

DOES THE PROVISION OF ICT TOOLS ENCOURAGE EMPLOYEES TO WORK AWAY FROM THEIR OFFICES?

An activity-travel diary survey in three departments of the Dutch Ministry of Transport

Ruihua Lu MSc¹, Jasper Lim MSc², Prof. Toon van der Hoorn³

¹Faculty of Technology, Policy and Management, Department of Transport and Logistics,
Delft University of Technology, the Netherlands

²Merlien Institute

³Amsterdam Business School, University of Amsterdam

ABSTRACT

Our understanding of people's need for information and communication technologies (ICT) lags behind our expectation of the potential benefits of ICT to reduce congestion and improve accessibility. This paper, based on a two-round activity-travel diary survey conducted within three departments of the Dutch Ministry of Transport, investigates whether providing ICT tools to employees encourages them to work away from their offices. The two-round surveys were carried out before and after the provision of ICT tools, respectively. This paper compares the employees' work for three categories: working at home, working in the office and the use of the ICT tools during work. The results demonstrate that providing ICT tools does encourage some employees to work away from their offices, particularly at home. However, most employees still prefer to work in the office, even when they have the required facilities and ICT tools for working away from their offices ('teleworking'). These findings imply that ICT's potential benefits on traffic via teleworking are affected by people's needs and preferences, and therefore may not be fully achieved as expected.

KEYWORDS

ICT, teleworking, activity-travel diary

INTRODUCTION

Due to the high rate of car use, traffic congestion is one of the most serious problems in the Netherlands. Increasing investments in road infrastructure has little impact on traffic jams, especially around the urban regions. Such strategies as car pooling, car-sharing and park-and-

ride (P&R) facilities have only a marginal effect. Traffic congestion leads to economic losses for business.

Information and communication technologies (ICT) enable employees to work away from their traditional offices (teleworking) (J. Nilles, 1988), for instance at home or in teleworking centres, using email, mobile phones, internet or collaboration softwares. It has been concluded in many studies that teleworking would lead to traffic reduction (see e.g., Choo, Mokhtarian, & Salomon, 2005; Henderson & Mokhtarian, 1996; Koenig, Henderson, & Mokhtarian, 1996; Martino & Wirth, 1990; J. M. Nilles, 1990; J. M. Nilles, 1993; J. M. Nilles, Carlson, Gray, & Hanneman, 1974; Park, Nilles, & Baer, 1996). Teleworking is expected to enhance employees' job satisfaction and productivity level (Martino & Wirth, 1990). Teleworking has gained support from the Dutch labour unions, because it would be a means for balancing work and family life. Businesses, government institutions and transportation planners are paying more attention to teleworking, and also increasingly accepting it as a new style of working. Despite the expectations of ICT's benefits in reducing congestion, our understanding of people's need for ICT is not yet clear. This paper aims to reveal, via a two-round activity-travel diary survey, how employees' travel behaviour changes when they are provided with ICT tools for teleworking. The two-round activity-travel diary surveys were conducted within three departments of the Dutch Ministry of Transport. Via these two-round diary pilots, we aim to provide answers to the following questions: i) how would ICT affect employees' working routines?, and ii) what are employees' preference towards the provided ICT tools for working? The results of this study are expected to provide some preliminary empirical insights of people's need and preference for ICT tools, thereby providing implications to transport planners and policy makers when developing ICT-related policy strategies to stimulate teleworking and as such to reduce congestion

THE ACTIVITY-TRAVEL DIARY SURVEY

Activity-travel diaries have been often used to collect data for estimating activity-based transportation models and travellers' behaviour models (Axhausen, 1995). Activity-travel diaries provide multi-dimensional data that combine spatial, temporal, and attribute information (Yu & Shaw, 2004). Such contextual information improves not only the understanding of travel behaviour but also the quality of the collected data (Kenyon, 2006). Activity-travel diary was used successfully in earlier studies of the impacts of telecommuting (J. Nilles, 1996; J. M. Nilles, 1993; Pendyala, Goulias, & Kitamura, 1991). Therefore, we use activity-travel diary to extract the information of employees' activity-travel data for this study. The first-round diary survey was carried out during October 2007, covering a period of 28 consecutive days, and the second-round survey from November to December 2008, covering a period of 30 days. The two rounds serve as a before-after pair.

