

Urban Form and Travel Behavior:

Experience from a Nordic Context

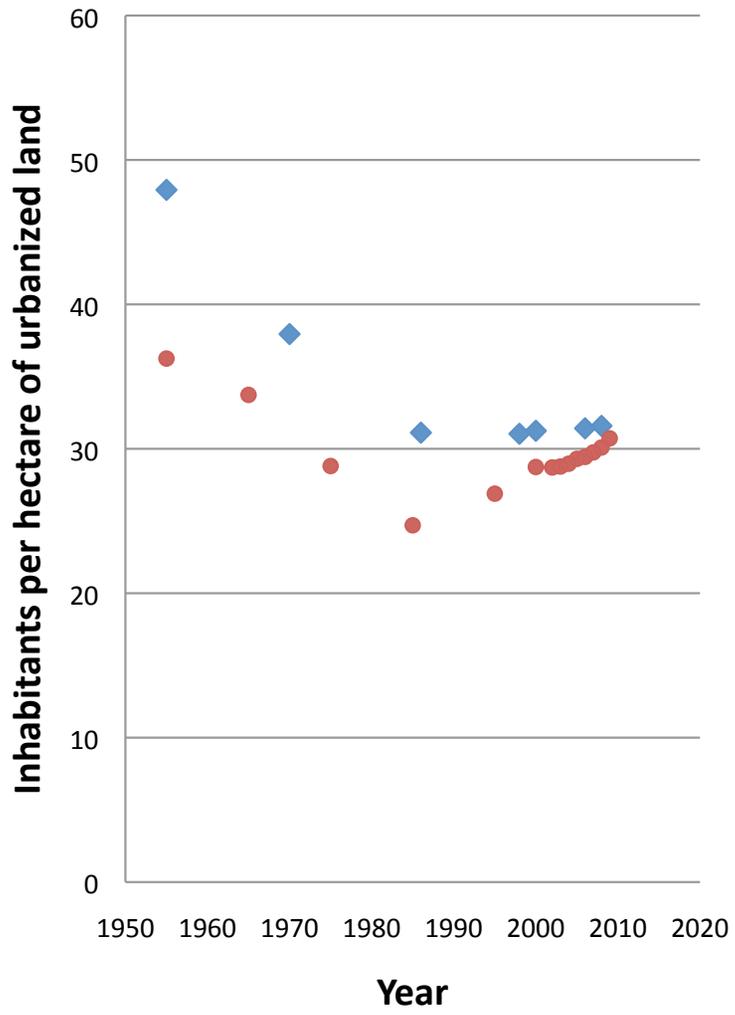
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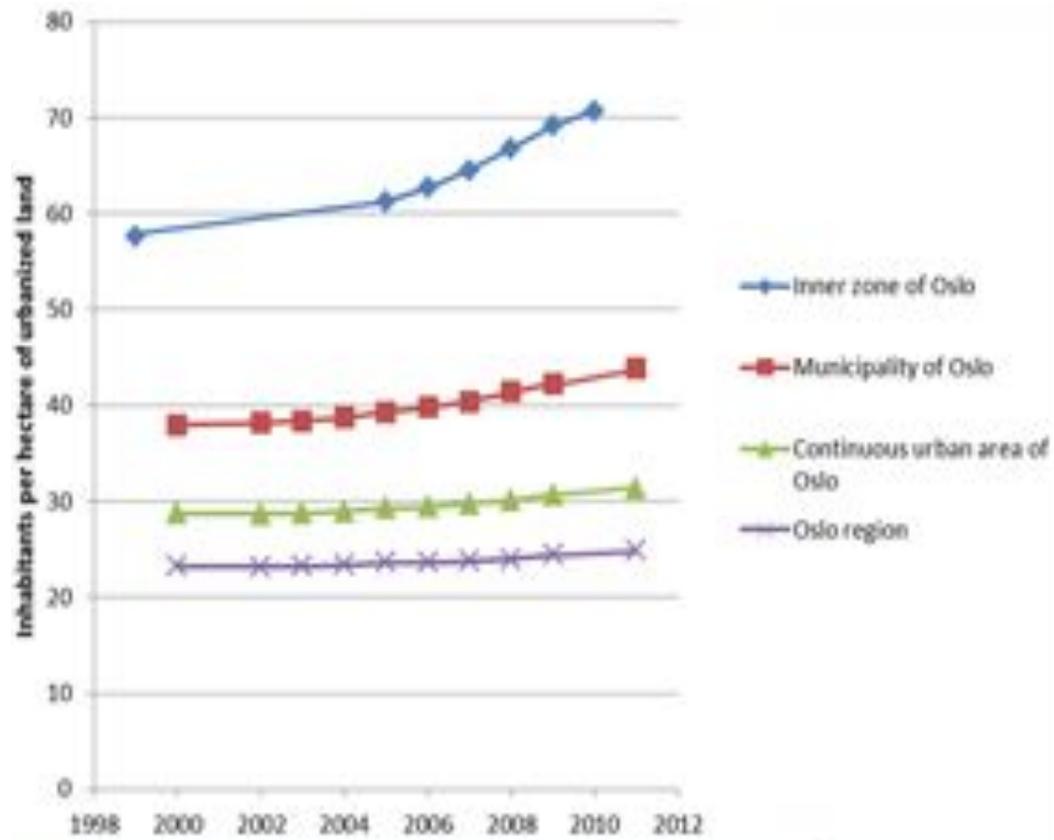
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The Nordic research context

