INTRODUCTION—THE INTERNET, CHANGING MOBILITIES, AND URBAN DYNAMICS[1]

Tim Schwanen[2] and *Martin Dijst*
Department of Human Geography and Planning
Faculty of Geosciences
Utrecht University
The Netherlands

Mei-Po Kwan
Department of Geography
The Ohio State University

It is by now well established that the Internet and other relatively recent information and communication technologies (ICTs) are fundamentally altering the spatial and temporal organization of the activities of households, firms, and other actors in cities. Views on the nature of ICT-induced changes have, however, become more qualified. At least among geographers, technologically deterministic, utopian, or dystopian visions on how urban structure and mobility may be affected by ICT have become outdated. Instead, the reciprocity of the links between telecommunications, offline activity, and urban spaces as well as their temporal and spatial complexity are being emphasized (e.g., Graham and Marvin, 1996; Aoyama and Sheppard, 2003).

With regard to the time dimension, changes engendered by ICTs come about much more slowly than visionaries had hoped (Zook et al., 2004). This is exemplified by the growth of telecommuting. Although it is very difficult—if not impossible—to pinpoint the exact number of telecommuters, it is fair to say the projections from the 1970s and 1980s of the share of telecommuters in the total labor force and the associated savings in vehicle miles traveled have turned out to be overly optimistic (Choo et al., 2005; Mokhtarian et al., 2005). Various factors are responsible for this shortfall from expectations, including forces that bias forecasts upward, reservations and resistance to telecommuting by employers, and a limited understanding of how employees (prefer to) organize their work activities in space and time as part of their everyday life (e.g., Mokhtarian et al., 2005; see also Hjorthol, 2006, this issue).

Concerning spatial complexity, geographers have taken great pains to argue that cyberspace has not come to dominate the socio-physical spaces on the Earth's surface. To be sure, recent wired and wireless technologies have weakened some of the associations between activity, place, and time and relaxed the space-time fixity and embeddedness of

[1]Financial support from the Social Sciences Internationalisation Fund (ISW Fund) of the Netherlands Organization for Scientific Research (NWO), the Urban and Regional research centre Utrecht (URU), and the Department of Human Geography and Planning of the Faculty of Geosciences, Utrecht University for the November 2004 ICT-PPS meeting in Doorn is gratefully acknowledged.
[2]Correspondence concerning this article should be addressed to Tim Schwanen, Department of Human Geography and Planning, Faculty of Geosciences, Utrecht University, P.O. Box 80.115, 3508 TC Utrecht, the Netherlands; telephone: +31-30-253-4437; fax: +31-30-253-2037; e-mail: t.schwanen@geo.uu.nl

Urban Geography, 2006, **27**, 7, pp. 585–589.

(human) interaction. The maxim of tell me where you are, and I tell you what you are doing is no longer valid in many cases (Couclelis, 1998). Socio-physical space nonetheless molds and shapes cyberspace in many ways. First, cyberspace is grounded in physical space (Dijst, 2004; Zook et al., 2004). There is a hidden infrastructure of fiber-optic cables, communication towers, and a multitude of other technical artifacts that support E-activity that give digital divides a spatial dimension as well. As a consequence, access to the newest technologies is differentiated on the basis of the degree of urbanization at the national level (Gorman and McIntree, 2003; Hwang, 2004), while neighborhood socioeconomic status continues to be of central importance at the intra-urban level (Townsend, 2001; Graham, 2002).

Second, it is increasingly recognized that the Internet and e-activity do not act as mere substitutes for face-to-face (F2F) communication and activity in the physical world, but mainly a complement. Urry (2004), for instance, has noted that virtual communication is not as rich as F2F communication, that trust is established and sustained in situations of corporeal co-presence, and that people want and need to experience places and events in the physical world. There is also increasing empirical evidence that Internet use on balance generates more travel than it replaces (e.g., Mokhtarian, 2002). Rather than thinking in "either/or" terms, it is more productive to think of "both/and" and to emphasize the hybrid nature of virtual and physical interactions (a theme that also runs in various ways through the papers collected in this issue).

Third, cyberspace can function as an annex to social space, consolidating and reinforcing social practices and cultural norms tied to specific locales, regions, or nation-states (Aoyama and Sheppard, 2003; Madge and O'Connor, 2006). The adoption of e-commerce is a case in point. There is increasing evidence that the adoption and use of the Internet by retailers and consumers is situated in socio-physical contexts and that technology trajectories depend on and reinforce nation-specific institutional regimes, urban forms, and cultures (Aoyama, 2003; Zook et al., 2004; see also Weltevreden and Atzema, 2006, this issue). Work along these lines thus shows that the Internet cannot be separated from its geographical context—a point that also emerges from the other two papers in this issue.

