

Draft 12-10-11

Word Count 1900

Mobility, access and choice in urban environments

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The pattern of human habitation has been shaped by the development of transport systems, which in turn has depended on the evolution of transport technologies. Two hundred years ago nearly all travel was on foot. This meant that most people had to live close to where they worked and so had limited choice of dwellings, markets, schools and other facilities. Rising incomes have made possible the widespread adoption of successive technological innovations which permit faster travel and hence more access than is possible by walking – principally bicycles, buses, trams, trains, motorised two-wheelers and cars.

Peter Hall has described how, for each successive development of transport technology, there was a corresponding kind of city, but the relationship was mutual in that the previous growth of the city shaped and constrained the subsequent transport options. Michael Thomson investigated twenty eight cities from five continents and identified five archetypes which reflected geographical features, relative accessibility, development control and dynamic processes. Peter Newman and Jeff Kenworthy distinguish different classes of city according to population density. ‘Walking cities’ were the major urban form for 8000 years and substantial parts of the central areas of many major cities retain this character – dense mixed use areas no more than 5km across. ‘Transit cities’ developed from 1850 to 1950 based on trams and trains, allowing spreading from dense centres 20-30km along rail corridors. ‘Automobile cities’ from the 1950s on could spread further at low density to 50-80km. Newman and Kenworthy find that constant average travel time defines the shape of cities - successive innovations in transport technology have permitted travel at higher speeds, hence greater distances are possible in the limited time available, and lower densities ensue.

Investments in new transport technologies which allow higher speeds of travel have permitted greater access within the time available for travel, and this in turn has

offered increased choice of employment, residence, shopping, leisure and educational facilities, and so forth, within cities, their suburbs and beyond. The findings of the National Travel Survey shown in Figure 1 make clear what has been happening over the past forty years. This survey covers all modes of personal travel by British residents except international travel by air.

[insert Figure 1]

The average number of journeys made has held steady at about 1000 per person per year (pppy). The average time spent travelling has also stayed fairly constant at about 370 hours pppy or an hour a day. What has changed is that the average distance travelled has increased from about 4500 miles pppy in the early 1970s to reach 7000 miles around 1995, since when it has plateaued (aside from a recent dip, probably on account of the economic recession). Although we lack direct data, what we know about social conditions and urban geography would suggest that we could extrapolate back to an average distance travelled of about 1000 miles pppy two hundred years ago, just before the modern era of transport commenced with the first railways in the 1820s. 1000 miles was how far you would go each year on foot, allowing an hour a day for travel. Consistent with this is the contemporary observation that if you stood at London's St Paul's Cathedral in 1800, you could reach the countryside within half an hour in any direction.

We know also from the National Travel Survey that the purposes of journeys have changed little over time. The main purposes, in rank order, are shopping, visiting friends, commuting, education and personal business. So why is it that we travel faster and further for the same purposes? Our need for daily travel is predominantly to gain access to regular destinations outside the home. The faster we can travel, the more choice of each kind of destination we have – choice of jobs accessible from where we live in the time we allow ourselves for travel, choice of homes accessible from where we work, choice of shops, schools and so on. This choice is valuable, which is why speedy travel is attractive. In fact, access and choice increase with the square of the speed of travel, since what is accessible is defined by the area of the circle whose radius is proportional to the speed of travel. On the other hand, choice is

subject to the economic principle of diminishing marginal utility – each extra increment of choice is less valuable than the previous.

This combination of access increasing with the square of the speed and the value of choice governed by diminishing returns implies a saturation of demand for travel, which is what we see in Figure 1. The average distance travelled has not increased since the mid-1990s, following two hundred years of steady growth.

This cessation of growth of travel is not unique to Britain. It is also seen in other developed countries. It is a phenomenon that is helpful for concerns about sustainability, since the transport sector has been seen as less tractable than others as regards reducing carbon emissions. Note, however, that the analysis excludes international travel by air, which is still growing. Note also that thus far we have focused on per capita travel behaviour. It follows that future growth of total daily travel demand will be driven by population growth (and, to a lesser extent by other demographic changes, in particular population ageing).

The population of Britain is currently 62m and is projected to grow to 70m by 2035. A key issue is where the additional population will live and work. Historically, the growth of the housing stock has largely taken place on greenfield sites, on the edges of existing settlements or, on occasion, in the form of entirely new towns. In recent years, however, new housing in Britain has predominantly been erected on ‘brownfield’ sites, that is, on previously developed land. This is the result of national policy that at least 60% of new housing should be provided on previously developed land, as well as of local resistance to greenfield development. Indeed, in 2009 80% of new dwellings, including conversions, were on previously developed land.

New houses on greenfield sites at relatively low densities in pleasant environments, priced to sell, have always been attractive. Car-based mobility is the preferred transport mode. On the other hand, brownfield developments within existing urban boundaries allow little opportunity for additional carriageway construction and thus for car use, particularly when the road network is already congested at times of peak usage. Hence more public transport provision is the natural response to the mobility

needs of growing urban populations. The recent and future development of London illustrates the possibilities.

At the beginning of the nineteenth century the population of London was one million. It grew to over six million by the beginning of the twentieth century, reaching a peak of over eight million by mid-century. There was then a period of decline, with a loss of 1.2m during the 1960s and 1970s, as some people chose suburban and rural lifestyles. After a period of stability in the 1980s, London's population has grown steadily from 6.8m to reach 7.6m by 2008. The forward projection is for continued growth, with around 1.3m more people and more than 750,000 additional jobs by 2031. Population growth has been within the existing urban boundaries, such that 96% of capacity for new housing comes from formerly used sites.

