for Transport (2007d) table D.

⁴⁶ Bayliss D (2008), p16.

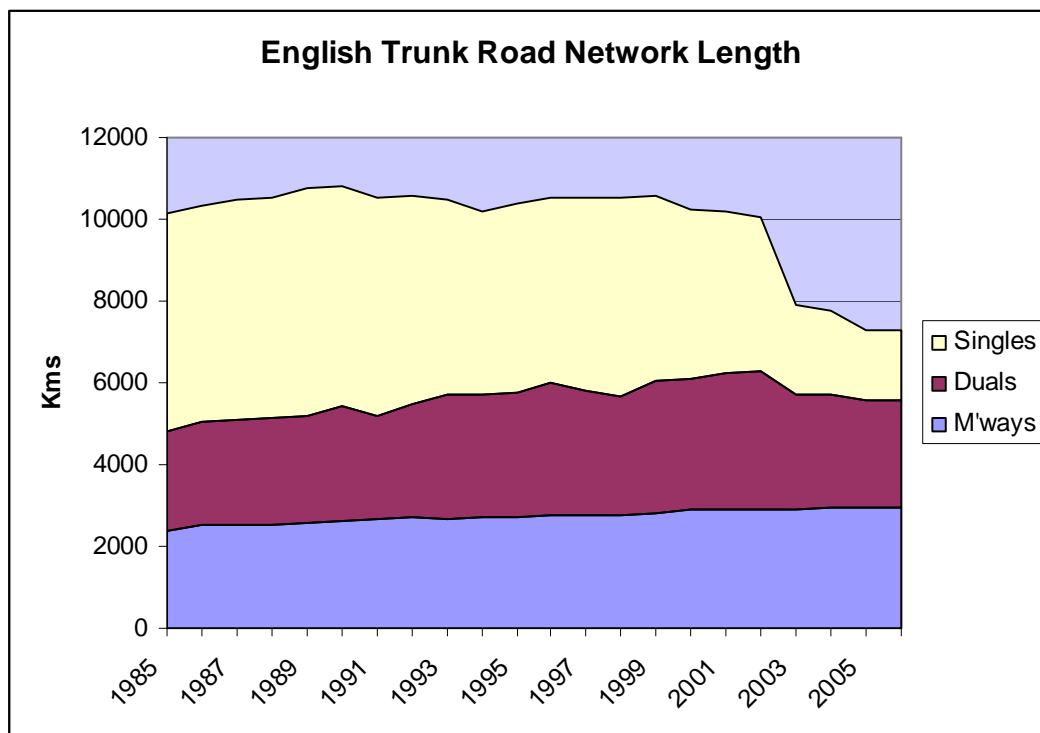
⁴⁷ Department for Transport (2006b) table 12.

⁴⁸ Department for Transport (2005a) table 6.

Improvements in the accessibility provided by the road network include both capacity and changes in speeds. It is not possible to track changes in the capacity of the trunk road network as the necessary data are not available and there is a major complication from reclassification.

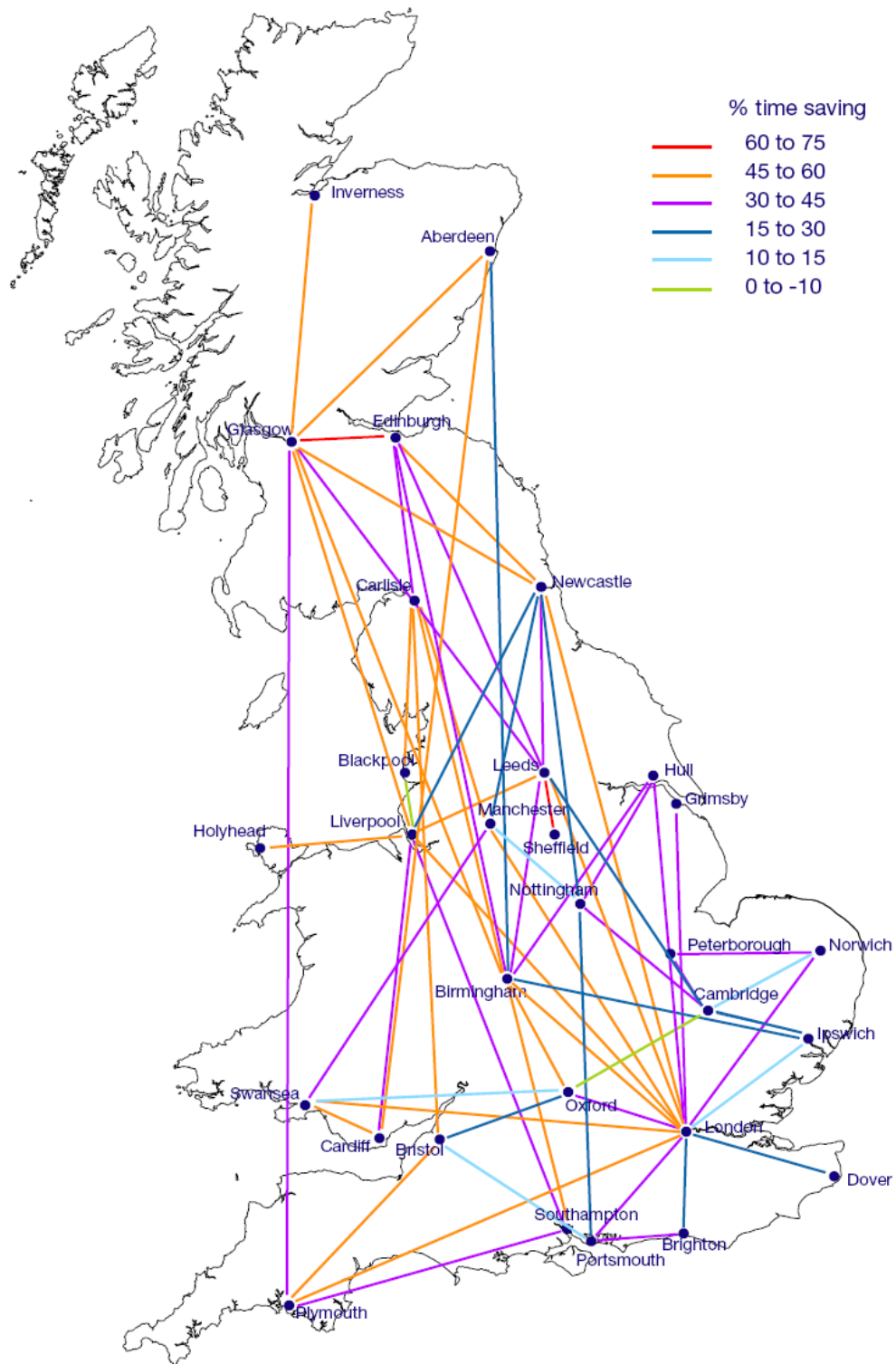
Looking back at the English trunk road network over the last twenty years or so the length of the trunk road network has reduced: notable as a result of the de-trunking of many rural single carriageway trunk roads in 2002 as can be seen in figure 13.

