Residential Development and Sustainable Travel Patterns in the London Region 2011-22: The Widening Price Gap for Sustainable Housing

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Abstract. London's sustainable planning aims are being affected by acute housing affordability challenges. This paper analyses growth patterns in the London region using the new 2021 census data, and tracks progress towards sustainable development policy through classifying areas by their degree of travel sustainability. The results show a dual growth trend: within Greater London, planning authorities have guided growth towards sustainable development sites on the inner-city fringe. Contrastingly in the wider region, most growth is in car dependent semi-rural locations, as many households are priced out of the most accessible inner city and outer town centre locations. Overall there is a complex picture emerging, with housing affordability problems curbing sustainable planning aims at the regional scale, in tandem with post-pandemic changes towards flexible working patterns.

Keywords: Sustainable urban planning, residential location, urban mobility, flexible working, housing markets, post-pandemic behaviour change

1   Introduction

Despite a politically and economically disruptive last decade both globally and nationally for the UK, London and the South East region have continued to grow, with Greater London reaching a record 8.8 million residents in 2021 [1]. The Greater London Authority maintains ambitious proposals for new housing delivery and sustainable travel [2], with the overall aim of achieving 80% of trips by walking, cycling and public transport [3], to be delivered through a general planning framework of transit-oriented development [4], public transport investment and continued expansion of road demand management through congestion and pollution pricing [5].

The densification of Inner London and growth through transit-oriented development has been a successful approach for London planning in the last two decades, delivering substantial economic and population growth overwhelmingly based on public transport travel [6,7]. There are however significant challenges for this success continuing for future decades. The most high-profile problem is the ongoing housing affordability crisis in London [8]. Median house prices in Greater London have risen from £300k in 2011 to £520k in 2022 for an apartment/flat, while for terraced/row housing median prices have nearly doubled from £480k to £900k. Average incomes in the UK during

this period have been relatively static. This situation has priced the majority of households out of accessible urban locations, and acts as a considerable push factor towards suburban fringe and exurban low-density housing. A second more recent issue is how residential preferences have responded post-pandemic, boosting demand for larger properties with home offices and gardens. Given a large increase in hybrid working levels [9], there is very likely an increased tolerance for living further from workplaces. It is uncertain whether this trend will continue into the medium to long term, but there is evidence it has fuelled house price increases in suburban and more rural locations since 2020 [10].

This paper uses the latest Census 2021 data to assess population growth in the London region between 2011-2021, considering the accessibility and car dependency of the locations where growth is occurring to track progress towards sustainable land use planning aims. Growth patterns are then compared to data on house prices to show links between where populations have expanded and locations with better affordability. Finally, the latest travel behaviour data is reviewed to consider whether residential and flexible working changes are translating into travel behaviour changes.

2 Population Growth and Residential Location Change in the London Region 2011-21

2.1 Residential Population Change and Development in Greater London

After several decades of inner-city regeneration and densification, recent development in London has increasingly switched towards sites on the edge of the inner city, particularly in East London and in former industrial riverside sites [11]. We can use the 2021 Census data to assess the overall outcomes of London planning policy in the last decade, with 2021 population density mapped in Figure 1, and population change 2011-21 mapped in Figure 2. Priority development sites (known as Opportunity Areas in the London Plan) are marked on the maps, showing that growth has been directed towards major East London development sites such as Stratford, Canary Wharf and North Greenwich.

