A multi-dimensional view of transport-related social exclusion: A comparative study of Greater Perth and Sydney

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ABSTRACT

Transport-related social exclusion is a complex issue. It can be studied from a variety of angles, be influenced by a number of factors, and affect diverse population groups. This study investigates transport-related social exclusion from a multi-dimensional view. Transport inequity was measured based on different development stages of a region using the Lorenz Curve and Gini index, and compared socio-economic characteristics, such as housing affordability, employment self-sufficiency, urban sprawl, and transport-mode share at different degrees of spatial aggregation. Two hierarchical spatial aggregation levels are used: (1) Sydney – Perth; (2) Inner – Middle – Outer sectors. Spatial gaps of transport-related social exclusion are identified for both cities and a number of policy implications are considered to provide suggestions to improve transport-related social inclusion in both cities.

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1. Introduction

Social exclusion (also called social inequity or injustice) refers to the obstacles that certain groups, such as those with physical or mental disabilities, low incomes or minority status, face in accessing economic and social opportunities, such as healthcare, education and employment. Social exclusion tends to be inefficient and unfair, so most communities consider social inclusion (that is, reducing social exclusion) to be an important policy goal (Lucas, 2012). Integrating transport with other policies, such as affordable housing, employment self-sufficiency and urban sprawl, can help achieve social inclusion objectives (Litman, 2015; Bureau of Infrastructure Transport and Regional Economics (BITRE), 2013; Currie et al., 2010; Church and Frost, 1999). According to Church et al. (2000), transport-related social exclusion studies can be divided into two types based on the focus of research: category approach and spatial approach. The focus of the category approach is on the transport demand side, addressing issues such as travel patterns, attitudes and needs of particular social groups (Gaffron, 2012; Shergold and Parkhurst, 2012). The spatial approach emphasises the transport supply side particularly the quality of transport supply, access to public transport, and spatial gaps of transport supply based on resident's needs (Currie, 2010; Ricciardi et al., 2015; Kaplan et al., 2014; Welch, 2013). These studies investigate how social exclusion is related to transport supply, for whom, in what direction, where and why. Most transport-related social exclusion studies focus on a single region, from which conclusions are drawn for a specific city, at a particular development stage and for a

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particular dimension of the problem, such as age or income. There is a need to understand the transport inequity problem from a multi-dimensional view. This includes multi-levels of spatial scale, such as, inner urban areas, middle areas, outer areas of a city, a whole city, or even a country, multi-levels of urban development stages and a variety of factors affecting transport-related social exclusion.

The aim of the study is to use urban planning tools to conduct a systematic comparison of transport inequity from a multi-dimensional view. Transport inequity refers to transport constraints that prevent people from participating in or having access to social activities, employment, education and social services (Litman, 2014). Inadequate transport supply could contribute to the social exclusion of people, especially vulnerable people, such as people who don't own a car, have a low income, older people, or people with disabilities. Transport inequity evolves based on both population density (demand side) and levels of transport services (supply side). The imbalance between demand and supply, more precisely higher demand than supply, leads to patterns of transport-related social exclusion. The research questions raised here are:

- How is transport-related social exclusion different at various levels of spatial aggregation and urban development?
- What are the factors that cause the difference in transport-related social exclusion?

In order to answer these research questions, the Lorenz Curve and Gini index were used to measure transport inequity at the various levels of urban development. We proposed two nested spatial aggregation levels:

- City level: large city (Greater Sydney – five million population) and medium city (Greater Perth – 2 million population);
- Sector level: inner, middle, and outer sectors.

The first research question was answered by a systematic comparison of transport inequity at the two levels for three cohorts: people who are don't own a car, those with a low income, and seniors. We also conducted spatial gap analysis using a supply demand matrix to identify the areas of concern for the three cohorts at the two levels. The second research question was answered by developing a conceptual framework to understand transport inequity at various levels of urban development and its relationship with a variety of factors such as housing affordability, employment self-sufficiency and urban sprawl.

2. Related research

2.1. Definition of transport-related social exclusion

Both social equity and access to transport have been the subject of extensive academic research around the world (Lucas et al., 2009; Currie, 2010; Bocarejo et al., 2012). Transport inequity has been found to be one of the important factors leading to social exclusion (Lucas et al., 2016). However, the definition of equity, as a base for measurement, changes according to the field being considered (Welch and Mishra, 2013) and is further complicated for transport distribution as it becomes more complex (Litman, 2014). In order to more accurately measure transportation equity, three categories can be considered (Litman, 2014):

- Horizontal equity: focus on transport fairness through the spread of resources amongst socio-economic groups with equivalent ability and need.
- Vertical equity with regard to income and social class: focus on the spread of resources among socio-economic groups with differing ability and need.
- Vertical equity with regard to mobility need and ability: focus on fairness of the resources amongst those with special needs.

Both horizontal and vertical equity are considered throughout this research. Horizontal equity is considered with an all-inclusive analysis of where all Statistical Area Level 1s (SA1s, the smallest geographical unit for the release of Census data by the Australian Bureau of Statistics (Australia Bureau of Statisitics (ABS), 2011) are considered to be of the same importance. Equity is then tested by how well each SA1 is serviced and how this transport supply is distributed among the SA1s. Vertical equity with regard to income and social class is then considered by an analysis of the distribution of transport supply to the three socioeconomic groups. A similar approach was successfully used in a recent study by Ricciardi et al. (2015).

2.2. Methods in measuring transport-related social exclusion

Three streams of research has been developed in the area of transport-related social exclusion since the1990s (Masser et al., 1992).

The first stream defines equity and the transport-related social exclusion (Khisty, 1996; Rawls, 1971) and lays the theoretical foundation for this (Lucas, 2006; Liu et al., 2010; Jones and Lucas, 2012; Preston and Rajé, 2007). Some examples of these theories include value judgement (Khisty, 1996; Sen, 1997), social capital (Di Ciommo et al., 2014; Granovetter, 1985),