

URBAN PLANNING AND ENVIRONMENT

  
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# **Spatial Planning, Urban Form and Sustainable Transport**

Edited by **Katie Williams**

# Spatial Planning, Urban Form and Sustainable Transport

*Edited by*

KATIE WILLIAMS

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# Preface

The purpose of this book is to advance the debate on the relationship between urban form and sustainable transport, and to investigate the associated role of spatial planning. In all, twelve chapters present new research findings, debates and lessons from planning practice on these issues. The aim in compiling the book was to present new thinking on the links between urban form and sustainable transport from a number of different perspectives. The contributors come from a range of professional and disciplinary backgrounds, including human geography, urban planning, civil engineering, urban design, growth management, environmental planning, and transport research. The book is international in scope, with chapters from the UK, Australia, the USA, Belgium, The Netherlands, Germany and Japan. This highlights both differences and similarities in transport planning contexts and debates.

The book forms one of a series produced under the auspices of the International Urban Planning and Environment Association (IUPEA). The aim of the series is to share research findings and current best practice on a number of aspects of environmental planning. The books are devised to present and critically assess a variety of initiatives to improve environmental quality. The other books in the series are: *Urban Environmental Planning: Policies, Instruments and Methods in an International Perspective* (Miller and de Roo, 2004); *Integrating City Planning and Environmental Improvement: Practicable Strategies for Sustainable Urban Development* (Miller and de Roo, 2004); and *Compact Cities and Sustainable Urban Development: A Critical Assessment of Policies and Plans from an International Perspective* (de Roo and Miller, 2000). All are published by Ashgate.

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## Chapter 1

# Spatial Planning, Urban Form and Sustainable Transport: An Introduction

Katie Williams

### Introduction

The ways in which we travel are having a huge impact on the sustainability of the planet. There is general agreement that current levels of car use, fuel consumption and emissions are unsustainable. The issue which this book addresses is the relationship between travel patterns and the physical form of cities. It considers how urban form affects mobility, and the role of spatial planning in that relationship.

The debate about whether particular urban forms, in terms of their shape, density, configuration and so on, can have an impact on the sustainability of cities has a relatively long and rich history (see for example, Breheny, 1992; Williams *et al.* 2000; de Roo and Miller, 2000). Within this debate, researchers and planning practitioners have considered the impact of urban form on a number of elements of sustainability, such as social equity, accessibility, ecology, economic performance, pollution and health. However, the issue which has attracted the most attention both academically and in practice is the impact of city form on transport and mobility. In particular, this field of enquiry has concentrated on the 'best' urban forms to facilitate sustainable transport solutions, generally seen as reducing trip lengths and times, reducing reliance on the car, enabling efficient public transport, encouraging walking and cycling and reducing transport-related emissions, pollution and accidents.

The outcome of much of this research is an advocacy of 'contained', compact, urban layouts, with a mix of uses in close proximity: i.e. a move away from functional land use zoning and a reduction of urban sprawl. The reasoning is that such forms reduce travel demand because people can work near their homes and make use of local services and facilities. Such forms can also provide population densities high enough to support public transport services and, through improved urban design, encourage cycling and walking. Variations on this model, with concentrations of high density developments around public transport nodes, or in local neighbourhoods within a city, are also advocated. In Europe such models

have become common in planning strategies. They are now also becoming more widely accepted elsewhere, particularly in Asia, the USA and Australia.

However, as with all issues in the sustainability debate, the reality is not as straightforward as this 'compact city' solution would suggest. There are three key areas of debate, and these form the focus of this book. First, there is considerable uncertainty about the extent to which spatial planning or the manipulation of urban form can contribute to sustainable mobility *at all* in the face of broader socio-economic and cultural trends. Clearly, a number of forces shape travel patterns and transport options: economic activity and related production trends, structural socio-demographic changes, trade flows, technological change, consumer choice and income levels all have a significant impact (OECD, 1999). Currently, such forces are leading to increases in vehicle numbers, travel frequencies and trip lengths. Given this context, it is almost impossible to isolate the benefits of planning.