Population growth in London over the past two decades has been accompanied by declining relative car use and increasing popularity of public transport. Figure 2 shows estimates made by Transport for London of the share of journeys by mode, 1993-2008. Private transport has been declining while public transport use has been increasing, with walking and cycling staying level. Note that the total number of car-based trips – driver and passenger - has held steady over the period at about 10m per day, consistent with a fixed amount of road space, but the share of car-based journeys has fallen on account of population growth. Private transport mode share is projected to decline to 37% by 2031, from the present 41%, compared with a peak of car use in London of 50% of all trips in the early 1990s.

[insert Figure 2]

This decline in mode share for car use in London reflects the revival in urban living in recent years, for which the car is less central. The relegation of the car is most marked in the urban regeneration that has taken place in the former Docklands area, where redevelopment was catalysed by crucial rail-based transport developments – the Docklands Light Railway and subsequently the extension of the underground Jubilee Line followed by renovation of surface Overground system. This rendered Canary Wharf readily accessible – ten minutes travel time – from the historic financial centre of the City, with the result that a second financial district has grown

up over a twenty year period, with a working population of approaching 100,000. There are only 3000 car parking spaces at Canary Wharf, reflecting the very large reliance on urban rail travel, with a further underground line – Crossrail – under construction.

The trend of declining car use in London is remarkable. Historically and globally, as incomes have grown so has car use. Yet in London, a world city with a vibrant economy and median incomes in the inner boroughs 50% above the national average, this trend has gone into reverse. The relative decline in car use in London has been fostered by the provision of more and better public transport, but also by a number of circumstances that constrain car use, in particular: a fixed road network, with a greater share of carriageway allocated to bus lanes; enforced restrictions on, and general charging for, parking during working hours; and the Central London Congestion Charging scheme. The increasing population density implies smaller catchment areas, whether for schools or supermarkets, which in turn allows readier access by walking, cycling and public transport.

The trend of increasing urban density in inner city areas first seen in London has spread to other economically buoyant British cities over the past decade, including Manchester, Nottingham, Bristol and Sheffield, as employment in finance and business services has grown. This reflects a break from the previous long term trend of declining inner city populations and shift of employment to low density residential areas in the urban periphery and beyond.

Globally, there is a trend to urban living, with 50% of the world's population now resident in urban areas, up from 36% in 1970 and projected to grow to 70% by 2050. The experience of London, involving a declining share of journeys by car while population and prosperity are both increasing, potentially has implications for other major urban centres. A high quality public transport system, particularly rail-based for journey time reliability and low emissions, can serve to constrain the historic growth of private transport, even amongst those who can readily afford to own a car. It is noteworthy that London's new financial centre at Canary Wharf has been made possible by new high quality rail transport, which has proved acceptable, despite

overcrowding at times of peak use, to the well-paid staff of the international businesses that have chosen to locate there.

The Government is consulting on a new National Planning Policy Framework. Regrettably, this includes the proposed removal of the current 60% brownfield target for housing development. The existing policy of preferring brownfield sites for housing has been successful in promoting urban regeneration, protecting the countryside, fostering more sustainable travel behaviour, and helping absorb a growing population while minimising the environmental impact. It should be retained.

Figures

Figure 1 Average distance travelled (miles), travel time (hours) and trips, per person per year.

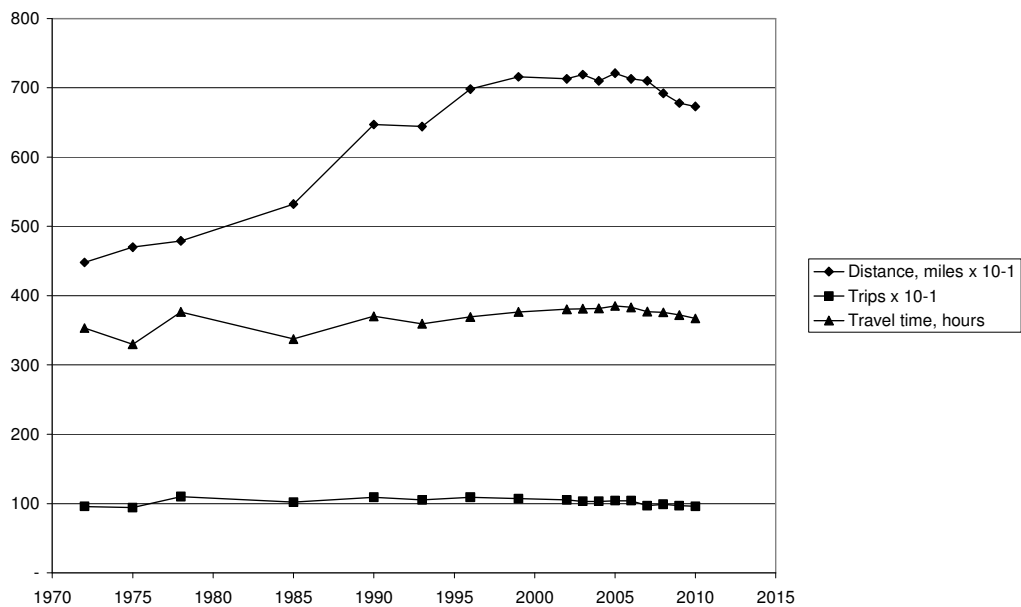


Figure 2 Trip based mode share by main mode in London.

