e-City

Analysing Efforts to Generate Local Dynamism in the City of Tampere

Antti Kasvio & Ari-Veikko Anttiroiko (eds.)

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TAMPERE UNIVERSITY PRESS

Published in association with the Finnish Society for Futures Studies
and the Historical Society of Tampere

Sales
Bookshop TAJU
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33014 University of Tampere
Finland
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Fax +358 3 3551 7685
taju@uta.fi
http://granum.uta.fi

Page Design
Aila Helin

Cover Design
Mainoscraft Oy, Anita Lahtinen

ISBN 951-44-6449-4
ISBN 951-44-6525-3 (pdf)

Tampereen Yliopistopaino Oy – Juvenes Print
Tampere 2005

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Preface

The last few years have not been an era of undisputed success for western Europe. Economic growth has been sluggish, and many companies have been relocating their operations to areas that can offer better growth prospects. Aging of the population will add to the already heavy financial burdens of European welfare societies. The European Union has been falling further behind the United States, despite the determination of the Lisbon Programme to make the EU the world's most competitive economy by 2010. There has been much talk about the need to implement major structural reforms and to spark up Europe's economic development. However, measures proposed on economic grounds are often resisted by citizens who wish to defend their existing rights and who aspire to maintain the European social model irrespective of the tightening international competition. This apparent conflict of interests has led to a situation where many people have lost confidence in the very idea of an integrated Europe.

The situation varies somewhat between different parts of Europe. Certain smaller western European countries, as well as some new EU member states, have been able to react to the challenges with more dynamism than Germany, and the other large continental countries. The Nordic countries in particular have shown that it is possible to reach high levels of economic competitiveness without sacrificing the basic institutional features of Nordic welfare states. Still, these countries are not immune to the pressures of global competition, and despite certain undeniable advantages, the Nordic countries continue to share many of the problems that are acute in the rest of Europe.

The current economic challenges are also faced on the level of individual cities and regions, which are forced to face the consequences of globalisation in a very concrete way. Sometimes globalisation may signify the opening of new market opportunities for local companies, but in many cases it leads to large-scale redundancies, or plant closings which may cause serious damage to the whole region. Individual regions are trying to strengthen their positions in the midst of worldwide competition for investments and jobs by modernising their institutions, and by distributing information about the location advantages they can offer to companies and their employees. Regions are eager to attract dynamically developing business clusters, which are expected to afford a variety of benefits for the whole region.

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In the late 1990s, Finland became known as one of the world's most advanced information societies, and was able to reach relatively high rates of economic growth, mainly thanks to the spectacular success of Nokia and the whole Finnish telecommunications cluster. Finland was also seen as a country that had been able to build on the positive synergies between the new economy and the welfare state in a rather unique manner.

The Finnish city of Tampere originally developed as a centre of traditional manufacturing industries. Like many other similar centres, Tampere suffered from the decline of its traditional industries in the 1970s and 1980s, and the situation was further aggravated during the deep economic recession that hit Finland in the early 1990s. However, only a few years later Tampere managed to go through a significant economic transformation. Nokia and several other ICT companies created thousands of new jobs in the region, and established a close collaboration with the region's universities and polytechnics.

On the basis of these positive experiences, different actors in the Tampere region decided to launch a new five-year programme called eTampere in autumn 2000, in order to continue and to strengthen further similar economic change processes in the future. The objectives of the eTampere initiative were defined very ambitiously. The general objective, according to the official rhetoric of the programme plan, was 'to make Tampere a global leader in the research, development and application of issues related to the Information Society'. Among the more concrete objectives were, for instance, the generation of several new internationally competitive companies, a significant increase in the number of ICT jobs, reduction of the region's overall unemployment rate by 5 per cent, providing all citizens with Internet access, improving digital literacy and ensuring a balanced and equal development of the local information society.

In practice, the realisation of the eTampere programme during 2001–2005 has taken place through several sub-programmes with a relatively strong R&D orientation. The Infocity programme has developed electronic services for citizens and opened new participatory channels within the local government. The Information Society Institute has been committed to promoting research and education, targeting the different aspects of the development of the information society. The eBusiness Research Centre has focused on the study of e-economy, whereas the Research and Evaluation Laboratory has specialised on the analysis, development and testing of new user-oriented ICT applications. The technology engine programmes have organised research on the next-generation solutions, whereas the eBusiness Accelerator has been helping small start-up companies to expand their activities and to find new funding in order to reach the next stage in their evolution towards more established businesses.