Figure 13: Changes in the Length of different types of English Trunk Roads 1985 – 2006



Sources; TSGBs 1975 - 1985 to 2007.

Figure 14: Coach Journey Timetable Differences 1959 - 2006



Sources: National Express (1959) and National Express (2006)

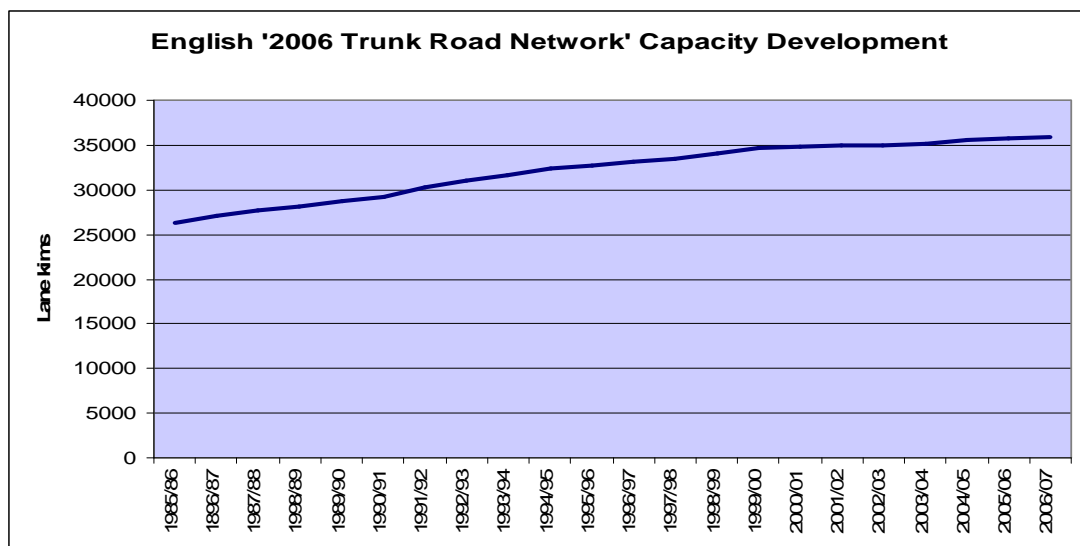
However the core network has been strengthened. Taking the 2006 English trunk road network, figure 13 shows how this has grown in capacity (measured in lane kilometres). The growth is based on the assumption that all the additional capacity built since 1985 was added to the network as it existed in 2006. In practice some of the capacity may have been on those sections of the network that have been de-trunked in the meantime, but this is probably very small and therefore will not change the picture in figure 13 significantly.

On this basis the capacity of the network gauged by lane kilometres has increased by 36% since 1985 whilst the traffic has almost certainly doubled. The rest of the road network has grown substantially – largely as a result of new residential and commercial access roads.

On this scale Motorways are inconspicuous as they make up less than 1% of the length of the overall network. The trunk and principal road network – what might be called the main road system - has reduced from 14% of the total in 1956 to 12¾% currently.

Accessibility of air travel has improved with an increase in the number of airports with scheduled services increasing from 44 in 1974⁴⁹ to 56 today⁵⁰; and the number of flights increasing from 480 thousand in 1964, to 710 thousand in 1974⁵¹ to 2,494 thousand in 2007⁵².

Figure 15: Growth in Lane Kilometres of the English 2006 Trunk Road Network



Source: TSGBs 1995-96 to 2007 & HA (2008c).

⁴⁹ Department of Transport (1975) table 124.

⁵⁰ CAA (2008) table 01.

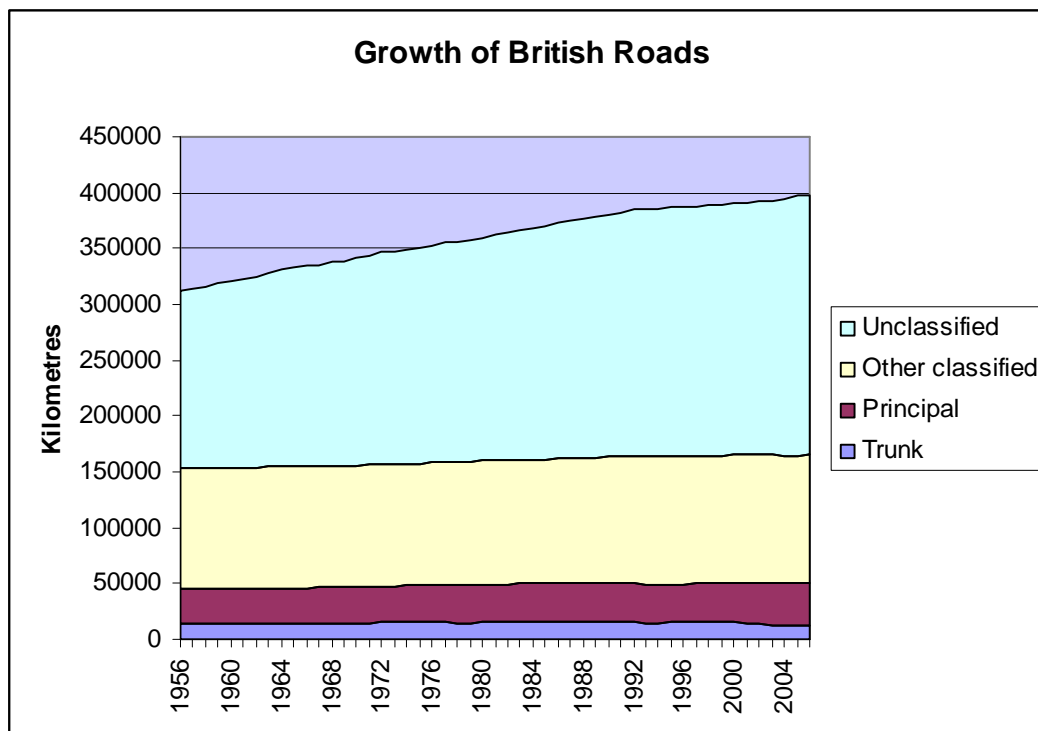
⁵¹ Department of Transport (1975) table 124.

