Chapter 9
The Internet in Three Finnish Cities: Accessing Global Networks

Tommi Inkinen

9.1 Introduction

Large scale engineering projects are traditionally associated with physical structure development. One term used to describe these massive processes and their final outcomes is megaengineering. Massive projects have emerged during the history. Brunn (2008) outlined examples such as the Egyptian pyramids, Roman Coliseum, Machu Picchu, the Great Wall of China, and more recently the U.S. Interstate Highway System. Common to all these examples is that they are local, regional or national developments having a visible physical form.

What we consider as "large scale" is dependent on time of their construction and the contemporary context when they are analyzed. A common denominator for these tasks countable as "mega" is that they are extensive in their size and economic costs. They also have significant impacts to economic, environmental and social dimensions within the context they emerge. These impacts expand to global scales far beyond their original geographical location. Massive structures are also often used as landmarks and tools for location marketing. Hoover Dam located in the state border of Nevada and Arizona is a good example of both an electricity production site and a tourism attraction.

In addition to location-bound foci of civil engineering, there are other types of technological engineering trajectories accountable as mega. In a contemporary world the information transferring technologies are examples of immaterial megaprojects based on software development. The most important technological advancements include the development of global mobile networks and the emergence of the Internet available to wide populations. These developments have small or non- visible consequences compared to the physical structure building, but their immaterial impacts in the world economy and on local living have been enormous. It is noteworthy that these two megatrends have been converging during the last

T. Inkinen (✉)
Department of Geosciences and Geography, University of Helsinki, Helsinki, Finland
e-mail: tommi.Inkinen@helsinki.fi

S.D. Brunn (ed.), *Engineering Earth*, DOI 10.1007/978-90-481-9920-4_9,

© Springer Science+Business Media B.V. 2011

decade. The Internet was originally an issue of computing whereas mobile networks derived for the need of voice communication.

I consider the development of the Internet as a "mobile turn" (e.g. Urry, 2002; Uteng & Cresswell, 2008) and the emergence of global online services clearly as megaprojects. Even though their provision structure is rather different from "single purpose" targeted structure developments, the Internet has several analogues common to physical megaprojects. First, it has impacted economies greatly and provided new ways of creating massive amounts of wealth. Second, information accessibility and Internet connection availability can also be considered as a civic right. The support actions to enhance the electronic inclusions traditionally involve the provision of free Internet access in libraries, education units from elementary levels to universities, and in public offices. In addition, there arel businesses that offer free Internet access within their premises. Third, technology integration into urban structures contributes to place promotion. This is one of the main drivers to motivate cities to participate in network structure creation.

I present here a network example of megaengineering, viz., how to make the Internet (as a megaproject) accessible to various societal groups in open and public city space. As such, this paper includes aspects relevant to large scale developments: social (or electronic) inclusion in that project. This view describes rather well the term "augmented city" (e.g. Aurigi & De Cindio, 2008) which refers to technology implementations within city space. Spatial concepts, such as public space, have parallels to urban network terminology including popularities of open access, hotspots, open networks or social media.

9.2 Access to the Internet as Socio-Spatial Technology Phenomena

Large engineering projects are often considered as symbols of development. For a geographical perspective such the development, usually understood in economic terms, gives impetus to widely used slogans such as creative development, informational development or knowledge-based development. These terms are often used to highlight technology-driven local, regional and national development. Also on particular policies and policy documentations which have emerged to support the alliance between economic and technology development within a context of location.

An influential term used in the debates surrounding technology project implementations and social inclusion of all parts of population is digital divide, which is mainly associated with global scale differences in the Internet penetration among countries (e.g. James, 2008; Norris, 2001). Digital divides also occur and emerge within regions, cities and societal groups. Earlier studies on the geography of the Internet showed that the main determinant in the Internet use depends on the life situation. Age is one of the main explanatory variables in the content use of Internet resources. Age also reflects education phases and finally income levels. The most active user groups are students and knowledge workers (Inkinen, 2006).

