No.170/July 2006

Flying around the globe and bringing business back home?

Paul Haynes
IIIS & Department of Sociology,
Trinity College, Dublin.

Alessandra Vecchi
IIIS & Department of Sociology,
Trinity College, Dublin.

James Wickham
IIIS & Department of Sociology,
Trinity College, Dublin.

IIIS Discussion Paper No. 170

Flying around the globe and bringing business back home?

Paul Haynes, Alessandra Vecchi and James Wickham

EMPLOYMENT RESEARCH CENTRE
Department of Sociology, Trinity College Dublin, Dublin 2, Ireland
http://www.tcd.ie/erc

Flying around the globe and bringing business back home?

Paul Haynes, Alessandra Vecchi and James Wickham

Working Paper
submitted Institute of International Integration Studies, TCD
7 November, 2005
This revised version submitted:
6 February, 2006

Paper presented
Economic Sociology Research Network Stream
European Sociological Association Conference
Torun, Poland
10 September 2005

Correspondence address:
e-mail: jwickham@tcd.ie; tel: +353 1 608 1875; fax: + 353 1 677 1300

> 'In a world of strangers…a new sucker arrives every minute…The dealings of strangers are subject to social norms. In a world of Hobbesian asocial nomads the next stranger you meet would just as well shoot you as shake your hand. That is why the airlines are crowded with business travellers, on their way to making friends' (McCloskey 1994, p.373)

Introduction

For many managers and professionals today, to work is to travel. Business travel is now so interwoven with doing business that its apparent continued growth is a matter of common sense. Yet paradoxically, these same business travellers are *also* intensive users of communication technology (phone fax, e-mail, etc), many will use web based technologies to locate information and even do business, while some will use information technologies to work together with colleagues in distant physical locations. Why then the need for physical travel?

Rather than taking the growth of travel for granted, a sociology of business travel could explore those factors that make business more or less travel-intensive. Just as some forms of economic growth are more energy-intensive than others, just as some cities (with the same overall income levels) are more car dependent than others (Wickham, forthcoming), so some forms of business may be more travel-intensive than others. A few years ago such a question would have been 'academic', but today there is increasing awareness of the negative environmental consequences of hyper-mobility, and in particular of the contribution of air travel to global warming. Against this background, the research project[1] from which this paper derives examines business travel from two separate angles. Firstly, we ask about the factors that generate business travel, and secondly we explore the consequences of business travel for travellers' identity and relationship with their non-work lives. This paper is based on preliminary work for the first of these two topics.

The first part of the paper examines the economic and spatial structure of the global economy. The growth of dynamic global cities, ICT clusters and global production networks as well as the network organisation all make long-distance communication more important. The second part of the paper examines the role of physical travel within this. We explore the extent to which physical travel and electronic communication are complementary or substitutes, and document the growth of business travel. Finally, we sketch how these issues all emerge through the importance of business travel for the Irish software sector. The Irish software industry was identified for research because of the

[1] The project 'Mobile Lives' is funded as part of the 'Business as a Conduit of Globalisation' research programme within the Institute of International Integration Studies, Trinity College Dublin, Ireland. http://www.tcd.ie/iiis

interesting paradox that while its product is "weightless" and can be transmitted and mediated through virtual technology, the sector seems to be very travel intensive. The paper ends with some initial conclusions and directions for further research.

Part 1. Communications and the structure of the global economy

There has been a lot of recent work about new spatial forms of economic activity, ranging from the general globalisation argument, through global cities to ICT clusters. All of these have implications for – or even depend on - physical mobility and/or virtual communication – yet nobody seems to have addressed this issue.

In this section, the paper will concentrate on the factors that explain why location is an issue for business and some of the ways in which important locations are connected to each other. This section will therefore explore the notion that certain dynamic cities and geographical clusters have emerged and are integrated into global production networks in ways that have had a big impact on socio-economic factors, which include radical changes to mobility patterns. This section will begin by introducing some of the notions from the globalisation debate that will then enable the issue of proximity to be addressed, and, with it, an understanding of the emergence of dynamic cities, clusters and networks, and their relevance to changing mobility patterns.

Overall, the paper will present some of the key features that have been developed in the literature partly in order to show that there are tensions between these features (centre/periphery; proximity/footloose; physical mobility/virtuality etc) and that business travel is often the absent presence in resolving these tensions.

Globalisation – and the missing link of travel

The major economic contextual factors informing business travel are location, organisational structure, market, collaboration, transportation infrastructure, technology and information. While this is perhaps a very similar list to one that could have been generated to understand the economics of trade and travel a hundred years ago, most of these factors have changed dramatically in the last thirty years or so. This notion is part of the globalisation thesis and has been described by a wide range of academics from a variety of disciplines.

Terms such as "globalisation," "global networks" and "glocalisation" are contested terms. '*Globalization is on everybody's lips; a fad word fast turning into a shibboleth, a magic incantation, a pass-key meant to unlock the gates to all present and future mysteries*' (Bauman 1998: 1). Despite Bauman's caution in the use of the term, the concept of globalisation has a great deal of substance. For many authors, the concept 'globalisation' refers to a sense of global proximity and to a shrinking world (see Van der Bly, forthcoming). Tomlinson emphasises this aspect by referring to globalisation as '*an empirical condition of the modern world, which I call complex connectivity. By this I mean that globalisation refers to the rapidly developing and ever-densening network of interconnections and interdependencies that characterizes modern social life*' (Tomlinson, 1999: 2). In a similar way Mittleman (1996) defines globalisation as '*the spatial reorganization of production, the interpenetration of industries across borders, the spread of financial markets, the diffusion of identical consumer goods to distant*

countries, massive transfers of population within the South as well as from the South and the East to the West, resultant conflicts between immigrants and established communities in formerly tight-knit neighbourhoods, and an emerging world-wide preference for democracy' (Mittleman 1996: 2).

The notion of globalisation as a catalyst for radical economic, political and social change is therefore a recurring issue. There is however a lack of consensus over the strength and likely the impact of globalisation. This conceptual vacuum is nicely described by Scholte, who affirms that '*In spite of a deluge of publications on this subject, our analysis of globalisation tends to remain conceptually inexact, empirically thin, historically and culturally illiterate, normatively shallow and politically naïve. Although globalisation is widely assumed to be crucially important, we generally have scant idea what, more precisely, it entails*' (Scholte, 2000: 1). A common theme permeating the literature on globalisation is the changing significance of geographical proximity. There is a popular view that the world is moving toward a globalised economy, and that this implies that globalisation is inevitably associated with some "regionalism" of some form (Isaksen, 2001; Sudgen & Wilson, 2001). This trend toward a more pronounced regionalism seems supported by looking at trade patterns – whereas global trade has been growing in the last decade, intra-regional trade has been increasing at a faster pace (O'Neill, 2004). Similarly Davidson finds that intra-European travel has been growing faster then world-wide travel (2004).

In this context, Scott affirms that '*contrary to many recent predictions, geography is not about to disappear. It becomes increasingly more important because globalisation enhances the possibility of heighten geographic differentiation and locational specialisation*' (Scott, 2001: 813). Yet such locational specialisation is only part of globalisation if the different regions, agglomerations or nodes are all connected. As globalisation proceeds, an extended mosaic of dynamic cities is evidently coming into being and these particular agglomerations are now beginning to function as the spatial foundations of a "new world system". Yet again, such elements only form a system if they are linked, yet while research focuses on the individual elements, it takes for granted the connections between them. Similarly Storper (1997) analyses the resurgence of regional economies and stresses the increasing importance of regional communities and firms as the basic building blocs of a global market; "regions" are important units of analysis but the connections between them are largely ignored. Regionalisation refers to economic activity dependent on resources that are specific to individual localities and the most unequivocal sign of this trend towards regionalisation is the visible growth of regional clusters over the last decades. Similarly, research on industrial clusters has grown enormously in recent years – industrial geographers and economists alike are increasingly concerned with unveiling the distributional logics that are respectively associated with the socio-spatial organisation of industrial firms and their networks (Yeung, 2000). It is to this stream of research that the paper now turns.

Dynamic cities

Large cities have attracted the attention of social scientists over the last century and this is indicated by the wide range of terms used to describe them: imperial cities, primate cities, great industrial cities, millionaire cities, world cities, global capitalist cities,

international financial centres, mega-cities and global cities are all well-known travel destinations.

Drawing on the functional approach to global cities, from the seminal work of Peter Hall (1966) to the comprehensive analysis of London, New York, Tokyo and Paris in the mid 1990s, or international financial centres toward the end of the millennium (Economist, 1998), the central focus of the world city literature has been to rank cities according to their disproportionate economic power in the world-system. To illustrate this richness Beaverstock et al. (1999), for example, were able to distinguish four main types:

I Cosmopolitan characteristics and the multinational corporate economy
II World cities and the new international division of labour
III The internationalisation, concentration and intensity of producer services
IV World cities as international financial centres

There is an emerging consensus that global cities are becoming prominent in the networks of the global economy as "command and control centers" (Sassen, 1991), where the headquarters of multinational corporations, giant banks, and new supranational economic institutions (trade organizations, development banks, etc) are located. These world cities become the increasingly dominant centres of progressively more integrated, hierarchical world city system (Beaverstock et al., 1999; Smith & Timberlake, 2001). Perhaps paradoxically, though, these cities are increasingly connected to each other but to less extent to their own hinterlands (Sassen, 1991).