In the second-round diary, five categories of ICT tools were provided for the pilot respondents, though some participants may already have owned certain tools as personal belongings and had already been using them in their work before the survey. The tools include: (1) computers (work desktop, work laptop, private desktop, private laptop), (2) telephones (mobile and fixed), (3) Blackberries, (4) conference-related equipment (sound-station, video-conference tool), and (5) Universal Mobile Telecommunication System (UMTS) related tools (GPRS, remote webaccess, PDA with UMTS).

The pilot respondents were recruited from three groups within the Ministry, viz. DVS, MAVA and Groene Golf Team. 50 and 23 respondents recorded their activity-travels in the 1st and 2nd-round diaries respectively. This selection was based on the following reasons: (1) teleworking is generally promoted within these three departments; (2) the majority of their work (e.g., policy research and report writing) could be done remote with the help of ICT

tools; and (3) internal recruitment within these departments ensures a high sense of responsibility. Despite the small scale of the surveys, the participants widely vary as to age, education-level, job-level and main job activities, thus ensuring the sample heterogeneity.

We investigate the changes of participants' working time at home and in the office, and the changes in their use of ICT before and after the provision of ICT tools. Via an online diary-recording program, the participants were asked to record: (1) the starting and ending time of their work at home and in the office; (2) the type of the work-activities done at home and at the office; and (3) the information on their use of the ICT tools (location, timing, duration, and type). The diaries also collected the respondents' demographic information (e.g., age, gender) and their choice of frequently-used travel modes (e.g., car, train, bus and bike). Apart from the provision of ICT tools, we kept all other aspects constant or similar in the two surveys (e.g., the job functions of respondents, the respondents' office and home locations).

INTERPRETATION OF THE ACTIVITY-TRAVEL DIARY RESULTS

This section interprets the diary results for the three defined aspects: working at home, working in the office and the use of ICT tools.

First, it is found that the provision of ICT tools would only partially, rather than substantially, motivate employees to change their working times on certain days and to work away from the office (e.g., work at home temporarily, or work during travel). The employees did change their office-working start time and duration, but no significant difference is found for the office-working end time between the two travel diaries. In the 2nd-round travel diary, the employees started their office work later than in the 1st travel diary. They also reduced their office-working duration in the 2nd travel diary. The reason may be that, with the ICT tools, employees have more options for working away from the office (e.g., working temporarily at home before going to the office). However, generally, the employees still maintain their favourite start and end times for office work.

Second, this paper compares employees' time of working at home and concludes that the provision of ICT tools encourages employees to engage in home-working, either partially or for whole days. In the 2nd-round diary, the employees are more involved in home-working (more days at home). Female employees greatly increased their home-working after they had been provided with the ICT tools. However, in both travel diaries the male employees work more at home (measured in total hours) than the female employees. It is also found that the employees prefer partial home working to whole-day home working. But they still work mostly in the office.

Third, this paper analyzes the employees' use of the ICT tools in both diaries. Overall, providing ICT tools does increase the employees' likelihood of working at home. It is also concluded that: (1) Work PC and work laptop are the two most-used tools in both travel diaries. In contrast, private PC and private laptop are not commonly used for work. (2) In the 2nd travel diary, the pilot employees used Blackberries for work, substituting mobile and fixed telephones, but only for short-period work, such as mailing and calling. (3) Mobile equipment (i.e. Blackberry & mobile telephone) are preferred to fixed telephones. (4) Conference-related and UMTS-related tools are seldom used.

CONCLUSIONS

In order to increase our understanding of people's need for ICT, this paper provides an interpretation of the results from a two-round activity-travel diary survey conducted within three departments in the Dutch Ministry of Transport and investigates whether providing ICT

tools encourages employees to work away from their offices. The two-round activity-travel diary surveys were carried out before and after the provision of ICT tools, respectively. We compare the differences in the employees' work in three categories: working at home, working in the office and the use of the ICT tools during work. The empirical results demonstrate that providing ICT tools does encourage some employees to work away from their offices and increases the likelihood of employees to work at home. However, most employees still prefer to work in the office. These findings imply that the potential benefits from ICT may be affected by people's needs and preferences, and therefore may not be fully achieved as expected.

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