- The research reviewed in the paper includes Nordic studies focusing on the influence of urban land use (the geographical distribution and density of the building stock and the urban functions therein) and settlement patterns on transportation variables
- Altogether 30 published studies carried out during the latest three decades: 15 in Norway; 9 in Denmark; 4 in Sweden; one in Finland and one study comparing cities in four Nordic countries
- Considerable political attention to land use as a measure to reduce car dependency, contributing to reduced sprawl and in some countries increasing urban densities
- The research has provided important inputs for these policies



- ◆ Greater Copenhagen (continuous urban area)
- Greater Oslo (continuous urban area)



Topics addressed in the Nordic studies

- Qualitative research on causal influences of urban form on travel (5)
- Neighborhood-scale density (7) and design (2)
- Overall urban density (2)
- Residential location at a city/metropolitan scale (18)
- Location of workplaces (8) and retail (3) at a city/metropolitan scale
- Centralization vs. decentralization at a regional scale (5)

A note on credibility

- Among the 30 studies, 8 have been published in peer-reviewed English-language scientific journals (making up 15 separate articles), another 5 have been subject to doctoral defense, whereas the remaining studies (apart from one) have been published by universities or independent research institutes as scientific reports
- Most studies have controlled for socioeconomic variables, some have also controlled for attitudes. Self-selection was dealt with in depth in one study

Transport rationales -

a term referring to the basic backgrounds, motives and justifications influencing travel behavior

- Rationales for activity participation
- Rationales for location of activities
- Rationales for choice of travel mode
- Rationales for route choice

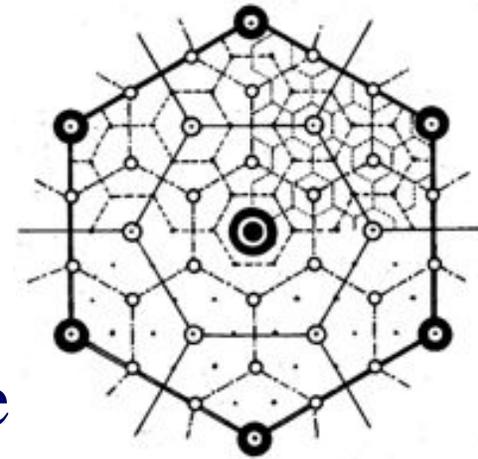
The concept includes instrumental, safety-based, comfort-based, aesthetic as well as affective dimensions