Within the new geographic rationale of the 'network economy' which situates places in multifarious flows of information, transactions, people, and goods, Witlox et al. (2004) focus on the geographic outline of an important enabling infrastructure and communication network – the worldwide distribution of air passenger flows. More precisely '*because of its relatively rapid capacity to reply in terms of supply and demand, air traffic provides a pertinent indicator in the quest to evaluate the international character of cities*' (Cattan, 1995:303). From the findings it emerges that besides the intra-North-American and the intra-European flows, the largest number of passengers is travelling between Northern America and Europe, Northern America and Pacific Asia, and Europe and Pacific Asia. The findings also suggest that Northern America, Europe and Pacific Asia are strongly linked together. Europe is the only region where the first five intra-regional connections exceed the threshold of one million passengers. In relation to intra-European flows, the largest intra-European connection (Milan-Rome) is only slightly more important than the second one and the importance of the ranked connections diminishes very gradually (see Table 1.1)

Table 1.1: Intra-European flows

Rank	Between	And	Number of passengers

1	Milan	Rome	1 534 156
2	Amsterdam	London	1 242 822
3	London	Paris	1 064 510
4	Dublin	London	1 051 102
5	Marseilles	Paris	1 044 202
6	Barcelona	Madrid	890 038
7	Edinburgh	London	788 752
8	Frankfurt	London	779 600
9	Berlin	Munich	705 129
10	Düsseldorf	Munich	656 576

When analysing the number of passengers departing from, and arriving in, each city, Witlox et al. notice that London dominates the scene, closely followed by New York, Paris and Los Angeles. Dublin ranks between 4-6 million with much larger cities such as San Paulo, Mexico City and Bombay (see Table 1.2)

Table 1.2: The 150 cities with the largest number of arrivals and departures

Number of arrivals and departures	Cities
30 - 32 million	London
28 - 30 million	New York
18 – 20 million	Paris
16 – 18 million	Los Angeles
12 – 14 million	Chicago, Hong Kong
10 – 12 million	Washington, Frankfurt, San Francisco

8 – 10 million	Miami, Singapore, Toronto, Amsterdam, Rome, Bangkok, Milan
6 – 8 million	Atlanta, Boston, Madrid, Munich, Las Vegas, Dallas, Tokyo, Taipei, Sydney, Houston
4 – 6 million	Sao Paulo, Mexico, Barcelona, Dubai, Brussels, Zurich, Vancouver, Denver, Berlin, Bombay, Seattle, Detroit, Minneapolis, Johannesburg, Seoul, Düsseldorf, Melbourne, Stockholm, Phoenix, Manila, Dublin
2 – 4 million	Philadelphia, Manchester, Montreal, Kuala Lumpur, Tampa, Hamburg, Athens, New Delhi, Copenhagen, San Diego, Lisbon, Buenos Aires, Rio De Janeiro, Vienna, St Louis, Riyadh, Cairo, Jeddah, Honolulu, Geneva, Tel Aviv, Istanbul, Oslo, Auckland, Guadalajara, Shangai, Beijing, Stuttgart, New Orleans, Cape Town, Brisbane, Kansas, San Jose California, Osaka, Portland, Jakarta, Cleveland, Calgary, Kuwait, Venice, Helsinki, Cologne, Birmingham, Edinburgh, Moscow, Marseilles
0 – 2 million	Budapest, Prague, Bogota, Naples, Chennai, Indianapolis, Pittsburgh, Columbus, Glasgow, Caracas, Lima, Charlotte, Lyon, Palermo, Warsaw, Cincinnati, Santiago, Perth, Hartford, Gothenburg, Santo Domingo, Ottawa, Beirut, Durban, Monterrey, Bologna, San Jose Costa Rica, Ho Chi Minh, Turin, Karachi, Hanover, Colombo, Manama, Sacramento, Amman, Bordeaux, Brasilia, Tijuana, Abu Dhabi, Belo Horizonte, San Salvador, Casablanca, Nairobi, Dhaka, Guatemala, Doha, Bilbao, Belfast, Tunis, Nassau, Christchurch, Edmonton, Buffalo, Basel, Adelaide, Bangalore,…

In the case of Dublin, surely the high ranking is partly geographical, although according to the authors, certain relations between cities can be attributed to historical ties such as the presence of colonies, while others are the consequence of FDI or far-reaching economic integration that stimulates international trade (see Witlox et al. 2004).

At the city level of analysis, these findings seem to suggest a series of questions - since the data presented in the study take into account the overall passenger flows, what is the share that can be merely attributed to air business travel? Air travel data itself is problematic because it does not allow any distinctions to be drawn between business and non-business travel. Similarly we cannot make any distinction by considering the 'class' of ticket since increasingly business travellers tend to fly in economy or to use budget airlines and generally business and non-business travel are frequently intertwined (Davidson, 1994). Yet, to what extent the actual amount of business travel undertaken reflects FDI or other patterns of international trade is not clear. The literature on global cities, besides acknowledging that there might be some correlation between business travel and patterns of international trade, fails to explore this issue in depth.

ICT Clusters

According to Scott, today, after intense economic restructuring and technological change, significant transformations of this older order of things has occurred virtually across the world, '*bringing in their train the outlines of a new social grammar of space, or a new world system*' (Scott, 2001: 814). One of the outstanding features of this

emerging condition is the apparent formation of a multilevel hierarchy of economic and political institutions ranging from the global to the local. One main aspect of this state of affairs is that there has been a resurgence of region-based forms of economic and political organisation, with the most visible expression of this tendency being manifest in the formation of large global city-regions. According to Scott '*these city-regions form a global mosaic that is now beginning to override the system of core-periphery relationships that has hitherto characterized much of the macro-geography of capitalist development*' (Scott, 2001: 814).

Scott emphasises how the propensity of many types of economic activity, manufacturing and service sectors alike, to gather together in dense regional clusters or agglomerations appears to have been intensifying in recent decades. This renewed quest for '*collective propinquity'* on the part of all economic agents can in part be interpreted as a strategic response to heightened global economic competition in the context of a turn to post-fordism in modern capitalism (Scott, 2001). Propinquity is seen as being especially important in this context because it is a source of enhanced competitive advantage for many types of firms (Porter, 2001; Scott, 1998; Storper, 1997), and, as a corollary, large regional production systems are coming increasingly to function as territorial platforms for contesting global markets (Scott, 2000, 2001).

One of the seeming paradoxes is that '*whereas dramatic improvements in technologies of transportation and communication over the last few decades are helping to annihilate the barriers of space by bringing all parts of the world into ever closer contact with one another, dense urban agglomerations continue to increase in size and importance everywhere*' (Scott, 2001: 816). These apparently incompatible trends turn out on further scrutiny to be '*two faces of a mutually reinforcing set of relationships whose geographic logic can in significant ways be understood in terms of the network arrangements that constitute the basic structure of organised economic and social life*' (Scott, 2001: 816).

In relation to knowledge-intensive clusters, Scott further adds that leading-edges of the contemporary post-fordist economy are represented by sectors like high-technology production, neo-artisanal manufacturing, cultural-products industries, the media, business and financial services which persistently assume the form of intricate networks or systems of producers bound together in relations of specialisation and complementarity with diverse synergies appearing at points of mutual interaction (Cooke and Morgan, 1998; Scott, 1998). These features are associated with a number of far-reaching geographic consequences: where the multifaceted transactions costs associated with these networks are high per unit of distance (above all where they involve frequent, unpredictable, and constantly shifting face-to-face meetings), producers will have strong incentives to locate in close proximity to one another; by contrast, it is often the case that the distribution of the final products of these sectors incurs only low costs per unit of distance, which means that they can span a relatively extended geographic scale.

According to Scott large cities are more likely to be hosting creative clusters because '*they are all the more pervasive in large cities because of the countless combinatorial*

variations in the kinds of inter-personal encounters that can occur, and out of which there sometimes flow completely unexpected and unpredictable forms of creative action' (Scott, 2001: 818). Richard Florida (see Florida 2002) takes this argument further and attempts to explore the factors that attract talent and its effects on high-technology industry and regional incomes. Talent, defined as individuals with high level of human capital, measured as a percentage of the population with a bachelor's degree and above, is attracted by diversity or what are referred as low barriers to entry for human capital. The findings confirm that talent is associated with the diversity index and with the location of the high-technology industry, whereas amenities play a secondary role.

In recent years, then, dynamic cities displaying different degrees of ICT-related growth, especially in relation to knowledge-intensive industries have received increasing attention. An important hallmark of these industries that are reliant on individual creativity and talent, known as 'creative industries' is the continuing innovation and development of products and processes, often measured by the number of patents awarded.

These creative industries also are almost city-based – they tend to cluster in large cities and regions that offer a variety of economic opportunities, a stimulating environment and amenities for different lifestyles such as Boston, San Francisco, San Diego, Seattle, Austin, Washington DC, Dublin and Bangalore (Wu, 2005). Some empirical studies investigate the importance of the external environment for innovation in relation to these dynamic cities (Van Winden & Woets, 2003; Wu, 2005; Breathnach, 2000; Kelly, 2003; O'Riain, 2004). These studies tend to be in line with the vast and growing literature on the development of local clusters, strategic networking and regional development. Many contributions have explored the relation between local networks and regional development. Related terms include "innovation system" (Asheim & Isaksen, 1997), "milieu" (Maillat, 1996), "technopole" (Castells & Hall, 1994) and "cluster" (Porter, 1990). Engagement in local networks has several well-documented advantages (Jarillo, 1993; Castells, 1996; many others), but they are particularly important in relation to innovation (Camagni, 1991; Cooke & Morgan, 1998). The main line of argument is that denser local networks lead to more innovation, which results in favourable local development.

Yet, nowhere is the assumption that spatial proximity supports inter-firm cooperation, collective learning and innovation more prominent than in the literature on industrial clusters and to a greater extent in the literature of industrial districts (Dei Ottati 1987; Storper 1997) Within this strand of literature, a critical theme is the role 'space' and the extent to which it can trigger cooperation and in particular interactive learning as well as innovation between firms. Space is taken as synonymous with geographical proximity, such that physical nearness is taken to be a necessary and often sufficient condition for inter-firm cooperation, such that many studies of successful industrial clusters often 'find' geographical proximity as a main driver for clustering. Within this context, innovation is thought to occur more easily in situation of geographic proximity – innovation activities benefit from a concentration of economic activities by similar and related firms in a cluster, which facilitate knowledge spillovers and stimulate various

forms of adaptation, imitation, learning and innovation (Enright 1998). The main argument, then, is that the localisation of an industry with many firms competing in the same sector or cooperating across related industries tends to trigger dynamism and flexibility as well as learning and innovation.

At the cluster level of analysis, co-location therefore makes a difference in business if the business sector requires talented people to support it, as best illustrated by knowledge intensive industries. While this implies that technical and creative industries are clustered in a relatively small number of locations, this does not in itself imply anything at all about the nature of international business travel. It might even be inferred from such trends, that exports or FDI can rise, while the actual amount of physical travel can fall, as the agglomeration of skills continues. As we shall see later in this paper, this has not been the case, but why this has not been the case involves both the nature and the sustainability of the production networks themselves, which will now be examined in more detail. Another point that this literature fails to address is that about the nature of travel – who travel and for what reasons in a given cluster? We would assume that companies in sectors like high-technology production, neo-artisanal manufacturing, cultural-products industries, the media, business and financial services which assume the form of complex networks bound together by relations of specialisation and complementarity with diverse synergies appearing at points of mutual interaction, would undertake different amount of business travel and for different purposes.

