

Book Review

Urban Structure Matters

Petter Naess

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Danish scholar Petter Naess's 2006 book *Urban Structure Matters* uses the comprehensive study of the Copenhagen Metropolitan Area as an empirical case to examine the relationship between urban structure and travel behavior. The overall theme of this book is how urban spatial planning influences the amount of travel and the modal split. The research results are relevant not only to land use and transport planning in Denmark, but also to a wider global context.

Structurally, this book contains three parts. Part 1 (Chapters 1 and 2) provides an introduction and a theoretical perspective on the influence of urban structure on travel. Part 2 (Chapters 3 through 11) is the core of the book, detailing various components of the Copenhagen Metropolitan Area study. Part 3 (Chapters 12 and 13) expands the study to a wider sustainability perspective and outlines the planning processes for a sustainable development.

In Chapter 1, Naess provides the background of this research in light of the current Danish transport policies and sustainable development requirements for a coordinated land use and transport planning.

Chapter 2 gives a theoretical perspective on the influence of urban structure on travel, which is summarized by the simplified behavioral model (pg. 29). According to this behavioral model, urban structural, individual, and social conditions; accessibility to facilities; rationales for activity participation and location of activities; actual activity participation and location of activities; and total traveling distances are all interconnected in a complex manner. An empirical inquiry is needed to test this model.

Chapter 3 presents the geographical context and research methods of this study. As one of the largest urban areas of Northern Europe, the Copenhagen Metropolitan Area is famous for its "Finger Plan" of 1947, according to which urban development has been taking place along five railway lines to the north, west, and south of the city, with the "green wedges" of farmland and forests set aside between these "fingers." This research addresses the following five topics: 1) relationships between the location of the residence within urban structure and travel behavior; 2) impact of residential location on the range and frequency of activities; 3) rationales of people's choices of activity locations and travel modes; 4) variations of the residential location/travel behavior relationships among different subgroups of the population; and 5) compensatory mechanisms in travel behaviors. Research data come from qualitative interviews of

17 households, questionnaire survey among inhabitants of 29 selected residential areas (1,932 respondents), and detailed travel diary survey (273 respondents).

Chapter 4 describes the mobility patterns in different parts of the Copenhagen Metropolitan Area. Within this area, most of the respondents living in the outer and peripheral areas (“the car tyres”) have a higher amount of travel and use cars to a larger extent than their counterparts living in the inner and central districts (“the bike hub”), which are characterized by a high share of non-motorized travel, a low car ownership, and a low total amount of transport.

Chapter 5 explains geographical variations of residential locations and travel patterns among different population subgroups based on the qualitative interviews conducted. The qualitative interview results suggest that the amount of travel in the Copenhagen region is influenced by the location of the residence in relation to concentrations of facilities, rather than the distance to the closest single facility within a category. Of course, for those non-participants of the labor force, the location of the residence relative to local centers may be more important.

Chapter 6, the cornerstone of the entire research, is devoted to conducting the multivariate regression analysis of the aggregate-level relationships among urban structural, demographic, socio-economic, and attitudinal factors. Chapters 7 through 10 further probe into the relationships among residential location, travel behavior, trip lengths, activity participation and travel time, indirect effects of residential location on travel, daily-life travel among different population groups, and compensatory mechanisms in travel behaviors. The quantitative analysis yields the following five findings.

First, the location of the dwelling relative to the center structure of the Copenhagen Metropolitan Area has the strongest influence on the travel behavior of the respondents. Other important impacting variables include: distance between residence and closest second-order urban center; distance between residence and closest urban railway station; and density of inhabitants and work places in the local area.

Second, the influences of residential location are especially strong on the availability of facilities and trip distances. However, its influences on the use of local facilities, activity participation, trip-making and travel time are weaker and somewhat confined to certain activities, travel purposes, and period of the week.

Third, transport attitudes, environmental attitudes, possession of a driving license, and the frequency of overnight stays away from home are also influenced by the urban structural situation of the dwelling.

Fourth, there exists a great variation among different subgroups of the population with respect to the location of the residence on travel behavior. For example, the location of the residence influences the amount of transport more strongly among workforce participants than among non-participants of the workforce. The average proportion of car travel on weekdays is higher among men than among women. Fifth, compensatory travel behavior within the study area exists to a certain extent. For example, more and longer trips are made outside of the local region among residents of dense location areas. Trip frequencies may decrease if the distances to the relevant destinations are long, reflecting the so-called “distance decay” phenomenon.

In Chapter 11, which concludes the Copenhagen Metropolitan Area Study, Naess is confident that his study results are consistent with the other similar investigations of residential location and travel in Copenhagen Metropolitan Area, Aalborg, and Frederikshavn in Denmark. He also provides a rebuttal to some previous studies that have concluded that only weak or no relationships at all exist between urban structural characteristics and the inhabitants’ travel be-

havior. In his opinion, travel distance is a better indicator of the amount of transport than both travel time and daily number of trips because travel time is affected by speed and daily number of trips say nothing about trip length. If these two indicators had been used, the central Copenhagen area would have a larger amount of transport than the peripheral area.

In Chapter 12, Naess puts his research in the perspective of sustainable development, and compares principles for a less auto-oriented and transport-demanding urban development with a broader range of criteria for sustainable development. Based on this case study, Naess concludes that densification is preferable to urban sprawl in reducing transportation-related environmental problems. In the meantime, he also admits that densification has both pros and cons when matching people's diverse preferences for residential styles.

In Chapter 13, Naess discusses the feasibility of implementing transport-reducing and environmentally friendly urban development principles and of planning procedural strategies.

This book has several strengths. First, the study integrates quantitative travel survey approach with qualitative interviews, which help identify the more detailed mechanisms through which urban structure affects travel behavior. Second, the statistical analyses include twenty-three independent variables pertaining to urban structures, respondents' socio-economic characteristics, and attitudes towards transport and environmental issues. Third, it puts the residential location/travel behavior research in the wider theoretical perspective of sustainable development, thus elevating this case study to a theoretical level.

However, the book also has its limitations. First, even though a standardized coefficient (Beta) is provided to measure each variable's relative importance, the overall multivariate regression results shown in Tables 6.1 and 6.3 have rather low adjusted R^2 values (0.269 and 0.311, respectively), suggesting the relatively low explanatory powers of the regression models. Second, the sample size for the qualitative interviews ($N=17$) seems too low, compared to respondents of main survey ($N=1,932$). Because of this, the validity of qualitative interview may be called into question. The book also acknowledges that certain population subgroups, including people who were neither workforce participants nor students, are clearly underrepresented among the surveyed respondents. Third, Chapters 2, 12, and 13 are loosely organized with too much extraneous information. No clear research findings and conclusive remarks are provided in the end. Fourth, using travel distance as the sole measure of amount of travel is simplistic. It may be necessary to revisit other travel-related indicators, including person mile of travel, accessibility, and others.

Overall, this is an interesting book that is worth reading. As Naess said, "this study has significantly improved the status of knowledge about the influence of urban structure on travel behavior."