

## Chapter 4.26

# Sustainable Transportation Development: A Framework to Determine Transportation Disadvantaged

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### **ABSTRACT**

Urban sprawl combined with low density development causes unsustainable development patterns including accessibility and mobility problems, especially for those who do not have the capacity to own a vehicle or access to quality public transport services. Sustainable transportation development is crucial in order to solve transport disadvantage problems in urban settlements. People who are affected by these problems are referred to as ‘transportation disadvantaged’. Transportation disadvantage is a multi-dimensional problem that combines socio-economics, transportation and spatial characteristics or dimensions. However, a substantial number of transportation disadvantage

studies so far only focus on the socio-economic and transportation dimensions, while the latter dimension of transportation disadvantage has been neglected. This chapter investigates the spatial dimension of transportation disadvantage by comparing the travel capabilities of residents and their accessibility levels with land use characteristics. The analysis of the study identifies significant land use characteristics with travel inability, and is useful for identifying the transportation disadvantaged population.

### **INTRODUCTION**

Since transportation plays a significant role in human life, providing essential access and mobility levels has been a great challenge in the field of

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physical planning and transport planning. As most of the cities in the world are growing 3–4% per annum, the travel distance between residential, work, leisure and other activities is increasing (Banister, 2009). This circumstance has triggered substantial efforts to achieve a high level of sustainability in transportation planning and, in particular, to provide an inclusive environment and avoid the increasing numbers of those with transportation disadvantage.

Transportation disadvantage is essentially an accessibility problem, which emerges due to the conflict between transportation planning and the social domain. The inability of the transportation system to cater for certain travel needs within the society has jeopardised the individual's opportunity to participate in important activities and retain certain life standards. Despite the flaws in the provision of the transportation system, transportation disadvantage is partly due to mono-centric development and the dramatic growth of cities, which have led to urban sprawl and the development of low density residential areas. This situation has become worse because land and property values in the inner city have increased dramatically in the past few decades. This situation has forced low income earners to move out of the inner city and settle in the outer areas which, in general, have relatively lower mobility levels and a higher travel distance to the urban centres (Dodson et al., 2006). To remedy transportation disadvantage, equilibrium should be developed between all elements of transportation planning. These elements include the physical dimensions of transportation—in particular, urban form and traffic—as well as the social dimension—people and proximity. Therefore, the relationship between transportation access and social problems should be understood; this understanding recognises the need for more integration between spatial and transport planning. In this sense, there exists a substantial need to identify which spatial characteristic lead to severe transportation disadvantage. Even though socio-economic characteristics and

the public transport system have a substantial role in determining transportation disadvantage, it has been identified that only a few transportation disadvantage research projects have included detailed spatial characteristics as part of their transportation disadvantage analysis.

In this chapter, the authors examine the close relationship that exists between transportation disadvantage and spatial characteristics. The chapter begins by explaining the various approaches that have been used to identify spatial characteristics that have a significant relationship with transportation disadvantage. Using the travel capabilities and accessibility approaches, researchers have identified that land use characteristics (such as low density development, long distance from the urban centre, mixed land uses, types of neighbourhood, presence of pedestrian facilities and parking) are spatial indices that have significant correlation with location of transportation disadvantage.

### **Sustainable Development, Mobility and Automobile Dependency**

As concerns about environmental quality, social equity, economic vitality, and the threat of climate change increase, the notion of sustainable development has grown as a subject of interest (Deakin 2001). Policies have been developed at various levels, ranging from local to global organisations, because environmental issues involve all social assets and human capital. The dimensions of sustainable development are governed by environmental and social equity and have been translated into various definitions and notions.

In clear terms, sustainable development ensures that all of society and their future generations have their basic needs met. This notion of sustainable development is rather more than a concept; sustainable development can only be achieved when it satisfies three basic conditions: (i) the rate of renewable resource use does not exceed their rate of regeneration; (ii) the rate of non-renewable resource use does not exceed the rate at which

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