

Effects of Urban Expansion in the Choice of Commuting Modes by the Population of Metropolitan Areas

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1. INTRODUCTION

At present, urban expansion is one of the biggest problems that cities must solve. The phenomenon of urban growth entails a spatial transformation that has been accompanied by negative effects such as the extensive use of land, excessive use of motorised private transport, environmental pollution, increased transport costs or social segregation. This phenomenon accentuates the socio-spatial distances and consequently increases private vehicle use and the time dedicated to motorised journeys. Therefore, the countryside diminishes and is replaced by a monotonous landscape without great architectural or landscape values. Similarly, to the uncontrolled increase of the use of private vehicles, urban expansion prevents the development of the sustainable city. The fight against urban expansion is justified by the need to protect the environment with all of its resources, but also by the need to rationalise economic resources and pursue greater wealth and population health.

The singularity of the expansion of the metropolitan area of Seville has its origin in the Sixties with the approval of the Development Pole, which aided economic and social growth in the area, producing a new process of territorial and spatial transformation. This was a long and slow process that bore no fruit until the mid-Eighties (Caravaca, I. y García, A., 2009). In most of Seville's metropolitan area, the model of the diffuse and sprawling low-density city was established, composed mainly of single-family or semi-detached houses and chalets, which promoted the idea of an apparent higher quality of life and lower price compared to houses located in the main core of the city.

One of the most relevant manifestations of the phenomenon of urban sprawl has been the incorporation of rural spaces to the processes and dynamics of a metropolitan order, becoming part of the conurbations (García, M., 2014). To the extent that urban agglomerations expand, daily mobility is also diversified by the creation of new residential homes for workers. There exists an inverse relationship between mobility and distance which explains a greater number of trips when the destinations are nearby and a decreased predisposition to make trips when that distance increases (García, J.C., 2008).

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The aim of this study is to analyse the evolution of modes of transport used by the population residing in the municipality of Mairena del Aljarafe in their commute.

2. METHODOLOGY

The municipality of Mairena del Aljarafe has a characteristic feature of the metropolitan periphery, becoming one of the most important areas of expansion in terms of both residential and industrial use. With a population of 45,471 inhabitants, it is located in the metropolitan area of Seville, which is the fourth most populated metropolitan area in Spain and the first in southern Europe. This study presents the results of the analysis of data obtained through a cross-sectional survey conducted in the municipality. The survey sample was randomly selected using the municipal census database previously stratified by geographical area, gender, and age groups (Braçe et al., 2017). A large number of items on the questionnaire focused on the modes of transport used for commuting, the reasons for daily commuting, the location of the workplace and/or study centre, along with life habits related to physical activity and the sedentary lifestyle.

3. RESULTS

The people surveyed in the municipality of Mairena del Aljarafe showed a strong dependence on private transport modes in their daily commute, while public transport had a testimonial use. 77.2% of this sample was obliged to travel outside the municipality of Mairena del Aljarafe daily, either for study or for work. This could partly explain the massive use of private vehicles as the main mode of commute, as well as the strong dependence on the capital, the city of Seville itself. In terms of the time dedicated to the daily commute, 54.4% who travelled to Seville, together with the 25.5% who commuted to other municipalities within the metropolitan area, reported spending more than 40 minutes per day doing so. Those who spend more than 80 minutes per day correspond to the numbers who travel outside the Metropolitan Area. It is interesting that only 5% of respondents did not use motorised transport modes.

Another important result of this study concerns how the use of transport modes for daily commuting has evolved. That is, during childhood/adolescence, 63.8% of the population of Mairena del Aljarafe used non-motorised transport and only 21.5% used private transport modes. Nowadays the situation has changed drastically with a huge increase in car use from 15% to 73.5%. This is partially due to the fact that the majority of the population in Mairena del Aljarafe had not previously owned a private car since they had resided in the city of Seville (usually near to their study centre and/or workplace). The low percentage of this cohort using the underground is explained as being because it is a recently introduced infrastructure, having been constructed in 2009. It is important to note that those who did report using the underground during their childhood/teenage years were born or lived in other cities where such transport infrastructure has long existed (e.g. Madrid or Barcelona).



4. DISCUSSION AND CONCLUSION

The city expansion and new territorial model have led to a change in the population's lifestyle. Attracted by affordable housing prices and greater space, the population tends to reside increasingly farther away from the city core. This type of disorganised and sprawled urban expansion has caused a series of negative consequences including inefficient land use, traffic congestion, and the invasion of the city's green belt (Liu, Y., Wang, L. & Long, H., 2008). The choice in modes of commuter transport is linked to urban morphology and is the result of the balance between efficiency and convenience. Meanwhile, the travel duration for those using private vehicles is conditioned primarily by the quality of the available transport infrastructure and the real time traffic levels (Song, Y., et al., 2017).

The results of the present study highlight how living far from the main urban core, where the majority of services, equipment and work centres are concentrated, implicates the almost exclusive dependence on motorised transport modes for commuting. It has been demonstrated how the population of the municipality of Mairena del Aljarafe maintains a close relationship with the city of Seville due to existing family relations and/or labour dependency. This would explain the time spent by the population on the daily commute, in addition to the choice of private vehicle as the main or only mode of transport.

Urban morphology is one of the elements that most affects environmental sustainability, greatly conditioning the behavioural patterns of the city population. Contemporary urbanisation has the potential to help the transition to sustainability as a result of innovation, productivity, and efficiency. The challenge is to reach a balance between the scale, shape, optimal urbanisation index, and create opportunities for sustainability in both developed and developing countries (Fragkias, M. & Seto, K.C., 2012).

It is interesting to note how, despite the existence of a public transport infrastructure of great capacity and quality such as the underground system, the percentage of the population using it is quite limited. This would highlight how the implementation of the underground as an alternative to displacement does not meet the needs of the majority who continue to use mainly private vehicles in their daily commute. Therefore, it is necessary to promote the use of the underground as an attractive mode of transport not only for the population residing in the municipality, but also for those living in adjacent municipalities; this would reduce traffic congestion and saturation currently suffered by the city of Seville.

In recent years, an important change has occurred in the use of transport modes in favour of motorised transport, to the detriment of public transport and non-motorised modes such as walking or cycling. It should be noted that non-motorised transport modes, besides being environmentally sustainable, leads to increased physical activity. Therefore, the reduction of this method of transport supposes the loss of healthy life habits that negatively affect population health levels.