⁵² CAA (2008) table 02.

Accessibility to public transport for people with mobility difficulties has improved in recent years with the growing use of low-floored buses and easier access to rail. Also specialised ‘on demand’ public transport services have become increasingly common. The establishment of a national concessionary fares scheme⁵³ is also expected to increase bus travel use by eligible elderly and disabled people.

The growth in the number of cars has not always been matched by increased parking capacity – especially in busy centres where parking capacity restrictions, regulation and pricing are frequently used to reduce car access to congested areas. On the other hand the increased provision of station car parking has increased accessibility to the growing number of people with access to a car⁵⁴.

Figure 16: Growth of the British Road System 1956 – 2006



Source: Department for Transport (2007a) table 7.1 (discontinuities smoothed out)

Prices

Spending on transport has been a major item of family expenditure over many years. In 1957 8% of income was spent on transport – less than a third of that on food and drink.

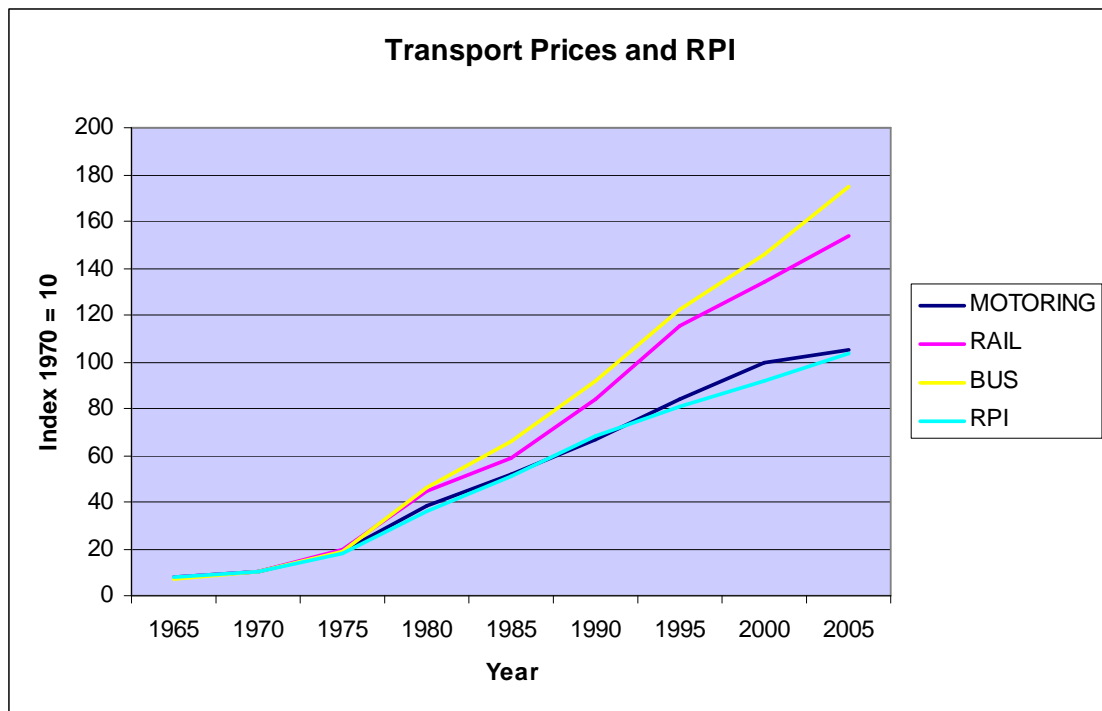
⁵³ Concessionary Bus Travel Act 2007

⁵⁴ Bayliss D (2008), page 15.

By 1977, with the rapid growth in car ownership this has grown to 14% where it remains today⁵⁵: making the price of transport an important matter for families. Figure 16 shows how transport costs have moved over the last forty years in relation to prices generally. Motoring costs have moved broadly in line with the Retail Price Index but public transport prices have increased more rapidly. The cost of rail travel has risen by 45% more than that by car and bus by 85% more than by car since the mid 1960s. This has been a factor in the declining use of buses but it does not seem to have had the same dampening effect on rail.

Concessionary fares on local buses after the morning peak are available to people over 60 and those with disabilities so these groups have been protected from the price increases on buses. The recent introduction of a national scheme is likely to increase demand for bus travel by approximately eleven million for people in these groups.

Figure 17: Growth in Transport and Retail Prices 1965 – 2005



Sources: Department of Transport (1975) table 8, Department of Transport (1984) table 1.12., Department of Transport (1996) table 1.21a & Department for Transport (2007a) table 1.19.

⁵⁵ National Statistics 2008 tables A and 3.3E.

Growth in Freight Transport

Freight transport (measured as tonne kilometres) has grown by almost 2¾ times since 1955. This is as a result of both more goods being shifted (about 1⅔ times) and longer hauls (about 1⅔ times)⁵⁶. The growth in goods lifted has been caused by the introduction of pipelines for the carriage of bulk liquids (mainly petroleum products), and an increase in the use of inland and coastal waterways - but mainly as a result of the growth in road freight. Rail freight has declined substantially for reasons discussed below.

The expansion of road freight was at its most rapid in the 1960s and the 1980s. Growth during the 1970s was more sluggish partly, no doubt, to the sharp increase in road fuel prices and economic effects of the 'oil crisis' in the mid 1970s. Fuel (cash) prices doubled between 1973 and 1976⁵⁷ and Gross Value Added in the national economy barely changed between 1973 and 1977⁵⁸. By 1980 the economy had started to pick up again and the effects of the Motorway building programme, which doubled the length of the system during the 1970s⁵⁹, was making the long distance shipment of goods by road, cheaper, faster and more reliable.

Changes in Goods Carried and Modal Use

The structure of the economy has changed over the last half century. Employment in manufacturing has fallen from 9 million in the mid 1950s to 3.2 million today, whilst employment in service industries has almost doubled from 11 million to 21½ million in 2005⁶⁰. This has meant a reduction in the movement of raw and semi-finished material to factories and more, lighter and service movements.