Additionally, there is growth in sites connected to the recently opened east-west rail link (the Elizabeth Line) and in a select few Outer London centres such as Croydon (South London) and Wembley and Hendon/Colindale (North West London). These centres were designated Opportunity Areas due to strong public transport accessibility and available land. Overall in sustainable development terms, the 2021 data provides evidence that land use planning functioning effectively within Greater London, delivering new housing in transit accessible locations. London's high-density inner city has expanded eastwards, in addition to the densification of several accessible Outer London centres.
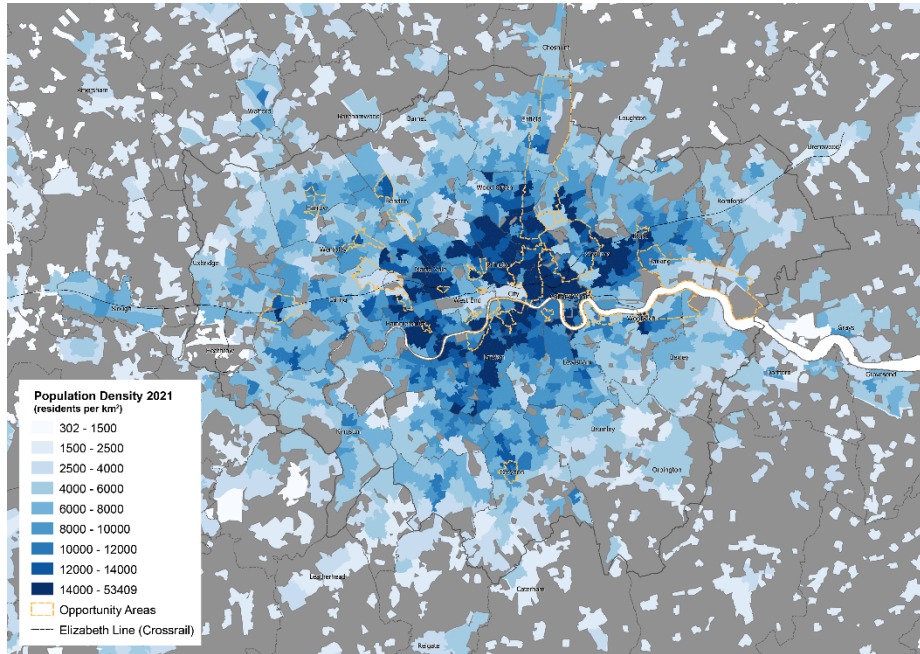
Fig. 1. Greater London Population Density & Opportunity Areas 2021 (Data- Census 2021)
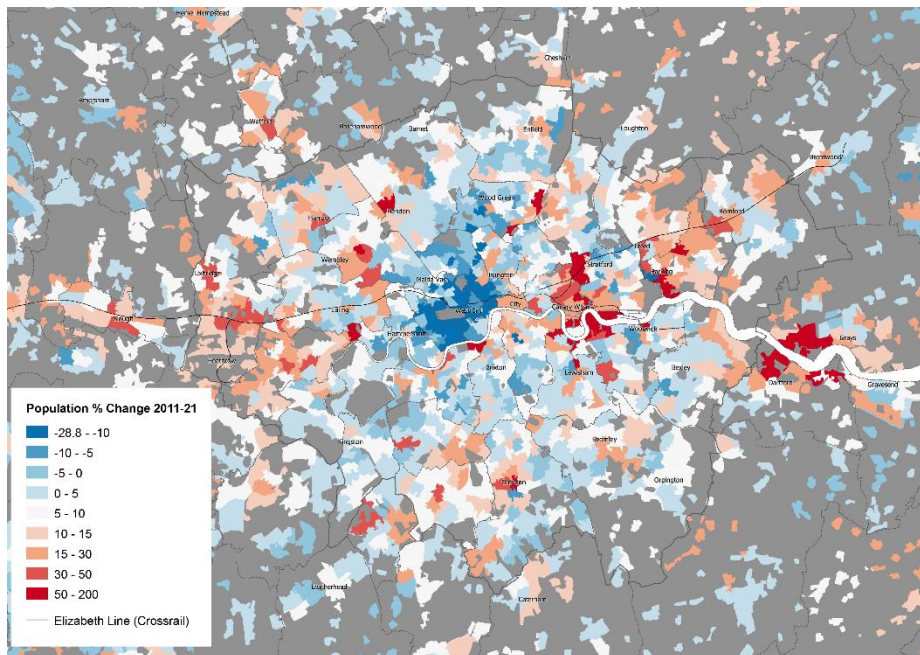

Fig. 2. Greater London Population Change Percentage 2011-21 (Data- Census 2021)

One additional trend of interest is that the Census 2021 data in Figure 2 records population falls in Inner West London in the boroughs of Westminster, Camden and Kensington and Chelsea. This trend is not in line with sustainable development aims of boosting inner city populations. The most likely explanation for the recorded population falls is that the census was conducted in March 2021 when the UK was emerging from a Covid-19 national lockdown, and some inner-city populations (including wealthier second home owners, younger renters and students) had not returned to Inner London during the lockdown [12]. Another alternative explanation is that 'super-gentrification' trends have seen more homes used as investments in London's West End, leading to fewer residents [13]. More data is needed to answer this definitively.

