Available online at www.sciencedirect.com
ScienceDirect
Journal of Transport Geography 15 (2007) 331–342
JOURNAL OF TRANSPORT GEOGRAPHY
www.elsevier.com/locate/jtrangeo

Relationships between commuting distance, frequency and telework in Finland

Ville Helminen *, Mika Ristimäki

Finnish Environment Institute, P.O. Box 140, FIN-00251 Helsinki, Finland

Abstract

The average commuting distance in Finland has increased steadily during recent decades. Daily long-distance commuting especially increases the number of vehicle-kilometres travelled. The aim of this work was to determine the relationship between commuting distance and frequency. The focus was on direct impacts of telework on commuting, but the significance of second apartments close to the workplace was also estimated. The empirical analyses were based on aggregate national data concerning commuting distances and a survey providing data of 19 000 employed respondents. The results of the study indicated that telework reduced by 0.7% the total kilometres travelled in Finland. The probability of working at home increases with commuting distance, but when the commuting trip exceeds 100 km a second apartment near the workplace becomes common and has a stronger impact on commuting kilometres travelled than telework.

Keywords: Telework; Telecommuting; Commuting; Commuting distance; Commuting frequency

1. Introduction

International estimates of the amount of telework ranks Finland as one of the most advanced countries in Europe (Benchmarking Progress on New Ways of Working and New Forms of Business across Europe, 2000). This is not surprising considering the recent advances in information technology in Finland. The implementation of information and communications technologies (ICT) leads to more flexible ways of organising working practices. Increasing numbers of employees are now working in the information sector, which also creates a potential for telework because technologically the work is no longer bound to a certain location (Heinonen, 2000).

Since the end of the 1980s the relationship between telecommunications and transportation has attracted growing interest among transport planners and practitioners (Garrison and Deakin, 1988; Mokhtarian, 1990). The environmental aspects of the new information society have also become widely recognized (see Jokinen et al., 1998). During the past 15 years growth of the ICT sector has been rapid; for example 20 years ago telecommunications meant principally telephones (Nilles, 1988). During the same period the capacity of transport systems in Finland has increased substantially. For example the total length of motorways in Finland increased from 250 km to 590 km during the period 1990–2001 (Ministry of Transportation and Communications, 2002).

Most of the studies concerning relationships between ICT and transportation deal with the substitution effect of telecommunications on travel. A great deal of the empirical data concerning the environmental and travel impacts of ICT deal with telework because it is relatively easy to estimate (HOP Associates, 2002; Mokhtarian, 1990, 1998; Nilles, 1988). Telework has also been feasible for longer than other tele-applications and thus has greater potential for travel reduction (Mokhtarian, 1998).

Urbanization and changes in the economic structure have expanded commuting areas in Finland. An earlier empirical study of commuting distances in Finland

* Corresponding author. Tel.: +358 20 490 2395; fax: +358 9 40 300 391.
E-mail addresses: ville.helminen@ymparisto.fi (V. Helminen), mika.ristimaki@ymparisto.fi (M. Ristimäki).

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doi:10.1016/j.jtrangeo.2006.12.004

(Lintunen et al., 2000) pointed out that on a national level, long-distance commuting trips are the most significant when considering the total amount of commuting kilometres travelled.

The Finnish register-based population system enables the separate identification of home and workplace locations for the whole working population. The distance between home and workplace can therefore be calculated, as well as commuting volumes between different areas. However, data on part-time or full-time jobs, mobile work, commuting frequency or the means of travelling cannot be obtained from any registers (Statistics Finland, 2002).

The objective of this study was to complement the register-based data on commuting distance with questionnaire-based data on commuting frequency (see Elvers, 2002). As a result we obtained a better estimation of the true amount of commuting kilometres travelled, since the impact of telework on commuting frequency has hitherto been unknown. In theory, one day of teleworking per week reduces weekly commuting by 20%. Another important task was to determine the relationship between commuting frequency and commuting distance. Our hypothesis was that most of the commuting trips greater than 100 km are not conducted on a daily basis because of the impacts of home-based telework and second apartments near to the workplace.