Megaengineering projects, by definition, include a combination of vast resources through various networks. This definition applies to the Internet as well, because the Internet is a network in the very essence of the term. Data transaction networks such as telephone, cable TV, and electricity lines and grids deliver data signals carrying specific contents trough nodes including fixed and wireless terminals and modems. From the engineering point of view, the Internet access provision is a question of using existing networks to provide content via user interfaces. Internet is as worthy as the content it delivers. The contents are created by organizations and individuals and their cross- and overlapping networks.

In a geographical sense, the Internet provides a potential for location-free information distribution. In the late 1990s and early 2000s this perspective was commonly associated with the debate of "diminishing meaning of distance" or "death of geography." However, later the analysis pointed out that the content provision and technological development of the Internet, both in terms of accessibility and bandwidth (hardware) together with contents (software), are locally constructed and bound to global networks.

Internet technologies can be divided into the main categories of hardware and software. These technologies capture also the essence of "physical" and "immaterial" (or virtual). Some scholars have also pointed out that software itself is only a carrier for content. Thus, software should be separated from content because, for example, the word processor is empty and the author creates the content. There are really two distinct segments in a legal sense (Benkler, 2000). Similarly, another type of classification was used by Loo (2007) in the analysis of Internet service provision and "Internet development." She refers to information production (content creation) and the uses of the information (content consumption).

Kellerman (2002, 2006) has examined both the worldwide Internet distribution as well as mobile turn within geographical setting. He (2006: 101) approaches wireless information technologies with a classification that includes selected properties of individual, societal and spatial aspects. My approach involves all these three aspects because individuals, as citizens or consumers, are a typical target group of technologies. Societies can also be regarded as cities or communities that are also collective organizations on local level. Finally, spatiality defines the context in which technology implementation takes place. This point is evident considering, for example, the maintenance of megaengineered projects. Internet maintenance is always a dispersed individual issue of server support or access provision. Civil engineering projects on the other hand are concentrated to the sites on question.

The Internet access provision structure also has relevance. Private sector Internet service providers (ISPs) commonly offer services based on their hotspot locations. They are commonly located in hotels, airports and other location specific places. These services are either provided by national or international Internet operators. In general, teleoperators commonly have a strong position in Internet service provision. Private hotspot Internet use is priced according to each company's policies depending on use time from minutes to weeks.

Free-of-charge urban Internet access networks have been implemented in cities around the world. They are commonly created in joint cooperation between local

organizations. In many cases, universities play an important role in these developments together with a local development company (often owned by the city) or from one to three companies. These Internet access networks often cover only core centre areas. However, coverage expansion varies according to the service provision solutions. This type of collaborative network access provision is an example of a triple-helix (for example, Etzkowitz & Leydesdorff, 2001) or B-U-G (business-university-government) collaboration (for example, Kasvio & Anttiroiko, 2005). They also demonstrate the varying attitude of local city administrations towards the "global access" rhetoric.

The emergence of the Internet as a megaproject technology for a long time stressed mainly technology aspects. Today's concept of the Internet is founded on the origins of the U.S. military network Arpanet created in the early 1970s in which four universities (UCLA, Santa Barbara, Stanford and Utah) played significant roles in the creation of this first four-node experimental network. The commercial use of the Internet and the expansion of the network to ordinary homes started in the mid 1990s. Currently, the discourse of "wireless Internet" or "fidelity" (WiFi) is dominant in terms of marketing and technological development. Outdoor urban networks are actualizations of this discourse, that is, comprising the essentials of "wireless society" through information transfer and exchange.

Another main strand in access provision concerns Wireless Local Area Networks (WLAN) and mobile networks. In terms of hardware and signal processing WLANs are based on standardized industry technologies. The three main solutions are variants of the IEEE 802.11 standard (802.11a, 802.11b and 802.11 g). Subsets (a) and (g) provide theoretical speed of 54 Mbps and the (b) standard 11 Mbps. These are also used in studied case networks. Questions of standardization and interoperability between the different technology domains remain one of the main challenges.