2.2   Residential Population Change in the South East Region

While changes within Greater London are largely in line with sustainable development aims, the wider regional scale shows some contrasting trends. In Figure 3 we repeat the mapping of population change between 2011-21 for the South East region. It is clear that there is significant growth in towns and rural areas at distances around 50-100km from Greater London. This includes smaller cities such as Milton Keynes, Bedford, Swindon and Colchester, as well as many low-density rural areas in Berkshire, Oxfordshire, Bedfordshire, Essex and Kent. Interestingly this growth has largely leapfrogged the traditional commuter belt (which is around 50km from Greater London). We will see in the next section how this leapfrogging is likely due to much higher prices and a lack of development in the Greenbelt surrounding Greater London. These population changes imply that residents are prepared to live at greater distances from London given current prices and potentially in response to new flexibility from remote working. There are a few exceptions where growth can be seen in the commuter belt, in towns such as Dartford, Crawley and Luton. This is again likely linked to the relatively lower prices in these towns (see Section 4).
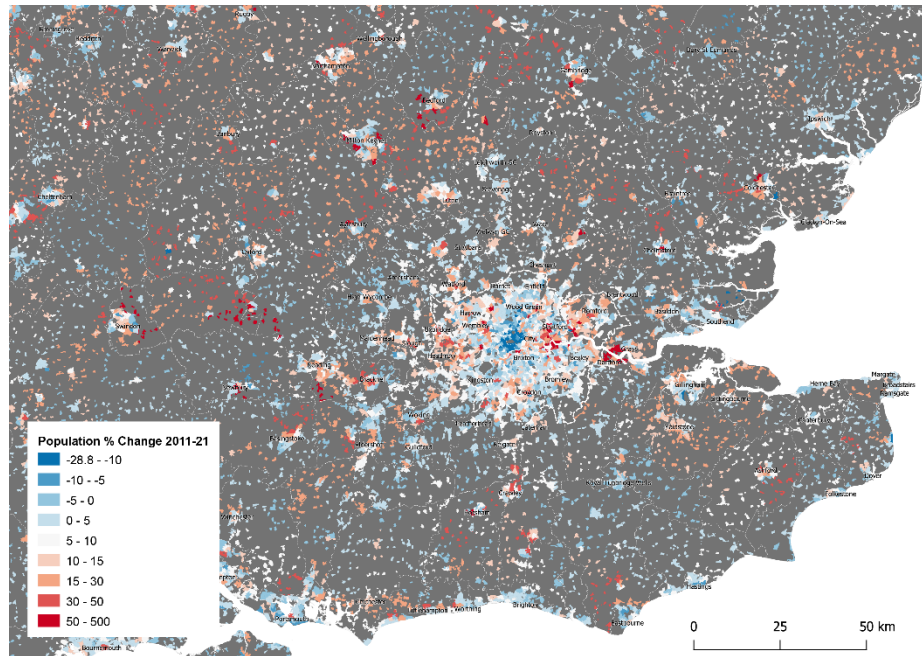
Fig. 3. South East Region Population Change Percentage 2011-21 and Greenbelt (Data- Census 2021)

To try and better understand the regional population changes summarised in Figure 3, we can classify the types of locations where populations are growing. Figure 4 shows a classification of census zones (MSOA scale) in the South East region using transportation sustainability variables from the 2021 census, including car ownership levels; travel to work proportions by car, public transport and active travel (home workers removed); and population and employment density. These variables were normalised and equally weighted in a k-means clustering-based classification producing 6 classes. Classes 1 and 2 represent the most sustainable locations, which are found in Inner London, the inner-city fringe and in the centres of smaller cities in the wider region such as Reading, Brighton and Oxford. Classes 3 and 4 represent suburban locations in Outer London and the commuter belt which have generally high car ownership, though at a medium density and with some transit options. Classes 5 and 6 represent highly car dependent low-density locations which are found in the wider region outside of towns and cities.
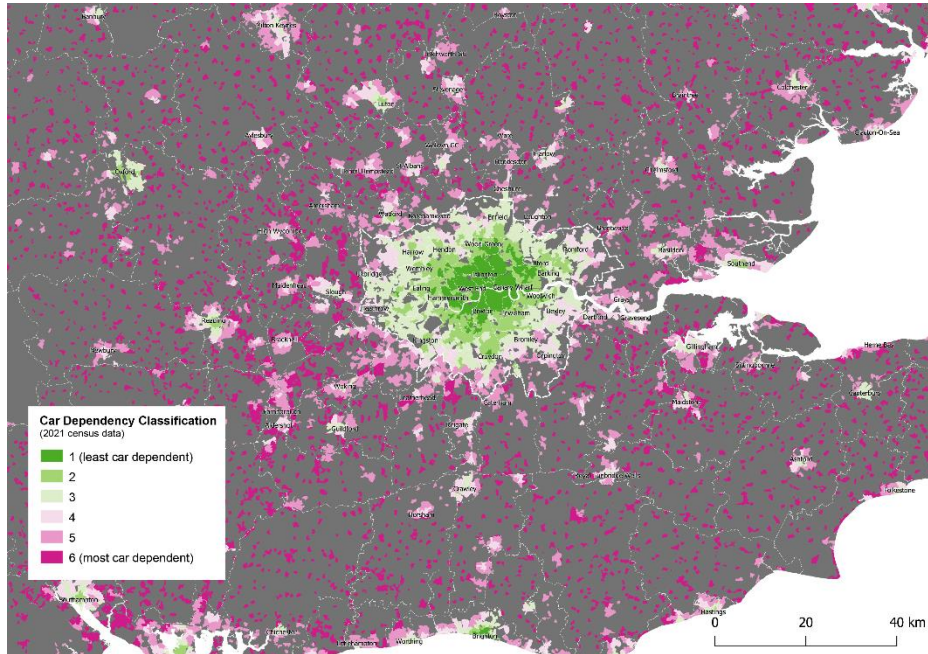
Fig. 4. Classification of Census Zones into Car Dependency/Travel Sustainability Classes Using 2021 Census Data

