12 What's 'Smart' About Working from Home: Telework and the Sustainable Consumption of Distance in Ireland?

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Abstract

The use of technology is pervasive in contemporary society, transforming lives and work environments. The internet and the availability of portable personal communication devices have resulted in immense societal change. Frequently held views of the relationship between individuals and technology are dominated by a production-centric perspective, with limited attention being paid to the social and environmental impacts of consumption. Elevated by improvements in information communication technologies and infrastructure, telework was heralded as an innovative way of working with the added potential of reducing travel demand. But early optimistic expectations failed to materialise, largely due to a poor understanding of social, political, and personal issues involved. This chapter presents an examination of telework in Ireland and argues for a more holistic approach to investigation. Before telework can be accepted as a potential benefit to the sustainable consumption of distance, the environmental consequences of changes in working practices must be understood. Researching an organisation with a telework culture, this paper investigated the environmental impacts of individuals working from home. Teleworkers reported no increase in water and other goods consumption, and no additional travel needs. However, they felt they increased their domestic food and energy consumption, and produced more waste working from home.

Keywords: telework, sustainability, consumption, ecological footprinting, mobility.

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1.   Introduction

The information communication technologies revolution of the last few decades has brought with it requirements for a new type of work, one that depends more on intellectual processing of information than on the physical labour of the past. People who perform and engage in this type of labour are frequently described as 'knowledge workers' (Drucker, 2000; Kling & Scacchi, 1982). Knowledge workers generally do not require access to industrial equipment or raw materials to carry out their tasks, but they do need access to the continuous flow of data to create information. Once they have access to data, and the necessary technology infrastructure and competencies, they may not be required to be present at any given physical worksite or location to accomplish their tasks. Telework occurs when information communication technologies are applied to enable work be performed at a distance from the location where the results are needed, or where that work would traditionally have been accomplished in the past.

The practice of telework has been highlighted as a cure for a variety of organisational and social problems in much of the recent research literature. It has been suggested as a strategy to help organisations reduce their infrastructural and on-going utilities costs (Egan, 1997; Van Horn & Storen, 2000), respond to employees' need for a more enhanced work-life balance (Hilbrecht, Shaw, Johnson, & Andrey, 2008; Shamir & Salomon, 1985), and as a way of promoting better social inclusion for people with disabilities, or who have been previously excluded from the traditional workplace for a variety of reasons such as locality, social class, or educational status (Anderson, Bricout, & West, 2001; Hesse, 1995; Kenyon, Lyons, & Rafferty, 2002). Telework has also been suggested as a means of reducing air and noise pollution, and traffic congestion in and around urban areas (Dwelly & Lake, 2008; Irwin, 2004). However, information communication technologies utilised for telework do not in themselves lead to overall travel suppression (Mokhtarian, 1990, 1991, 2002) and there are additional environmental consequences arising from the need to change or update technological equipment, infrastructure, living space, and other such lifestyle transformations (Arnfalk, 2002). It is claimed that telework and other forms of

distributed work collaboration are on the increase (Andriessen & Vartiainen, 2006; Brodt & Verburg, 2007) and efforts to limit climate change may accelerate this trend towards more flexible distributed organisations in the future (WWF, 2009). Yet, it is clear telework has failed to live up to its initial promise and early predictions (see Huws, 1991, for an overview of early telework forecasts) and although statistics suggest telework has increased, "the reality remains far removed from the early forecasts in the late 1970s and early 1980s" (Pyöriä, 2011, p. 2) and the actual global extent of telework may be much smaller than often imagined (White et al., 2010).

Sociology is often criticised for not discussing technology in a manner that has influence over its direction and development, and this work serves as a call for the discipline to become more involved at all stages of technology development, implementation, and adoption. Society is vulnerable to what Winner (1997) described as "technological somnambulism" (p. 57), which is our semi-conscious, sleepwalking attitude towards technology. He believed we often release technology into society and quickly abdicate responsibility toward it, and maintained we should manage and debate the terms of our relationships with technologies long before they become embedded into our daily and working lives. It also echoes a call from Law and Urry (2004) for social science to "interfere in the realities, to make a difference, to engage in an ontological politics, and to help shape new realities" (p. 404). Consequently, we should no longer simply view technology as a *black box* shaping the trajectory of society but rather a component having varying degrees of influence, or not, in time and space. It is imperative that we no longer relinquish this important research space to developers and engineers but seek to engage with these other disciplines to find a healthy and accommodating fit and understanding for technology within society.