GLOBAL PRODUCTION NETWORKS

The previous sections examined factors that imply the importance of location for certain types of business, and the impact that these factors might have on the need for business travel. This section will examine the connections between firms in different places and consider some of the issues that these relationships raise concerning mobility.

To illustrate the type of connectivity that exists between major production sites, Bathelt et al. (2004) develop a useful distinction when they explore the global network relationship, examining if tacit knowledge transfer is confined within geographical proximity whereas codified knowledge may roam the globe almost frictionlessly. To evaluate this claim they make a distinction between the learning processes taking place among actors embedded in a community by just being there – '*dubbed buzz*' – and the knowledge obtained by investing and building channel of communication – '*pipelines*' – to selected actors located outside the local community. The argument can therefore be advanced that the coexistence of high levels of dubbed buzz and many pipelines may provide firms located in outward-looking and dynamic clusters with a string of specific advantages not available to outsiders. '*The buzz encourages the development of shared values, attitude and interpretative schemes, typical for communities of practice, which enable the local actors to engage in interactive learning and problem-solving, and give meaning to complex information about changes in the market and in technologies'* (Bathelt et al., 2004: 45). Such connectivity between places, and differences between the *types* of connectivity might therefore imply more business travel between one city and another or, more specifically, between one cluster or sector and its counterpart (horizontal

or vertical) in another country. The question this raises is do such pipelines require increased levels of business travel to maintain them, or higher levels of ICT, or do they imply a range of "enablers" such as economies of scale, infrastructure or social habits that assist in the process of work related mobility? Further, this relationship should not be taken for granted as an inevitable outcome of the internationalisation of production networks themselves as technical and creative industries are centred in a relatively small number of locations and need to then be distributed widely, which in itself does not imply anything at all about the nature of international business travel. It might even be inferred from such trends, that exports can rise, both as measured in weight or economic value, while the actual amount of physical travel can fall, as the agglomeration of skills continues. As we shall see later in this paper, this has not been the case, but why this has not been the case involves the nature of the production networks themselves.

Part of the reason for the increase in mobility through changes in production networks is that it seems that a well-developed system of pipelines connecting the local cluster to the rest of the world bring additional benefits. Two of these benefits are outlined in Bathelt et al. Firstly, '*new and valuable knowledge will always be created in other parts of the world and firms who can build pipelines to such sites of global excellence can gain competitive advantage*' (Bathelt et al., 2004: 46). Secondly, '*it seems reasonable to assume that the information that one cluster firm can acquire through its pipelines will spill over to other firms in the cluster through local buzz*' (Bathelt et al., 2004: 46). This implies that such connectivity will be important in cities with knowledge intensive industries. We expect that firms in the Dublin ICT cluster will not only have technology-mediated connectivity with other hubs, but will also be among the most travel intensive firms on routes between these hubs.

This argument is not, however, quite so straightforward because the relationships between firms doing business involve a complex series of practices which necessitate business travel at strategic moments or to deal with information. Various commentators argue, perhaps somewhat paradoxically, that the weightless economy hardly exists and that the advent of ICT is pushing networks into a deeper engagement with tacit knowledge and the reappraisal of the virtues of craft production (Leamer & Storper, 2001; Thompson, 2004). Leamer and Storper (2001) argue that there is a difference between those businesses that require a 'handshake' for the conduct of their activities and those that merely require a 'conversation', which can be conducted with the aid of ICT at a distance. According to this view, the new activities that are associated with the advent of the knowledge economy increase the complexity of design and production and this in turn increases the need for face-to-face contact. In addition, according to these authors, the inevitable incompleteness of contracts will always imply the need of handshake transactions and regular face-to-face contacts to accommodate difficulties that may arise, which implies that international business travel is related to the content and complexity of business relationships. Information for detailed product specifications, the organisation of product schedules and the monitoring of quality standards cannot all be codified in advance. In this sense, there is no 'quick technical fix' for monitoring all these activities which require the continuation of proximity - the clustering of activities where they can be controlled and monitored through handshake transactions. It is necessary to understand

in more details the differences between hand-shake transactions that require business travel and those conversations that can be carried out via ICT.

To illustrate these practices within the ICT sector, for example, it seems to be the case that innovation often involves small entrepreneurial breakthroughs, often the result of informal collaboration between two or three individuals who have a bright idea that catches the existing players by surprise and that can quickly be brought to the market and become a rapid success. Many key developments in the ICT sector have been the result of the 'two nerds in a shed' theory. Tacit knowledge for instance is not suitable to be transferred via ICT. Tacit knowledge, by its nature, cannot be explicitly codified but it rests in implicit personal or organisational practices often associated with craft-like skills, awareness of reputations and hands-on techniques. While the distinction between tacit and explicit knowledge should not be exaggerated, this distinction might be one that the firms themselves, *including ICT firms,* identify with and might influence their assumptions on how to undertake collaboration and the travel budget to be put aside for product developers.

One consequence of this approach to understanding the limited impact of ICT on the overall production environment is that it suggests a different paradigm from the dominant one, encompassing knowledge, innovation and learning. The dominant paradigm is one that according to Thompson celebrates the 'scientization of technology', stressing the roles of R&D, ICT, high-tech industries and knowledge economy. At the opposite end of the spectrum, there is an alternative paradigm that places more emphasis on design and craftsmanship, where ICT reinforces the existing production environment and enhances its potential productivity gains rather than displacing it with a completely new paradigm of production (Thompson, 2004). The role of ICT in this context is to facilitate communication between the network participants, to complement handshakes rather than to serve as a substitute for them. Within this alternative paradigm, developing effective business relationships is hard work, especially when suppliers and customers are located in different parts of the globe. That being the case, managers cannot entirely rely on ICT mediated communication to conduct business with global partners, but in many cases must travel to the location in order to have a face-to-face contact to develop an effective business relationship. If this is to be found even in the ICT sector, the one type of industry where such mediation would seem to be ideal, then the research would expect to find that different software companies in different sub-sectors are likely to be equally travel intensive in proportion to the complexity of their product, the quantity of overseas collaboration and the extent of its international market, i.e. where their client base is and where they expect to find prospective clients, rather than the complexity and extent of their infrastructure or the ease with which the product can be distributed. Other research questions these assumptions and includes issues concerning the way in which collaboration or strategic alliances reduce or increase the amount of business travel, and the mobility patterns related to such factors as sub-sectors, strategic partnerships, markets, exports, growth rates etc. that are the consequences of more global production networks. The nature of the connectivity between production locations must be understood if the amount and function of physical mobility is to be explained at the level of the business sector. There are though more complex organisational factors that might

determine these relationships, and the paper will now turn to the function of networks for the organisations themselves.

The growth of the network organisation

Manuel Castells is one of the key academic commentators on the social consequences of the information technology revolution at the end of the 20th Century. Castells' contention is that a number of historically significant events that have occurred in the final decades of the twentieth century have had a transformative effect on people. Key amongst these events are the development of information technology, the emergence of new social movements and the simultaneous economic crisis of Western capitalism and Marxist-inspired statism. The "global restructuring" that such pressures and opportunities enabled ushered in a new economy, a new society, and a new culture, though with regional variations "according to their history, culture, institutions and their specific relationship to global capitalism and information technology" (Castells 1996: 13). The result of this restructuring is the emergence of a "network society": one that is characterized by networked forms of business, as opposed to hierarchical forms, the globalisation and trans-nationalisation of economic and social activity, and greater flexibility and uncertainty in the workplace, contextualised by, and sustaining, the information paradigm and ICT development: '*The process of work is at the core of social structure. The technological and managerial transformation of labour, and of production relationships, in and around the emerging network enterprise is the main lever by which the information paradigm and the process of globalisation affect society at large'* (Castells 1996: 201). These changes are not merely about fundamental transformations to production relationships, but also by the local consequences of flows and exchange of information, capital and cultural communication. These flows and exchanges have a dramatic impact on consumption and production, including changes to the nature of business organisations and their relationships with other organisations.

The new economy replaces the old (literally) bit by bit, but Castells suggests that this is because the qualities associated with the new economy are immanent to the old, but are switched on by an enabling technology: '*We observe the growth of the new economy within the old economy, as a result of the use of the internet by business, for its own purpose and in specific contexts*.' (Castells 2001: 5)

The new economic reality is therefore transformative of time and space as a consequence of changing practice and changing organisational structure. On the issue of mobility, and in particular the mobility of people, Castells is less clear about its importance in the development of the "fundamental transformation" of society. Virtual travel, and networks made possible by transportation systems, are described as of great importance (see Castells 1996: 2001); however, the importance of the physical movement of resources and goods and the physical mobility of workers and the quantity of work related travel is rather less emphasised in his work. The absence of commentary on the contribution and consequences of physical travel for this new socio-economic context is particularly telling and perhaps ironic in the context of an intellectual whose career is dominated by international travel.

It seems difficult to imagine the rise of the network society without the vast transportation networks or the physical flows of millions of people a year engaged in business across international borders. However, even the three main conditions Castells identifies for the fundamental shift that support the emergence of a new economic condition, all seem to imply greater mobility. The advent of information technology, Castells' first condition, involved the transportation of vast amounts of new equipment around the globe, considerable international collaboration among research and development professionals, which required greater, unprecedented amounts of international travel. The second factor, the growth in socio-cultural movements, such as environmentalism and human rights, can in part be seen as an exchange of ideas from different countries, the growth in the number of political refugees, and a response to some of the consequences of being on the move, for example air pollution. Indeed, one of the key early symbols of environmentalism is the globe as depicted from the perspective of the space traveller. The third factor, the international economic crisis and recession in the 1970s and early 1980s, was in part caused by trading restrictions and cost increases associated with specific physical imports, i.e. oil, coupled with changes to export and import relationships brought about as a consequence of the initial stage of the crisis which saw the emergence of Japan as a major economic power. While Castells is not alone in underemphasising the importance of physical mobility in the process of globalisation, he has devoted a great deal of analysis to almost every other aspect of it, often involving extensive travel keeping up with the global researcher networks that he is engaged with. Examining business travel issues at the level of the organisation and the inter-organisational network will therefore supplement Castells' work in describing the changes in terms of their function in enabling and responding to greater levels of physical mobility.