We can then use these car dependency land use classes to summarise the type of locations where population growth has occurred, as shown in Figure 5 and Table 1. There is growth in all land use classes across the board. The highest growth is in Class 2, which represents inner city fringe areas (overwhelmingly in Greater London), and corresponds with the Opportunity Area led growth in Greater London observed earlier in Section 2.1. There is also significant growth in the most car dependent Classes 5 and 6, linked to the expansion of low-density rural areas in the wider region shown in Figure 3. Overall, we have a polarised growth trend. In Table 1 we can see the highest proportional growth is in classes 2, 3 and 6, and around 41% of total regional growth is in the two most car dependent classes, compared to 30.6% of growth in the most sustainable classes 1 and 2.
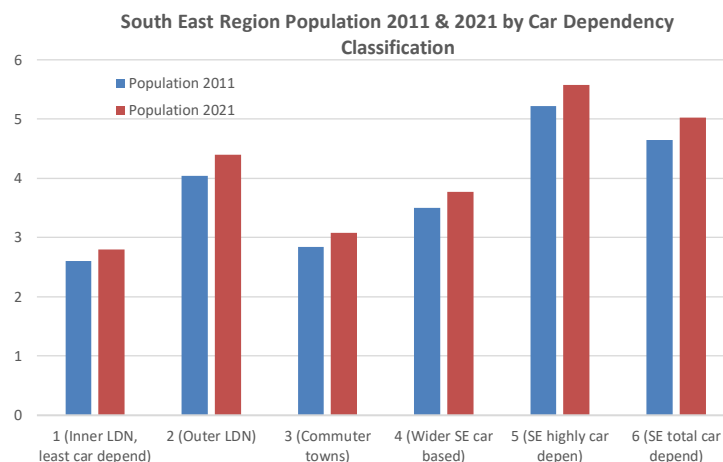
Fig. 5. Population Growth 2011-21 by Car Dependency Classification Groups

Table 1. Population Growth 2011-21 According to the Car Dependency Classification Groups

Car Dependency Group	Population 2011	Population 2021	Pop Change 2011-21	Pop Change 2011-21 %	Change as % of Total Region Growth
1 (Inner LDN, least car dependent)	2,605,691	2,794,194	188,503	7.2	10.5
2 (Inner fringe)	4,037,599	4,396,970	359,371	8.9	20.1
3 (Mixed suburbs)	2,841,957	3,074,131	232,174	8.2	13.0
4 (Suburban car based)	3,497,444	3,769,723	272,279	7.8	15.2
5 (SE highly dependent)	5,215,439	5,573,696	358,257	6.9	20.0
6 (SE most car dependent)	4,646,873	5,024,033	377,160	8.1	21.1
Total	22,845,003	24,632,747	1,787,744	7.8	100

3   Housing Market Analysis

London was already experiencing substantial affordability challenges in 2011, and the situation has become significantly worse in the last decade. We would therefore expect house prices to be playing an influential role in residential location patterns, particularly for first-time buyers (generally younger households, often with children) who have to rely on more affordable options to purchase their first property. Figure 6 gives an overall picture of house price changes in the last 15 years. It shows the remarkable growth in prices from 2010-2016, particularly for Inner London, followed by a generally static picture from 2016-2020, and then another increase in prices in response to the pandemic

