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A framework to analyze capability and travel in formal and informal urban settings: A case from Mumbai

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ABSTRACT

This study analyzes the association between individual capabilities and travel time in Mumbai. We formulate a conceptual hypothesis by differentiating the production (e.g., commuting) aspects from the consumption (e.g., leisure) aspects of travel. We argue that less capable people may focus more on the production aspects, whereas more capable people may focus more on the consumption aspects. Two operationalized hypotheses are introduced for empirical verification: (1) travel time is significantly related to individual capability and is shorter for less capable people, and (2) the variance of travel time, indicating the degree of freedom of movement, has a positive association with individual capability. To confirm the hypotheses empirically, an activity–travel survey was conducted in middle-income group housing, slums, and slum rehabilitation units in Mumbai, India. Our results support both hypotheses, suggesting that, when people are less capable, they attach more importance to the production aspects of travel, but as capability increases, the consumption aspects become more vital. Based on our findings, we discuss practical implications for transport appraisal in the development context.

1. Introduction

Particularly after the work of the UK Social Exclusion Unit (SEU, 2003), there has been a growing focus on the social benefits of transport in developed countries. Social inclusion or exclusion, happiness, psychological well-being, capability, and social capital have become important concepts currently in use (Beyazit, 2011; Currie and Stanley, 2008; Ettema et al., 2010; Hananel and Berechman, 2016; Kenyon et al., 2002; Lucas, 2011; Ryan et al., 2015; Smith et al., 2012; Stanley and Vella-Brodrick, 2009). There has also been a growing interest in exploring the social impacts of transport on a particular social group, e.g., according to gender, age, economic class, or disability (Church et al., 2000; Lucas, 2006).

In contrast, in developing countries, such social aspects have been less explored either theoretically or empirically (some exceptions are discussed in the next section), although their importance could be even higher than that in developed countries, because the poverty and disparities that are common issues in less-developed countries may be attributed to transport to some extent. For example, access to better job and education opportunities may be a major concern of people in such countries. Yet transportation investment projects in developing countries commonly focus exclusively on traditional transport issues such as congestion, and this is reflected in evaluations of transport infrastructure investment, where travel-time saving is the major component of the benefits. Studies may not have been conducted on the social aspects of transport in developing countries because of the lack of available data, but also because of the lack of concepts tailored to actual situations in developing countries, where the social systems are considerably different from those in developed countries. In particular, informal sectors typically play a substantial role in developing cities.

This study attempts to shed some light on the social aspects of transport in developing countries through some conceptual and empirical analysis, with particular focus on the association between individual capabilities and travel behavior, where the individual capability could simply be defined as the set of opportunities the individual can undertake given economic, social, and mobility constraints. This definition is similar with the one Sen (1985) used in his seminal work on the capability approach, while the definition of “capability” varies across applications (Lelli, 2008), and this is also true in the application of the concept to transport issues (Nordbakke, 2013; Nordbakke and Schwanen, 2014; Ryan et al., 2015; Smith et al., 2012). In a narrow sense, mobility (e.g., ability to travel) itself can be characterized based on the capability approach, while others use the capability approach in a broader way, e.g., characterizing accessibility by using the approach

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in which mobility is considered as one of the components determining accessibility (Chikaraishi, 2017). In this study, the term capability is used not to characterize mobility or accessibility, but to indicate a general ability of the individual to undertake actions and activities that the individual would value. Thus, we regard mobility as one of the functionings for undertaking actions and activities.

To explore the association between individual capability and travel behavior, we first conceptualize how individuals' capabilities link with time spent for travel from the viewpoint of time allocation theory (Becker, 1965), where the production and consumption aspects of travel are distinguished. We argue that people who are less capable attach more importance to the production aspects of travel, and those who are more capable focus more on the consumption aspects of travel. We then translate this conceptual statement into operationalized hypotheses that can be empirically confirmed with conventional travel diary data. As an initial attempt to confirm our hypotheses, we conducted a small-scale survey in Mumbai India, where around half of the population lives in informal residential areas (i.e., slums). The target areas include middle-income group housing, slums, and slum rehabilitation units. Based on empirical findings, we discuss practical implications for transport appraisal in the development context.

2. Literature review

A growing body of literature covers the social aspects of transport in the development context, although many studies have been qualitative only (Lucas and Porter, 2016). One of the major social aspects that must be carefully understood in the development context is the existence of slums or informal settlements. Largely because of rural–urban migration, the number of slum dwellers has continued to grow in many developing countries. Consequently, the impacts of urban and transport policies on slum dwellers are increasingly important to make the society inclusive and to mitigate poverty (Bardhan et al., 2015b).