The eTampere programme can be seen as an effort to realise the objectives of the wider eEurope initiative on a local level, and it has many features in common with a multitude of other local or regional information society initiatives that have been active in different parts of Europe. This said, one characteristic typical of this particular programme has been its powerful efforts to gather different societal actors into strategic collaboration in order to promote the dynamic economic and social renewal of the Tampere Region. In his analysis on the developments in Tampere, Manuel Castells has suggested that, if successfully implemented, the eTampere programme might be able to produce a new social model for growth.

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Expectations regarding the beneficial economic and societal effects of the digital revolution were at their highest during the period when the eTampere programme was being envisioned. Since then, economic and societal conditions in advanced industrial societies have changed dramatically. Today, it is no longer believed that the development and spread of new information and communication technologies can automatically solve all of the problems that arise in modern societies. The international media no longer praise Finland as the world's most advanced information society, and the pace of Finland's economic growth has slowed down significantly in comparison to the annual 5 per cent growth rates achieved in the late 1990s. Nokia may have managed to maintain its position as the world's largest producer of mobile phones, but it is constantly facing serious competition. Moreover, it is important to note that most of Nokia's new activities are located abroad.

Changes in the general environment have also been felt in the Tampere Region. The explosive growth of the ICT cluster has evened out into a more stable situation, and no spectacular attempts to introduce entirely new kinds of ICT applications

on the local level have emerged. Also, competition over research funding has intensified, and the willingness of the local research community to get involved in different kinds of information society projects is not on the level it was a few years ago. In consequence, the task of meeting the ambitious objectives of the eTampere programme and its various subprogrammes has been transformed into a much more challenging one than originally expected, and, for instance, the programme's economic targets will not be reached in full by the end of 2005. Still, the eTampere programme has had a significant role in maintaining the momentum of developmental activities within the region through the difficult adjustment period that has followed the burst of the stock market bubble.

Consequently, even though the eTampere programme will not be continued as such after 2005, the key societal actors within the region are firmly committed to pursuing the most essential developmental activities in different forms, and certain spearhead projects will be selected from the programme to carry out this task.

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The Information Society Institute has been a subprogramme of eTampere. It was formed as a multidisciplinary research centre at the University of Tampere, and according to the original action plan its main objective has been 'to make Tampere a world-leading research and training centre in issues related to the Information Society'. It was also stated that the Institute's research 'should focus on issues that best serve the practical aspects of building an Information Society at all levels, Europe, Finland or Tampere. At the same time, the institute should promote the efficient analysis of those problems that arise in using information technology and to increase the general level of expertise in this area within the two universities at Tampere'. The Institute has received

significant financial support from the City of Tampere during 2001–2005, with the expectation that this will help researchers to start new projects capable of acquiring their main funding from other sources. The operations of the institute are based on a decentralised organisation, so that most of the actual research work has been carried out at different departments and institutes of the region's universities.

Within the framework of this operational model, more than seventy projects covering a wide area of topics have been implemented. Projects in social sciences have made attempts to analyse the overall dynamics of societal change occurring in modern societies, and have carried out studies oriented towards analysing changes at work, as well as observing the development of people's everyday lives. The institute has also promoted projects concerning e-health, e-government, e-learning, information access, usability of different ICT applications, development of new audiovisual cultures, cybersecurity, future technological trends and the use of new information and communication technologies in less developed countries. At this point, it seems possible that the Information Society Institute will reach its original objectives in terms of total project volume by the end of 2005. Some of the projects have been able to produce results that have attracted interest beyond national boundaries. However, in certain areas, such as social scientific studies oriented towards analysing the overall development of the Finnish information society, finding the required research funding has proven surprisingly difficult. Partly due to this, the overall national or international visibility of the research activities of the Information Society Institute has remained below the level expected at the inception of the eTampere programme.

In the present situation, having a research centre devoted to the study of the information society does not appear as profitable as it did a few years ago. One reason for this is that the new

information and communication technologies have penetrated the activities of modern societies in a profound way, making it harder to determine which research activities actually belong to the field of information society research. Researchers today are often less inclined to perceive the information society as the best possible concept to describe the processes of change currently occurring in advanced industrial societies. In consequence, there is at present a rather widespread consensus among the local research community that it is not reasonable to continue the activities of the Information Society Institute in its current form, after the conclusion of the wider eTampere programme. The institute itself has directed its main efforts towards ensuring the formation of strong research teams in the main thematic areas of information society studies to enable them to pursue their activities after the year 2005 also. At the same time, the institute has tried to promote the idea that the region's universities should transform themselves into dynamically developing information-age academic institutions that display, in all their activities, an interest in the development of new information and communication technologies, and the potential uses of these technologies in the organisation of their own operational processes.