What is clear, however, is that currently almost all transport indicators world-wide are moving in an unsustainable direction. Since the 1980s, the majority of industrialised countries have experienced increases in the proportion of trips made by car compared with public transport (*ibid*), and overall the car accounts for around 80 per cent of passenger kms travelled. In most countries, road and motorway network densities (i.e. the proportion of land given over to road infrastructure) are also steadily increasing (*ibid*). Perhaps unsurprisingly the amount of traffic and the number of motor vehicles owned are also rising, with some of the largest recent percentage increases for industrialised nations in countries such as Korea, Poland and Turkey. Although, highest per capita car ownership rates are still in the USA, Canada, Australia and Western Europe. Along with these trends are increases in fuel consumption and emissions. Given these indicators, the extent to which changes in urban form, facilitated through spatial planning, can have an impact on sustainable transport is rightly questioned.

Second, there are still uncertainties about whether the compact form, as opposed to other urban layouts, is the most effective city form in terms of sustainable transport (Breheny, 1995; Rickaby 1987; Feitelson and Verhoef, 2001). Some have questioned whether the 'compact city' does actually lead to the desired effects of reduced car-use and increased walking, cycling and public transport patronage. There are also uncertainties about whether it can contribute to wider sustainable travel patterns, for example regional and intra-regional travel (Headicar, 2000; Newman and Kenworthy, 2000). Further, some researchers have claimed that the compaction model relies on an over-simplification of complex travel behaviour, especially in terms of live-work co-location (Breheny, 2004). In the light of these criticisms, other city forms such as 'corridor developments' and multi-centred cities are also suggested as having significant transport benefits (Williams *et al.*, 2000).

Third, even if it is possible to find a consensus on which urban form is the most beneficial in terms of sustainable transport, there are still questions about our ability to implement substantial changes in the physical fabric of cities through the planning system. Existing urban form changes relatively slowly, and opportunities for newly planned towns and cities are limited in most developed countries. In Europe, many of the most significant transport problems are found in historic towns which are bound by strict conservation policies, and where opportunities for

further compaction are rare. The compact city solution may be beneficial where there is vacant land ready for development within urban boundaries, but all too often urban intensification is experienced as 'town cramming' and is unpopular with existing urban residents. In fact, many measures to promote sustainable transport through planning, such as higher densities and mixed uses are, paradoxically, disliked at the local level. In the UK, plans for such forms of development are regularly stymied by local politicians. For these reasons, and others such as lack of resources, in many developed countries measures to temper travel demand through planning have not worked as effectively as hoped. In the UK, for example, the Government has had to acknowledge that its ambitious plans for sustainable transport have all but failed. In a recent overview of the Government's record on sustainable transport Docherty and Shaw (2003) concluded that while there were genuinely good intentions, the outcomes were minimal and the performance disappointing.

This said, advocates of planning would view this critique as unduly pessimistic. Clearly, there *is* a relationship between the way that space is planned and used and how people and businesses can access the services and facilities they need. Physical form, in terms of buildings and infrastructure, may change very slowly, but certain types of development, in certain locations, can have a major impact on travel patterns over long time periods (see Hickman and Banister, this volume). There are also examples of good practice in spatial planning that have made progress in stemming some unsustainable trends (for example, the UK's policy of restricting further out-of-town retail developments and European and Australian neighbourhood planning to encourage walking and cycling). However, there remain many gaps in our understanding of how to deliver urban forms that genuinely contribute to sustainable mobility.

The chapters in this book are arranged into three parts, which pick up on the three areas of debate outlined above. The first part (Part A) considers the impact of urban form, *in combination with other factors*, on sustainable transport. The authors consider the inter-relationships between, for example, urban form and socio-demographic characteristics and lifestyles. They also explore relationships between different physical form elements and various trip purposes and temporal aspects of travel behaviour for different sectors of the population. This research can be seen as a progression from some of the earlier urban form and transport research which either did not consider the impact of wider factors on the relationship between urban form and travel, or treated them as contextual rather than inter-related.

The second part of the book (Part B) addresses the relationship between *different aspects of urban form* and sustainable transport. For example, the contributors cover the relationship between transport infrastructure and employment development, the impact of a range of urban form features (such as density and topography) on petrol consumption, and the impact of road layouts on pollution levels. These contributions add depth to previous research by clarifying our understanding of the role of individual elements of city form on a number of specific aspects of sustainable mobility.

