

World Conference on Transport Research - WCTR 2016 Shanghai. 10-15 July 2016

Mitigating the impact of the expected increase in the population, economy and urban footprint in Cities of the South on greenhouse gas emissions: The case of Cape Town

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Abstract

The paper aims to demonstrate the potential of structuring the future growth of Cities of the South to reduce the expected growth in greenhouse gas emissions resulting from significant growth in urban population, economy, urban spatial footprint, and hence motorised travel. A situation that cannot be redressed by the typical responses of promoting non-motorised and public transport use because Cities of the South already display high levels of NMT and PT.

The paper applies the findings of research aimed at determining whether increasing accessibility always increases utility to inform the planned location of projected economic and population growth for Cape Town. Alternative land use structures are devised in which future population growth (i.e. housing and community facilities) and related work opportunities are allocated in an attempt to minimise motorised travel but yet achieve “sufficient” accessibility for four income groups.

The City of Cape Town has modelled the effect of applying a TOD urban land use and transport system in 2032. The paper allocates the changes in trip making between 2013 and 2032 in support of the concept of sufficient accessibility. This shows a significant reduction in motorised travel and greenhouse gas emissions when compared to the TOD approach.

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Peer-review under responsibility of WORLD CONFERENCE ON TRANSPORT RESEARCH SOCIETY.

Keywords: Sufficient accessibility; motorized travel; urban structure; greenhouse gas emissions;

1. Introduction

One of the primary objectives of urban transportation is to increase accessibility for persons living and working in the region. As cities grow and expand spatially transport authorities will attempt to provide easy access between all areas in the region. This is achieved by building more facilities on which high travel speeds can be attained; e.g. freeways, Bus Rapid Transit, Light Rail Transit and railways.

The populations of cities in developing countries, especially in Africa, are expected to double over the next 25 years (Demographia, 2010). The growth in population will result in the spatial expansion of major urban areas. When this is coupled with the expected increase in per capita income (Heerman, 2014), the spatial growth will be even greater as private car ownership rises and “suburbia” becomes the housing choice of the growing middle income population. This translates into longer motorized trips for the more affluent and the poor. While the more affluent can be expected to afford the increased cost of motorized travel and will coerce the transport authorities to provide faster travel options, three questions must be asked; namely:

- a) Can the national, provincial or metropolitan governments afford these additional costs?
- b) Can the poor afford the costs of longer travel distances?
- c) What are the environmental consequences of increased motorized travel distances?

Faced with these realities, transport authorities should be implementing city structures that require less motorized travel rather than retrofitting “laissez faire” land use development with higher speed transport solutions. Transport authorities applying such an approach will face strong opposition unless they are able to convincingly reply that “sufficient” accessibility is being provided. From a research point of view, this can be restated as “Is there a level of accessibility beyond which additional accessibility does not increase benefit or utility?” A socio-economic analysis of costs and benefits (in the broadest sense) could provide some answers. This paper does not describe such an analysis; but attempts to develop an understanding of the perceptions of employees and employers of the benefits and costs of different levels of accessibility.

The consequences of excessive travel are well known. The environmental costs are well known with transport having contributed 23% of CO₂ emissions in 2007 (WCTRS, 2011). There are examples of companies assisting employees to make commuting more sustainable by using public transport (e.g. Aspen Valley Hospital, 2010, *Work, Job and Income*, 2010), incentivise carpooling (Lawyers.com, 2010), and awareness programmes for staff encouraging modal shift and reducing carbon emissions (United Nations, (n.d.-b)).

The socio-economic costs are also well known with the poor spending more than 20% of their income on transport (Walters, 2008) and travelling for more than two hours to work. Some companies contribute to the costs of employee commuting in various ways that can overlap with the incentives to use public transport mentioned above (Shoup, 1997), private mass transit services and transport allowances separate from salary to reduce the burden of travel on staff. These incentives generally soften the cost of long distances, albeit in some cases through using mass transit; but do not encourage trip distances to be shortened.

Furthermore, employers admit to staff being late due to delays from traffic congestion and public transport inefficiencies (Coleman, 2000), as well as tiredness and reduced efficiency from long commuting distances. Yet it seems that decisions by employers on location choice and staff selection are based on minimising immediate financial cost and maximising short-term profit (Parr, 2002).

There are also examples of employers encouraging employees to travel less e.g. by employing locally or incentivising workers to move nearer to where they work (City of Trenton, 2011) while others try encourage working from home to reduce commuting (United Nations, n.d.-a).

In this paper we provide a brief review of the theory on “too much choice”; describe two studies in Cape Town to ascertain whether employees and employers perceive that too much choice of work opportunities or employees can bring negative benefits, and before testing the implications on motorised travel and greenhouse gas emissions of applying the concept of “sufficient” accessibility to land use and travel patterns in Cape Town in 2032.

2. Increasing accessibility increases choice

As mentioned earlier the purpose of increasing accessibility is to increase the number of destinations at which a trip purpose can be fulfilled or the catchment size of customers and employees; i.e. to increase choice. The

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