Being mired in poverty can be attributed to two sources: the individual and the system of provision (Lucas, 2011). For the individual, it is widely understood that gender and education level are fundamental factors affecting the level of poverty (Salon and Gulyani, 2010). With respect to the system of provision, it has been pointed out that a lack of basic transport services imposes high financial burdens on poor households (Oviedo Hernandez and Titheridge, 2016). Which of these factors is the major driving force of poverty depends on the context. One important context is the location of slums, which characterizes the system of provision. In particular, whether the slum is located in the urban core or on the urban periphery is crucial. In general, more job opportunities are available in the urban core, and thus slum residents in an urban core would have fewer spatial mismatches between housing location and labor market opportunities, resulting in less travel expenditure in terms of both time and money. For example, a study on low-income urban settlements in Durban, South Africa, showed that commuting time for both formal and informal sectors tends to be shorter in the urban core compared with that on the periphery (Venter et al., 2007). Mukhopadhyay and Dutt (1993) analyzed slum dwellers' daily travel patterns in a Calcutta slum and confirmed that very frequent essential activities such as shopping tend to be done near their residential area when people live in an urban core. A case study on low-income residents in Recife, Brazil, also showed that destinations tend to be closer to residential locations when people live in an urban core (Maia et al., 2016). These studies indicate that slum residents living on the urban periphery tend to spend more time on travel because of (Alberts et al., 2016) the spatial mismatch between housing location and activity opportunities (particularly job opportunities), and (Anand and Tiwari, 2006) the lack of affordable transport (and thus people tend to walk long distances). Indeed, some studies indicate that these are major reasons why resettlement from urban core to urban periphery can lead to exclusion of the urban poor from the city (Alberts et al., 2016), while resettlement within urban core may be less problematic.

Although these transport issues on the urban periphery are important and must be solved, slums in the urban core have different problems. Even though people have better access to various activity opportunities (i.e., they have a better system of provision), they mainly spend their time within their residential area because of social, economic, mobility, and time constraints, making the slum community exclusive. Because the urban core generally provides many activity opportunities close by, the main driving force of such constraints could be the low individual capability, rather than the issues of the system of provision. In addition, having a job inside the slum would imply that people could not find a better job, which would usually require them to travel more. In other words, shorter travel times might be a good sign for slum dwellers on the urban periphery, while it could be the opposite in the urban core because shorter travel times may indicate that people cannot utilize activity opportunities in the surrounding areas. However, most existing transport-related studies focusing on informal urban settlements employ the perspective that “shorter travel time is better,” and this approach has been widely used in most transportation studies. To explain logically the issues in urban slums, an alternative perspective is needed that logically explains the situation of slums in the urban core.

In this study, in contrast to existing studies, we take the perspective of “to what extent can people utilize activity opportunities in their surrounding areas?” We propose a conceptual framework that explicitly takes this perspective into account through the lens of time use and individual capability. Note that the proposed framework only considers slums in the urban core, i.e., various activity opportunities are available in the surrounding areas. The framework may not be applicable to slums on the urban periphery, where people must travel more just to satisfy basic needs.

3. Concept and hypotheses

This section explores the linkage between capability and travel in a conceptual way. We first attempt to distinguish between the consumption and production aspects of travel. We then introduce our conceptual hypothesis on the linkage between capability and travel, followed by the corresponding operationalized hypotheses.

3.1. Consumption and production aspects of travel

In conventional transport studies, travel is often considered as a cost that brings disutility. This is why travel-time saving is considered to be an important component in transport project evaluation. On the other hand, travel can also take part in “production” through allowing people to reach better activity opportunities. For example, one could find a better job further away from an existing opportunity, where the increase in income is high enough to compensate for the loss of time and money for travel. Although this viewpoint has seldom been taken into consideration in transportation practice, Becker (1965) showed the benefits of considering production aspects of travel through exploring the linkages between allocation of time and income.

There are at least two useful insights from Becker's work. First, he introduced the concept of “full income,” which is the sum of money income and earnings forgone by spending time on nonproductive activities, emphasizing that time and income should not be discussed independently. From this perspective, it is expected that the time use of the disadvantaged group would be largely restricted by income. This explains why low-income people allocate more time to productive activities than to nonproductive activities (such as leisure) and their associated travel.

Second, Becker introduced travel as a commodity that follows the concept of “productive consumption,” in that it contributes to work as well as to consumption. The gradation between production and consumption may vary depending on activity type. For example, commuting can be considered as a part of production rather than consumption, because it is necessary for income-generating activities. The