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This collection of articles is closely connected to the research activities carried out in the context of the eTampere programme and the Information Society Institute. It is not meant to provide a complete picture about the various research activities of the institute, and some of the authors are, in fact, in no way linked to the local research activities. Neither is the collection meant to present a thorough analysis about the aims and outcomes of the eTampere process. Rather, it should be viewed as an attempt to analyse on a somewhat more general level the developmental dynamics of today's informational cities, using the recent

developmental efforts in Tampere as a concrete example about the ways in which individual cities can try to respond to the competitive challenges of our time.

Producing a publication like this is always a result of a collaboration of various actors. As editors we would like to present our thanks first of all to the authors of the articles included in this book; the publisher and Outi *Sisättö* as its main representative; the anonymous referee; Hanna *Liikala*, who handled much of the correspondence with the contributors as well as assisted in finalising the language of the texts; Josephine *Abdallah* and Anthony *Kenny* who checked the language of many of the articles as well as those instances who with their preliminary orders have made the publication of this collection financially possible.

Antti Kasvio Ari-Veikko Anttiroiko

I

Introduction

Ari-Veikko Anttiroiko and Antti Kasvio

Informational Cities and Global Restructuring

Global forces are penetrating the economic life, political order and post-modern culture of our world so pervasively that it seems as though we are living at the threshold of a new era. The rapid internationalisation of economy since the 1980s, together with the IT boom has created favourable conditions for the emergence of a new economy. In recent times, the same factors have contributed to the emergence of a global market for skilled labour. Companies have started to outsource not only routine manufacturing operations, but also different kinds of R&D activities and IT-enabled services into China, India and other developing countries. Economic recovery has been in progress within the advanced industrial countries, but it has not led to an equally strong job growth such as that experienced during previous upswings.

Changes in the global competitive environment have presented western Europe with difficult challenges. Economic growth in the region has been sluggish, and Europe is falling further behind the United States in areas such as productivity growth. Furthermore, the rate of unemployment has remained on a high level and the number of jobless people has started to increase again. Many kinds of structural adjustments and deep-going reforms will undoubtedly be necessary if Europe is to become the world's most competitive economy, as decided in the European Union's 2000 spring summit in Lisbon (see e.g. OECD 2005; IMF 2005).

Local developments cannot be reduced from their macro-regional or even national contexts. This is why there is a need to paint a more 'pointillist' picture of the global competition

of hi-tech centres and growth nodes (see Anttiroiko 2004). Each locality has some capacity to control its own destiny, even if the structural context, national framework and community characteristics constrain local efforts in various ways. For these reasons, choice of locality continues to bear relevance, and thus merits a closer look.

Clustering and the pull of the city

For some time economists, regional scientists and geographers have been puzzled with the question of why dynamic growth tends to concentrate on some specific locations. Since Marshall's findings about the emergence of industrial districts from the latter half of the 19th century (Marshall 1890), many theories have been presented, including Perroux's ideas about growth centres (Perroux 1970), Porter's cluster analysis (Porter 1998), Castells' analysis of the informational city (Castells 1989), world city hypothesis (Friedman 1989; Sassen 1991), new conceptions of innovative cities, learning regions and ideopolises (e.g. Simmie 1999), the notion of technopoles (Castells & Hall 1996) and certain cultural aspects raised by Kotkin (2000), Florida (2002) and many others. One question remains: why do companies still crowd together in spite of modern ICTs and widely spread networks? From the point of view of an individual city, this question can be translated into a local development policy challenge: What can a city do to gain or to maintain its attractiveness in a highly competitive environment?

Due to the new 'borderless' economy (Ohmae 2005), localities and urban communities need to position themselves in a highly competitive and volatile environment that challenges their creativity, innovativeness, and governance capacity. This requires new strategies and perspectives. In this book, these topics are discussed both theoretically and with reference to the experiences

gained in the last years in the context of one particular city, the City of Tampere in Finland.