Influential future development will be the battle between market shares of short ranged WLANs (computer) and 3G or 4G (mobile phone) technologies. Currently, 3G networks still provide rather slow connection for the majority of users. In Finland, the most common mobile phone data transaction rate is currently around 386 kbs whereas WLANs provide an access speed around 2 mbs. In addition, there are 3G experiences problems related to functionality and international pricing. Contracts between telephone companies vary and in particular the Internet use in foreign countries with 3G may result in significant expenses. There has been cases in which the monthly telephone invoice has exceed 10, 000 Euros due to Internet use abroad with mobile telephones, even within European Union countries. Voice calls are regulated by the EU (a call from one EU country to another costs a maximum of 56 Eurocents per minute from 1 July 2009 onwards), but data transaction costs are not. This cost information exemplifies the problems of market pricing in the field of international data transactions with consumer products. However, if 3G services are priced reasonably and their connection speeds increase to fixed broadband level, it seems likely that mobile 3G Internet accessing will become dominant due to extensive geographical coverage.

In technical terms, another major debate surrounding information technologies and computing is the dualism between open access (OA) service provision and

closed systems. Perhaps the most well known general example is from the operating system Linux. This debate fits well into other topics than engineering due to the fundamental distinction between (closed) in-house product development against (open) user community development ideology. This aspect also combines technology development to social structures, human behavior and interaction.

The Internet has also another side of the coin considering the marriage of finance/economy and technology. It impacts masses in all parts of the world and in several cases has become a necessity for information distribution and also obtaining information. Therefore, social structures and the adaption processes of new technologies gain relevance. I deepen the social scientific foci of this paper to consider the perspectives of technology adoption and related implications that technologies have to end-users, whether they are citizens, customers or producers of Internet contents.

The Internet includes elements of transforming human practice into codes: search engines are good examples. Information searches become an unquestioned routine and the codified process through which information sources are accessed. Technologies tend to be embedded into everyday life resulting often in uncritical considerations of the electronic footprints that the user leaves behind.

For example, a primer in user friendly technology development has been the mantra of usability. User interface design aims to produce as easy to use as possible solutions for consumer markets. This, however, includes a paradox: the development of user interfaces to "plug-and-play" ideology definitely makes technology penetration higher, but also the number of technology users not knowing enough of the implications of their network behavior, for example, in terms of information security, at the same time also increases. This path leads actually to a quasi informal development that refers to increasing possibilities to use technologies, but also contributes to a relative decrease in levels of knowledge regarding technological functions among technology users. Knowledge regarding basic functionalities of the Internet and computer technologies, including software viruses, data protection and privacy, is fundamental to secure and protect work stations from not being abused by a third party.

9.3 Internet Technology and Social Life

Next I summarize some complexities involved in these crossings concerning the Internet in terms of technology, information distribution, economy and social life. These points also illustrate the dimensions relevant for the actualization of a global megaproject at a local level:

Technology: Issues in Internet accessing are a concern in three main spheres. They are: signal provision method (WLAN vs. 3G), software and content creation logic (OA vs. closed), and selection of end-devices (mobile devices vs. lap-tops). The distinctions in these categories become blurred in time due to the evident technological convergence of these technologies depicting theories presented in the 1980 that related to the social-shaping of technology and technology-society interrelations (e.g. Heap, Thomas, Einon, Mason,

& Mackay, 1995). Currently, we are able to witness merger between the computer and mobile devices.

Information distribution: The Internet has provided a new means to distribute information particularly in countries with democracy deficits. There are several examples concerning countries that deliberately want to control Internet contents among their population such as China and Iran. The openness promotes freedom of speech and to the politics of democracy. Moreover, these manipulations are dependent on service provider agreements (e.g. Google and national government). Thus, local level information producers may achieve a global audience through the Internet, while the local (national) context determines to a large extent the way the Internet is regulated and how accessible it is.

Economy: The creation of innovative Internet services has produced massive amounts of wealth and income for some producers. Search engine companies are perhaps the best examples. Terms such as "new economy" or "information economy" have been conceived. The main source of financial flows on the Internet is derived from marketing (banners and sponsored links) or end users payments. The global economy is reflected at the local level via online shops (market places), networking (user communities) and virtual contents (products). The Internet has extended the possibilities of immaterial or virtual products and income sources.

Social life: The contents of the Internet function as a means to create knowledge from information. Thus, individuals create their image of the world to a large extent via indirect information sources. The Internet provides an easy option to access information from varying spatial scales. A critical assessment of the information quality should be recognized. This point relates to the simplified "press the button" doctrine of computing user interfaces. Issues of privacy and Internet security (in terms of abuse of open networks) remain one of the key challenges in their provision.