Rationales for location of activities

- *Choosing the best facilities:*
 - Choosing facilities where the instrumental purpose of the activities can best be met
 - Choosing facilities where social contacts can be maintained
 - Choosing facilities matching the interviewees' cultural, esthetic and symbolic preferences
 - Variety-seeking
- *Minimizing the friction of distance:*
 - Minimizing the spatial traveling distance
 - Minimizing travel time
 - Minimizing the stress or physical efforts of traveling to the destination
 - Minimizing economic expenses associated with the trip

The 'catchment areas' have expanded

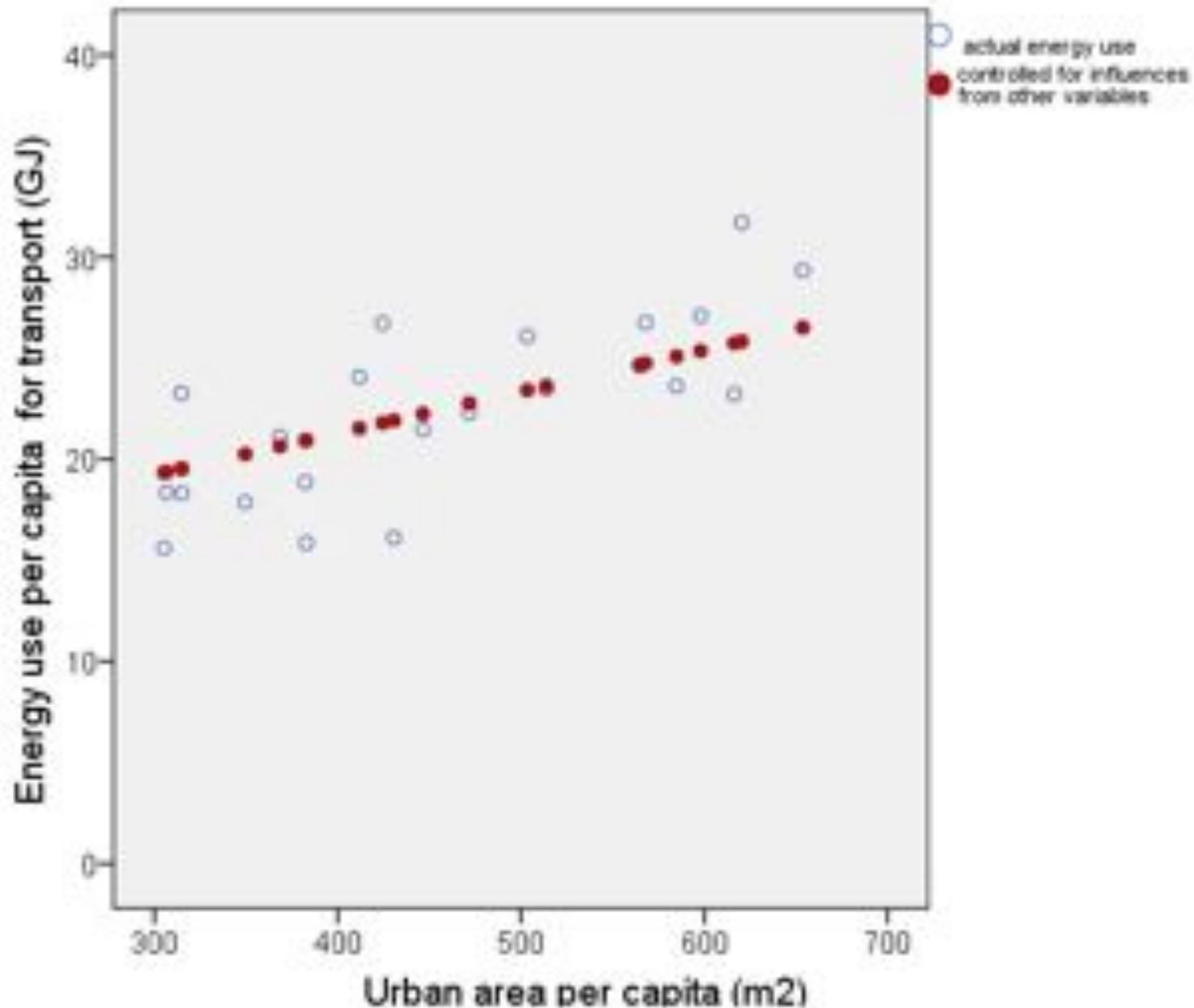
- For most travel purposes, most people do not necessarily choose the closest facility, but rather they travel a bit further if they can then find a better facility. This is especially true as regards workplaces.
- Travel distances therefore depend more on the location of the dwelling relative to large concentrations of facilities than on the distance to the closest facilities
- People who live close to the city center have a large number of facilities within a short distance from the dwelling and therefore do not have to travel long, even if they are very selective as to the quality of the facility
- Since travel distances are often short, inner-city residents carry out a higher proportion of trips by bike or on foot



