



The built environment and travel behavior in urban China: A literature review



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ABSTRACT

Interests in studying of the built environment impacts on travel behavior have proliferated from North America to other parts of the world including China. Until very recently, there has been very little research into travel behavior in China. However, during the last decade, there has been a fast growing interest in studying the built environment and travel behavior in Chinese cities, perhaps motivated by China's unprecedented urbanization and rapid urban transport development. Case studies from China provide new insights into the impacts of built environment on travel behavior that can help to enrich existing scholarship. However, currently there is a generally poor understanding of the role played by Chinese research and how it has enriched the international literature. This paper aims to fill this gap by reviewing studies in and outside China by both Chinese and non-Chinese scholars. The focus is on the contribution of these studies to the international literature. We identify four areas of contribution: how the built environment has been developed and its implications for travel behavior; the importance of housing sources in defining residential built environment and explaining travel behavior; the unique *Danwei* (or work unit) perspective on jobs-housing relationships and commuting behavior; and the importance of neighborhood types in explaining travel behavior in Chinese cities. The findings from this review should be relevant for researchers interested in developing future studies that will further advance geographic knowledge of the built environment and travel behavior, specifically in China and with broader global contexts.

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1. Introduction

The built environment impact on travel behavior is perhaps the most studied topic in travel behavior research. According to Ewing and Cervero (2010), there were more than 200 reported studies on this topic up to 2010 (Ewing and Cervero, 2010) and to date a number of literature reviews on this topic have been published (e.g., Ewing and Cervero, 2001, 2010; Handy et al., 2005; Mokhtarian and Cao, 2008; Cao et al., 2009; Boarnet, 2011). While the majority of studies have been conducted in developed societies, especially North America, a growing number of studies from other parts of the world have been published in the past decade. One noticeable example is the recent proliferation of studies in Chinese cities.

This great research interest has likely been motivated by the unprecedented urban development of China over the past few decades. Over the last twenty years, China's urbanization level has increased from less than 30% to more than 50% (Zhang and Lin, 2012). Rapid urbanization has resulted in a fast urban population growth and a major expansion of urban

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built-up areas. Meanwhile, market-oriented reforms, such as the land and housing reforms introduced in the 1980s, have triggered spatial restructuring and transformation of Chinese cities. These transformations in residential environment and neighborhood type have resulted in changes to jobs-housing relationships and ultimately daily travel demand. Meanwhile, car ownership has increased more than 10 times from 2000 to 2013 ([China Statistics Yearbook, 2014](#)) with mass transit having experienced a significant growth. Before the 1990s, only two Chinese cities (Beijing and Tianjin) had a metro system. Today, at least 22 cities have an underground rail transport system in operation and at least 17 other cities are currently constructing underground rail. The mobility and mode choice of urban Chinese have been changed substantially because of the proliferation of private cars and the enormous investments in mass transit. The built environment transformation, coupled with soaring automobile ownership and mass transit development, has provided an important context for studies of the built environment and travel behavior in urban China.

A decade ago, there had been very few studies on the built environment and travel behavior in China (we could find only two studies published before 2005). Chinese case studies offer significant opportunities to improve and broaden the existing literature, which is dominated by research with a Western context ([Ewing and Cervero, 2010](#)). This has led to a proliferation of studies (e.g., [Pan et al., 2009a, 2009b](#); [Zhao et al., 2011a, 2011b](#); [Wang and Lin, 2014](#)) that cover a wide range of topics and adopt a variety of methodologies based on different cities. Research findings are diverse and consensus seems rare. More importantly, there is little understanding about how the Chinese studies have enriched the relevant literature in general. It is imperative to review this literature and summarize the major research findings, to identify research gaps and to develop agendas for future research. To the best of our knowledge, there is as yet no such review available. We believe a systematic and comprehensive examination of the relevant studies should benefit future research on similar topics.

This paper aims to fill in this gap by critically reviewing the existing literature on the effects of the built environment on travel behavior in urban China. Studies in and outside China by both Chinese and non-Chinese scholars are reviewed and discussed in terms of research topics, research methodologies and empirical findings. The focus will be on the contribution of studies about Chinese cities to the literature in general. We shall argue that studies in the Chinese context complement studies from the West and that they contribute to the understanding of the built environment impacts on travel behavior in a number of areas. These include how the built environment has been developed and its implications for travel behavior; the importance of housing sources in defining residential built environment and for explaining travel behavior; the unique *Danwei* (or work unit) perspective on jobs-housing relationships and commuting behavior; and the importance of neighborhood types in explaining travel behavior in Chinese cities.

This paper is structured and organized as follows. Section 2 presents an overview of relevant studies in the field in terms of research themes, research methods, etc. Section 3 discusses the major research findings of these Chinese studies and focuses on their contributions to the literature in general. The last section summarizes the major findings of the existing studies, identifies research gaps, and suggests directions for future work.

2. Studies on the built environment and travel behavior in urban China: an overview

This review is based on a survey of relevant studies in the field and an extensive online search. We have mainly relied on search engines such as Google Scholar and collected only studies that had been published in peer-reviewed academic journals. In total 54 articles were retrieved: 28 were published in international English journals while the remaining 26 were published in domestic Chinese journals. A summary of the major articles reviewed in terms of data and methods, research questions, and major findings is presented in [appendix](#) (available online only). Most of the studies were conducted in major Chinese cities with more than half based on Beijing, the capital city of China. Other cities include, for example, Shanghai, Nanjing, Guangzhou, and Hangzhou. These large metropolitan areas represent the most developed and advanced regions in China, both economically and culturally. This implies a bias in the existing literature and a need to enrich future research through studies of less developed central and Western parts of China and small and mid-size cities, where the built environment is rather different. It is also worth noting that the majority of studies were published after 2010 and that only two predated 2005, reflecting the rapid and recent expansion of research interests in this area.

2.1. Major research themes and dimensions of the built environment

The studies examined discuss various aspects of travel behavior and cover different dimensions of the built environment. Travel time, travel distance, trip frequency, daily commuting time and distance and the preferred transport mode are among the most studied aspects of travel behavior. However, although travel is mostly driven by activities, there has been only a limited effort in terms of activity behavior, possibly due to a lack of data as most cities only conduct survey on travel behavior, not on activity behavior. Nevertheless, some research has touched upon aspects of activity-behavior, including time use for maintenance and recreation activities ([Wang et al., 2011a, 2011b](#); [Zhao and Chai, 2013](#)).

[Table 1](#) lists the major dimensions of the built environment that have been examined in the literature. Jobs-housing relationships appear to be the most studied dimension of the built environment. More than 60% of the reviewed studies chose jobs-housing relationships as the major research theme. One possible reason for this is China's unique *Danwei* system that administratively co-locates work and housing. Other popular subjects for study include accessibility to transport facilities, neighborhood or housing types, and population density. Around 30% of the studies consider one of these three dimensions.

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