These four main groups are one way of looking at the complex web of information distribution and Internet access provision. They have parallels to each other and contribute to each other's contents. The main recognition is that the internet access provision is not only a simple issue of technology provision but it also reflects broader societal and communal ambitions and values that have impacts on everyday life.

9.4 Global Network Locally Accessible in Three Finnish Cities

I begin with three major questions:

(1) What types of solutions have the cities used, if any, to provide Internet access?
(2) What organizations participate in the provisions of these networks?

(3) Who is able to used them and have the service providers identified specific user segments with different fees?

I used fieldwork observation with a laptop computer to answer these questions. Table 9.1 is constructed on the basis of discussed socio-spatial spheres of the Internet. Observation (Hay, 2000) is commonly used to analyze human behavior in a location. My approach focused on technology availability. I walked the streets of the central areas of these Finnish cities with a laptop and estimated the extensiveness of the network coverage. In Helsinki this was problematic because the city does not have a "single branded" network; also available outdoor networks are provided either by ISPs or other businesses. Therefore, the network descriptions available regarding these networks are augmented with the observation method. It can be regarded as a modification of observation on location.

I also considered the functionalities of the network according to my use and experience. These tasks included being familiarity with the functionality of the network, that is, I was able to connect to the network (as it was supposed to) and actualize the data transaction speed. In theory, the networks should provide 10 mbs connection, but in practice the data speed was between 50 and 150 kbs. Moreover, there were no significant differences in the actual network speeds between the cases. The objective network descriptions (see http://www.panoulu.net, http://www.sparknet.fi/index.php, and http://ptp.hel.fi.wlan/) that are available regarding these networks are augmented with my experience of the access functionalities (see Townsend, 2008: 231). The following cases are from Finland, which is considered a

Table 9.1 A summary of urban WLAN provision in three Finnish cities

Property	Helsinki	Oulu	Turku
Network coverage	Fragmented center	Core center	Extended centre
Access logic (OA, semi, private)	Private	Fully OA (RotuaariWLAN)	Semi (Sparknet) Private (Openspark)
Login requirements	Payment per use	Non	Membership in participating organization
Provision arrangement	Private sector	Triple-Helix	Triple-Helix
Elements of location marketing	No	Yes	Yes
Main organization	Non (service providers)	City of Oulu	ICT Turku Ltd (Publicly owned development company)
N access points (hotspots)	N/A	1065 (2009)	2365 (2009)
Reliability	High due to high number of independent providers	Dependent on a location network	Dependent of home organization network

Nordic welfare state (e.g. Esping-Andersen, 1990, 1996) with relatively low income differences between societal groups and regions. I will present three case cities and their efforts to provide urban space outdoor Internet access, referring to the possibility of logging into a WLAN in an outdoor conditions within their city centers. The case study cities are Helsinki (population 570,000), Turku (170,000) and Oulu (130,000).

Table 9.1 illustrates the main differences among these cities. The city of Oulu is selected because it has used IT as a place promotion tool since 1980s. Today, the city hosts one of the Nokia's main product development sites and the corresponding subcontracting network has created an impressive growth in terms of population and tax income. The provision a fully OA urban network continues the enhancement of this "technology centre" discourse, which is strongly supported by the city administration (Äikäs, 2000). The WLAN network itself has been realized in collaboration between the University of Oulu, Oulu polytechnic, and the local telephone company. The collaboration agreement was made in 2003. Four networks are combined under the brand of PanOulu (http://www.panoulu.net). These cover different areas in the city center such as the city hall, educational units and city center. The network usable in the city center is fully open access, that is, not requiring user specific authentication process.

The second case is the city of Turku and Sparknet (http://www.sparknet.fi/index.php) outdoor network. It is managed by a local, city owned development company, ICT Turku Ltd. Originally, the network was created by the University of Turku and a small private company. The city joined the organizational collaboration in 2003. Thus, Oulu and Turku created their urban Internet access networks approximately at the same time. Sparknet has the widest geographic area in all urban networks in Finland (Sparknet, 2009). It has two network systems. "Sparknet" is the network used by organizational partners and is accessible with user rights provided to these organizations. "Openspark" is a community network targeted to residents of Turku. The individuals that are not involved with organizations provided Sparknet may purchase access time similar to other private ISPs. However, Openspark's physical coverage area is more extensive than in the cases of hotspot service providers.