Some types of freight transport have particular affinities with particular products, so their use is strongly linked to the production and consumption of these. The most obvious examples are pipelines, which despite attempts to use them for the movements of solid materials, are used almost entirely for the transshipment of liquids and gas. Pipelines also transport huge volumes of water and sewage - but this does not figure in national transport statistics⁶¹. Also coastal shipping has expanded to shift sea-dredged aggregates and to supply oilrigs.

⁵⁶ Department of Transport (2007a) table 4.1.

⁵⁷ AA (2006).

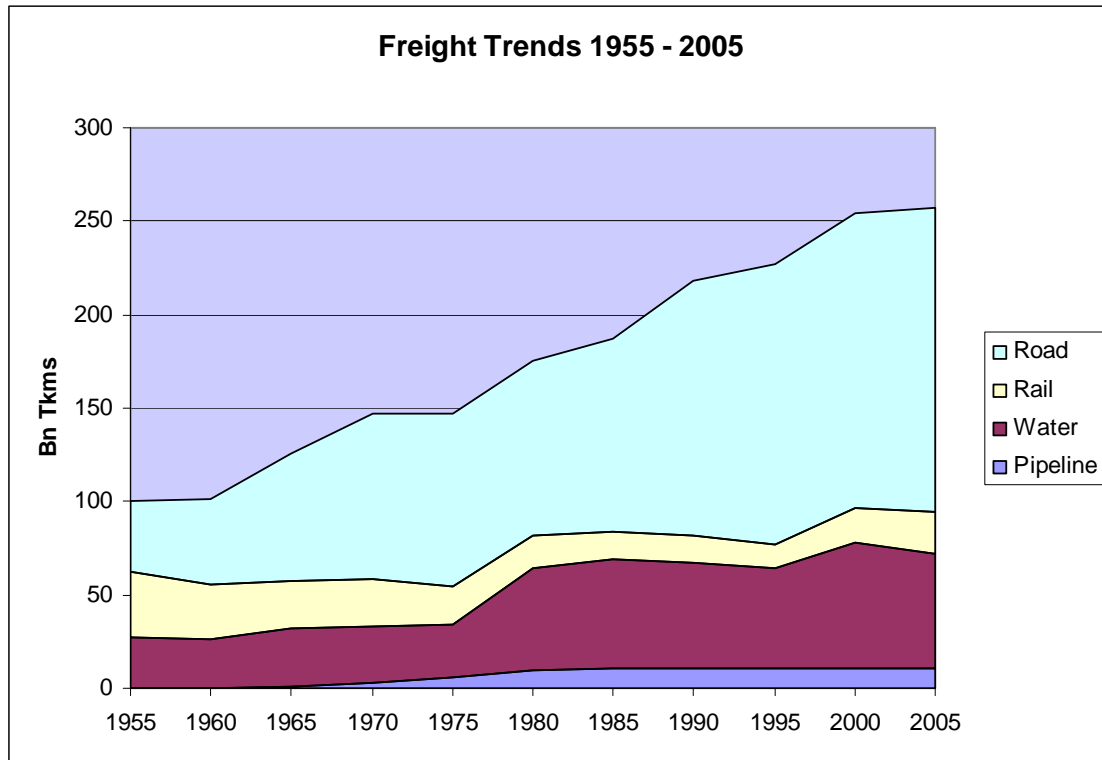
⁵⁸ National statistics (2008a).

⁵⁹ Department of Transport (2007a) table 7.6.

⁶⁰ The Economist (1997) p76/77 & National Statistics (2006b) figure 4.13.

⁶¹ About 12.3 million tonnes of water is piped to premises each day in Britain (OFWAT {2007}, *Security of Supply 2007-07 Report*, Birmingham.)

Figure 18: Changes in Modal use for Freight Transport in GB -1955 to 2005 (bn tkms)



Source: Department for Transport (2007a) table 4.1.

The relationship between products shipped and the modes used is illustrated in table 2. Taking coal as an example there were eight hundred and fifty underground mines in 1955, which produced about 210m tonnes that year. Today there are only 19 mines producing a little over 8 million tonnes annually. The output of open cast coalmines has also fallen from 11m to 8.4m tonnes since 1956⁶². As rail was the principle means of shipping coal from mines to power stations and local and regional distribution depots that decline has had serious implications for rail coal and coke freight with it shrinking from 12 billion tkms in 1962⁶³ to 8.8 billion tkms in 2006. The pattern of traffic has also changed with the sharp reduction in shipments from domestic mines being offset by carriage of imported coal from coastal ports.

⁶² The Coal Authority (2008).

⁶³ Department of the Environment (1976) table 18.

Table 2: Use of Transport by Product Type, (bn tkms), Great Britain 2005

Product	Road	Rail	Water	Pipelines	All
Petroleum products	5.6	1.5	37.8	10.8	55.7
Coal & Coke	1.3	8.8	0.5	0.0	10.6
Foodstuffs & Fodder	36.3	-	-	-	-
Machinery & Manufactured Products	67.3	-	-	-	-
Metal Products	6.3	2.1	0.2	-	8.6
Chemicals & Fertilizers	7.8	-	1.2	-	-
Other	42.3	8.3	12.1	-	62.7
Total	166.9	20.7	51.8	10.8	250.2

Sources: Department for Transport (2007a) tables 4.2 & 4.3 & Department for Transport (2007g) table 1.2.

Incidentally the reduction in domestic solid fuel consumption (with the spread of oil and gas fired central heating) released railway sidings, used for the transshipment of coal from rail wagons to carts and lorries, for conversion to station car parks thereby stimulating 'park and ride' rail passenger traffic.

Over the last twenty-five years the shipment of food products, minerals and building materials as well as machinery and manufactured products, where road carries the lions' share, has doubled; whilst that of other products has grown by only 15%⁶⁴.

The Growth of Road Freight

The increased use of road freight also reflects changes in logistics, with stock levels being reduced and shipment becoming an integral part of the supply chain for an increasing number of production and distribution activities: the ratio of stock to turnover fell by 40% between 1986 and 2004⁶⁵. Also lorries have increased in size with changes to the permitted maximum weight over recent years with the upper weight limit of a six axle articulated lorry now at 44 tonnes. Since 1980, when they were first permitted on Britain's roads, the number of lorries over 33 tonnes Gross Vehicle Weight (GVW) has increased to about one hundred thousand and comprise 23% of the lorry parc⁶⁶. However these vehicles carry over 72% of tonne kilometres and with an average haul length of 124 kms⁶⁷ are natural users of the Motorway network - with 58% of travel on motorways compared with only 19% for other vehicles.