demand for larger suburban and rural properties. Average prices in Inner London are now approximately 15 times average incomes [14], thus effectively marking inner city owner occupation an impossibility for all but the wealthiest households (note there are some limited affordable housing options, but with demand hugely outstripping supply). The map of median prices in Figure 7 gives a more detailed geography of affordability. Prices are substantially lower in East London, regional cities/towns such as Milton Keynes, Reading, Luton and Crawley, and in rural areas over 50km from London, beyond the traditional commuter belt. These are all areas of population growth identified earlier in Section 3, and there are clearly many links between population growth and the remaining areas of affordability in the London region. Conversely, the areas with the highest prices and lowest affordability (West London and the rural areas close to Greater London) correspond to areas of low or static population growth.
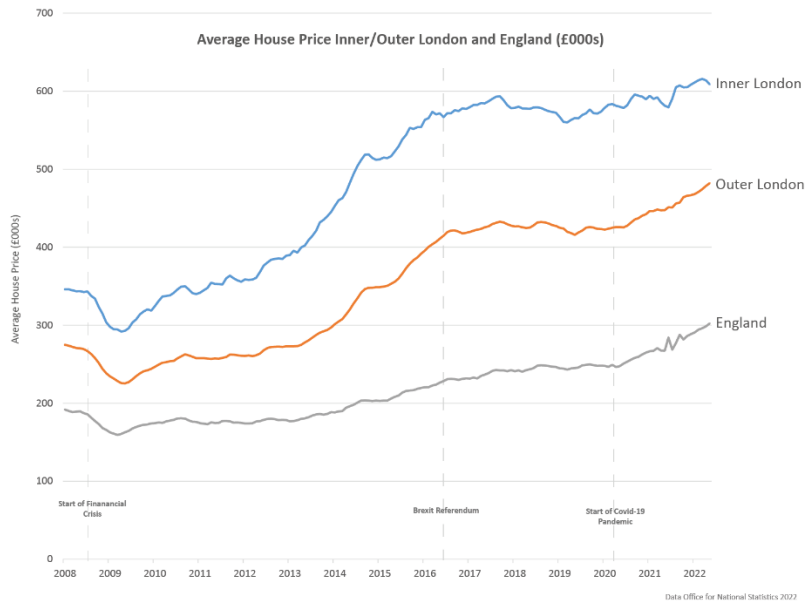

Fig. 6. Mean House Price Paid Inner and Outer London, 2008-2022 (Data- Land Registry price paid, 2022)
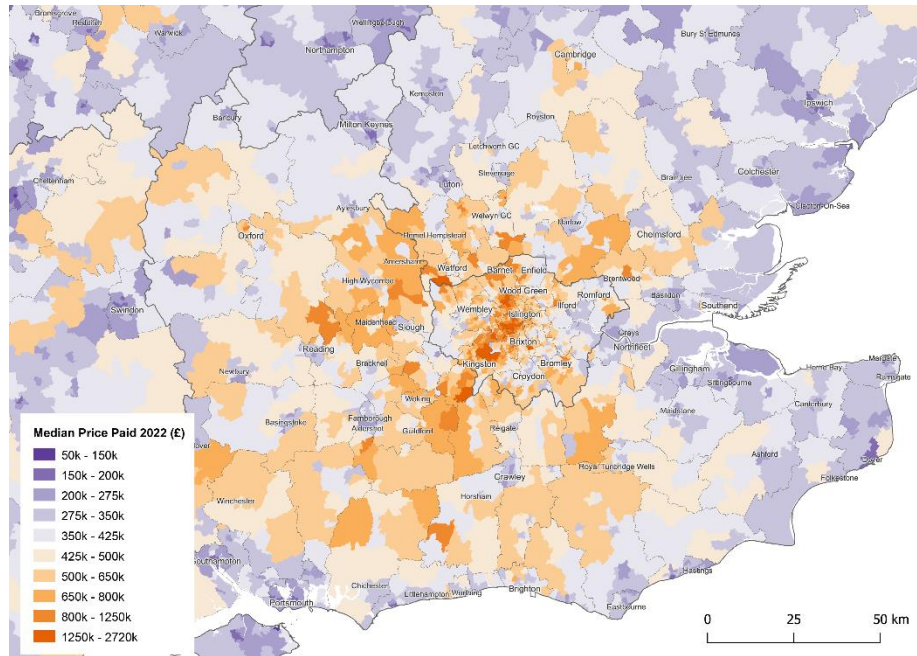
Fig. 7. Median House Price Paid by MSOA 2022 (Data- Land Registry price paid, 2022)