The third case city, Helsinki (http:ptp.hel.fi/wlan/) exemplifies a business driven fragmented competition model of Internet service provision. The mayor of Helsinki has stated that the city will not start to compete with Internet operators by providing no cost or low cost Internet access services. Therefore, Internet use in the center of Helsinki is more expensive and is based on numerous private actors. Helsinki misses the collaboration link that smaller cities have been able to produce. From the end-user point of view the collective and wide coverage network in Helsinki would be easier and cheaper to use than fragmented private sector short-distance networks. Table 9.1 summarizes case study locations of Helsinki, Turku and Oulu.

The answer to the first question stated above is presented in the "Access login" and "Login requirements" segments of Table 9.1. Illustrates the Internet provision

in cities reflects examples of broad societal ideologies: a market driven competition model referring to access pricing through market competition (Helsinki), a mixed model including organizational and individual alternatives for access charge (Turku) and a public financed experiment with full open access (Oulu). Networks of Oulu (PanOulu) and Turku (Sparknet and Openspark) are collections of organizational networks. These include accesses provided by educational units, libraries, administrative offices and other organizations within the network.

The second main question is answered in the "Provision arrangement" and "Main organization" segments of Table 9.1. It indicates that when city organizations participate in joint collaborative efforts, they also want to use the provision as a tool for their image marketing nd place promotion campaigns. For example, in the case of Turku, the old city history (starting from the 13th century) is intertwined with discourse on the information society explicitly (also Äikäs, 2000).

The main question concerns civil society and segmenting of the population: how targeted is the user of these networks. The division in Table 9.1 (who is the user) shows that in the case of Helsinki the user is the customer, that is, a person ready to pay for Internet accessing. In the case of Turku organizational membership matters and in Oulu everyone is provided OA service. The OA ideology in the access provision is intriguing, as it also includes several information security threats. Therefore some urban administrations want to have a least a registration process for use of the service to help to identify user misconduct. From the end user this is the easiest and the most convenient way to proceed, but as discussed, it includes risks for network misuse such as spamming, illegal downloading, and the distribution of questionable materials. These security issues, including the abuse of a fully open network, are evident and expected in this type of experiment.

The network connections must be changed in short periods to short coverage distances in Helsinki. In addition, the accumulate charge for using networks is considerably higher for the end-user. Turku, on the other hand, provides a rather reasonable middle way. Access requires registration to one of the public sector institutions, such as the library or an educational unit. Individuals can participate in the expansion of the network coverage through the Openspark network. The idea is that the person participating is given a segment of the bandwith for public use and then granted the right to use the whole network.

Finally, it should be remembered that there are other several public sector organizations that also provide outdoor Internet access to their members. Examples include universities which are public institutions in Finland which provide their own network services. All Finnish higher educational units belong to a so-called HAKA system that enables all persons with within one university passwords to access WLANs in all other universities. However, this access is limited only to the vicinity of university controlled hotspots. Quite commonly they cover an entire campus area, but in the case of e.g. Helsinki, where the central campus is dispersed across the central city, it is in practice possible to use free WLAN with a rather extensive coverage.

9.5 Discussion: Internet Access in Finland and Megaengineering?

The paper title at the outset asked whether local access outdoor Internet can be regarded as an illustration of megaengineering. The answer depends on what point of view is used. In local, regional and urban development, Internet technologies are something that commonly is taken for granted. To the social scientist, however, the presented structuring "how to create these networks" raises the question whether the service should be free of charge or not to the end user? And what socio-spatial and economic implications do these solutions hold and how do global businesses and information sources fit into the picture?

The attitude towards a "no cost" Internet service provision also reflects society's attitude and tradition to information use and knowledge creation. Urry (2002: 270) discusses issues of mobility and raised relevant questions regarding virtual mobility and social condition. His article deals mainly with the intersection of physical movement and virtual presence, that is, who is present on the Internet and who is not? These concerns also relate to the studied access provision. Low or no cost Internet access provision benefits people who are able to use mobile devices such as palm- or lap-tops. For them WLAN accessibility provides one more option to participate and use a global megaproject. Another question is whether the information inquiring person's use would decrease if these networks would not exist. Due to this fact, the access provision itself does not aid those who are unable to use computing in the first place. Therefore, the no cost Internet provision might also be seen as supporting the already networked or computer literate societal groups and, thus, further increases the digital divide, that is, it has the opposite effect.