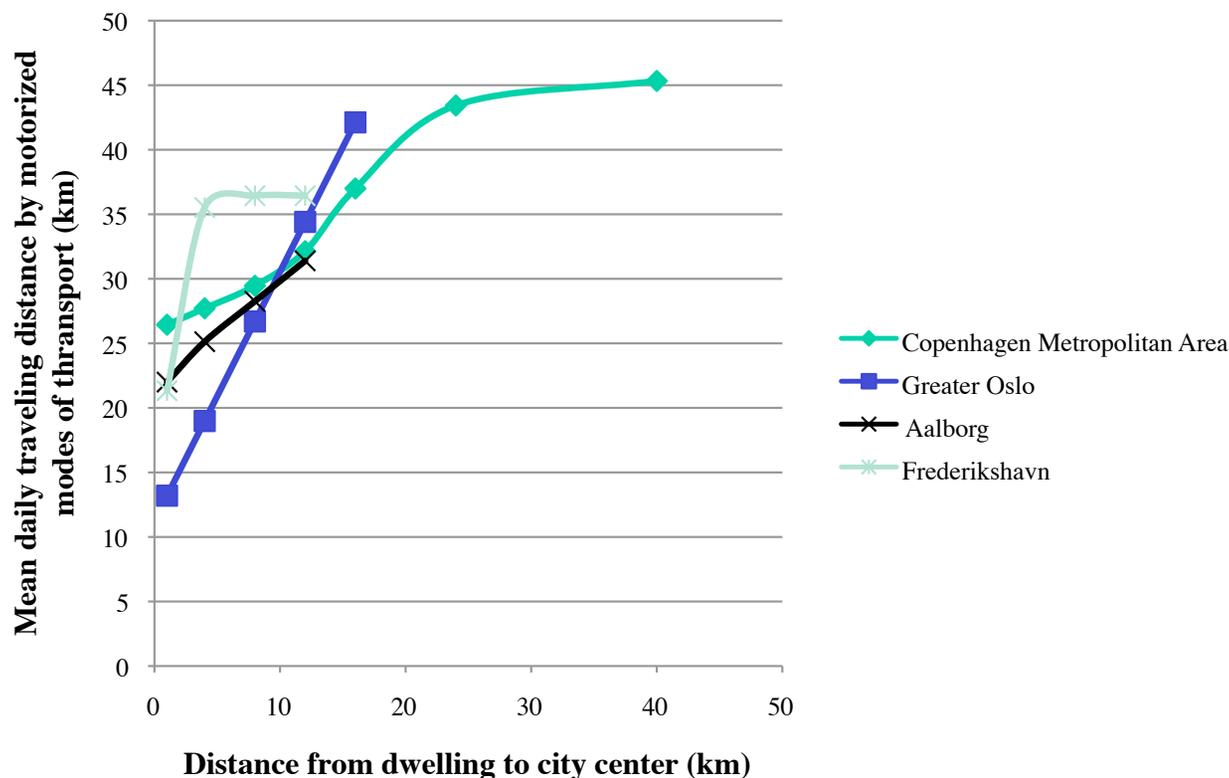
Local-scale density and design

- In larger cities, residential neighborhood density has been found to influence the share of public transport and travel distances by car, but the effects are not very strong
- Density in the surroundings of the workplace has been found to influence the share of commuting trips by public transport
- Density in the surroundings of shopping malls has been found to influence the amount of car travel for shopping trips
- No effect whatsoever found of local street pattern when controlling for the location of the residential neighborhood