Informational cities

The concept of the informational city originated in the 1980s as the response from urban theorists to the intensification of information society development and related urban processes. The most thorough early analysis of the informational city was presented by urban sociologist Manuel Castells in his book *The Informational City*, published in 1989.

The informational city is a macro-theoretical concept, based on an analysis of the relationship between the new information and communication technologies and urban-regional processes, analysed in the broader context of the historical transformation of capitalism. Thus, this new city formation points to transformed spatial forms and processes as a manifestation of changes in technological and organisational development, and of the restructuring of capitalism. In this respect, it comes fairly close to the concepts of e-city, technocity, virtual city, intelligent city, wired community and smart community, which have also figured in urban theoretical discussions (see e.g. Downey & McGuigan 1999; Caves & Walshok 1999; Komninos 2002).

A precondition for understanding the essence of the informational city is to understand its broader context, the historical development of the socio-technical organisation of advanced societies. Suffice it to say that after the historical states of development usually labelled the agrarian and industrial societies, a new societal formation started to emerge in the 1950s, radicalising in the 1980s and the following decade. It is commonly – and according to some newer interpretations mistakenly (Castells 2004, 6–7, 41–43; Dutton 2005, 19–20) – referred to as the information society. Whatever the label

given to this societal formation, its underlying logic revolves around the idea of the informational mode of development, as concluded by Castells (2000, 13–21). Thus, in the same sense as the information, knowledge or network society depicts a new phase in societal development, the informational city reflects the formation of a new kind of urban setting (see Castells 1989).

To take the above-mentioned evolutionary view further, it is important to note that at the core of the informational society there are specific technological arrangements used in production processes. The new technological paradigm emphasises knowledge creation and innovativeness. This new 'informationalism' started to emerge in the 1980s, and has had an enormous impact on society by modifying the material basis of the entire social organisation and structure. Thus, just as the industrial city reflects the urban-regional aspect of the industrialisation of the entire society, the same holds true for the informational city. In brief, the term 'informational' indicates a specific form of social organisation in which the creation, processing and transmission of information have become the fundamental sources of productivity and power. It is important to keep in mind that 'information' in a narrow sense is not enough to depict neither its relevance as a fundamental resource nor its connection to the social role of ICTs (cf. Dutton 2005, 20). Rather, it is vital to contextualise and make concrete this fundamental concept by economic, political and cultural linkages and connections in order to understand its constitutive role in the emerging societal formation.

In concrete terms, analysis of the informational city concentrates on topics such as the formation of a new industrial space, informational capitalism and the space of flows, changes in capital-labour relationships, the dual-city phenomenon, and the urban-regional aspects of globalisation. This discussion

reveals how techno-economic tendencies and social realities pose a challenge to city governments that must design new urban policies in order to mediate the global networks of instrumental exchanges and local conditions (Borja & Castells 1997). The informational city can also be approached as a self-governing democratic city government that represents the locality's needs to develop e-government, e-governance, e-democracy and e-services, and to make use of ICTs in urban-regional development processes (Castells 2002, 146–155). e-City and similar concepts are alternative expressions that have sometimes been used when discussing such ICT-related aspects of urban life.

At the present state of their development, informational cities need to fine-tune their development policies and related practices to meet the challenges of global restructuring. On the basis of Castells' theory, we may conclude that in the context of informational/global economy a crucial role will be played by the complex interactions that develop between the historically-rooted political institutions of an informational polity and the increasingly globalised economic agents and networks of instrumental exchanges. A successful adjustment process requires not only a profound understanding of the dynamics of global transformation, but also an active stance towards the development of local governing, learning and innovation capacities, as well as a readiness to manage effectively their external governance relations. These requirements are illustrated in Figure 1, with special reference to the case of the City of Tampere.