The Car Dependency land use classes created in the previous section can also be used as a means of summarising house price changes by location type. In Figure 8 we can see that house prices are considerably higher in that most sustainable groups 1 and 2 (Inner London and the inner-city fringe), with huge price increases between 2011-2016, followed by a levelling off between 2016-2022. Group 3 (Outer London) also experienced high price increases. This corresponds with the general conclusion that affordability problems are most acute in the most accessible higher density locations in and around Greater London. Prices are substantially lower in suburban (4) and ex-urban/rural (5 and 6) locations, though these areas also experienced significant increases between 2011-2022.
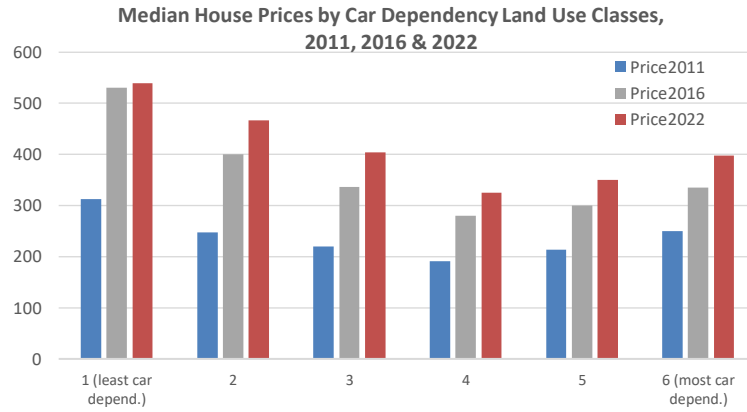
Median House Prices by Car Dependency Land Use Classes, 2011, 2016 & 2022

Fig. 8. Median House Prices in the South East Region by Car Dependency Classes

4 Travel Behaviour Impacts of Residential Location and Post-Pandemic Changes

The effects of post-pandemic flexible working, and the residential location changes discussed previously, are likely to have impacts on travel behaviour, though the situation is still evolving. Travel demand was hit by unprecedented shocks during the pandemic lockdowns, and in the UK travel demand only began to return to normal levels in 2022. The UK Department for Transport has been integrating various big data sources to track overall demand levels in the post-pandemic period, and this data is graphed below in Figure 9 (this data is indexed for each specific travel mode to Feb 2020). The lockdown periods are clearly visible, with much larger falls in public transport demand than car travel. Overall travel demand has fallen, even in 2022, with bigger effects on transit but also a minor reduction in car travel.
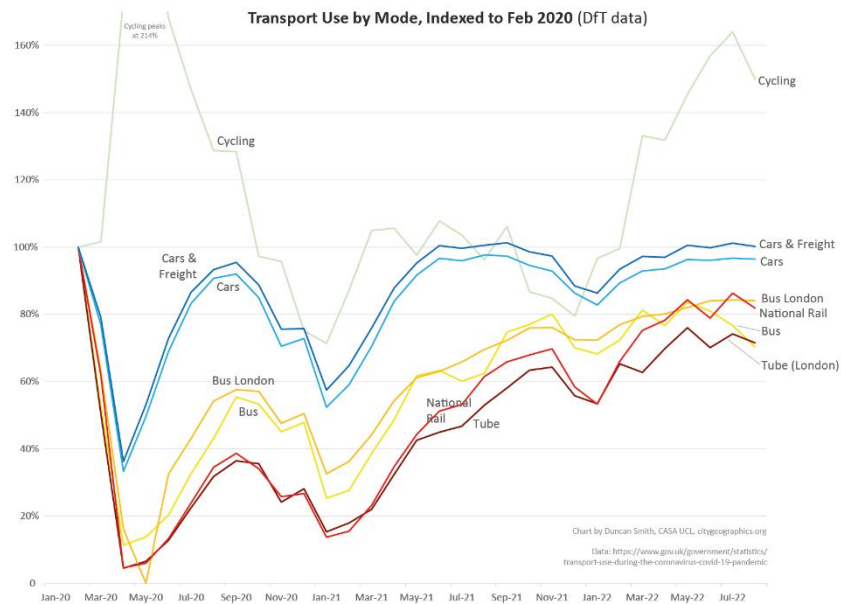
Fig. 9. UK Transport Use by Mode, Indexed to February 2020 (Department for Transport, 2022)

