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Would it be feasible if everyone drove a car in the UK?

Shivani Kerai

The Centre for Interdisciplinary Science, University of Leicester

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Abstract

This paper investigates whether it would be feasible if everyone drove a car in the UK, considering the age population of 17 and over in the year 2019. In the context of this paper it is assumed that each person would drive a Vauxhall Corsa 1.0T Eco FLEX SE 5dr, and the whole land area of the UK was considered. It was shown that the total area taken up by cars would be 374.800 km². In consideration of the whole land mass of the UK, there is enough space if everyone drove a car. By considering the road area of approximately 15284.74 km² it will still be feasible, but may cause significant traffic.

Introduction

The latest report from the Office of National Statistics (ONS), released in November 2018 showed the population of the UK was estimated to be approximately 66 million; in mid-2017. The population on the 24/01/2019, the population is estimated to be 66,867,421. It is thought that the UK population is projected to grow and could reach up to 73 million by 2041 [1]. This growth is based on the increasing amount of births compared to deaths, in which the UK population is living longer than previous years.

The Vehicle Licensing Statistics dataset states that in 2017 the total number of privately and company registered cars in the UK was 32.16 million [2]. This does not include any other vehicles such as heavy goods, vans etc. There has been an increasing dependency on cars, with the number of registered vehicles on the roads growing. The latest figure as of September 2018, the number of privately registered is 32.58 million [3]. This in fact is approximately 50% of the current population in 2019 owning a car. In order to calculate whether it would be feasible for everyone to drive a car in the UK, the population including age of 17 and above, and UK land size will be considered; the UK land size is 248,532 km².

Assumptions

There are several assumptions made for this paper, one of the assumptions is that the car that would be driven is a Vauxhall Corsa 1.0T Eco FLEX SE 5dr. The

dimensions of this car have been taken, and the surface area of this car is calculated. This car was chosen as it had reasonable dimensions of a standard affordable car. Also, the age of the population that is considered is age of 17 and above, as this is the legal driving age in the UK. Finally, it will be assumed that the whole land size in the UK is 'driveable' rather than just considering the developed urban road area.

Calculations

Using equation 1 the dimensions of the car (L: 4021 mm, W: 1746 mm), the area of the Vauxhall Corsa is calculated to be 7.02×10^{-6} km². [4]

$$A = LW, \quad (1)$$

where A is the surface area, L is length and W is the width of the car.

The current population in 2019 retrieved from the ONS is shown in table 1, which is 66,867,421 for all ages, and the total population age of 17 and above is 53,390,359. This is approximately 79.8% of the population.

In order to calculate the total surface area of covered land, the population including age of 17 and above and surface area of each car was used. Equation 2 outputs a value of 374.8 km² to give the total area (TA) that could be taken up by cars.

$$TA = \text{No. of Individuals} \times A. \quad (2)$$

Age	Total
All Ages	66,867,421
Aged 18 to 24	5,610,495
Aged 25 to 49	21,866,590
Aged 50 to 64	12,819,627
Aged 65+	12,388,354
Age 17	705,293
Total (17 +)	53,390,359

Table 1 – The population in the UK as of 24/01/2019 using Office of National Statistics (ONS), nomis dataset [1].

Driving Area

$$\% A = \frac{TA}{Landsize\ of\ UK} \times 100. \tag{3}$$

In consideration of the whole land size of the UK, only 0.15% of the total land size would have been taken up by numerous Vauxhall Corsa 1.0T Eco FLEX SE 5dr cars.

An alternative is to consider the area of road in the UK. The total length of roads in the UK is approximately 2,100,200 miles (~3,379,979 km), this is including all motorways, A roads, B roads, C roads and U roads [5, 6]. These type roads signify the importance of traffic, where motorways have a higher significance of traffic, in contrast where C and U roads have lower significance of traffic [7]. It is difficult to assume the width of the roads based on the type of road. Therefore, the relative widths are assumed based on relevant sources and their significance of traffic [8].

Type	Length (km)	Width (km)	Area (km ²)
Motorway	3931.29	0.022	86.49
A roads central	8757.72	0.0146	127.86
A road local authority	40553.52	0.0083	336.60
B road	33157.87	0.0073	242.05
C and U road	3293578.4	0.0044	14491.74

Table 2 – Length of the type of roads in the UK, with the estimated width is shown to calculate the total area [4, 5].

Discussion

It would have been thought that there would not have been enough space. However, in this model the whole area of land size was deemed ‘driveable’, but only a mere 5.9% of UK is built on (roads, buildings, airports etc) [9]. The majority of UK land is farmland, natural and green area.

Therefore, just the area of the roads was considered as seen in table 2. The total area of roads in UK was estimated to be 15284.74 km², which shows that it would be feasible for everyone in UK to drive a car. However, this value would vary, as the width of these roads can vary significantly. If only A roads are considered, which have high significance of traffic (after motorways), the total amount of cars would fit into that area. This means 80.7%, of the total area of A roads would be taken up by cars. However, this can cause significant amount of traffic, if it is assumed that all cars used these types of roads at the same time.

Not everyone ages of 17 and above will drive a car as more people would find it easier to use other methods of transport such as bus, train, cycling etc. There would be some conditions that would not allow a certain proportion of the population to drive. In order to improve this model, the use of public transport and other vehicles such as vans, lorries etc should be considered.

Conclusion

This paper concludes that there is enough space if every individual age of 17 and above had a car by taking account of the whole area of UK. Also, by considering the area of the road size, it will still be feasible if everyone drove a car in the UK. The use of just A roads, would mean that there would be considerable congestion, with ~80.7% of A roads taken up by cars. This paper took the minimum of only car owners and other vehicles were disregarded. If other modes of transport were considered, it may not be feasible if everyone drove a car in the UK.

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