As a result of this rise of the network society, then, modern organisations tend to adjust to market uncertainty by adopting different configurations that allow them to minimise perceived risk and instability. The growth of technology which renders remote working possible, coupled with economic developments, has forced companies to address the issue of organisational design. Recent research into modern companies indicates that organisations respond to external environmental factors by assuming different configurations: in stable environments firms tend to assume a mechanistic model characterised by rigidity, bureaucracy and a strict hierarchy; in dynamic, unstable environments, firms tend to apply an organic model which is characterized by openness, responsiveness and lack of hierarchy. In 1988 Peter Drucker predicted the shift from 'the command-and-control organisation' – the organisation of departments and divisions – to 'the information-based organisation'. In his view, this organisation was to be composed largely by specialists who direct and discipline their own performance through organised feedback from colleagues, customers and headquarters (Drucker, 1988). As forecast by Drucker, in the early 1990s a new form of organisational structure started to emerge in response to complex, rapidly changing and highly competitive global environment. This type of structure consists of autonomous cross-functional teams designed around critical processes and was named horizontal organisation. The importance of this structure, as opposed to project teams or virtual teams, will have an expected impact on the type of coordination required for the organisation. Where such teams are dispersed, as required

in the production networks outlined in the previous section, this is expected to have an impact in business travel.

There is another type of horizontal organisation in place today – the network organisation which is internally coordinated horizontally while is coordinated externally with other organisations at the value-adding level (Nikolenko & Kleiner, 1996). The network organisation is an organisation that coordinates economic activity to deliver value to customers using resources outside the traditional boundaries of the organisation (Stough et al., 2000). Multinational firms are adopting this network structure in response to the complex, though perhaps opposing, forces of global integration and local responsiveness. One of the prescriptive tools for implementing this approach, according to Nikolenko & Kleiner (1996), is the existence of international teams of managers who meet regularly to develop a cohesive organisational strategy. There are, therefore, travel implications based on maintaining such a network structure and therefore it might be expected that as a multinational organisation adapts to changes, requiring improved coordination, the amount of travel by those responsible for strategy would be expected to rise in response to organisational factors, irrespective of other factors.

An alternative sense of the relationship between virtual networks and mobility is that of the work of Charles Handy. William Davidow and Michael Malone championed the idea that the virtual corporation will become an important form of organisational design in the near future. The virtual corporation represents a temporary network of independent companies that come together quickly to exploit fast-changing opportunities (Byrne, 1993). Similarly, according to Handy (1995), large parts of organisations are now made up of ad hoc mini-organisations, projects collated for a particular time and purpose, drawing their participants from both inside and outside the parent organisation. These projects often have no one place to call their own. They exist as activities not as buildings; their only visible sign is an e-mail address. Inside the buildings that do exist, so-called hot-desking is increasingly common and in international business video-conferencing is the norm. According to Handy, if there will be an office in the future, it will be more like a clubhouse: a place for meeting, eating and greeting, with rooms reserved for activities, not for particular people. The question as to whether organisations are becoming more like the virtual organisation outlined by Handy is therefore an important issue with important mobility implications.

The development of the virtual corporation based on virtual teams has emerged in response to the growing demands placed upon organisations to efficiently coordinate individuals located in geographically dispersed locations. The extensive use of virtual teams allows firms to improve cycle time – if virtual teams are scattered around different time zones, the virtual corporation becomes a 24-hour organisation – reduce travel costs as well as reducing redundancies across organisational units. Moreover the use of virtual teams provides an opportunity to coordinate complex business tasks across a potentially far-flung confederation of separate organisations (Kayworth & Leidner, 2000). The virtual corporation heavily relies on third parties to conduct its business. Outsourcing, once used for downsizing or cost reduction, is now used to obtain teams with specialised expertise to complete a total product. Since companies often lack expertise or resources

in all areas, the virtual organisation consists of suppliers, manufacturers, marketers, customers and even competitors. Each member provides a team to contribute specific expertise. Once the job is finished, the group and its team will generally disband (Stough et al., 2000). However, one important twist is the likelihood that the need to maintain a virtual team or to profit from the skills that are brought together is likely to be the need for co-presence at strategic moments, such as to ensure a successful product launch. If, for example there are many such launches across many regions, the actual amount of travel, even for virtual teams, is likely to be extensive.

Before turning in more detail to these implications it is important to note that virtual networks, and in particular the spread of virtual teams or "the call centre ethos" (see Wickham and Collins 2004: 11ff) is enabling a new type of global production to emerge: '*the innovation of the call centre lies in the combination of virtualised workplace and poly-authored work, resting in turn on the combination of database and ACDS technologies. Forms of working and forms of customer relationship that are linked to these technologies are consolidated in the call centre, but now diffusing into the wider society. In this sense call centres are important not so much for what they are, but for what they have created'* (Wickham and Collins 2005: 16). If the extent of virtual teams is indeed an important, and growing, phenomenon, we should, again, expect this to be reflected in extensive global production patterns within the ICT sector, not merely in terms of simple and routine task outsourcing. The implications for business travel would also be important, depending upon the nature of such virtual teams. For example, if call centre employees become more integrated with the organisation as a whole, then travel might be necessary from the organisation not merely for routine coordination, but to reinforce bonds of trust and confidence between managers and employees. The extent of these types of virtual teams and the amount of contact and communication they require to maintain effective functioning are issues that need to be more thoroughly investigated in the research.

However, Handy has a more traditional take on the emergence of virtual working practices, in which this mixture of economics and technology means that changes to the organisational structure will require spending time in virtual space – out of sight, if not out of touch. Most meetings will have to be scheduled, even those on video, and will therefore become more infrequent. We will have also to learn how to run organisations without meetings. We will also have to get accustomed to working with and managing those whom we do not see, except on rare and prearranged occasions. Within this context, trust is the heart of the matter. If we are to enjoy the efficiencies or other benefits of the virtual organisation, we will have to discover how to run organisations based more on trust than on control. But, if these are reasonable assumptions, we would expect the beginning of these changes to be occurring right now, particularly in organisations which are more innovative and have an early take-up of technology. However, this seems particularly difficult to assess because it seems to generate a paradox: if virtuality requires trust to make it work, as Handy states, and if trust requires the type of assurance that cannot easily be mediated through technology, then for virtuality to work effectively it requires the very face to face interaction that it was supposed to replace. A key research question, then, is how, with the changing role of the

organisation, and the opportunities of virtual working that are afforded by new technology, organisations can adapt to ensure that virtual working can be managed effectively, particularly in international organisations.

The ICT sector is, again, an appropriate sector for this research because of the extent to which organisations are able to function as virtual teams, their international nature, the relative early stage in the founding and growth cycle for many ICT companies, the innovative practices associated with the sector etc. It is important therefore to identify the degree to which the different models identified in the literature discussed in this section reflect the practices of real organisations and strategies, involving mobility or not, in order to maintain these relationships. It cannot simply be assumed that the possibility of organisation networks, virtual teams and the growth of e-business would imply less physical mobility because they imply an alternative to more static organisational structures. Indeed, if Leamer and Storper's analysis outlined in an earlier section of this paper is correct, then businesses that exist even in highly virtualised network organisations, which should be more open to substitution, will be engaged in high levels extensive business travel, irrespective of any substitution effects (see Leamer and Storper 2001). The relationship between these recent trends in organisational change and mobility patterns needs, therefore, to be examined empirically, in particular to test if there are any identifiable enabling factors or barriers directly linking organisational structure and/or change and mobility. Whether organisational structural change requires more business travel or factors associated with increasing levels of business travel requires the need for organisational change, or both, as implied in the different literatures evaluated in this section, are key issues in understanding trends in mobility alongside the recent changes in business as a whole, and in particular in the ICT sector.

The paper now turns to the role of business travel in general before returning to the specific relationships with organisational, sector and management practice.

Part 2. Business travel and business communication

Communication technology and physical travel

Whereas the literature on business travel seems to focus mainly on traditional forms of organisational design, in conjunction with the growth of the network organisation as well as other forms of organisational design, a significant factor that is increasingly taken into consideration by the literature is the implementation of ICT and the extent to which such ICT factors might have an impact on business travel. The potential impact of ICT on business travel has led some authors to raise the question of whether '*airlines have reached that point in their product life-cycle where other forms of technology have begun to erode their vital business passenger traffic base'* (Stephenson & Bender, 1996: 15).

There is a vast amount of literature on teleworking at home, showing how working at home affects productivity, satisfaction and work-life balance (Breure & Van Meel, 2003). It is clear however that people do not only work at the office or at home. A growing group of mobile workers take work into a range of public settings, from hotel lobbies and airport lounges, to other spaces, including those they pass through while being 'on the

move'. The management literature rhetorically addresses these workers as 'nomadic workers' or 'road warriors' but empirical research on international business travel mobility has received less attention.

Besides the horizontal, the network and the virtual organisation, the implementation of information technology has allowed organisations to optimise the use of teams in innovative ways in strategic planning, flexible jobbing initiatives as well as global networks (Stough et al., 2000). In the attempt to encourage employees from different countries and product areas to communicate and facilitate global learning, many multinational corporations are constantly moving their managers from one foreign subsidiary to another to help them to develop a global view. This practice helps expatriate managers build a network of contacts throughout the world that they can use to increase global integration. Increasingly groups of managers from foreign subsidiaries undertake the same practice to develop a global perspective. Team members act in this context as consultants and might transfer new ideas and innovation to foreign subsidiaries while they can learn new foreign techniques and innovations that can be transferred to the home country.

Similarly in the case of outsourcing, while ICT is truly a key enabling factor that allows supply chains to be managed, it is not sufficient to guarantee a capable global supply base. Expanding the scope of the current practices, processes and associated information system is not enough in order to establish and manage a productive global supply base. As organisations seek to improve global supply base performance, according to Handfield & Nichols (2004), they cannot accomplish this task with limited face-to-face contact with their suppliers. Two strategies in particular are suggested. The first of these is that direct supplier participation in team meetings is necessary when technology is complex or when the buying company does not have a high level of internal expertise in the area. Additionally, face-to-face meetings are also necessary to attribute meaning to data prior to automating the relationship. According to Handfield & Nichols (2004) this would be increasingly crucial since supply chain participants need to conduct data definition summits where business and technology owners from all source information systems agree to common data definitions for all data exchanged.