The study is based on the nationwide Labour force survey with over 19 000 respondents and the register data from the Monitoring System of the Spatial Structure, which is a GIS-based monitoring system of built-up environments developed by the Finnish environmental administration (Helminen et al., 2003). The study concentrates on the direct impacts of telework on commuting at an aggregate level. The indirect impacts on overall travel are excluded. However, both the number of teleworkers and the frequency of telework are estimated at an aggregate level.

2. Defining telework

Telework is a commonly used term in Europe, including in a broad sense all work-related tele-activities. In the United States the generally used term is telecommuting, which emphasizes the travel impacts of teleworking. Although these terms are usually seen as a synonyms, Nilles (1988) pointed out that telecommuting is a subset of teleworking and made a clear distinction between the two terms: "telework includes all work-related substitutions of telecommunications for travel, whereas telecommuting concerns the impacts on daily commuting to and from work". In this study we use the term "telework" because it has the same meaning as the established Finnish term "etätyö". The direct translation of the word "etätyö" is "remote work".

The definition of a teleworker may differ considerably depending on the viewpoint (Mokhtarian, 1991b; Pratt, 2000). Teleworkers can be identified using various different definitions and therefore estimations of the number of teleworkers vary between different studies and surveys.

The common definition, which usually states that "at least part of the job tasks are performed outside the traditional workplace and involve information technologies" does not specify the time, place or frequency of telework (Pratt, 2000). When counting teleworkers the fundamental criterion is usually the amount of time spent teleworking. For example, the worker should spend at least one full day teleworking per week in order to be counted as a teleworker (see Benchmarking Progress on New Ways of Working and New Forms of Business across Europe, 2000). According to the location, teleworkers can be divided into different classes, e.g. home-based, centre-based or mobile. Temporal classifications usually include full-time, part-time and supplementary telework (see HOP Associates, 2002).

As a result of the multidimensional nature of the phenomenon there is no universal definition for telework, but rather several strict or broader definitions depending on the context. Strict definitions may require teleworkers to have a contract (i.e. permission) to work at home or may exclude occasional telework by its higher threshold frequency. Strict definitions are appropriate when estimating the frequency or the impacts of teleworking in order to obtain accurate data for each occasion.

Broader definitions are appropriate when estimating the number of teleworkers or the characteristics of teleworkers at an aggregate level. Strict definitions usually lead to a lower count of teleworkers, which might be inappropriate when estimating the number of teleworkers. In general, the studies on telework usually concentrate on finding out either the number of people teleworking or the frequency of telework and its impacts.

3. Impacts of telework on travel

Telework has both direct and indirect impacts on travel. Direct impacts are expected to be seen as reduced commuting kilometres (Choo et al., 2002; Lyons et al., 1997; Mokhtarian, 1998), whereas indirect impacts include wider consequences for total travel and travel behaviour as well as potential long-term impacts on household location and land use (Lund and Mokhtarian, 1994; Nilles, 1991). This study concentrates on the direct impacts on travel.

Studies concerning the impacts of telework on travel have been reviewed in several works (HOP Associates, 2002; Mokhtarian, 1991a; Nilles, 1988). Most of the empirical findings are from small-scale case-studies (e.g. Balepur et al., 1998; Hamer et al., 1991; Hjorthol, 2002; Koenig et al., 1996; Lyons et al., 1997; Mokhtarian and Varma, 1998; Pendyala et al., 1991), which have found short-term benefits of telework at the disaggregate level. However, there is a lack of aggregate studies concerning the impacts of telework on travel (Choo et al., 2005; Mokhtarian, 1998).

The number of teleworkers and the frequency of telework have rarely been studied simultaneously at an aggregate level, which has been seen as a problem (Choo et al.,