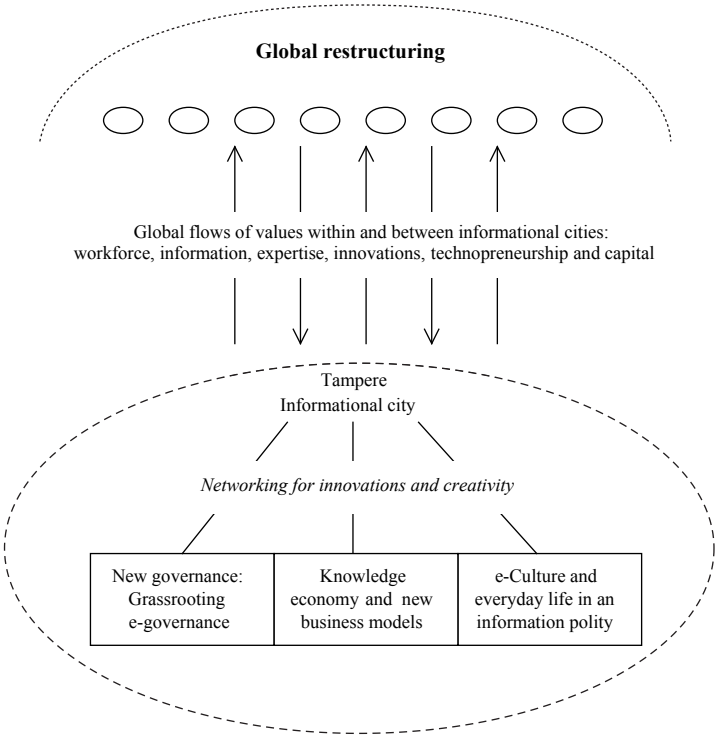

Figure 1. *Aspects of Tampere's development policy in adjusting to global economy*

Focusing on the City of Tampere

In this book, the local adjustment process is discussed from the viewpoint of a particular city, the City of Tampere, Finland. It is based on the framework of the informational city in the context of global competition and new global dynamics of the space of flows. The City of Tampere was born in the wake of industrialisation and must restructure itself in order to be able

to assert its position as an urban community capable of creating prosperity and welfare for its citizens. The recent restructuring process began during the 1980s, and reached new dimensions in the 1990s and early 2000s. It was inspired by such megatrends as globalisation and the development of the information society.

The Tampere Region (Pirkanmaa in Finnish) is a modern concentration of industry, commerce, services and education in the central part of Finland, two hours by train from the capital city Helsinki. It is the place where the Nokia Corporation started its journey to the top of the world's mobile business (on Nokia see Steinbock 2001). No activities of the Nokia Corporation are currently located in the actual town of Nokia itself, but in the neighbouring City of Tampere the situation is different. Nokia remains the most important private sector employee in the city. Tampere itself is a medium-sized city with some 200,000 inhabitants. In certain areas, it clearly rates among the most innovative cities in Europe.

There is, however, another side to the coin. It is fair to say that the strategies, development policies and measures taken by the City of Tampere have not been altogether unique; similar kinds of development activities have been pursued in a number of other cities in Europe as well as other parts of the world. Neither can Tampere be presented as an exceptional success story. Rather, Tampere is an average European middle-sized industrial city that still suffers, for instance, from a relatively high level of structural unemployment. This makes the story of Tampere interesting to thousands of cities currently struggling with similar problems.

In order to tackle these structural problems and to make use of the opportunities that were emerging with the rise of informationalism, in autumn 2000 the city government and its partners decided to launch the eTampere development programme, a comprehensive city-wide information society initiative with a five-year duration. What may be fairly exceptional

about the eTampere initiative is the extent of networking, partnership and co-operation between the programme's key actors in order to create new adjustment strategies, growth models and spearhead development projects (City of Tampere 2000; see also Castells & Himanen 2003, 124–126). In this respect, Tampere could perhaps be said to represent a new kind of European 'growth node' (for the term, see e.g. O'Callaghan 2005).

Networking

Networking and networks have been a central issue among both practitioners and researchers for almost a decade now. Among researchers, the interest in networks and relationships was already raised in the 1980s, and as companies and other organisations have also gradually bought into it, the idea of networks has also become one of the megatrends in modern management thinking (e.g. Marsden & Lin 1982; Taylor 2001; Castells 2004).

Networks can be addressed from many different levels. The macro-perspective enables an analysis of the forces or powers that have led to the increased significance of networks. Globalisation and heightened competition have increased the need for different actors to concentrate on their core competencies at company, regional, and even national levels. The restructuring of the global economy has challenged various actors to reconsider their positions and to evaluate their strategies. In the new economy, the complex production and business processes can no longer be managed effectively by vertically controlled companies operating separately from each other. Nowadays, many activities are coordinated through global networks consisting of many companies located all over the world (on network enterprises see Castells 2000, 163–215; see also Cooke 2003 and Cooke & Morgan 2000).