Overall, the literature of the effects of ICT on business travel is ambiguous whereas empirical evidence for complementarity is substantial, although not definitive, and empirical evidence for substitution appears to be less consistent. A number of empirical studies of the impact of ICT on business travel have found net reductions in number of trips and distance travelled. This evidence seems to suggest that there is a varying degree of substitution of ICT for travel (Burgar, 1995; Bender & Stephenson, 1998; Denstadlli, 2004). However, there is significant conceptual and empirical evidence suggesting a stimulation or generation effect as well (Saffo, 1993; Roy & Filiatrault, 1998; Mohktarian, 1998, 2000, 2003). This discrepancy could be explained by the fact that generally studies that focus on a specific ICT application (e.g. videoconferencing) tend to underestimate stimulation effects, which tend to be longer-term and more indirect (Mohktarian, 1998). Mohktarian (1998; 2000; 2003) for instance introduces a conceptual framework that views all communication as requiring some form of transportation in

order to occur. The model introduced seems remarkably comprehensive as it takes into consideration *'time'* as a critical variable by identifying short term and long term effects. Furthermore, this conceptual framework permits to identify the *'net effects'* of what may be counteracting tendencies. There are three major modes of alternate communication, each with various sub-modes:

1. Meeting in person (personal travel)
2. Transferring a physical object containing information (goods movement)
3. Sending electronic signals (ICT)

Amongst these alternative modes of communication at least four types of cross-mode impacts are possible:

1. *Substitution (elimination or replacement)* occurs when the use of one mode reduces the use of another one.
2. *Generation (stimulation, complementarity)* occurs when the use of one mode increases the use of another. *Complementarity* can result either from the use of one mode that encourages or directly involves the use of another mode (enhancement), or from the use of one mode that makes the other mode more efficient (Mokhtarian, 2000).
3. *Modification* occurs when the use of one mode alters the use of another mode.
4. *Neutrality* occurs when the use of one mode has no impact on other modes of communication.

The amount of communication occurring via a particular mode can increase over time as a result of three possible effects:

1. *Own-mode generation*, when one mode increases independently of the other modes.
2. *Cross-mode substitution* in which the given mode replaces another mode, and hence the given mode increases while the other mode decreases.
3. *Cross-mode complementarity* in which both the given mode and another mode increase.

All three of these effects can occur to varying degrees for all three modes of communication, so the net outcome is a complex composite of counteracting effects (Mokhtarian, 2003). The findings also tend to suggest that many effects can occur simultaneously although the predominant effect across different communication modes is complementarity rather than substitution. Overall, substitution, complementarity, modification and neutrality within and across communication modes are all happening simultaneously. More precisely, the net outcome of these partially counteracting effects is likely to be faster growth in ICT than in travel, resulting in an increasing share of interactions falling to ICT, but with continued growth in business travel in absolute terms (Mokhtarian, 2003). The consequences of this conclusion for the type of organisational changes identified in the earlier discussion are immense as technology and business practices will for certain sectors be co-transforming.

Other studies seem to reinforce Mokhtarian's argument; for example, Zumkeller (1996) concludes that the complementarity factor of the interrelationship between travel and ICT is much stronger than the substitutional effect. Similarly a KPMG study (1997) found that heavy users of ICT had greater work-related travel, while Saffo (1993) identifies 'travel-shifting' that implies a measure of short-term substitution followed by

increased long-term travel. Overall, complementarity between ICT and business travel is a fashionable theme within the literature, although several issues deserve a more comprehensive articulation. In relation to complementarity *within* sectors, beside general research on ICT use and adoption that not always relate to business travel, this topic has not received much attention.[2]

Griffiths (1994) contends that ICT may stimulate nearly as much traffic as it eliminates by freeing workers from *intra-company* business trips, thereby permitting workers to engage in new *inter-company* relationships or sales during the time they would have spent on intra-company trips. In this context, the employment of ICT becomes employee productivity enhancer rather than a travel reduction expedient, where the net effect would be an increase in employment productivity but not a decrease in business travel. Denstadli & Lian (2004) and Roy & Filiatrault (1998) show that substitution is most likely to occur within intra-company travel which does not represent a dominant segment of the business market. For other purposes substitution is expected to be minor, especially for *sales/marketing* and *technical service*, with ICT used more frequently in *customer contact* (Denstadlli, 2004).

Roy & Filiatrault (1998) point out how ICT use has increased, it allows to eliminate certain trips, although travelling is always necessary. The frequency of trips is often determined by re-engineering of firms, acquisitions, mergers and business development. ICT has fostered a 'new way to work' which improves business communications and general performance rather than to reduce travel expenses.

The implementation of ICT has enabled companies to adjust existing business practices on a global scale as well as to introduce new ways of doing business that increasingly transcend geographical distance. The impact of both existing and new business practices on business travel mobility remains a quite unexplored issue within the mainstream literature. Overall, where is widely accepted that lower barriers to entry, as well as the greater homogeneity of costumer tastes and attitudes worldwide, are driving companies to become more and more committed to global strategic management (Lasserre, 2003), little has been written on the business travel mobility that the latter encompasses.

According to Denstadli (2004), personal meetings represent the most effective way of doing business and seeking new markets as well as exchanging ideas both within and outside the company. Roy & Filiatrault (1998) suggest that they are useful for meeting people for the first time, presentations, conferences, training and commercial activities in foreign countries. In this context, face-to-face contacts enable the capacity to transmit equivocal information, to produce immediate feedback and to build a personal atmosphere (see also Denstadli, 2004). The main advantages of business trips are: a more personal contact; a better understanding of the environment within which the counterpart operates; acquisition of new knowledge; more efficient demonstration of new products; prestige; sightseeing. Amongst the disadvantages: additional work upon return; loss of control over employees and projects; costs; fatigue and the inconvenience. Among the

[2] But see Denstadli & Lian (2004)

advantages of using ICT: savings due to reductions in time and costs of travel; efficiency and inclusiveness as they allow more people to be involved, while the disadvantages include: costs, technical problems and the sense of uneasiness perceived by some users.

While these factors are important in understanding why firms might choose to travel or use ICT in one context or another, there is very little literature that interrogates the impact that either of these features, and more importantly the combination of these two factors, is having at the organisational level or on socio-economic factors such as employment, migration, or environmental concerns. The changing patterns associated with business travel have a number of important consequences that are only now becoming visible.

The growth of business travel

Both the coexistence of a vast array of definitions within the literature and the hybrid nature of travel activities prevents an exact account of the size and value of business travel. Rogers (1998) contends, for instance, that the shortage of statistics based on a standardised terminology has ensured that governments have not taken the industry seriously as an important driver of national economies because it has been impossible to demonstrate clearly the economic impact that business travel has.

Despite all the above mentioned difficulties in providing an accurate estimate of the size and the value of the business travel sector, there are unequivocal signs that overall the industry is growing. Due to increasing globalisation, changes to organisational structure, and the opportunities afforded by more effective networks, few companies can afford not to travel on business. The economic globalisation, more accessible markets and the advent of new technology this paper has outlined are creating a boom in travelling. This trend is likely to continue, as the World Tourism Organization (WTO) predicts that the number of international travellers will jump from 697 million per year in 2000 to 1 billion by 2010 (Archambault & Roy, 2002).

According to the figures presented in Table 2.1, corporate travel in Europe is growing. Corporate travel has been growing to the extent that it now represents the third highest element of companies' expenditure after salaries and data-processing (American Express, 1999).

Table 2.1 – Corporate spending in Europe

Country	Business travel spending (US dollars, billions	Comparative share of spending (%)	Business travel spending (% share of total travel spending)	Forecast annual growth in business travel 1998-2010 (%)
France	32.2	17.3	24.9	3.1
Italy	27.5	14.8	28.5	3.8

Germany	26.7	14.4	13.2	3.3
UK	26.4	14.2	17.6	3.6
Spain	17.7	9.5	34.6	5.4
Switzerland	7.5	4	26.5	3.1
Netherlands	6.7	3.6	18.1	2.4
Turkey	5.7	3.1	37.3	11.5
Sweden	4.7	2.5	25.7	3.1
Denmark	3.5	1.9	25.2	2.5
Greece	3.5	1.9	33.6	5.5
Finland	3.1	1.7	26.5	4
Norway	2.9	1.6	24.4	3.3
Portugal	2.5	1.3	32.3	4.4
Ireland	1.7	0.9	35.6	5.5
Total	**186**	**100**		

Source: Davidson & Cope (2003)

As these figures show, for all counties included in the study, business travel is forecast to grow, and Ireland is amongst the highest in this growth. There seems to be some accuracy of this projection as, indeed, business travel in Ireland has remained high since 1998, even though there have been factors which have reversed this trend in other countries, principally after September 11, 2001. The paper will now turn to one specific sector of the Irish economy that has been instrumental in the growth of international business in the last decade or so: the ICT industry.

Part III: Profile of the Irish ICT and software industry

The Irish ICT industry generates economic growth and seems to generate physical mobility. It is an industry that is export driven, has many foreign multinational companies located in the sector, has developed within Dublin in clusters, is highly networked and has developed in relation to the organisational themes outlined in the earlier sections of this paper. The sector seems to be suited to virtual team working, indeed is a part of the process of developing the enabling conditions for such work processes. It is a sector through which research can reveal some of the contradictions and unanswered problems about mobility and uncouple some of the features of business travel that are often assumed to be determinant of business travel. Example of issues, such as growth or exports, which much of the literature uncritically assumes must require travel in proportion to their increase, or the assumption that the uptake of technology implies proportionately less travel, must be examined in more detail rather than assumed to be the case. It is also, importantly, a sector of global production and illustrates the changing business practices at the level of the organisation and network better than perhaps any other sector.

To illustrate some of the reasons for this growth in business travel, changes to the business organisation and their relationship to technology, the research examines the ICT sector in Ireland, a sector that seems to involve both a high degree of business travel and high levels of communication and networking that is technologically mediated. While we recognise that there are limitations on analysing one sector and that this sector cannot be

said to be representative of the Irish economy or demography, we do feel that it represents many of the issues that have emerged in the so-called new economy, and would expect it to be indicative of the decision-making tendency of firms fully engaged with the new socio-economic reality. We also expect it to be a very travel intensive sector despite the association of the sector with opportunities for substitution of business travel. This section will set out a brief overview of the ICT sector in Ireland, in particular the software sector, and outline some of the key factors that might explain the travel intensity associated with the sector, addressing some of the themes developed in the earlier sections.