We can also use evidence from travel survey data to track changing travel behaviour. The figures below graph data from the National Travel Survey between 2019-2021, both for London and for the national picture across England. Overall travel distances have fallen substantially by car and public transport. Public transport recovered in London in 2021, but is still well below the 2019 figure. The fall in travel distances is strongly linked to a decline in commuting distances, which have fallen by more than a third. Business and shopping travel distances have also fallen. The 2022 National Travel Survey data has not yet been published, but other evidence suggests that the fall in commuting distances looks to be continuing into the medium term.
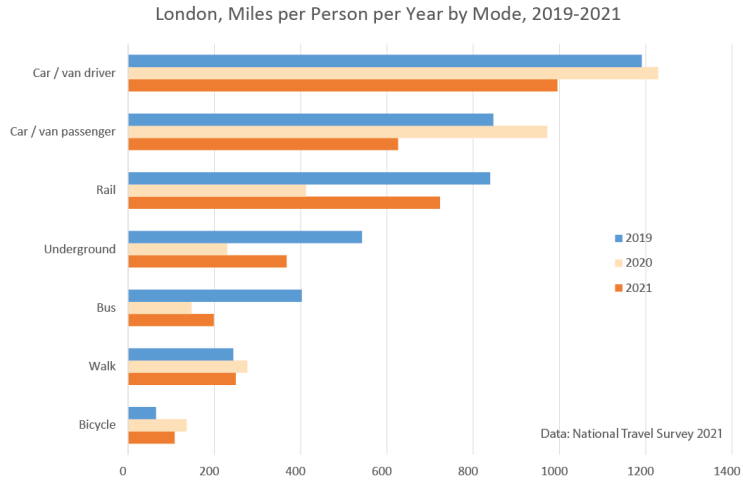
London, Miles per Person per Year by Mode, 2019-2021

Fig. 10. National Travel Survey Analysis of Annual Trip Distances by Mode for London

England Miles per Person per Year by Mode, 2019-2021
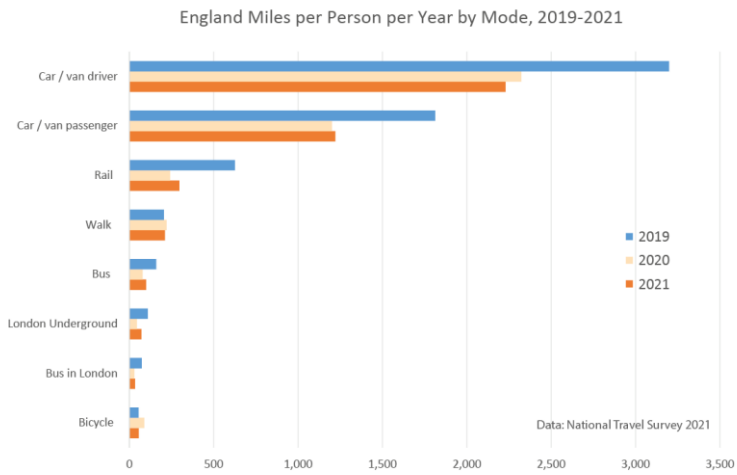
Fig. 11. National Travel Survey Analysis of Annual Trip Distances by Mode for England

Trip Purpose, Miles per Person per Year, London 2019-2021
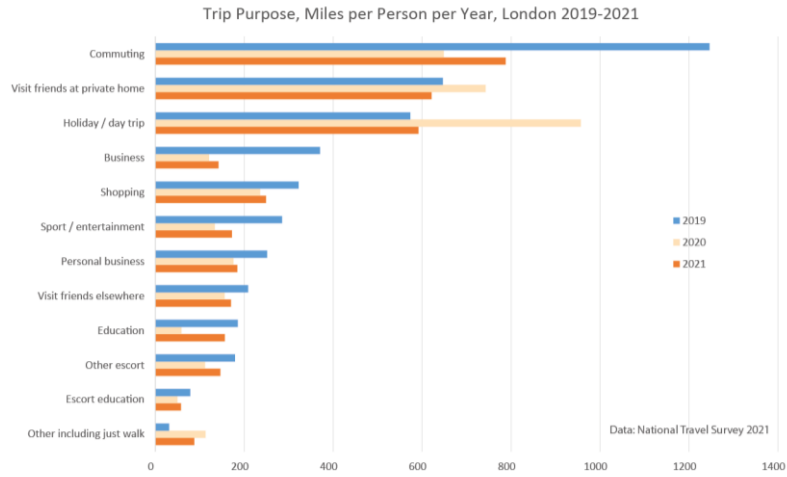
Fig. 12. National Travel Survey Analysis of Annual Distance by Trip Purpose for London