⁶⁴ Department of Transport (1981) table 1.6 & Department for Transport (2007a) table 4.2.

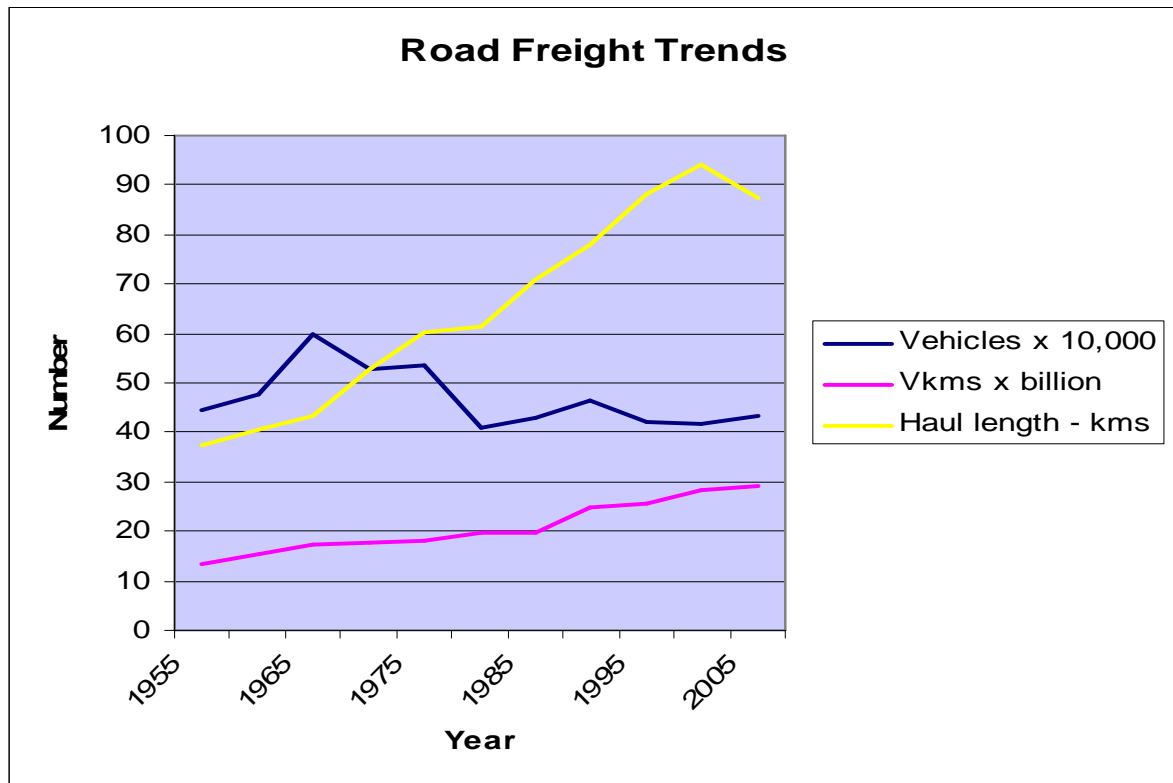
⁶⁵ Department for Transport (2006d) chart 1.1.

⁶⁶ Department for Transport (2007e) table 1.2.

⁶⁷ Department for Transport (2007e) tables 1.6 & 1.8.

Looked at another way, whilst articulated lorries form less than 3% of traffic generally, they make up over 8% of Motorway traffic⁶⁸.

Figure 19: Road Freight Trends 1955 – 2005



Source: Department for Transport (2007a) table 4.1, 7.1 & 9.1.

Despite the image of lorries as a major cause of traffic congestion, their *numbers* have not changed that much over the years, with slow but steady growth up ‘till the late 1960s, followed by a two decades of relative stability then a decade of decline, with some growth since the turn of the century. It is clear from figure 16 that average distance covered by Heavy Goods Vehicles (HGVs) in a year has been increasing and now, at 65¼ thousand kms a year, it is 2¼ times what it was in the mid 1950s and the average lengths of haul have increased substantially⁶⁹.

⁶⁸ Department for Transport (2007a) table 7.4.

⁶⁹ N.B. a change in the statistical series in 2004 means comparisons with earlier year should be made with caution

Heavy goods traffic now comprises barely 6% of all vehicle kilometres although its representation on trunk roads and Motorways is greater where it comprises 11% of vehicle kilometres, compared with only 3¼% on other roads⁷⁰, and an even higher figure if its passenger car units (PCU)⁷¹ weighting is taken into account.

Of the 156 bn tkms of lorry traffic in 2006, 38% was for the carriage of miscellaneous goods (semi and fully manufactured articles, furniture, waste, equipment, post and parcels) 27% for food drink and tobacco (mainly agricultural products and packaged food), 27% for bulk products (mainly aggregates and building materials) and 8% for chemicals, petrol and fertilizer (mainly petroleum products)⁷² with an average haul length of 86kms⁷³. However over half the goods lifted were carried less than 50kms, although road freight with haul lengths over 50kms makes up 87% of lorry tonne kilometres⁷⁴.

This growth in road freight has been associated with increasing sophistication of the road freight industry. More companies now use general hauliers who now carry 72% of road freight compared with 61% twenty-five years ago⁷⁵. Many of these are specialist logistics companies, which provide integrated transport services and provide other value added activities. As such it is common nowadays for Third Party Logistics Managers (TPMLs) to operate as part of the 'production' process as well as handling shipments and distribution. These trends have led to 'lean' operations in manufacturing and commerce in which the flexibility of road transport has come into its own and, whilst other modes of land transport are used by TPLMs, the control and flexibility of road transport puts it at a distinct advantage for many shipment purposes⁷⁶.

With the growth in overseas trade, which the expanding European Union and European Free Trade Area have stimulated, there has been an increase in shipments between Great Britain and the Continent and greater numbers of overseas based road vehicles using British roads. Over the period 1955 to 2005 imports and exports of goods increased from £6½bn at current prices to £490bn⁷⁷ - a real growth of 4½xs if adjusted for price increases. Between 1993 and 2003 the number of foreign lorries travelling to Great Britain increased by 232%⁷⁸. These vehicles carried out 10.2bn tkms of freight transport in 2003⁷⁹ compared with a total of 159bn tkms for all road freight.

⁷⁰ Department for Transport (2007a) table 7.4.

⁷¹ Passenger Car Units (PCUs) are a means of weighting vehicle types to reflect their relative effects on road and junction capacities.