The third part of the book (Part C) addresses the more *practical implementation issues* surrounding spatial planning policies aimed at engendering

sustainable transport. This section broadens out the debate to consider not only what planning practitioners should be doing, but what is hindering progress towards implementing sustainable transport policies. It gives examples of good practice in policy development and implementation from Australia and the USA, and offers some cause for optimism about the role of spatial planning in delivering sustainable mobility.

A summary of the chapters is presented below. However, first it is useful to consider what is meant by 'sustainable transport' and how it is interpreted in the contributions that follow.

### A Definition of 'Sustainable Transport'

The concept of 'sustainability' is now so widely used that repeating common definitions here is unnecessary. However, it is important to be specific about the term 'sustainable transport'. A review of some alternative definitions developed by researchers and organisations involved in transport policy gives useful comparisons.

Richardson (1999, quoted in VTPI, 2004) describes a sustainable transport system as: 'One in which fuel consumption, emissions, safety, congestion, and social and economic access are of such levels that they can be sustained into the indefinite future without causing great or irreparable harm to future generations of people throughout the world.' In a similar vein, the Environmental Directorate of the Organisation for Economic Co-operation and Development define 'environmentally sustainable transportation' as:

... transportation that does not endanger public health or ecosystems and that meets the needs for access consistent with (a) use of renewable resources that are below their rates of regeneration, and (b) use of non-renewable resources below the rates of development of renewable substitutes (*ibid*).

The World Business Council for Sustainable Development defines sustainable mobility as: 'the ability to meet society's need to move freely, gain access, communicate, trade, and establish relationships without sacrificing other essential human or ecological values, today or in the future' (WRI, 2004). And the European Union Council of Ministers describe a 'sustainable transport system' as one that:

- Allows the basic access and development needs of individuals, companies and society to be met safely and in a manner consistent with human and ecosystem health, and promotes equity within and between successive generations.
- Is affordable, operates fairly and efficiently, offers a choice of transport mode, and supports a competitive economy, as well as balanced regional development.
- Limits emissions and waste within the planet's ability to absorb them, uses renewable resources at or below the rates of development of renewable substitutes, while minimizing the impact on the use of land and the generation of noise (quoted in VTPI, 2004).



These definitions display a great degree of commonality. They refer to sustainable transport systems providing a basic requirement to *meet society's and the economy's mobility needs* (although, in practice, there is considerable disagreement about how mobile society needs to be). They also refer to *social equity* elements of sustainability, i.e. that transport systems should be affordable, accessible and safe. In addition, the definitions share references to *environmental impacts*, both in terms of operating within carrying capacities and avoiding pollution of natural resources, such as air and land. Although each of these aspects of sustainability is complex and contested, they form the basis for a common understanding of sustainable transport shared by the majority of contributors to this book.

## A Summary of the Chapters

### *Part A: The Impact of Urban Form, in Combination with other Factors, on Sustainable Transport*

In the first chapter, Tim Schwanen and his colleagues take as their starting point the hypothesis that urban form affects travel behaviour, but that socio-demographic factors are equally, if not more, important. The authors stress the value of taking account of the interactions between urban form and socio-demographic characteristics, because constraints imposed by the physical environment may be compensated for, or reinforced by, an individual's circumstances. Hence, they argue that urban form impacts may not be equally important for all sectors of the population. Given this position, they seek to answer the research question: 'Does the direction and/or magnitude of the influence of urban form on travel vary across different household types?' The authors then present research findings for a number of types of trips across six different types of household living in different residential contexts. The results they obtain vary markedly according to the kind of trip, household and purpose of travel: hence the answer to their research question is 'yes'. This leads the authors to conclude that it may be useful to develop land use policies aimed at different sectors of the population. For example, building high-rise developments near public transport facilities in larger cities may be a sensible policy for single workers and two-worker couples, but concentrating new development in compact suburban locations may be a better strategy for one-worker couples or retired households. Overall, the research shows that the complex interplay of socio-demographic factors, physical elements and travel behaviour requires a sophisticated planning approach, as straightforward relationships between urban form and travel behaviour can not be assumed given heterogeneous urban populations.

Following Schwanen *et al.*, Joachim Scheiner and Birgit Kasper continue to investigate the importance of additional factors in combination with urban form in influencing mobility. In this case, they are interested in the impact of different lifestyles on both residential mobility and travel behaviour. They start by citing recent sociological research which describes the fragmentation of society (via individualism, differentiation and pluralisation of lifestyles). They assert that not