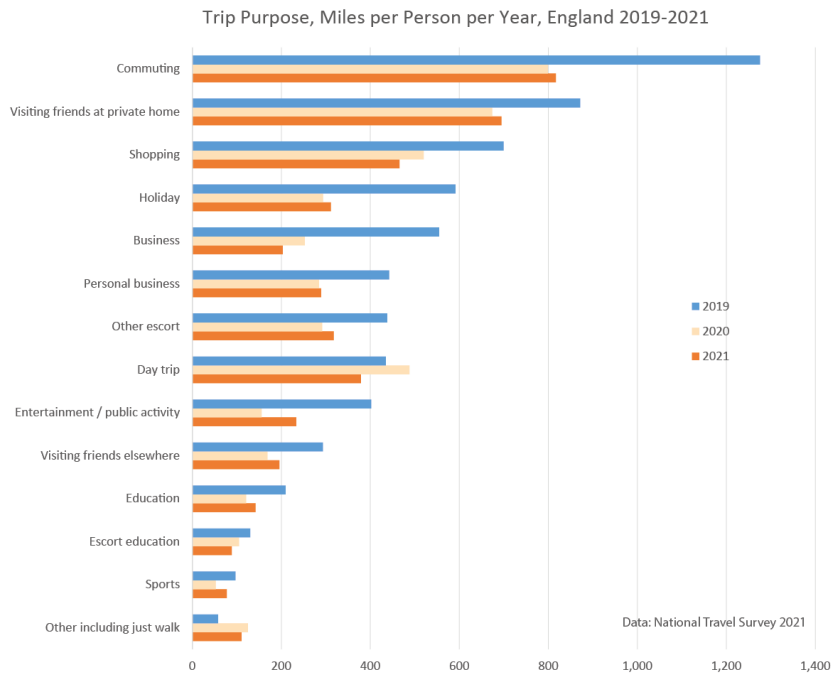Trip Purpose, Miles per Person per Year, England 2019-2021

Fig. 13. National Travel Survey Analysis of Annual Distances by Trip Purpose for England

In terms of comparing residential location and travel behaviour data, this leaves us with a somewhat contradictory picture. The population growth data showed that at the regional scale there has been significant growth in car dependent locations. However, the travel behaviour picture is one of reduced demand, particularly for commuting, as well as for other trip types, most likely also due to online substitution. Travel behaviour theory would suggest that the decline in commuting travel would then lead to substitution through other trips [15], such as leisure travel. There is not much evidence for this in the National Travel Survey data so far. Transit operators are however reporting increases in weekend travel compared to falls in traditional commuter rush hour demand [16], which would fit with the leisure travel substitution theory. The problem with highly car dependent residential locations is that it is not just a problem of commuting: there are very few transit and active travel options for all the main trip purposes, and so travel sustainability problems would remain for these residential locations even with the scenario of a continued fall in commuting travel.

5 Conclusions

The population growth data from the 2021 census reveals a dual trend in the London region. Within Greater London, growth is largely following a sustainable land use planning model, with the expansion of the inner-city fringe, particularly in East London and in well-connected Outer London centres. This is in line with the aims of the London Plan and transit-oriented development, with growth directed to Opportunity Areas linked to transit infrastructure, including the new Elizabeth Line. The picture in the wider region is much more mixed, with considerable growth in low density semi-rural areas with very high car dependence at distances beyond the traditional commuter belt. This trend is mainly the result of the push factor of very high prices, preventing all but the wealthiest households from buying in Greater London. A second evolving factor is the flexibility offered by hybrid working, enabling households to live at greater distances from jobs and commute to workplaces infrequently. Additionally post-pandemic there has been increased demand for larger houses with gardens, which are again highly unaffordable within Greater London, and make ex-urban locations more attractive.

It is possible than some of these trends are temporary or cyclical. Demand for larger houses may soften as experiences of the pandemic start to fade. Additionally house prices in London peaked in 2022, and will likely be static in 2023 given the recent substantial rise in interest rates to reduce current levels of high inflation. Nevertheless, the situation has arisen where there is a large price premium on residential locations with good public transport, walking and cycling options (the data here puts median prices for inner city locations around £150k higher), and that many households, particularly first-time buyers and families, no longer have this option, while car dependent residential living in more remote locations is considerably more affordable.

The Greater London Authority is seeking to maximise housing delivery, including the target of 50% of new development to be affordable housing [2], which is surely the appropriate answer to address these challenges. Arguably the biggest future problem is

not within Greater London, rather it is the lack of policy coordination in the wider region where there is a need to integrate planning between the many independent local authorities. Delivering more housing in smaller and medium sized cities such as Reading, Milton Keynes and Luton would be means of offering more affordable larger housing options in locations that also have moderate transit and active travel options compared to most the low-density remote locations that have been growing in recent years.

The travel behaviour data offers some cause for optimism, though the picture is still evolving. There is an overall fall in the number of trips and distances (and also some expansion of active travel). Online substation of commuting, shopping and business trips appears to be continuing into the medium term. Travel behaviour theory suggests leisure travel will increase as a substitute, and policy makers need to try and direct this towards more active travel trips as was the case during lockdown. It has been theorised that in an information society, many socio-economic configurations are possible within the same physical built environment structure [17], and that appears to be the evolving picture here, with the online behaviour transformations having already occurred, and corresponding residential location patterns are still catching up with these changes.

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