In Finland wireless Internet access costs as well as mobile telephone costs for the end-user are, and have always been, relatively low. Finland is ranked as the fifth cheapest country in mobile telecommunications pricing in Europe (Ficora, 2009). All Nordic countries are among the nine cheapest EU-countries. This result should be considered in light of general price levels, considering consumer electronics, Finland is the fourth most expensive country in the EU (Eurostat, 2008). This illustrates the bias between costs in products that are expensive compared to relatively inexpensive communication costs.

The outcome is a complex mix of spatial scales and organizations operating on them as well as public authorities and the agreements between them. In addition, the role of creative individuals who might come up with a breakthrough idea should not be underestimated even in a large picture. There are countless examples, particularly in the contents of Facebook, Linux and Skype. All these services have in common the idea of an open access information provision. In the case of Linux, the whole system development has been dependent of the user community. However, it seems that when innovative "open" systems and make a global breakthrough these systems tend to start moving towards "closed" systems. For example, copyright issues of user provided personal photos and pictures in Facebook illustrate this trend.

There are several open questions that need be considered in future research dealing with societal implications of technology, especially when thinking of changes in spatial scales from global phenomena (Internet) to local reality (access provision and content creation):

(1) The importance of location as a context. Global processes always have their roots in a spatial context. Internet expansion to worldwide information sources and information distribution channels provide information that is used in locations. These interactions between global information and local conduct are a potential field for geographical research. For example, how does the emergence of new ideas and innovations diffuse through the Internet and what local factors are determining the phase of the adoption process?
(2) The applications and implementations of Internet access should be framed into comparative perspectives and into wider societal contexts. National values and ethos reflect the methods that are used in the service provision. They also determine the extensiveness of information availability to different societal groups. For example, how do different countries use and make benefit of the Internet and computer technologies in elementary education and thus create a tradition of information technology use as an everyday resource?
(3) There is a need to further develop measurements for human-technology/human interactions on the empirical level. This is a difficult task due to the fact that the most important impacts that technologies bring are bound to the using the information obtained from networks: the use of information (or technology) is mainly an individual process of thought whereas measurements operate on an aggregate level. The transformation of the subjective experience of importance into a measurable code illustrates the problem of quantifying qualitative phenomena. How does one measure the importance of the Internet in the addition to individual knowledge resources?

The combinations of perspectives at varying spatial scales may also provide fruitful research designs, that is, combining individual, local, regional, national and finally international aspects probably results in synergies in the knowledge creation regarding the information society development. Thus, the development of measurements of various scales and the integration of specific content areas of information technology and society in geographical contexts will broaden our view of the contemporary world.

9.6 Conclusions

The Internet is without doubt a megaproject in the sense of networking. The network provides its own replenishment through other networks. Public open access Internet networks exemplify local efforts to generate an information society. Whether or not cities start to create their own network access systems is dependent on the motivation and need of the local condition. The drivers for the motivation are coming from

global sources. Technological development has made it possible for actors at various and changing spatial scales to take part in networks outside their own local vicinities. Furthermore, "networking" will continue to grow its importance in global affairs as well as the importance of the Internet as an information resource itself continues to grow.

Finland has a long tradition of technology discourse as part of its national development. Nokia's development and its present status have influenced not only the telecommunications industry in Finland, but also it has increased its national profile and international awareness of Finland (Castells & Himanen, 2002). Technological advancements in ICTs, therefore, have implications that are far more reaching than just economic success or a marvel of engineering; they reflect societal conditions and the image of a nation and its citizens.

The main reason for cities to provide free of charge Internet access relates to image creation. Information and knowledge cities have been widely used to describe efforts in place promotion. Local development companies, commonly operating with public sector funding from the city, are usually the key organizations responsible for public Internet access provision. These companies are often organizing the required public-private partnerships or "triple-helix" functions of local resources. In this regard, technology/knowledge oriented development discourse, in several cases, use relatively studied concepts of economic geography.