Population density for the city as a whole



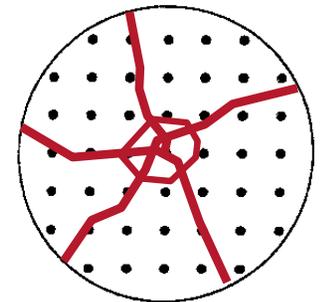
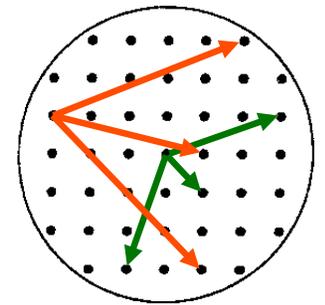
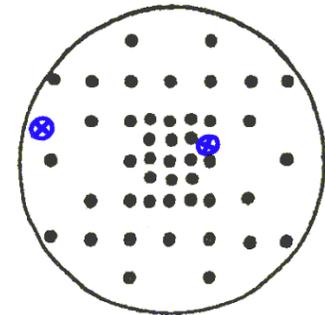
Residential location at a city/metropolitan scale



- Higher shares of non-motorized travel and lower shares of car travel among inner-city residents
- No clear center-periphery gradient for the use of public transport. Suburbanites living close to high-standard transit have the highest public transport usage
- Also some effects of the location of the dwelling relative to lower-order centers, but in the Nordic countries these effects are generally smaller than those of location relative to the main city center