Significant initial efforts to promote telework in Ireland at the beginning of the century ended abruptly and, as this author maintains, proved to be ineffectual in the long run. Some of the blame for the lack of success in implementation can be placed on the lack of adequate research into significant social components that make up the practice of telework, including Irish employers unwillingness

to support this technology-aided way of working (Hynes, forthcoming). Whilst significant importance was placed on economic issues and the consequence of telework for the development of a 'smart economy', little in the way of the social and domestic issues involved were discussed or considered. Indeed, national and regional telework policy resided firmly within a sphere of a laissez-faire attitude among government and other decision-makers, effectively giving employers' undisputed power when it came to the introduction and recognition of such work practices. As many were unaware, or indeed unconvinced, of the benefits that can accrue from telework the practice principally became the providence of a handful of organisations, generally within the Civil Service and technology industries.

2.   Telework in Ireland

Much of the initial pioneering work in developing telework frameworks and schemes within the European Community took place in the peripheral countries and regions of Europe, including Ireland. The expectation was that more dispersed populations with significant distance and location barriers to overcome would benefit most from individuals working from home. Results from early research were largely mixed and inconclusive (see ECaTT, 2000; SusTel, 2003) and point to inconsistencies particularly in the Irish case:

> "While there has been stronger growth in Scandinavian countries, further west development has been slow by European standards. Ireland has been to some extent a puzzle. Despite energetic early work by telework pioneers, and Ireland's developing reputation as a place for high-tech investment, progress has been below the European average" (Lake, 2009, p. 1).

Similar results were found in the standard Eurobarometer survey (European Commission, 2001). This showed regular telework in Ireland at just 2.4 per cent of the adult workforce, and occasional teleworkers at 6.1 per cent. European averages, by contrast, were 5 per cent for regular and 6.6 per cent for

occasional teleworkers. More recent data on telework in Ireland was published in February 2003 by the Central Statistics Office in Cork (CSO, 2003). Detailed questions were added to the Quarterly National Household Survey (QNHS) to determine levels of home-based workers outside of the large agricultural sector, teleworkers being the most significant constituent. The summarised data confirmed there were 59,200 teleworkers in Ireland, representing just 3.5 per cent of the workforce, with approximately 38 per cent of these workers residing in the Dublin region. This raises interesting questions about the difficulty with developing and implementing telework in Ireland.

There is no employment (or other) legislation dealing specifically with the subject of telework or the status of teleworkers at present on the statute books in Ireland. When the European Framework Agreement on Telework (Europa, 2002) was concluded, the majority of countries elected to implement the agreement through bipartite collective agreements. Ireland, however, elected implementation through soft law[1] mechanisms giving employers an effective veto over any telework proposal or request. Adam and Crossan (2001) maintained that where telework existed it had been implemented in an ad-hoc manner and was largely employee-driven. Telework was not actively encouraged and management commitment was virtually non-existent. As a result, the necessary support was not forthcoming and the practice of telework was not seen as a priority within the organisations sampled. It appeared Irish managers were not yet convinced of the benefits inherent in the concept of telework, or they were uncertain whether the benefits were worth the risks resulting from the introduction of this new method of (re)organising work.

The efforts, in respect of telework, by policy and decision-makers in Ireland can largely be characterised as bridging an informational gap which existed at the turn of the century. While some clarification in respect of the tax implications was provided by the Revenue Commissioners (Revenue, 2001), overall strategies and policy to promote and develop telework in the country could be described as improvised. No evidence is available that would indicate a willingness to

1. Soft law is the term applied to measures such as guidelines, declarations and opinions, which, in contrast to directives, regulations and decisions, are not binding on those to whom they are addressed.

research or better understand the often complex social, personal, and political issues involved when adopting this way of working. Even today, telework remains largely unexplored as a tool for economic and social development, and environmental protection. Indeed, much of the early enthusiasm shown at governmental level has long since faded in an atmosphere of ambiguity and uncertainty, along with outdated or shut-down web portals, action groups, and reports[1]. Consequently, a considerable gap in knowledge currently exists that needs to be bridged.