Knowledge about the Internet, mobility, and urban dynamics has rapidly accumulated and quite a few books and special issues have been published in recent years (e.g., Aoyama and Sheppard, 2003; Graham, 2003; Park and Taylor, 2004). We believe, however, that the relations between ICT, mobility, and urban dynamics require further investigation by geographers and scientists from related disciplines. Apart from the question of whether conventional theoretical and methodological frameworks are still appropriate for studying contemporary urbanism (e.g., Kwan and Weber, 2003), the following reasons may be advanced. First, information and communication technologies, (spatial) diffusion patterns, and their social constructions evolve so rapidly that knowledge quickly becomes outdated. Second, relatively little is known about how people and firms actually employ ICTs in the their everyday lives (Kwan, 2002; Valentine and Holloway, 2002; Zook et al., 2004). Third, e-activities are often studied in isolation from one another and from other, offline choices households and firms make. In the telecommuting literature, for instance, there is only limited attention devoted to the interdependence between the choice to telecommute and residential and employment location decisions, or the everyday "juggling" of household and work obligations (see the papers by Ory and Mokhtarian and Hjorthol, 2006, this issue). Fourth, the situatedness of ICT use in

geographical contexts calls for additional research from countries and regions that have received less attention in prior studies (such as Norway or the Netherlands studied by Hjorthol, and Weltevreden and Atzema, respectively). Even though there is a fair degree of variation in the geographical contexts on which published accounts are based, empirical evidence is biased toward ICT "frontrunner" countries, such as Japan and Finland, and the USA and UK (reflecting the Anglophone dominance of the discipline).

In light of the substantial need to advance our understanding of the interactions between information and communication technologies and dynamics in mobility and urban structure, we have set up an international thematic network entitled *ICT: Mobilizing Persons, Places, and Spaces* (ICT-PPS). This network has five main goals. First, it seeks to promote multidisciplinary research of the interrelations between ICTs, people's everyday lives, and the use of places and spaces in various cultural, spatial, and institutional contexts. Second, it intends to develop and discuss methodological approaches to data collection, data sharing, analytical methods, and methods of representation with respect to the interactions between ICTs, mobility, and urban dynamics. Third, we want to stimulate joint research activities regarding those interactions. Fourth, the network is a forum for the exchange of knowledge among researchers through workshops and other face-to-face meetings. Finally, we intend to disseminate theoretical, methodological, and empirical findings through special issues in international scientific journals, books, and other media.

The three articles in this special issue of *Urban Geography* arose from some of the contributions to the first international workshop we organized in November 2004 in Doorn, The Netherlands. Each of them examines a particular aspect of the dynamics in Internet adoption and use, mobility, and urban structure. Another collection of papers emerging from that meeting will appear in *Transportation Research Part A* (Kwan et al., 2007). Those papers have a different focus—the interaction between new information technologies and human activity–travel behavior—and devote less attention to the geographies of ICT use.

The first paper that follows is written by David Ory and Patricia Mokhtarian (2006) and is concerned with the implications of telecommuting for residential and employment location choices and urban structure. Given that telecommuters tend to live farther from their physical employment locations than non-telecommuters, they ask whether people choose to telecommute because of their long home-to-work journeys or whether the ability to telecommute induces people to increase the spatial separation between the home and workplace. Using retrospective data on residential and employment histories from more than 200 State of California workers, they conclude that "rebound effects" from telecommuting programs in the form of an unintended triggering of longer distances traveled are not very likely to occur.

Randi Hjorthol (2006) takes the fact that the extent of telecommuting falls short of expectations as the starting point of her paper. She investigates why the level of teleworking is so low now that so many people have gained access to the Internet at home over the past decade, using a mix of quantitative and qualitative methods with data from three major urban areas in Norway—Oslo, Bergen, and Trondheim. Residential and employment location *per se* do not yield statistically significant results, but commute distance has a positive impact on the frequency of teleworking. Her research also shows the

importance of cultural factors and everyday practicalities in decisions about working from home and the associated travel impacts.

Finally, Jesse Weltevreden and Oedzge Atzema (2006) focus on click-and-mortar retailing. Arguing that the majority of studies about the uptake of e-commerce by retailers ignore the relevance of the spatial context, they investigate to what extent the adoption of information-only and online sales strategies are influenced by city size and the attractiveness of retailing concentrations in city centers. Their focus is on retailers in eight city centers in the Netherlands, where restrictive location policies have consolidated their role as the most important shopping concentrations. Weltevreden and Atzema also investigate whether click-and-mortar retailers actively promote their websites offline. Their study emphasizes the hybridity of retailing strategies, as well as the geographical differences in the ways the Internet becomes embedded within socio-physical retailing environments.