In an empirical sense, Finland provides several different solutions to non-commercial Internet access networks in outdoor spaces. The main question is that whether or not Internet access should be considered as a civic right or a commercial product. In more detailed way, the question concerns the right to obtain information. Commercial Internet service providers usually overprice their services in short access sessions. Countries with great differences between socioeconomic groups have a higher probability of experiencing both spatial and social digital divides. Therefore, the Internet and online resources, whether mega or not, have local impacts in terms of information provision and use.

Acknowledgements This paper is part of research funded by the Academy of Finland project 127213.

References

Aurigi, A., & De Cindio, F. (Eds.). (2008). *Augmented urban space. Articulating the physical and electronic City*. Aldershot: Ashgate.

Benkler, Y. (2000). From consumers to users: Shifting the deeper structures of regulation toward sustainable commons and user access. *Federal Communications Law Journal, 52*(3), 561–579.

Brunn, S. (2008, July). *Welcoming remarks. Engineering Earth: A conference on the impacts of megaengineering projects*. Lexington, KY: University of Kentucky.

Castells, M., & Himanen, P. (2002). *The information society and the welfare state: The Finnish model*. Oxford: Oxford University Press.

Eurostat (2008). *Consumer electronics and household appliances – Comparative price levels in 37 European countries for 2007*. Retrieved July 3, 2009, from http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-SF-08-063/EN/KS-SF-08-063-EN.PDF

Esping-Andersen, G. (1990). *The three worlds of welfare capitalism*. Cambridge: Polity Press.

Esping-Andersen, G. (Ed.). (1996). *Welfare states in transition. Social security in the new global economy*. London: Sage.
Etzkowitz, H., & Leydesdorff, L. (Eds.). (2001). *Universities and the global knowledge economy. A triple helix of university-industry-government relations*. London: Continuum.
Ficora (2009). Mobile Phone Service Prices 2009 – International Comparison. *Finnish Communications Regulatory Authority publication 3/2009*. Retrieved July 4, 2009, from http://www.ficora.fi/attachments/englantiav/5hZDeLzGf/KV_GSM_loppuraportti_koko_paketti_EN.pdf
Hay, I. (Ed.). (2000). *Qualitative research methods in human geography*. Oxford: Oxford University Press.
Heap, N., Thomas, R., Einon, G., Mason, R., & Mackay, H. (Eds.). (1995). *Information technology and society. A reader*. London: Sage.
Inkinen, T. (2006). The social construction of the urban use of information technology: The case of Tampere, Finland. *Journal of Urban Technology, 13*(3), 49–75.
James, J. (2008). Digital divide complacency: Misconceptions and dangers. *The Information Society, 24*(1), 54–61.
Kasvio, A., & Anttiroiko, A.V. (Eds.). (2005). *e-City. Analysing efforts to generate local dynamism in the city of Tampere*. Tampere: Tampere University Press.
Kellerman, A. (2002). *Internet on earth. A geography of information*. Chichester: Wiley.
Kellerman, A. (2006). *Personal mobilities*. London: Routledge.
Loo, B. P. Y. (2007). Strategies of internet development in the Asia-Pacific region. *Journal of Urban Technology, 14*(1), 3–22.
Norris, P. (2001). *Digital divide. Civic engagement, information poverty, and the iInternet world wide*. Cambridge: Cambridge University Press.
Sparknet. (2009). Wireless access everywhere. Retrieved January 29, 2010, from http://www.sparknet.fi/index.php
Townsend, A. (2008). Public space in the broadband metropolis: Lessons from Seoul. In A. Aurigi & F. De Cindio (Eds.), *Augmented urban space: Articulating the physical and the electronic city* (pp. 219–234). Aldershot: Ashgate.
Urry, J. (2002). Mobility and proximity. *Sociology, 36*(2), 255–274.
Uteng, P. T., & Cresswell, T. (Eds.). (2008). *Gendered mobilities*. Aldershot: Ashgate.
Äikäs, T. A. (2000). Heritage and high-tech: Landscapes of image cities. *Nordia Geographical Publications, 29*(2), 11–23.