Given the plethora of technological developments since many of these original studies and reports were commissioned, a fresh approach to the subject of telework is essential. However, before any strategy for promotion and implementation can be developed it is imperative to define and critically test the credentials of telework as a virtual mobility tool that has the potential to reduce the consumption of distance. Telework promises some direct savings by eliminating the daily commute and various auxiliary savings in utilities and building expenditure. But does working from home actually reduce or increase a person's carbon footprint? Whilst it has been strongly promoted in Ireland as an economic instrument and given little attention as a virtual mobility tool (Callanan, 1999; e-Work Action Forum, 2003; Irish DoETE, 2001), is telework an effective tool for reducing environmentally harmful work-related mobility or does it simply shift any environmental impacts (and their costs) from the worksite to home?

Our understanding of the overall implications of telework in terms of consumption is limited. Telework is frequently promoted on environmental grounds because of its potential to suppress or eliminate certain mobility, but many studies have this single issue focus (Andrey, Burns, & Doherty, 2004; Atkyns, Blazek, & Roitz, 2002; Nelson, Safirova, & Walls, 2007) and there is no universally accepted method for assessing the implications for sustainability of individuals teleworking (Devuyst & Van Volsems, 2001). Much of what

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1. It is difficult to get current information on telework in Ireland as many of the associated research websites and information portals have been closed since the early part of the decade. In addition, much of the early research relied heavily on EU funding, which was short-term in nature. There are currently no longitudinal studies or on-going research in this area, to this author's knowledge.

exists on the issue at present is excessively optimistic, lacking any real critical investigation or analysis of the practice. Although of an often complex nature, telework needs a wider framework to provide a clearer understanding of the broader implications of its sustainability merits. A teleworker, for instance, may need to consume more heat and energy at home if their house would otherwise have been unoccupied when they were at work, though the extent to which home energy use is offset by decreased workplace energy consumption has also not been sufficiently determined (Hopkinson & James, 2003; Kitou & Horvath, 2003). Many family homes may still have occupants whilst one or more adults go out to work, so the change to telework may not be so noticeable with regards to energy consumption. More importantly, the consequences of telework for general consumption behaviour and waste generation have not, to-date, been comprehensively accounted for. Moos, Andrey, and Johnson (2006) used an ecological-footprint approach to assessing the overall sustainability of telework, and their research moved beyond single-issue studies and single-data analysis. They provided an exploratory investigation and suggested the assumed benefits of telework for society at large must be more carefully examined to "avoid promoting telework's ostensible tendency to reduce air pollution only to find that other harmful effects offset these gains" (Moos et al., 2006, p. 12). This research will complement this particular body of knowledge by using a self-assessment approach to measure impacts using *Ecological Footprinting* to ascertain the environmental impact of telework in Ireland.

What is ecological footprinting and could it be useful in assessing the environmental impacts of telework? Wackernagel and Rees (1996) describe ecological footprinting analysis as an accounting tool that enables us "to estimate the resource consumption and waste assimilation requirements of a defined human population or economy in terms of a corresponding productive land area" (p. 9). It has been widely acclaimed for presenting current total human resource use in a manner that communicates easily to most people, but there is some concern when these calculations are used in interpreting it as an indicator of something else. While some argue in favour of its use for policy decision-making in the context of sustainability (Collins, Flynn, Wiedmann, &

Barrett, 2006; Wackernagel & Silemtein, 2000) others see a much more limited role for ecological footprinting (Ayres, 2000; Fiala, 2008). Although research using the application of ecological footprinting on its utility as a policy tool is largely applied at a national level with some success (Monfreda, Wackernagel, & Deumling, 2004; Wackernagel et al., 1999), some research has applied it at a regional and city level (Barrett, 2001; Rees & Wackernagel, 1996). In the context of this particular research we will consider a meso-level investigation using ecological footprinting analysis at an organisational level.

3.   The case study

The purpose of this case study, which took place in March 2012, was to examine the assumed environmental impacts of a person's decision to telework. The empirical evidence was gathered from a multinational company which operates from eight separate locations across Ireland, and which embraced a flexible working culture as an affirmative option for organisational change over the past number of years[1]. The organisation has a diverse workforce of management, sales, administration, technology personnel, and manufacturing workers, and their headquarters in Ireland is located in the Dublin West region. Many of the worksites across the country focus principally on manufacturing and would have difficulty implementing telework on a large scale, but the Dublin headquarters actively promotes and encourages the practice as a legitimate and progressive method of working.