The ICT sector in Ireland comprises sub-sectors such as software, hardware, some forms of telecommunications and a range of other services. The whole sector contributes more than 10% of Ireland's GDP. According to ICT Ireland, an IBEC-supported lobby group, the ICT sector as a whole comprises more than 1300 firms, employing around 100,000 people, and contributes 25% of Irelands exports (ICT Ireland 2002: 1). Other recent statistics that they quote for the sector as a whole include:

- Over 300 overseas companies in the ICT sector have a presence in Ireland directly employing approximately 61,000 *(Goodbody Stockbrokers)*
- Ireland is the largest exporter of software in the world *(IMD World Competitiveness Yearbook 2003)*
- 7 of the worlds top 10 leading ICT companies having a substantial base in Ireland *(IDA Ireland)*
- One third of all PC's sold in Europe are manufactured in Ireland *(Eurostat)*
- Turnover in the ICT sector was over €51 billion in 2001 with three of Ireland's top exporters (Dell, Microsoft and Intel) accounting for 18% of total exports between them *(Forfás)*
- The top 10 ICT companies in Ireland are employing more now than they did at the beginning of 2000 *(IDA Ireland)*
- Ireland has a higher proportion of science graduates than any other EU member state *(Eurostat)*
- Value added in the ICT sector accounted for 11.6% of Ireland's GDP in 2000, compared with an EU average of 5.1% *(Economic Intelligence Unit Business Environment Rankings)*

While accurate figures for the whole sector are problematic, as there is some degree of double counting and including some ICT firms under other categories, and electrical appliances and media content as ICT outputs, there are very accurate figures for the largest sub-sector, software.

Software accounts for an increasing proportion of the costs of all ICT development and strict lines of demarcation between the software sector and computers, telecom and related business services, do not exist. Indeed in Ireland, the relationship between the indigenous software sector and key sub sectors, such as communications software, banking and finance software and systems software, are particularly strong, which implies a higher level of synergy and interdependence between software and other high-growth and high-value sectors (see O'Riain 2004c: 645-647). This sector and can be divided among the 140 foreign multinational companies, which employ around 12 700

workers, and the 750 or so indigenous companies, which employ around 11 250 workers, but which tend to be much smaller firms, indeed their combined production accounts for only 10% of the total sector.

The profile of the sector is both export driven and location sensitive. The software sector, as with the ICT sector in general is heavily dependent upon exports, with a total export value of €16bn. Of this total market, around €1bn of exports, i.e. less than 10% of the value of exports, are supplied by indigenous companies. The nature of the ICT industry in Ireland, in particular the indigenous firms, is one with many specialist companies, with much of the industry depending upon the specialist market, which is a particularly international client base. The products and services developed by Irish companies are not generally "off the peg" and this is reflected in the high price for a particular product and the small number of clients that a supply company needs to service to be a viable business. The foreign firms tend to be more general in their product development and less niche supply-oriented, which is indicative of their greater average size and wider distribution than Irish firms. Some of these foreign owned firms were attracted to Ireland because of low taxes and low transfer pricing, while others were attracted to Ireland in a more embedded way, establishing European and logistic hubs in Ireland.

The establishment of foreign firms in Ireland was also part of official government policy and its associated agencies and their partners. According to Neil Coe (see Coe 1997) IDA Ireland identified software as an internationally traded service possessing significant employment potential, and consequently began targeting US ICT companies that would seem to require a large number of employees but had not developed a local office in Europe. Part of this strategy was implemented though a project called The Digital Hub, an Irish Government initiative, supported by IDA, to create an international centre of excellence for knowledge, innovation and creativity focused on digital content and technology enterprises located near Dublin city centre is an example of this.

> At the moment it is going quite well, with about 30 companies mainly involved in web design, software, very design intensive work. (interview: Proinnsias Breathnach)

However, other initiatives seem to be less effective, for example the incentives to attract an innovations cluster, with Media Lab as an anchor tenant, were less well thought out.

> Politicians forced it on IDA, and it had funding but wasn't very well researched and a combination of a lack of structure, the organisation not being run very effectively and the dot.com crash meant that it faded away. (interview: Proinnsias Breathnach)

The "dot.com crash" in March 2000 and the other factors that have halted the fast acceleration of growth in the Irish ICT sector in the last few years seems, however to have been weathered by those that remain in the sector, according to the IDA:

> There has been buoyancy across all of our business sectors and a noticeable recovery in the ICT sector. Investment in research and development by overseas businesses is becoming increasingly important and Ireland continues to grow as a major location for services to support business activities throughout Europe (Sean Dorgan, Chief Executive of IDA Ireland)

Until 2000 growth in Irish ICT firms had been much higher than foreign firms in both revenue and exports, which reversed by 2000. However, the latest statistics for the software industry show that for the first time since 2000, both revenue and export value for indigenous software firms has grown faster than for the foreign multinationals. The impact that these changes have had on travel by overseas multinational will be examined after a brief evaluation of more regional location factors for foreign and indigenous firms in the ICT sector.

Dublin is the centre of almost all of the sectors that expanded rapidly in the 1990s, including financial services and professional services,[3] and it is not surprising therefore that it is the location choice for much of the ICT sector in Ireland. Approximately 60% of the indigenous ICT companies are located in Dublin,[4] as are most of the distribution, marketing and sales functions of the foreign multinational ICT firms based in Ireland. Indigenous ICT firms, however, generally base their entire supply chain in Ireland. There are, though some Irish companies which have established development centres in countries that have an abundance of software developers, in particular India, to overcome perceived skill shortages in Ireland. This is likely to be a growing trend, according to Seamus Gallen from the National Informatics Directorate, and may well be instrumental in facilitating the growth of the Irish software industry, he argued.

More specifically, site location in Dublin is also divided along foreign/indigenous company lines. There are two primary locations for ICT firms in Dublin: the south central part of the city which tends to attract the specialist indigenous companies, and the business parks centred around the M50 ring road, which provide office space tailored more to the needs of the, generally larger, foreign multinationals. There are other differences between indigenous companies and foreign companies that might contribute to location decisions:

> The multinationals tend to have few local linkages. Their interaction is predominantly with customers overseas and with other locations of the company in the US, Europe or Asia. The indigenous firms tend to work more in partnerships with local firms and also have more relationships with local knowledge institutions. (Van Winden and Woets 2003: 16)

[3] Enterprise Ireland uses the term Internationally Traded Services, which comprise ICT, financial and banking software and digital media. The sector accounted for €2.8bn of sales and €1.48bn exports in 2001.

[4] There are other smaller "clusters" in Limerick, Galway and Cork but few other ICT companies elsewhere in Ireland.

These differences can have an impact on the amount of travel undertaken by managers and other employees of firms as well as their travel profile, an issue that the research examined in more detail. The literature examined earlier would, indeed, point to there being different travel profiles, however, the question about what these differences are between foreign and indigenous firms, and how factors such as the lack of local linkages impinge on developing partnerships will be a way to understand the effects of networks on travel much more clearly.

While both types of companies within the sector seem to be travel intensive, partly due to their export dependency, different factors other than size and principal location of the firm seem to be important in the amount of physical travel that is required in order to do business. These can range from life-cycle issues, the value and complexity of the product, whether there is a local office in the export country, the degree of outsourcing or the strength of links between subsidiaries and parent companies. These are important research themes and secondary sources and interviews will be used to evaluate these factors, and compare indigenous firms to foreign firms and different categories of firms, i.e. sub sectors of the software sector.

The literature on the ICT sector in Ireland is growing, and there is a great deal of impressively research work that has been published in the last few years, particularly on the software sub-sector (see, for example Coe 1997; Crone 2002a; 2002b; 2003; O'Riain 2000; 2004; 2004b; 2004c; Van Winden and Woets 2003; White 2004); the area related to the travel that the sector generates is sparse, as is the literature on work-related travel in general. As with the research findings from the interviews, some of the evidence derived from the literature is anecdotal; it is nevertheless a useful indication of the key factors relating to travel decisions – for example, on the issue of internal company communication:

> One manager of a US firm had previously worked for a number of years at the company's HQ and had travelled to the US 14 times the year before. He commented on the lack of connections another Irish subsidiary had to its parent in the US. (O Riain 2004c 654)

On the issue of outsourcing, particularly when the company has many offices and decision makers are constantly travelling as they feel they need to be involved in face-to-face contact. With international businesses, international travel is likely to be needed in exactly the same way:

> The tendency towards outsourcing is likely to increase travel. There are more interdependent firms with separate executives and more senior decision makers. They function as "reticulators" to link the various parts of the business. However, at the same time there is a tendency for supplier firms to locate closer to the firms they supply. (Interview Proinnsias Breathnach)

More obviously, as firms have developed a more international market, so travel has also become more important:

> The process of finalising the product requires detailed consultation between the supplier and the client company. They typically need to re-engineer the product, which might begin 6 months before the delivery date. (interview: Eoin O'Malley)

The complexity of these ICT products and the range of functions they need to satisfy mean that the supply company needs to talk to a range individuals in the client company to understand the specifications:

> They are not just selling one product but something that combines a range of products. They need to speak to this person and that person at different levels of the customer company. (interview: Eoin O'Malley)

This is particularly important when there are many tasks involved in the development process, which is especially common for the type of companies that remain in the sector. The option of cutting costs, as reflected in the job losses in the sector since 2000, might not therefore have had a negative impact on business related travel, but as there are no accurate figures on travel costs for the sector on sub sectors, this is simply an inference from the profile of the companies that remain in the sector.

Eoin O'Malley's assumption was echoed by another interviewee, suggesting that "since software requires a high degree of customisation ['hub and spoke' products] this might justify both the amount of business travel involved and how Ireland moves from being a 'periphery' to Europe but became a 'core' for the sector" (interview: Frances Ruane).

The reason for travel by managers and other employees in this particular context, then, would be twofold. Firstly there is the need to manage the production process, and face-to-face meetings are deemed essential for this purpose. The second key reason is for marketing purposes, which involves a variety of complex information exchange that is collectively unsuited to technological mediation (see Hutchby 2001: 80-89).