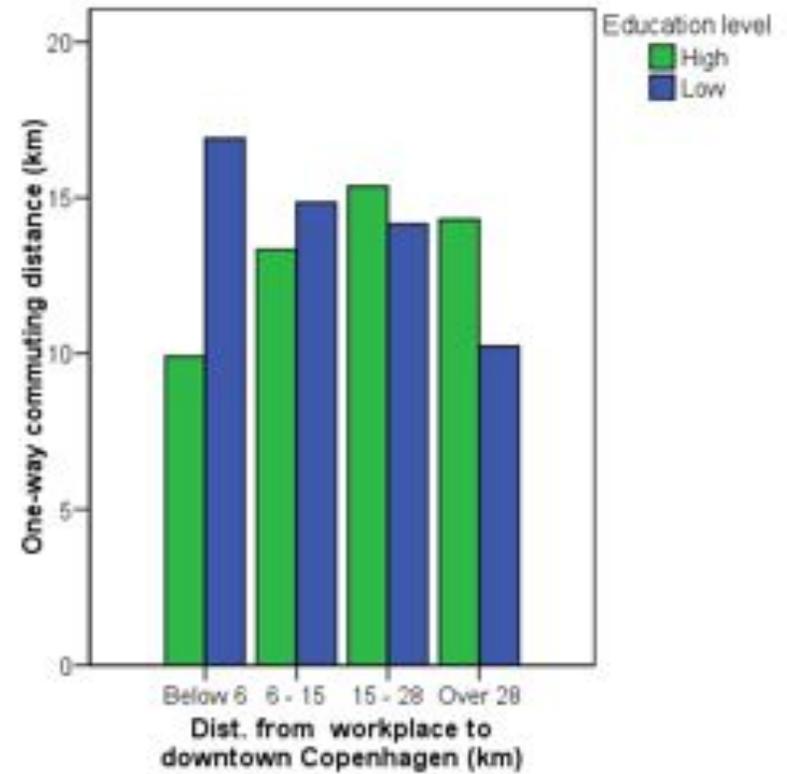
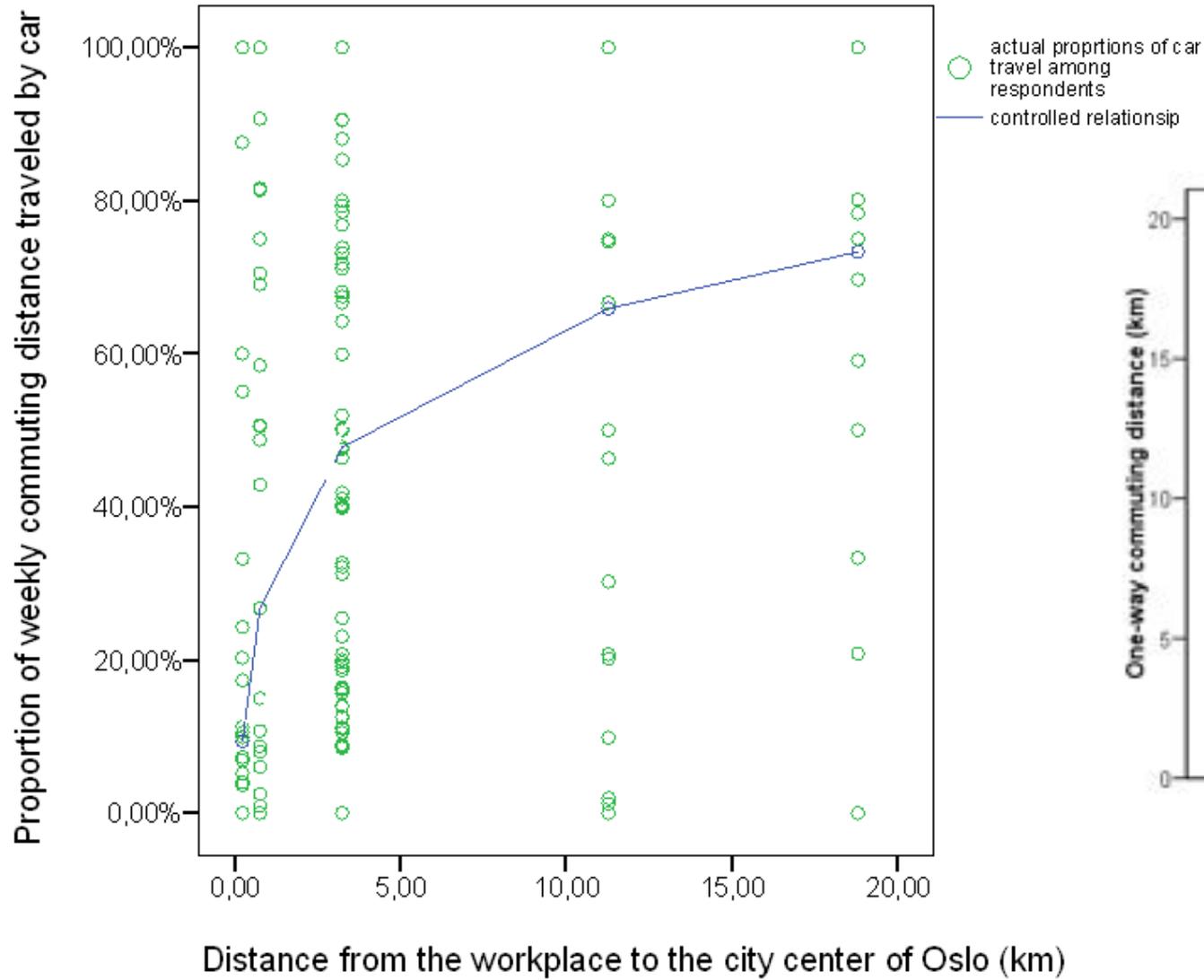
The influence of a central residential location to the accessibility of facilities