As one of the foremost companies in the country with an established flexible working and telework program, the organisation was deemed the most appropriate for this particular research. The number of potential teleworkers at the Dublin site was calculated at 114[2] and a personalised email was send to each of these employees and managers inviting them to participate in the research, beginning with answering a carefully structured online questionnaire

1. The organisation involved requested to remain anonymous for this particular study.

2. This figure of potential teleworkers was provided by the Human Resources Manager.

using the Limesurvey software. 53 individuals took part, a response rate of just over 46 per cent. The research relied on self-reflection and self-assessment to estimate the impact of telework on a person's carbon footprint when they worked from home, focussing on six key areas of household consumption: food, energy, travel, goods[1] water and waste. This data constitutes a discursive framework of the assumed environmental impact of teleworkers rather than actual measurement, and thus has obvious limitations in the context of comprehensive assertions and conclusions. The respondents were asked to consider their consumption requirements on days they teleworked, and contrast these needs with days where they commuted to their centrally-located office. In addition, five[2] respondents were selected at random and interviewed to allow for more in-depth analysis of telework in general, and issues of sustainability and environmental concerns interconnected with this method of working.

4. Results

Figure 1. Food and energy consumption

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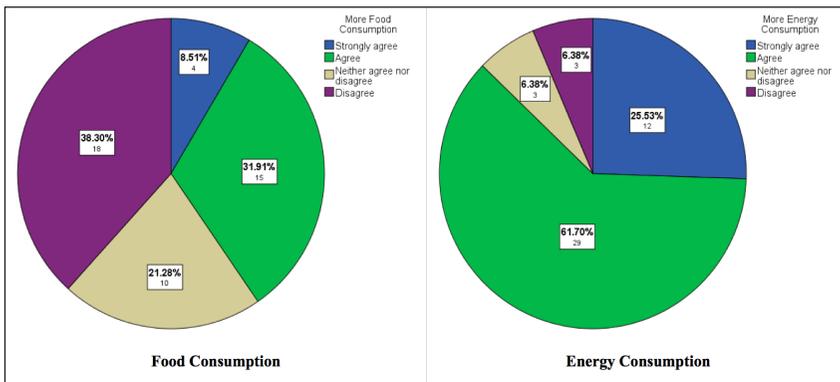
1. Goods, in this instance, refer to new equipment, furniture, clothing or other items that may need to be purchased by teleworkers other than foodstuffs.

2. The number of interviewees was agreed with the organisation beforehand in an attempt to minimise disruption as the company was actively involved in other areas of research. The interviews were carried out over distance with the individuals from their homes in an informal manner using a teleconferencing facility, and all interviews were recorded and consent obtained.
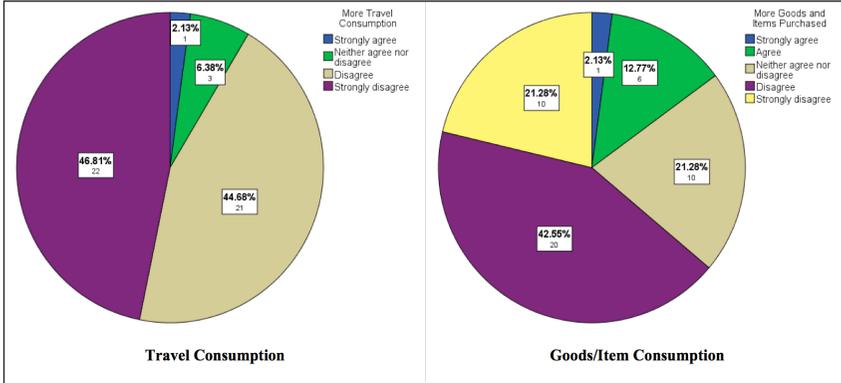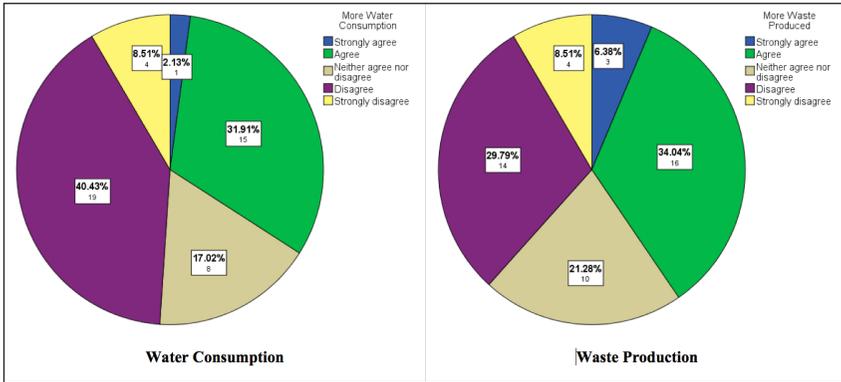
Figure 2.   Travel and goods/item consumption