The complex motivation for travel within the ICT business sector is not, however, one of the factors supported by dedicated funding either by Enterprise Ireland or IBEC. According to Reg McCabe, IBEC Transport director, the issue of business travel for IBEC was considered mainly in relation to the trade and export orientation of individual firms, rather than as a sector:

> We have traditionally taken the view that firms that export more, travel more, but maybe it is time to assess what is happening in this area. A lot of the software companies are foreign owned and this is likely to make a difference is the amount of business travel, but I imagine it's a bit more complex. (Interview: Reg McCabe)

He concluded that sectors such as software, chemicals and telecommunications seemed to be travel intensive but different degrees of both maturity as well as internationalisation of

different sectors might have an impact on the overall amount of business travel that was undertaken. There is, however, no IBEC research on this, this was just an intuition based upon Reg McCabe's experience in recent years.

To conclude this section, then, it is interesting to note that Enterprise Ireland do, though, list the trade shows at which Irish software companies exhibit. For example, the two weeks before the ISA National Software conference on 19th May 2005, fifteen different trade shows are listed in places including Australia, France, Holland, Hungary, Switzerland, UK, and USA. The importance that such trade shows might have for business and employees is examined in great detail in research undertaken as part of a sister project to Mobile Lives.

Conclusions

The intention of this paper was to present a series of factors which have contributed to increases in international work-related mobility and to evaluate critically the relationship between these factors. The final objective to this paper was to exemplify these factors and relationship in the new economy and in the context of Ireland by examining recent business patterns in the Irish software industry. This approach was able to develop an appropriate context for an important sector of the Irish economy while the theoretical analysis reinforces identified practices, so that practices are made visible and scrutinised, and theory is grounded in reference to practice and exemplified by actual organisations and relationships rather than merely representing an a priori decision governing the interpretation of such evidence. The first aspect, understanding the precise context is important particularly as so much depends upon developing appropriate policies and implementation strategies. As Sean O'Riain argues:

> As the 'Celtic Tiger' runs into difficulties, it becomes all the more important to understand the precise character of the transformations that occurred in the Irish economy in the 1990s. (O'Riain 2004b: 27)

Work related travel seems to have been a contributing factor to this growth, though one that has not been emphasised in the literature. Indeed it is hard to imagine the emergence of the new economy, global production and dynamic cities without extensive mobility patterns. Proximity to an international airport is among the most important location factors for a wide range of businesses and yet key commentators continue to stress the importance of the virtual infrastructure and the technology that can support virtual networks. However, this paper shows clearly that underneath the virtual network is a very real network and technologically mediating this network is not enough to enable it to perform any serious business or other collaborative functions.

The power of maintaining networks by face to face meetings and the type of interaction that implies extensive business travel illustrates that communication is a complicated matter that depends on a whole series of rituals, intentions, meanings, engagements and performances which are collectively deemed to be worth the billions of dollars and millions of work days spent in the air that companies accept or, indeed, impose. The idea that these processes can be systematically substituted by interaction mediated by more sophisticated telephones and computers was never really likely. However, the way in which such technology can enhance, facilitate and maintain these

networks to enable them to be the catalyst for developing more opportunities for collaboration across boundaries of distance is an important, interesting and neglected aspect of investigating the globalisation process. The way in which we interact and how this can shape and be shaped by technology is one issue, but the way in which it simultaneously serves as a substitute for, contributes to and enables greater mobility, and is economic sector- and country-specific is an issue which will have profound implications for business for the foreseeable future.

The final issue that emerged in this paper was that the nature of the software industry seems to require a great deal of international travel and the wide range of explanations as to why this is the case. The complexity of the final product, the high value of the software product, the international nature of the ICT industry, the multiple input nature of product development, the hands-on style of product development, the interactive character of creative development and collaboration, the highly educated class of employee in the sector, the internationalisation of the new economy in general, are some of the many explanations that have been suggested in this paper and supported, to some degree or other by secondary literature. Systematic research in this area is, however, needed if these different reasons are to be properly evaluated.

The next stage of this research will be a series of interviews with companies in each of the different sub-sectors of the Irish software industry, both indigenous and foreign, in order to test these hypotheses. The directions for further research will then turn to the social consequences of the process of flying around the world, bringing business home that becomes an ever more important aspect of our mobile lives.

References:

Alderman, N. (1999) Local product development trajectories: engineering establishments in three contrasting regions. In Malecki and Oinas (eds.) *Making Connections – technological learning and regional economic change.* Ashgate, Aldershot.

American Express (1999). The 1999 American Express Survey of Business Travel Management. New York.

Archambault, M. & Roy, J. (2002). The Canadian air transport industry: In crisis or in transition? *Journal of Vacation marketing*, 9 (1):5-16.

Arnfalk, P. & Kogg, B. (2002). Service transformation – managing shift from business travel to virtual meetings. *Journal of Cleaner Production*, 11:859-872.

Asheim, B.T. & Cooke, P. (1999) Local learning and interactive innovation networks in a global economy. In Malecki and Oinas (eds.) *Making Connections –technological learning and regional economic change.* Ashgate, Aldershot.

Asheim, B.T. & Isaksen, A. (1997) Location, agglomeration and innovation: towards regional innovation systems in Norway? *European Planning Studies* 5:299-330.

Barrett, A. (2005) Irish Migration: Characteristics, Causes and Consequences, in Zimmerman, K. F., *European Migration: What Do We Know?* Oxford: Oxford University Press.

Bathelt, H., Malmberg, A. & Maskell, P. (2004) Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation. *Progress in Human Geography* 28(1):31-56.

Bauman, Z. (1998) *Globalization: The Human Consequences* New York: Columbia University Press

Beaverstock, J.V., Smith R.G., and Taylor P.J. (1999) A Roster of World Cities. *Cities* 16(9): 445-458.

Bender, A. R. & Stephenson F. J. (1998). Contemporary issues affecting the demand for business air travel in the *United States Journal of Air Transport Management* 4: 99-109.

Breathnach, P. (2000) Globalisation, information technology and the emergence of niche transnational cities: the growth of the call centre sector in Dublin. *Geoforum* 31: 477-485.

Brenner, N. (1999). Globalisation as Reterritorialisation: The Re-scaling of Urban Governance in the European Union. *Urban Studies* 36 (3): 431-451.

Breure, A. & Van Meel, F. (2003). Airport offices: facilitating nomadic workers. *Facilities* 21 (7/8).

Byrne, J. (1993). The virtual corporation. *Business Week*, 8 February 1993.

Camagni, R. (1991) Introduction: from the local 'milieu' to innovation through cooperation networks. In *Innovation networks: spatial perspectives.* Belhaven Press, London.

Cameron, G. & Muellbauer, J. (1998). The housing market and regional commuting and migration choices. *Scottish Journal of Political Economics* 45: 420-446.

Castells, M. (1989) *The Informational City,* Oxford: Blackwell

Castells, M. (1996) *The Network Society: The Information Age*. Oxford: Blackwell.

Castells, M. (1996) *The Rise of the Network Society,* Oxford: Blackwell

Castells, M. (2001) *The Internet Galaxy: Reflections on the Internet, Business and Society*. Oxford: Oxford University Press.

Castells, M. and Hall, P. (1994) *Technopoles of the World: The Maqking of 21st Century Industrial Complexes*. London: Routledge.

Cattan, N. (1995) Attractivity and internationalisation of major European cities: the example of air traffic. *Urban Studies* 32(2): 303-312

Cendant Mobility (2004a) *Emerging trends in Global Mobility: The Assignee Perspective* worldwide Benchmark Study

Cendant Mobility (2004b) *Emerging trends in Global Mobility: Policy and Practices Survey*

Coe, N. M. (1997) US Transnationals and the Irish Software Industry: Assessing the Nature, Quality and Stability of a New Wave of Foreign Direct Investment, *European Urban and Regional Studies* 4 (3) 211–30.

Cohen, R. B. (1981) The new international division of labour, multinational corporations and urban hierarchy. In Dear, M. and Scott, A. (Eds.) *Urbanisation and Urban Planning in Capitalist Society*. Methuen, London, pp. 287-315.

Cooke, N. & Morgan, K. (1998) *The Associational Economy: Firms, Regions, and Innovation*. Oxford, Oxford University Press.

Crone, M. (2002a) *A Profile of the Irish Software Industry*. Irish Software Project: Report 1, April

Crone, M. (2002b) The Irish Indigenous Software Industry: Explaining the Development of a Knowledge-intensive Industry Cluster in a Less Favoured Region. ERSA 2002 Dortmund: 42nd Congress of the European Regional Science Association (August 27–31)

Crone, M. (2003) Clustering and Cluster Development in Knowledge-intensive Industries: A 'Knowledge and Learning' Perspective on New Firm Formation and Firm-building/Firm Growth in Ireland's Indigenous Software Industry. Regional Science Association International: British and Irish Section 33rd Annual Conference, St Andrews (August 20-22)

Davidson, R. (1994). *Business Travel*. Longman Group Limited, Harlow.

Davidson, R (2004). *Economic Trends Report*. September 2004. www.eibtm.com

Dei Ottati, G. (1987), 'Il mercato comunitario' in Becattini, G. (ed). '*Mercato e forze locali: Il distretto industriale*', Bologna, Il Mulino.

Denstadli, J. M. & Lian J. I. (2004). Norwegian business air travel-segments and trends. *Journal of Air Transport Management* 10: 109-118.

Denstadli, J. M. (2004). Impact of videoconferencing on business travel: the Norwegian experience. *Journal of Air Transport Management* 10: 371-376.

Doloreux, D. & Parto, S. (2005) Regional innovation systems: current discourse and unresolved issues. *Technology in Society* 27: 133-153.

Drucker, P. (1988) The coming of the new organisation. *Harvard Business Review*, January-February.

Eliasson, K., Lindgren, U. & Westerlund, O. (2003). Geographical labour mobility: migration or commuting? *Regional Studies* 37 (8): 827-837.

Enright, M. (1998) 'Regional cluster and firm strategy'. In Chandler, A.D., Solvell, O. and Hagstrom, P. (eds) *'The dynamic firm: The role of technology strategy, organization and regions'*. Oxford, Oxford University Press.

Financial Times, 26/1/05

Florida, R. (2002) The economic geography of talent. *Annals of the Association of American Geographers* 94(2): 743-755.

Freeman, O. & Kern, C. F. (1997). A model of workplace and residence choice in two-worker households. *Regional Studies and Urban Economics* 27: 241-260.

Friedmann, J. (1986) The world city hypothesis. *Development and Change*, 17: 69-83.

Gilly, J. and Wallet, F. (2001) Forms of proximity, local governance and the dynamics of local economic spaces: The case of industrial conversion processes, *International Journal of Regional and Urban Research* 25 (3): 553-570.