- Downtown as destination
 - Downtown's concentration of workplaces and service
 - The Downtown atmosphere
- Downtown as the center of gravity for the housing stock and the workplaces
- Downtown as the main node of the transport network



Workplace location at a city/metropolitan scale

- In several Nordic cities, lower proportions of employees have been found to commute by car and higher shares to travel by public transit, bicycle or by foot to workplaces located in the inner-city than to suburban jobsites
- Typically, 80-90% commute by car to workplaces at the urban fringe, compared to 20% in the downtown areas of big cities (1 mill or more) and 35-60% in the central parts of medium-sized cities (0.1-0.3 mill.)
- No clear intra-urban center-periphery gradient for commuting distances
- A slight tendency of shorter commuting distances to central than to peripheral workplaces among employees with high education, but the tendency is the opposite for employees with low education

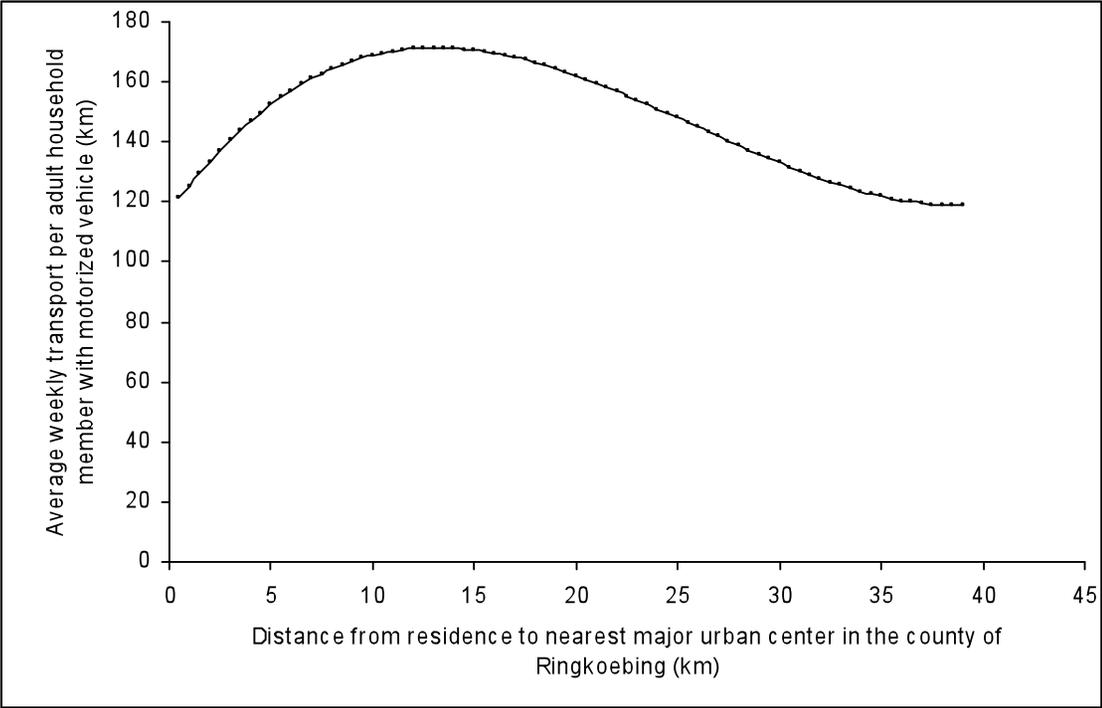