Figure 3.   Water consumption and waste production

As illustrated in the graphs above (Figure 1, Figure 2, and Figure 3), 40 per cent ($N = 22$) agreed or strongly agreed that their food consumption in the home increased when teleworking, with 21 per cent ($N = 10$) undecided on this issue. Over 87 per cent ($N = 41$) of the respondents either agreed or strongly agreed that their domestic energy consumption increased, whilst the majority of respondents, over 91 per cent ($N = 43$), felt that their consumption of distance did not increase during episodes of telework. Similarly, most of the respondents felt their purchase of goods and other items was unaffected

by their telework practices. Figures were somewhat mixed on additional water consumption and waste produced when working from home.

Contrasting the figures for respondents who agreed and strongly agreed with those who disagreed and strongly disagreed, and eliminating the undecided, the reported changes in impact are listed in Table 1 below.

Table 1.   Self-reported changes in environmental impact due to telework

Category of Domestic Consumption	Reported Increase
Food Consumption	Yes
Energy Consumption	Yes
Travel Consumption	No
Goods & Items Purchased	No
Water Consumption	No
Waste Produced	Yes

The issue of overall environmental concern and the need to reduce the consequence of transport's negative impact on the environment was explored with the five interviewees. This concern was often an incidental consideration in their choice to telework, but many felt satisfied that such a decision reduced their overall commuting impact:

Teleworker A1: [Environmental concerns] wouldn't have been the biggest reason but it would have been a concern yes, and because we have the one car it is great that it cuts down our commute - (female, employee, aged 30-35).

Teleworker A2: I live about thirty minutes away but I do car share anyway so between the two of us we usually sort of agree, and particularly these days [reference to the current economic situation in the country], the other thing is it's half an hour or an hour depending on the traffic out of your day at both ends so from that point of view it's a sort of double bonus - (male, management, aged 55-60).

Teleworker A3: It's probably not so much environmental it's probably more personal from the point of view of getting a bit more time back at home because I spend so much time on the road… I was involved in a big project with one of my colleagues over in Sligo and we had been meeting up halfway so I'd drive an hour each way but because of the snows [last year] we couldn't do that so we sat down and we called up each other and sat down with our laptops and our docking stations and in our various offices on either side of the country and we both said at the end of that we got more done that day working over the telephone and on our laptops you know spatially separated than we had done anywhere because straight away we were saving ourselves two hours travelling time and we were in environments that were a lot more conducive to work rather than sitting in a pub and obviously it's a lot more private as well and we found there were no issues at all so that worked out really really well - (male, employee, aged 35-40).

Teleworker A5: …not really no it's more social kind of reasons in terms of, what would you say, its more work/life balance - (female, employee, aged 35-40).

When asked if they considered telework had increased their overall expenditure at home, such as electricity, heating, and energy costs, the responses were largely similar, with most respondents attributing any increase in their bills to other issues such as the economic downturn in the country, or exceptional weather events:

Teleworker A1: I mean our bills haven't gone up dramatically or anything like that, I did ask my husband about it and I tend not to turn on the lights so there's not much electricity being used, you know the kettle does go on for a cup of tea now and again that's about it but the heating bill probably did go up but ever so slightly nothing that my husband told me he could notice - (female, employee, aged 30-35).

Teleworker A2: I would say anything that I have noticed would be offset

by the fact that I'm not having to take an hour's car journey which probably costs a good couple of litres [of petrol] anyway - (male, management, aged 55-60).

Teleworker A4: I'm not sure what I save on petrol costs verses the additional power requirements in the house but it's probably not much but yea it's a contribution towards not being part of the drain on the environment as well I guess - (male, aged 30-35).

Teleworker A5: When you just telework infrequently I think the benefits cover the costs - (female, employee, aged 35-40).

5.   Discussion and conclusions

Before the practice of telework can be endorsed as an instrument for encouraging a positive approach to the sustainable consumption of distance, it is crucial that we have a more robust understanding of the true social and environmental implications of individuals working from home. This particular body of research is a movement towards a better understanding of how teleworkers evaluate themselves and their impact on the environment overall and is not simply confined to the context of travel and their daily commute. Whilst it can be argued that the findings presented here are merely suggestive, given the size of the sample, it is nevertheless an important initial step in a necessary investigation process.