⁷² Department for Transport (2007e) table 1.14b.

⁷³ Department for Transport (2007e) table 1.14c.

⁷⁴ Department for Transport (2007e) tables 1.24.

⁷⁵ Department for Transport (2007e) table 1.8.

⁷⁶ European Council of Applied Sciences and Engineering (2000) p181.

⁷⁷ National Statistics (2007d).

⁷⁸ Department for Transport (2003a) Introduction para 1.

⁷⁹ Department for Transport (2003a) table 2.1b.

Most of this travel (68%) was on Motorways which is not surprising given that their average round trip on British soil was 640 kms⁸⁰ in length and most drivers visit the UK less than once a month and so are less likely to be familiar with the general road system. Also 90% of the goods moved are carried by very heavy lorries (over 38 tonnes GVW).

These vehicles brought more goods into GB than they carried out – 20 million tonnes compared with 9.4 million tonnes⁸¹ with carriage from France, Netherlands and the Republic of Ireland making up almost half the total⁸². The mix of goods carried differs from domestic traffic in that, whilst the proportions of food, drink & tobacco and chemicals, petrol & fertilizer are much the same, as would be expected, the proportion of bulk materials is substantially lower (18% compared with 27%) and miscellaneous products significantly higher⁸³ (47% compared with 37%).

Vans and Van Traffic

Whilst the use of heavy lorries for the shipment of goods has increased since the late 1950s a more recent phenomenon has been the growth in the use of vans. Figure 20 shows the growth in the number of light goods vehicles and their use since 1955.

The definition of 'van' is not precise as the distinction between certain types of vehicles used as private cars and vans is difficult to make. Also with some Light Goods Vehicles (LGVs) weighing almost 3½ tonnes these can be regarded as small lorries. The number of company-registered vehicles with van type bodies⁸⁴ was 1.375 million in 2004⁸⁵ and the number of privately owned vans in 2003 (Q1) was 0.99m⁸⁶ compared with the total number of LGVs of 3.0m. The growth in the number of LGVs since 1956 of over 4½ times compares with a 5% decline in the numbers of Lorries⁸⁷ and LGV traffic has grown 2½ times as fast as lorry traffic. The average distance driven by vans has also increased since 1955 from 15¼ thousand kms/year to 21 thousand. Of all van traffic, company owned vans comprise 73%⁸⁸.

⁸⁰ Department for Transport (2003a) Summary.

⁸¹ Department for Transport (2003a) Summary.

⁸² Department for Transport (2003a) table 2.1b.

⁸³ Department for Transport (2007e) table 1.14b & Department for Transport (2003a) table 3.2.

⁸⁴ Department for Transport (2005c) – Definitions.

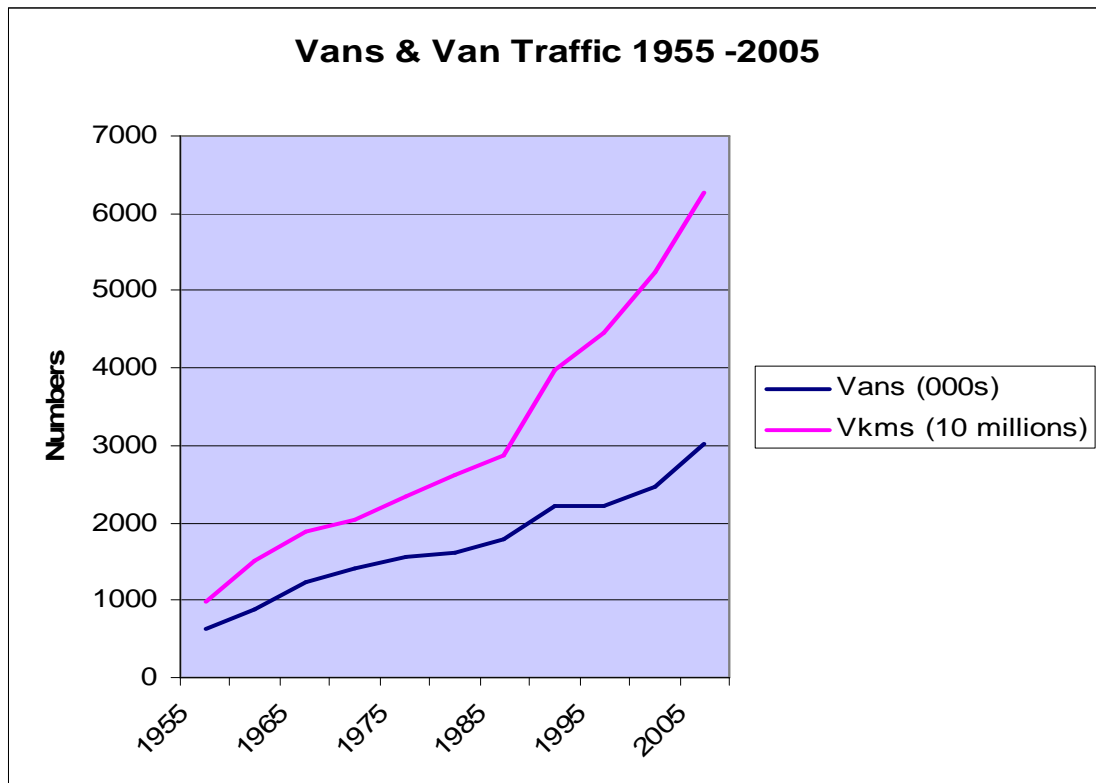
⁸⁵ Department for Transport (2005c) table A4.

⁸⁶ Department for Transport (2004) table A3.

⁸⁷ Department for Transport (2007a) table 9.1.

⁸⁸ Department for Transport (2004) table 8, Department for Transport (2005e) & unpublished data from the DfT.

Figure 20: Number of LGVs and Volumes of LGV Traffic in Great Britain



Source: TSGB 2007 tables 7.1 & 9.1.

Many of these company owned vans are kept overnight at the drivers' homes and so almost a third of travel is driving between homes and places of work. A similar proportion is involved in the collection and distribution of goods, with a quarter of distance travelled in moving between jobs⁸⁹. Over four fifths of private van travel is to and from work⁹⁰.

