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Modeling the Choice of Tele-work and its Effects on Travel Behaviour in Indian context

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Abstract

Information and communication technology (ICT) empowers people with virtual accessibility to a wide range of activities reducing physical travel and traffic congestion. Since 1990, accessibility to ICT technologies, along with a drop in internet tariffs and prices of various devices like computers and mobile phones, has brought about a transformation of the activity travel behaviour of Indian employees. This paper analyses the choice of tele-work and its effects on the travel behaviour in Indian context through the disaggregated data collected from Bangalore, considering all potentially influencing variables on tele-work. The study covered employees who work from home either for a few days in a week or occasionally. The analysis was carried out in two stages. In the first stage, a preliminary exploration of the data was carried out to assess the presence of the tele-work scenario in the Indian context with respect to the worker's individual-and household-related characteristics. Secondly, the frequency of tele-work was modelled with the conventional variables of socio-demographic and transport-related characteristics. This research will be continued to quantify the benefits of tele-work in terms of vehicle miles travelled, savings in time and fuel consumption. The ultimate aim would be to convey to the policy-makers the strategic advantage of adopting tele-work as an alternative traffic management scheme for Indian cities.

Keywords: Tele-work; ICT, IT/ITES

1. Introduction

Demand for travel arises from the need of people to participate in different activities like work, shopping, education, entertainment etc. in different places at different times of the day. Since 1990, the traditional notion about accessibility to activities has changed considerably with the emergence of Information and Communication Technology (ICT), which encourages people to perform activities virtually. According to Golob (2000), accessibility can no longer be measured in terms of travel time, distance or generalised cost alone. Technology -- cell phones, personal computers, and the internet–facilitates performance of all sorts of activities viz. e-shopping,

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e-leisure, online reading, online services like travel booking, transactions, bill payments, etc. without physical travel. Future generations will evolve new technologies in the telecommunication sector allowing people to perform activities faster and more efficiently. Golob & Regan (2001) reviewed the technological developments that are likely to influence personal travel and activity behaviour. The interaction of ICT with transportation can substitute, modify, generate and add activities (Mokhtarian & R Meenakshisundaram, 1999; Salmon, 1986). Adoption of ICT and its impact on personal travel has been in the limelight from 1970's (Albertson, 1977; Viswanathan K & K G Goulias, 2001; Hjorthol, 2002).

The adoption of tele-work and its impact on the traffic scenario have been in the focus of research for more than two decades (Mokhtarian, Kitamura & Pendyala, 1991; Nilles, 1994; Sangho Choo, L Mokhtarian & I Salomon, 2005). Telecommuting (Tele-work) can be defined as working at home or at a location close to home instead of commuting to conventional working locations (Mannering and Mokhtarian, 1995). Tele-work has been considered as a strategy for reducing traffic congestion, energy consumption and air pollution (Niles, 1991). Niles has quantified the impact of tele-work in terms of reduction of fuel consumption and respective emissions of CO, NO, HC and particulate matter. Most studies claim significant reductions in emission values with the adoption of telecommuting (Henderson et al, 1996; Mokhtarian et al, 1996; Mokhtarian & Varma, 1998; Erasmia Kitou & Arpad Horvath, 2006). Erasmia Kitou & Arpad Horvath (2006) have analysed the effects of mode of transportation and the benefits of tele-work. Morten Falch (2012) has categorized the environmental impact of tele-work on transport behaviour under three broad effects i.e. first order effect, second order or rebound effect and third order effect. The study outcomes indicated that a substantial part of transport savings are nullified by increased transport for other purposes such as shopping and increased transport by other members of the household. Telecommuting opportunities might also influence choice of residential and employment locations, which in turn will affect travel demand (Nilles & Pendyala et al, 1991; Collantes, G.O. & Mokhtarian, P.L, 2003).

There exist many ambiguities in the overall impact of tele-work. The empirical information available does not convincingly indicate that peak hour trips will be reduced by tele-working (De Graaff, 2004). In contrast to the general outlook on the factors that influence tele-work, it is surprisingly individual needs, compulsions or temperaments that influence the decision rather than the availability of ICT or considerations of reduced commuting time (Thomas De Graff & Piet Rietveld, 2006). Pratt (2002) indicated that telecommuting has proven to be less effective in trip reduction than anticipated. Wells et al (2001) and Pratt (2002) suggested that the actual impact of telecommuting may vary with the frequency of telecommuting the individual is engaged in. In an effort to understand the relationship between virtual and physical mobility, Hjorthol, R., & Gripsrud, M (2009) have found that the relation between virtual and physical mobility varies depending on the type of activity and the social group, but overall that is not very strong.

Indian cities are witnessing a huge migration from rural areas because of the employment, education and other opportunities that they offer. This results in enormous population pressure on the cities. The infrastructure improvements are not commensurate with the increased population density, resulting in congestion, increased travel time, high vehicle operating costs, pollution emissions and psychological stress. They also create many health problems. According to a study conducted by IISC, Bangalore, the daily congestion cost in Bangalore is Rs 208 million, computed on the basis of the approximate cost incurred by a traveller for a one-hour journey which amounts to Rs 91.35 per hour. The loss due to congestion, calculated in terms of the number of hours lost, is nearly a tenth of the average Bangalorean's daily wage. Statistics compiled by IISC has found that if one out of every 100 persons who commute by public and private transport shifts to bicycles or walks, Bangalore will save Rs 2.5 lakh every day. Findings of a survey made by IBM Smarter Cities Forum in New Delhi revealed that commuter stress in Bangalore is about twice as high as in Mumbai. However, the commuters' opinion on their choice of transport showed that they still preferred to travel by private modes.