The single-focused nature of many previous studies of telework has led to a frequently simplistic consideration of complex social and environmental interactions, and this particular study widens the boundaries of investigation of telework to provide a more representative and realistic conception of working from home. But this is a tentative preliminary step in any such research and there are limitations to this particular body of research. The possibility of a value-action gap in individual's self-reporting their consumption patterns is ever present, and this study is confined to a single employer who have adopted

a philosophy of supporting flexible working arrangements. This particular organisation may not be representative of employers in general in Ireland, and the low number of participants may not be reflective of teleworkers overall.

With the limited number of teleworkers currently operating in Ireland and the complexity involved in getting these often mobile workers to engage with researchers there is a need for better approaches to future research on the subject. It is also paramount for future research to continue to focus on managers' and employers' views of teleworking. Notwithstanding this, the concept employed in this study sets about broadening the investigation framework into telework and seeks to provide a platform for further studies in this area and should be viewed thus.

Finally, there is a need to develop enriched methodologies and indicators that can better capture the complex nature of telework, including its impact on the environment. Longitudinal research work combining time-use of material consumption data would be particularly useful in this respect. Notwithstanding some of its obvious limitations, research presented in this chapter offers a preliminary step towards understanding the multifaceted social, political, economic, and environmental issues surrounding the practice of telework in Ireland. Further sociological perspectives will be critical in re-visiting many of the social issues involved, and exploring telework for its potential as a tool for greater sustainability and enhanced resource-efficiency.

References

Adam, F., & Crossan, G. (2001). Teleworking in Ireland: Issues and Perspectives. In N. Johnson (Ed.), *Telecommuting and Virtual Offices: Issues and Opportunities* (pp. 28-49). Hershey, PA: Idea Group Publishing.

Anderson, J., Bricout, J. C., & West, M. D. (2001). Telecommuting: Meeting the Needs of Businesses and Employees with Disabilities. *Journal of Vocational Rehabilitation, 16*(2), 97-104.

Andrey, J., Burns, K. R., & Doherty, S. T. (2004). Toward Sustainable Transportation: Exploring Transportation Decision Making in Teleworking Households in a Mid-Sized Canadian City. *Canadian Journal of Urban Research, 13*(2), 257-277.

Andriessen, J. H. E., & Vartiainen, M. (2006). *Mobile Virtual Work: A New Paradigm?* Berlin: Springer Verlag.

Arnfalk, P. (2002). *Virtual Mobility and Pollution Prevention - The Emerging Role of ICT Based Communication in Organisations and its Impact on Travel*. Library at the IIIEE: Lund.

Atkyns, R., Blazek, M., & Roitz, J. (2002). Measurement of Environmental Impacts of Telework Adoption Amidst Change in Complex Organizations: AT&T Survey Methodology and Results. Resources, Conservation and Recycling, 36(3), 267-285. doi: 10.1016/S0921-3449(02)00082-4

Ayres, R. U. (2000). Commentary on the Utility of the Ecological Footprint Concept. *Ecological Economics, 32*(3), 347-349. doi: 10.1016/S0921-8009(99)00151-2

Barrett, J. (2001). Component Ecological Footprint: Developing Sustainable Scenarios. *Impact Assessment and Project Appraisal, 19*(2), 107-118. doi: 10.3152/147154601781767069

Brodt, T. L., & Verburg, R. M. (2007). Managing Mobile Work - Insights from European Practice. New Technology, Work and Employment, 22(1), 52-65. doi: 10.1111/j.1468-005X.2007.00183.x

Callanan, T. A. (1999). *New Ways of Living and Working: Teleworking in Ireland*. For: Department of Enterprise Trade and Employment, Report of the National Advisory Council on Teleworking. Dublin 2. Retrieved from http://www.djei.ie/publications/trade/2003/teleworking.pdf

Collins, A., Flynn, A., Wiedmann, T., & Barrett, J. (2006). The Environmental Impacts of Consumption at a Subnational Level: The Ecological Footprint of Cardiff. *Journal of Industrial Ecology, 10*(3), 9-24. doi: 10.1162/jiec.2006.10.3.9

CSO. (2003). *Quarterly National Household Survey: Module on Teleworking*. For: Central Statistics Office. Cork. Retrieved from http://www.stile.be/wp5/QNHS%20release%20module%20on%20Teleworking.pdf

Devuyst, D., & Van Volsems, S. (2001). Sustainable Lifestyle Assessment. In D. Devuyst, L. Hens, & W. d. Lannoy (Eds.), *How Green is the City?: Sustainability Assessment and the Management of Urban Environments* (pp. 393-418). New York: Columbia University Press.