Construction activity leads the field of company owned van use with almost a third of van travel (10.6bn vkms), followed by wholesale/retail/repairs/hotels with a fifth⁹¹. Not surprisingly, given the importance of construction, the largest use of vans is for carrying tools, equipment and other materials with only miscellaneous products, mail & parcels and foodstuffs exceeding 4% of the total traffic; showing how diverse the purposes for which vans are used. Household shopping, which might be expected to figure significantly given the recent rise in internet shopping, only accounts for 0.2% of the total; probably because most internet, telephone and catalogue shipments are classed as mail and parcels⁹².

⁸⁹ Department for Transport (2005c) figure 1.

⁹⁰ Department for Transport (2004)

⁹¹ Department for Transport (2005c) table 3.

⁹² Department for Transport (2005c) table 4.

It is perhaps surprising that the average length of company van journeys is 36kms with some purposes (collection and delivery of goods), at 86kms, being much longer⁹³. However it must be remembered that many van journeys are round trips in which more than one delivery/collection is made en route.

Privately owned vans travel has a shorter average trip length of 18kms and 17% of use is for personal travel and 38% on business or travelling between jobs.

There has long been a degree of 'virtual' shopping in Britain through the use of postal catalogues and telephone purchases. However this has expanded over the last decade or so through the use of the Internet, which has been enabled by the growth in home computers and increasingly fast Internet connections. At the end of 2006 69% of homes had a computer, 61% were connected to the Internet and 51% had broadband⁹⁴. In 2006 Internet sales rose to £130bn⁹⁵. Internet sales to households more than trebled from £6.2bn in 2002 to £21.4bn in 2005⁹⁶ of which over £16bn were physical products requiring delivery⁹⁷. If these grew at the average rate of Internet sales between 2005 and 2006 (29%) they would have reached £27.6bn and can safely be assumed to exceed £30bn today. If the average value of each purchase were £50 this would require 600 million deliveries a year. Although it is too early to be certain it appears that this may be associated with a reduction in the number of shopping journeys, which have declined by 13% since the mid 1990s⁹⁸ after a period of relative stability⁹⁹. The growth of van traffic during this period of Internet development has been particularly striking with an increase of almost 20% between 2000 and 2005, compared with only 5½% for other motorised road traffic; increasing their proportion of traffic from 10% to 13% since 1995¹⁰⁰.

Future Prospects

Whilst the *pace* of travel demand growth may well reduce in future some further increase is to be expected. The population and numbers of households continue to increase with the number of people in Britain anticipated to increase from 58.85m in 2006¹⁰¹ to 69.1m in 2031 (+17%).

⁹³ Department for Transport (2005c) table 1.

⁹⁴ National Statistics (2007c).

⁹⁵ National Statistics (2007d).

⁹⁶ National Statistics (2006).

⁹⁷ National Statistics (2006).

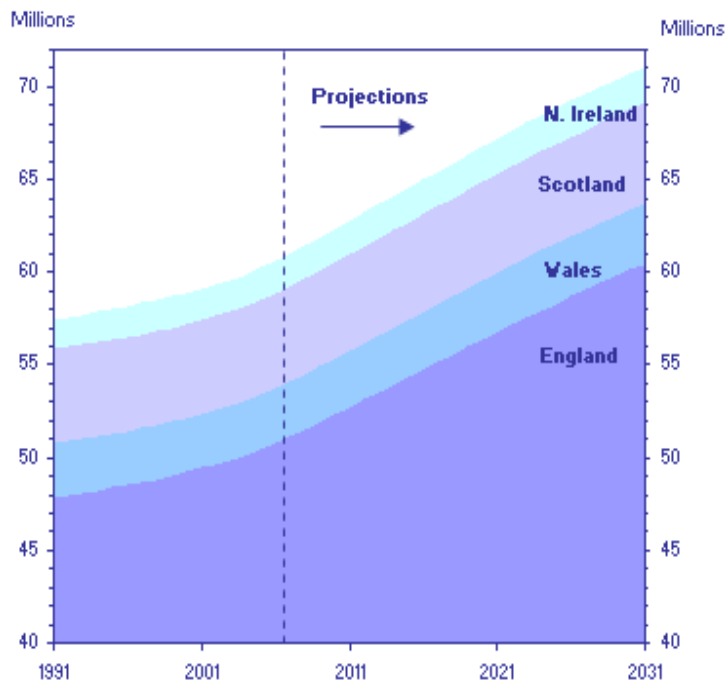
⁹⁸ Department for Transport (2007c) table 4.1.

⁹⁹ Department for Environment Transport and the Regions (2000) table 4.1.

¹⁰⁰ Department for Transport (2007a) table 7.1.

¹⁰¹ National Statistics (2008d).

Figure 21: Population Trends & Projections for the UK 1991 – 2031



Source: National Statistics { <http://www.statistics.gov.uk/cci/nugget.asp?id=1352> }

The number of households will also increase perhaps to 28 million by 2021¹⁰², from 25.29m in 2006, and 30m by 2031 (19%) or even greater. Real incomes can also be expected to grow. An average annual increase of 2½% up to 2025 is assumed in national transport demand forecasts¹⁰³. In 'Roads and Reality' more conservative income projections to 2041 were made¹⁰⁴ and between 2003 and 2031 real incomes were expected to grow by 77% as illustrated in figure 22.

These developments will result *inter alia* in there being more cars owned. Official forecasts are for 33.5m cars in 2031¹⁰⁵. In Roads and Reality the forecast was slightly higher and is illustrated in figure 23. It seems likely therefore that there will be another 10m cars on our roads before car ownership saturates. This implies a car ownership rate of about 510-cars/thousand population in 2031, which is similar to the current level in the EU15 but below levels in Japan (550), Italy (600) and the USA (780).