Each in their own way, the papers in this special issue show that geographical contexts are inseparably associated with the choice to use the Internet for the spatial organization of households' everyday life and retailers' contact with clients, and that the links between virtual and socio-physical spaces are multiple and complex. As such, they thereby complement and extend prior work on the interaction between ICTs, mobility, and urban spaces. We can only hope that the work brought together here stimulates further inquiry into these rapidly evolving relations.

REFERENCES

Aoyama, Y., 2003, Socio-spatial dimensions of technology adoption: Recent M-commerce and E-commerce developments. *Environment and Planning A*, Vol. 35, 1201–1221.

Aoyama, Y. and Sheppard, E., 2003, Guest editorial: The dialectics of geographic and virtual space. *Environment and Planning A*, Vol. 35, 1151–1156.

Choo, S., Mokhtarian, P. L., and Salomon, I., 2005, Does telecommuting reduce vehicle-miles traveled? An aggregate times series analysis for the U.S. *Transportation*, Vol. 32, 37–64.

Couclelis, H., 1998, Editorial: The new field workers. *Environment and Planning B: Planning and Design*, Vol. 25, 321–323.

Dijst, M., 2004, ICT and accessibility: An action space perspective on the impact of new information and communication technologies. In M. Beuthe, V. Himanen, A. Reggiani, and L. Zamparini, editors, *Transport Developments and Innovation in an Evolving World*. Berlin, Germany: Springer, 27–46.

Gorman, S. P. and McIntree, A., 2003, Tethered connectivity? The spatial distribution of wireless infrastructure. *Environment and Planning A*, Vol. 35, 1157–1171.

Graham, S., 2002, Bridging urban digital divides? Urban polarisation and information and communications technologies (ICTs). *Urban Studies*, Vol. 39, 33–56.

Graham, S., 2003, *The Cybercities Reader*. London, UK: Routledge.

Graham, S. and Marvin, S., 1996, *Telecommunications and the City: Electronic Spaces, Urban Places*. London, UK: Routledge.

Hjorthol, R., 2006, Teleworking in some Norwegian urban areas—motives and transport effects. *Urban Geography*, Vol. 27, 610–627.

Hwang, J.-S., 2004, Digital divide in internet use within the urban hierarchy: The case of South Korea. *Urban Geography*, Vol. 25, 372–389.

Kwan, M.-P., 2002, Time, information technologies, and the geographies of everyday life. *Urban Geography*, Vol. 23, 471–482.

Kwan, M.-P., Dijst, M., and Schwanen, T., 2007, Guest editorial: New information technologies, activities and travel. *Transportation Research A*, Vol. 41, 121–124.

Kwan, M.-P. and Weber, J., 2003, Individual accessibility revisited: Implications for geographical analysis in the twenty-first century. *Geographical Analysis*, Vol. 35, 341–353.

Madge, C. and O'Connor, H., 2006, Parenting gone wired: Empowerment of new mothers on the internet? *Social & Cultural Geography*, Vol. 7, 199–220.

Mokhtarian, P. L., 2002, Telecommunications and travel: The case for complementarity. *Journal of Industrial Ecology*, Vol. 6, 43–57.

Mokhtarian, P. L., Salomon, I., and Choo, S., 2005, Measuring the measurable: Why can't we agree on the number of telecommuters in the U.S.? *Quality and Quantity*, Vol. 39, 423–452.

Ory, D. and Mokhtarian, P., 2006, Which came first, the telecommuting or the residential relocation? An Empirical Analysis of Causality. *Urban Geography*, Vol. 27, 590–609.

Park, S. O. and Taylor, M., 2004, Introduction: E-commerce, E-business and the dynamics of metropolitan economies. *Urban Geography*, Vol. 25, 285–288.

Townsend, A. M., 2001, The Internet and the rise of the new network cities, 1969–1999. *Environment and Planning B: Planning and Design*, Vol. 28, 39–58.

Urry, J., 2004, Connections. *Environment and Planning D: Society and Space*, Vol. 22, 27–37.

Valentine, G. and Holloway, S. L., 2002, Cyberkids? Exploring children's identities and social networks in on-line and off-line worlds. *Annals of the Association of American Geographers*, Vol. 92, 302–319.

Weltevreden, J. and Atzema, O., 2006, Cyberspace meets High Street: Adoption of click-and-mortar strategies by retail outlets in city centers. *Urban Geography*, Vol. 27, 628–650.

Zook, M., Dodge, M., Aoyama, Y., and Townsend, A., 2004, New digital geographies: Information, communication and place. In S. D. Brunn, S. L. Cutter, and J. W. Harrington, editors, *Geography and Technology*. Dordrecht, Germany: Kluwer Academic Publishers, 155–176.