Drucker, P. F. (2000). Implementing the Effective Management of Knowledge Knowledge Worker Productivity: The Biggest Challenge. In J. W. Cortada & J. A. Woods (Eds.), *The Knowledge Management Yearbook 2000-2001* (pp. 267-283). Woburn: Butterworth-Heinemann.

Dwelly, T., & Lake, A. (2008). *Can Homeworking Save the Planet? How Homes can become Workspaces in a Low Carbon Economy*. London: The Smith Institute. Retrieved from http://www.flexibility.co.uk/downloads/Canhomeworkingsavetheplanet.pdf

e-Work Action Forum. (2003). *Report of the e-Work Action Forum 2002*. Dublin 2: Department of Enterprise Trade and Employment. Retrieved from http://www.djei.ie/publications/enterprise/2000/e-work/index.htm

ECaTT. (2000). The ECaTT Project. Website: *Empirica*. Retrieved from http://www.ecatt.com/

Egan, B. (1997). *Feasibility and Cost Benefit Analysis*. Paper presented at the International Telework Association Annual International Conference, Crystal City, VA.

Europa. (2002). Teleworking. *Website: Summaries of EU legislation*. Retrieved from http://europa.eu/legislation_summaries/employment_and_social_policy/employment_rights_and_work_organisation/c10131_en.htm

European Commission. (2001). *Benchmarking Report Following-up the Strategies for Jobs in the Information Society*. Brussels: Commission of the European Communities. Retrieved from http://csdle.lex.unict.it/docs/labourweb/Benchmarking-Report-following-up-the-Strategies-for-jobs-in-the-Information-Society-/1541.aspx

Fiala, N. (2008). Measuring Sustainability: Why the Ecological Footprint is Bad Economics and Bad Environmental Science. *Ecological Economics, 67*(4), 519-525. doi: 10.1016/j.ecolecon.2008.07.023

Hesse, B. W. (1995). Curb Cuts in the Virtual Community: Telework and Persons with Disabilities. *Proceedings of the 28th Annual Hawaii International Conference on System Sciences, Hawaii* (pp. 418-425).

Hilbrecht, M., Shaw, S. M., Johnson, L. C., & Andrey, J. (2008). 'I'm Home for the Kids': Contradictory Implications for Work–Life Balance of Teleworking Mothers. *Gender, Work & Organization, 15*(5), 454-476. doi: 10.1111/j.1468-0432.2008.00413.x

Hopkinson, P., & James, P. (2003). *UK Report on National SUSTEL Fieldwork.* Bradford: Sustainable Telework.

Huws, U. (1991). Telework: Projections. *Futures, 23*(1), 19-31. doi: 10.1016/0016-3287(91)90003-K

Hynes, M. (forthcoming). *Telework Policy in Ireland* [Draft]. Forthcoming 2013.

Irish DoETE. (2001). *Address by Mr. Noel Treacy T.D.*, Minister for Science, Technology and Commerce at the Launch of Telework Ireland's Teleworking Manuals and the Relaunch of their Website in Buswell's Hotel on 25th May, 2000 at 12 p.m [Website]. Retrieved from http://www.djei.ie/press/2000/250500.htm

Irwin, F. (2004). *Gaining the Air Quality and Climate Benefit for Telework.* World Resources Institute. Retrieved from http://goo.gl/IvdkU

Kenyon, S., Lyons, G., & Rafferty, J. (2002). Transport and Social Exclusion: Investigating the Possibility of Promoting Inclusion through Virtual Mobility. *Journal of Transport Geography, 10*(3), 207-219. doi: 10.1016/S0966-6923(02)00012-1

Kitou, E., & Horvath, A. (2003). Energy-Related Emissions from Telework. *Environment Science Technology, 37*(16), 3467-3475. doi: 10.1021/es025849p

Kling, R., & Scacchi, W. (1982). The Web of Computing: Computer Technology as Social Organization. *Advances in Computers, 21*, 1-90. doi: 10.1016/S0065-2458(08)60567-7

Lake, A. (2009). Teleworking in Ireland; Slow but Typical Growth Patterns on the Edge of Europe. Blog Title: *Flexibility*. Retrieved from http://www.flexibility.co.uk/flexwork/location/Teleworking-Ireland.htm

Law, J., & Urry, J. (2004). Enacting the Social. *Economy and Society, 33*(3), 390-410. doi: 10.1080/0308514042000225716