Griffiths, J. (1994). Organisational change, telecommunications, and the demand for air travel. IATA 8th Annual Worldwide Air Traffic & Economic Outlook.

Hall, P. (1966) *The World Cities*. Heinemann, London.

Handfield, R. & Nichols, E. (2004). Key issues in global supply base management. Industrial Marketing Management, 33.

Hutchby, I. (2001) *Conversation and Technology: from the Telephone to the Internet*. Cambridge: Polity

Hymer, S. (1972) The multinational corporation and the law of uneven development. In Bhagwati, J. (Ed.) *Economics and World Order from the 1970s to the 1990s*. Collier-MacMillan, London, pp. 113-140.

ICT Ireland (2002) *Strategic Vision: The ICT Sector in Ireland 2003-2005* Dublin: IBEC

Innis, H. A. (1951) *The Bias Of Communications*. Toronto: University of Toronto Press.

Innis, H. A. (1952) *Changing Concepts of Time*. Toronto: University of Toronto Press.

Isaksen, A. (2001). Building Regional Innovation Systems: Is Endogeneous Industrial Development Possible in the Global Economy? *Canadian Journal of Regional Science* 14 (1):101-120.

Jacobs , J. (1969) *The Economy of Cities*, New York, Vintage.

Jarillo, J.C. (1993) On strategic networks. *Strategic Management Journal*, 9(1):31-41.

Kaufmann, A., Lehner, P. & Todtling, F. (2002) Effects of the internet on the spatial structure of innovation networks. Paper presented at the 42th ERSA Conference, University of Dortmund (Germany), 27-31 August, 2002.

Kayworth, T. and Leidner, D. (2000). The global virtual manager: a prescription for success. *European Management Journal* 18(2).

Kelly, J. (2003) World winning cities in an era of change. *Property Futures*

Koser, K. and Salt, J. (1997) The Geography of International Highly-skilled Migration: A State of the Art Review. *International Journal of Population Geography*, 3 (4): 285-303.

Kulendran, N. and Wilson, K. (2000) Is there a Relationship Between International Trade and International Travel?, *Applied Economics*, 32, 1001-1009.

Lassen, C. (2004) Rethinking Central Concepts of Work and Travel in the 'Age of aeromobility' Presentation to The Alternative Mobility Futures, January.

Lasserre, P. (2003). *Global Strategic Management*. Basingstoke, Palgrave.

Laundry, B. Mahesh, S. and Hartman, S. (2005) The changing nature of work in the age of e-business. *Journal of Organizational Change Management*, 18(2): 132-144.

Leamer, E. and Storper, M. (2001). The economic geography of the Internet age. *Journal of International Business* 32(4).

Maillat, D. (1996) From the industrial district to the analysis of territorialized productive organizations. Institut de Recherches Economiques et Regionales Universite de Neuchatel Working Paper.

Malberg, A. and Maskell, P. (2002) 'The elusive concept of localization economies: toward a knowledge-based theory of spatial clustering', *Environmental Planning* 34: 429-449

Maskell, P. (1999) Globalisation and Industrial Competitiveness: The Process and Consequences of Ubiquitification' in Malecki and Oinas (eds.) *Making Connections –technological learning and regional economic change*. Ashgate, Aldershot.

McCloskey, D. N. (1994) *Knowledge and Persuasion in Economics*. Cambridge, Cambridge University Press.

McDonald, F. and Burton, F. (2002). *International Business*. London, Thompson.

McGrew, T. (2001). Feature Review - Globalization: A Critical Introduction (Jan Aart Scholte 2000). *New Political Economy* 6 (2): 293-301.

Middleton, V. T. C. (1994). Business tourism in the UK. Insights, July.

Mittelman, J. H. (1996) Globalisation: Critical Reflections. *International Political Economy Yearbook*, Vol. 9, Colorado: Lynne Riener Publishers Inc.

Mokhtarian, P. L. (1998). Beyond tele-substitution: a broader empirical look at communication impacts. California PATH Working Paper.

Mokhtarian, P. L. (2000). Telecommunications and Travel. Millenium white paper prepared for the Transportation Research Board.

Mokhtarian, P. L. (2003). Telecommunications and Travel – The case for coomplementarity. *Journal of Industrial Ecology*, 6(2):43-57.

Nikolenko, A. and Kleiner, B. (1996). Global trends in organizational design. *Work Study* 45 (7).

Ohmae, K. (1995). *The End of the Nation State: The Rise of Regional Economies*. London, HarperCollins.

O'Neill, T. (2004) Globalization: fads, fictions and facts: fads are no substitute for clear thinking about facts. *Business Economics*, Jan. 2004.

O'Riain, S. (2000) The Flexible Developmental State: Globalization, Information Technology, and the "Celtic Tiger" *Politics and Society*, Vol. 28 No. 2, June. 157-193

O'Riain, S. (2004a) *Remaking the Service Class? Class Relations Among Software Developers in Ireland*. Working Paper Series No. 23 (April)

O'Riain, S. (2004b) State, Competition and Industrial Change in Ireland 1991-1999. *The Economic and Social Review*, Vol. 35, No. 1, Spring. 27-53

O'Riain, S. (2004c) The Politics of Mobility in Technology-Driven Commodity Chains: Developmental Coalitions in the Irish Software Industry. *International Journal of Urban and Regional Research* Vol. 28 No. 3, September. 642-63

Passiante, G. & Secundo, G. (2002) From geographical innovation clusters towards virtual innovation clusters: the innovation virtual system. Paper presented at the 42th ERSA Conference, University of Dortmund (Germany), 27-31 August, 2002.

Porter, M. (1990). *The Competitive Advantage of Nations*. London, MacMillan.

Porter, M. (2001) Regions and the new economics of competition in A. J. Scott (ed.) *Global City-Regions*, Oxford University Press, Oxford.

Preissl, B. (2003) Innovation clusters: combining physical and virtual links. Discussion Paper n.359. German Institute for Economic Research.

Radice, H. (2000). Globalization and national capitalisms: theorizing convergence and differentiation. *Review of International Political Economy* 7 (4): 719-742.

Reed, H. C. (1981) *The Preeminence of International Financial Centres*. Praeger, New York.

Rogers, T. (1998). *Conferences: a twenty-first century industry*. Addison Wesley Longman, Harlow.

Roy, J. & Filiatrault, P. (1998). The impact of new business practices and information technologies on business air travel demand. *Journal of Air Transport Management* 4: 77-86.

Saffo, P. (1993). The future of travel. *Fortune*, Autumn.

Sassen, S. (1991) *The Global City*. Princeton University Press, Princeton.

Sassen, S. (1994) *Cities in a World Economy*. Pine Forge Press, London.

Saxenian, A. L. (1994) *Regional advantage: culture and competition in Silicon Valley and Route 128*. Harvard University Press, Cambridge, MA.

Scholte, J. A. (2000). *Globalization: A Critical Introduction*. Basingstoke, Palgrave.

Scott, A. J. (1998) *Regions and the world economy: the coming shape of global production, competition and political order*. Oxford, Oxford University Press.

Scott, A. J. (2000*) The cultural economy of cities: essays on the geography of image-producing industries*. London, Sage.

Scott, A. J. (2001) Globalization and the Rise of City-Regions. *European Planning Studies* 9 (7):813-826.

Smith, D. A. and Timberlake M. (2001). World City Networks and Hierarchies, 1977-1997: An Empirical Analysis of Global Air Travel Links. *American Behavioral Scientist* 44 (10) 1656-1678.

Staber, U. (2001) 'Spatial proximity and firm survival in a declining industrial district: The case of knitwear firms in Baden-Wurttemberg', *Regional Studies* 35(4): 329-341.

Stephenson, F. J. & Bender, A. R. (1996). Watershed: the future of U.S. business air travel. *Transportation Journal*, 35 (3): 14-32.

Storper, M. (1997) *The Regional World: Territorial Development in a Global Economy*. London: The Guilford Press.

Stough, S., Eom, S. and Buckenmyer, J. (2000). Virtual teaming: a strategy for moving your organization into the new millennium. *Industrial Management & Data Systems* 100 (8).

Sudgen, R. and Wilson J. (2001). Globalisation, the New Economy and Regionalisation. Globalization and World Cities Study Group Network (GaWC) Research Bulletin 70.

The Economist (1998). A survey of international financial centres - capitals of capitals. 9 May, pp. 3-46.

Thompson, G. (2004). Getting to know the knowledge economy: ICTs, networks and governance. *Economy and Society* 33(4).

Tomlinson, J. (1999) *Globalisation and Culture*. Cambridge: Polity Press.

Urry, J. (2000) *Sociology beyond Societies: Mobilities for the twenty-first century*. London: Routledge.

Van Der Bly, M. (2005, forthcoming) Globalisation: A triumph of ambiguity. *Current Sociology* 53(6), November.

Van Winden, W. & Woets, P. (2003) Local strategic networks and policies in European ICT clusters – The cases of Amsterdam, Bari, Dublin and Oulu. Paper presented at the 15th Annual Conference of the European Association for Evolutionary Political Economy, Maastricht, The Netherlands 7th-10th November 2003.

White, M. C. (2004) Inward Investment, Firm Embeddedness and Place: An Assessment of Ireland's Multinational Software Sector. *European Urban and Regional Studies* 11(3) 243–260.

Wickham, J. (forthcoming). 'Public transport systems: the sinews of European urban citizenship?' forthcoming in *European Societies.*

Wickham, J and Collins, G. (2004) The Call Centre: A Nursery for New Forms of Work Organisation? *Service Industries Journal* 24, 1. 1-18

Witlox, F., Vereecken, L. and Derudder (2004). Mapping the global network economy on the basis of air passenger transport flows. *GaWC Research Bulletin* 157.

Wittel, A. (2001) Toward a Network Sociality. *Theory, Culture and Society*. Vol 18(6):51-75.

Wu, W. (2005) Dynamic cities and creative clusters. World Bank Policy Research Working Paper n. 3509.

Yeung, H. (2000). Reconceptualising the firm in new economic geographies: An organisational perspectives. Paper presented at the conference 'The firm in economic geography', University of Portsmouth, UK.

Zumkeller D. (1996). Communication as an element of the overall transport context – an empirical study. Proceedings, 4th International Conference on Survey Methods in Transport, pp. 66-83.

Institute for International Integration Studies
The Sutherland Centre, Trinity College Dublin, Dublin 2, Ireland