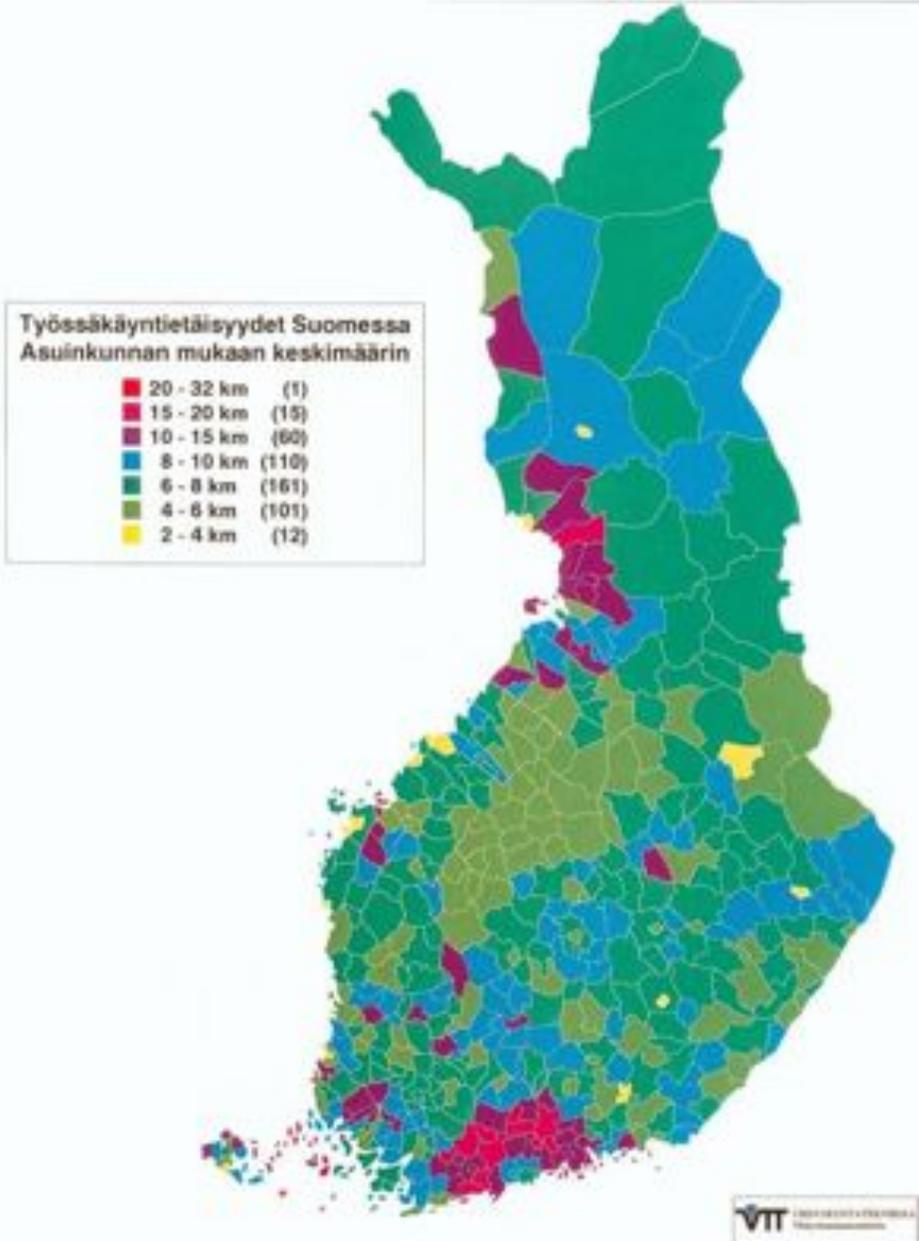


Retail location at a city/metropolitan scale

- According to Norwegian and Swedish studies, out-of-town location of shopping malls contributes to higher shares of car trips as well as more vehicle kilometers by car
- In a medium-sized Swedish town, the distance traveled by car for shopping increased by 50% due to the establishment of three out-of-town shopping malls.



Centralization vs. decentralization at a regional scale



Conclusion:

Urban land use principles contributing (within the Nordic context) to reduce energy use and emissions from urban transport

- Avoid further urban sprawl
- Increase the proportion of the population living in the inner and central areas of the city
- Increase the proportion of workplaces located in the inner and central areas of the city
- Ensure a sufficiently high density in new developmental areas
- At a higher (province-level) geographical scale, decentralized concentration seems to be more favorable than centralization