Mokhtarian, P. L. (1990). A Typology of Relationships Between Telecommunications and Transportation. *Transportation Research Part A: General, 24*(3), 231-242. doi: 10.1016/0191-2607(90)90060-J

Mokhtarian, P. L. (1991). Telecommuting and Travel: State of the Practice, State of the Art. *Transportation, 18*(4), 319-342. Retrieved from http://link.springer.com/article/10.1007/BF00186563

Mokhtarian, P. L. (2002). Telecommunications and Travel: The Case for Complementarity. *Journal of Industrial Ecology, 6*(2), 43-57. doi: 10.1162/108819802763471771

Monfreda, C., Wackernagel, M., & Deumling, D. (2004). Establishing National Natural Capital Accounts Based on Detailed Ecological Footprint and Biological Capacity Assessments. *Land Use Policy, 21*(3), 231-246. doi: 10.1016/j.landusepol.2003.10.009

Moos, M., Andrey, J., & Johnson, L. C. (2006). The Sustainability of Telework: An Ecological-Footprinting Approach. *Sustainability: Science Practice and Policy, 2*(1), 3-14. Retrieved from http://sspp.proquest.com/static_content/vol2iss1/0511-020.moos.pdf

Nelson, P., Safirova, E., & Walls, M. (2007). Telecommuting and Environmental Policy: Lessons from the eCommute Program. *Transportation Research Part D: Transport and Environment, 12*(3), 195-207. doi: 10.1016/j.trd.2007.01.011

Pyöriä, P. (2011). Managing Telework: Risks, Fears and Rules. *Management Research News, 34*(4), 386-399. doi: 10.1108/01409171111117843

Rees, W. E., & Wackernagel, M. (1996). Urban Ecological Footprints: Why Cities Cannot be Sustainable – And Why They are a Key to Sustainability. Environmental Impact *Assessment Review, 16*(4-6), 223-248. doi: 10.1016/S0195-9255(96)00022-4

Revenue. (2001). eWorking and Tax - IT69. *Website: Revenue*. Retrieved from http://www.revenue.ie/en/tax/it/leaflets/it69.html

Shamir, B., & Salomon, I. (1985). Work-at-Home and the Quality of Working Life. *Academy of Management Review, 10*(3), 455-464.

SusTel. (2003). SUStainable TELework - Assessing and Optimising the Ecological and Social Benefits of Teleworking. *Website: SusTel*. Retrieved from http://www.ist-world.org/ProjectDetails.aspx?ProjectId=7bd1d8d1af094dcdb0573f9570fee636

Van Horn, C., & Storen, D. (2000). *Telework: Coming of age? Evaluating the Potential Benefits of Telework* (pp. 3-32). Washington, DC: US Department of Labor.

Wackernagel, M., Onisto, L., Bello, P., Callejas Linares, A., López Falfán, I. S., Méndez García, J., Suárez Guerrero, A. I., & Suárez Guerrero, M. G. (1999). National Natural Capital Accounting with the Ecological Footprint Concept. *Ecological Economics, 29*(3), 375-390.

Wackernagel, M., & Rees, W. E. (1996). *Our Ecological Footprint: Reducing Human Impact on the Earth*. Gabriola Island, BC: New Society Publishers.

Wackernagel, M., & Silemtein, J. (2000). Big Things First: Focusing on the Scale Imperative with the Ecological Footprint. *Ecological Economics, 32*(3), 391-394. doi: 10.1016/S0921-8009(99)00161-5

White, P., Christodoulou, G., Mackett, R., Titheridge, H., Thoreau, R., & Polak, J. (2010). The Impacts of Teleworking on Sustainability and Travel. In T. Manzi, K. Lucas, T. L. Jones, & J. Allen (Eds.), *Social Sustainability in Urban Areas: Communities, Connectivity and the Urban Fabric* (pp. 141-154). London: Earthscan Publications Ltd.

Winner, L. (1997). Technologies as Forms of Life. In K. Shrader-Frechette & L. Westra (Eds.), *Technology and Values* (pp. 55-70). Lanham, MD: Rowman & Littlefield Publishers, Inc.

WWF. (2009). *From Workplace to Anywhere: Assessing the Global Opportunities to Reduce Greenhouse Emmissions with Virtual Meetings and Telecommuting.* WWF Sweden: World Wildlife Fund. Retrieved from http://www.worldwildlife.org/who/media/press/2009/WWFBinaryitem11939.pdf

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