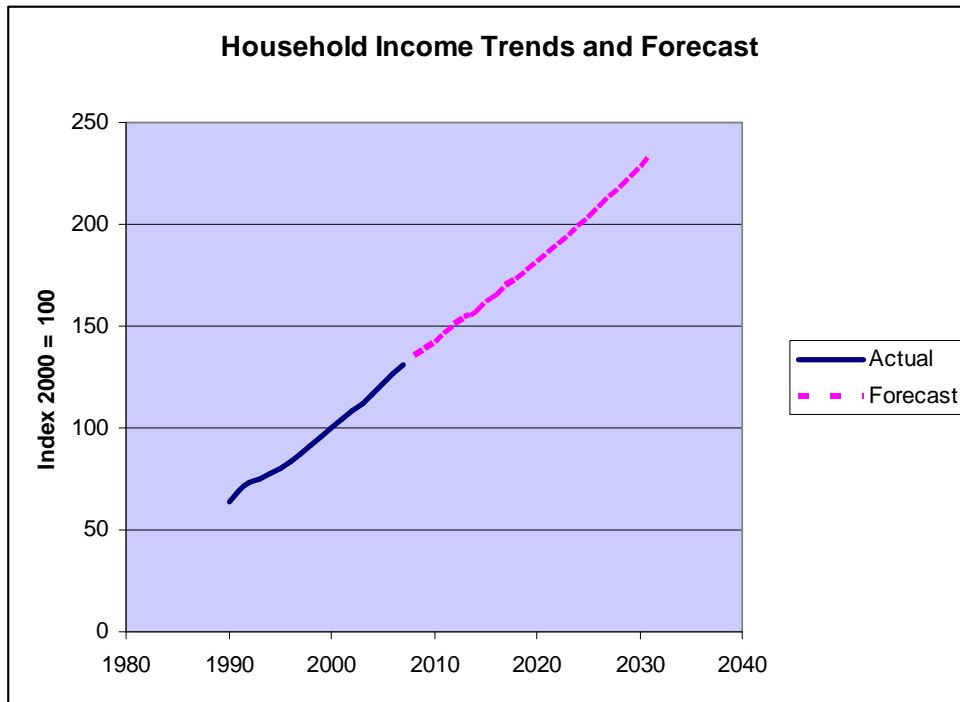
¹⁰² National Statistics (2008b) table 3.16

¹⁰³ Department for Transport (2007j) page 14.

¹⁰⁴ Banks N, Bayliss D & Glaister S (2007) table 3.1.

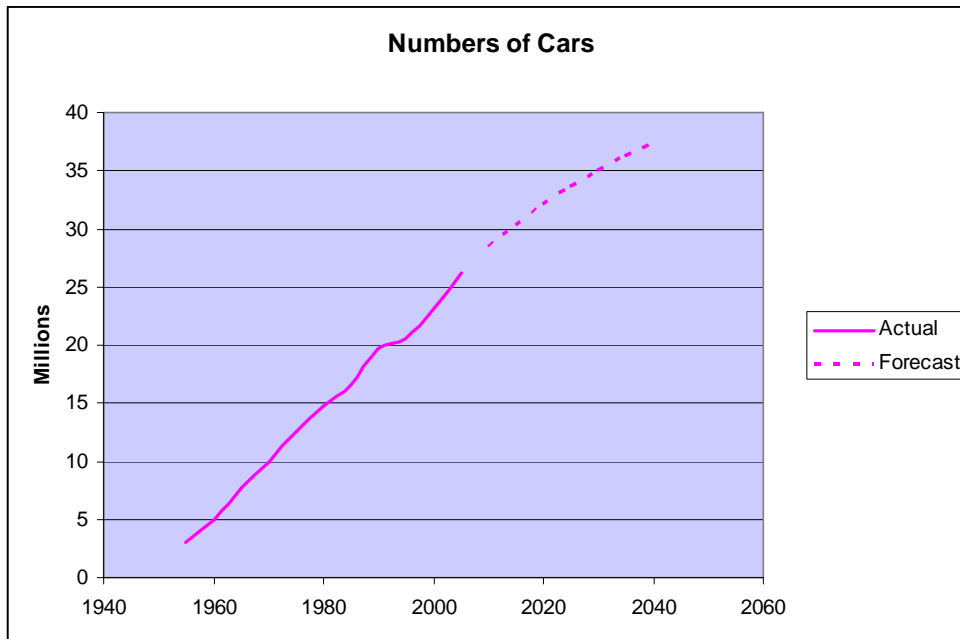
¹⁰⁵ Department of The Environment Transport and the Regions (1998) page2.

Figure 22: Household Income Trends and Forecasts 1990 – 2031



Source: National Statistics (2008f) & Oxford Economics 2006

Figure 23: Actual and Forecasts Numbers of Cars in Britain



Source: Department for Transport (2007a) table 9.1 & Banks, Bayliss & Glaister (2007) Annex 1.

Quite how demand will grow in future is uncertain. The Department for Transport produces travel forecasts for England with its National Transport Model and the road traffic element of these is shown in table 3.

Table 3: Road Traffic Forecasts for England 2003 – 2025

Year	Billion vkms	Increase in Journey Times over 2003
2003	422	-
2010	468	1%
2015	510	3%
2025	553	4%

Sources: Department for Transport (2003b), table 1.3 & Department for Transport (2007j), table 1.

Conclusions

The movement of people and goods has increased in line with the growth of GDP for many years, although it may be that this relationship is weakening at least in respect of lorry traffic. Higher incomes have meant that more people have been able to buy cars and afford to use them. This has been the main reason for increasing personal mobility, which has manifested itself through a complex pattern of changes in travel behaviour. More older people and women drive and use cars as their principle means of transportation and non-drivers benefit from car borne travel which provides them with as much mobility as buses do. Improvements to the road and rail systems have also stimulated personal mobility, which has taken the form of longer and faster journeys but with little change in the number of trips made; nor did the time spent travelling. This has been made possible through switching of journeys from the slower forms of transport (mainly bus and walking) to going by car.

Consequently, whilst car travel has grown, over recent years so has rail travel, albeit to a lesser extent. Local bus travel has declined outside London but long distance bus and coach use has increased steadily. There has also been a revival in the popularity of motorcycling. Of all the means of travel, flying has grown by far the fastest – by about twenty fold since the mid 1950s. The purposes for which people travel has, apart from escort journeys, has not changed markedly.

The use of cars and public transport is different for those living in dense urban areas, the suburbs, smaller towns and in the country. Most people live in suburbs and smaller settlements and this is expected to continue and here cars are firmly entrenched as the dominant means for travel.

Unlike personal travel, freight growth has been a combination of both more goods being shipped and longer journeys.

This has been fuelled by increasing consumption as incomes have risen as well as changes in the structure of the economy with a rapid growth in the movement of food, construction materials and manufactured products shipped by road; and slower growth or decline in heavier bulk products traditionally carried on rail or water. The extension of haul lengths - especially by road - reflects in part the growth of international trade which, in turn, has increased the number of foreign lorries on Britain's roads.

Since the mid 1980s van traffic has more than doubled and it appears that this is being fuelled by the recent growth of Internet shopping, as well as the longer term movement to a more service orientated economy.

More people, more households, higher incomes and more cars mean that this process of increasing travel demand seems set to continue, probably at a slower pace than in the past. Pressure on the transport system will mount and, in turn this may inhibit future growth, which may have implications for mobility.

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