At national or regional level, networks can be seen as a means of concentrating on the core competencies of the area. However, one may also focus attention on improving the nation's or region's overall competitiveness (see e.g. Malmberg & Maskell 2001; Gertler 2004). In the former case, the region has developed a clear strategy about its core competencies, and it is determined to exclude activities taking place outside the area. There are quite a few examples of strategies putting everything on one card, which is something that may also involve huge risks. However, in the future this may be the only way of surviving in the globalised world. For instance, during the 1990s Tampere attained a position as a city with a strong knowledge base for technological innovation, especially in the field of mobile communications. At present, the crucial question is how to progress further as more and more R&D operations are being relocated to countries like China and India. How can Tampere ensure a position in global innovation networks in the future, too?

The second type of strategy represents a more traditional way of building networks within a region. In practice, these kinds of networks are often built in order to serve certain rather specific purposes. For instance, innovation systems can be viewed as networks of organisations that aim to promote innovation within the region. The eTampere initiative can be seen as an example of this type of network. However, the problem with networks like this is that since their roots are regional they do not necessarily offer the tools or mechanisms needed to grow beyond the confines of the original region.

At the level of individual organisations, networks can be seen as focal networks, i.e. as a combination of all direct and indirect relationships that the organisation perceives as having an effect on it. Within and between these organisational and regional networks are the personal and social networks, which, in a way, bring all of the different levels together (e.g. Schwartz &

Jacobson 1977). The importance of such personal links cannot be overlooked when discussing networks, but exclusive reliance on local social networks may also be harmful. An active orientation towards the building of international contacts and global networking can provide local actors with a much richer pool of ideas, contacts and people than relying solely on local ties.

Increasing potential for innovation

There is clear evidence of the growing significance of *knowledge* in contemporary capitalism. The baseline argument can be summed up as follows: long-term economic competitiveness is not tied to new materials per se or even increased productivity in 'old' industries, but with new ways of creating, using and combining knowledge. This has led to theorising about knowledge economy (Romer 1990), economies of sign and space (Lash & Urry 1993), learning economy (Lundvall & Johnson 1998) and associational economy (Cooke & Morgan 2000). Castells' (2000) idea of informational capitalism is one of the most widely-used theoretical perspectives on this phenomenon. He claims that we have entered an era in which the innovativeness of firms, regions and nations is fundamental to their competitiveness.

In the 'old economy', economic growth stemmed from increases in the supply of capital, labour, or natural resources. Growth in the new economy stems from increases in knowledge and innovation and its widespread adoption. Technological innovation, in particular, is one of the fundamental drivers of growth in the new economy.

Within individual cities, new strategies are being called forth in order to create and apply innovations. Local innovation capacity needs to be strengthened. This is supported by the regional innovation system, which in turn is framed by the existing national innovation system. Finland has been among the

first countries to develop a fine-tuned innovation system that has also proved to be cost-effective (e.g. Schienstock & Hämäläinen 2001). The effects of this development are also visible in Tampere. Tampere has paid special attention to research within the eTampere programme and in several other development activities. Networking and partnerships have proved to be important elements in creating a favourable environment for innovation. In addition to business, this approach has also been applied in other areas such as local government.

Knowledge economy and new business models

At the risk of uttering a truism: old principles no longer work in the new age – this is what restructuring in the business world is all about. Businesses have reached the limits of the old model with respect to complexity and speed. With the development of new spaces of flows, it has become imperative for companies to renew their modes of operation even if the immediate returns on these investments have been modest and uncertain (e.g. Shapiro & Varian 1999).

To guarantee success, business organisations need to harness their full potential in a rapidly changing business environment. This development is conditioned by a business environment that has more networking both within and between companies and, to a greater extent, between organisations of different sectors.

Grass rooting local e-governance

Discussion about democratic governance has its roots in the early theorising about participatory democracy and teledemocracy that slowly evolved from the 1960s onwards from actions of small groups of academics and activists towards high-level policy agenda, fuelled by the Internet revolution (e.g. Becker &

Slaton 2000). Moreover, new forms of governance and increased globalisation have made 'democracy as usual' seem obsolete, leading to a situation sometimes referred to as 'democracy deficit'. As a result, by the 1990s the time was ripe for a new discourse that combined issues of democracy and governance with the potential of the new ICTs (Castells 2002, 155–165; Coleman 2003; Mälkiä et al. 2004).

From an overall policy perspective, this can be construed as a convergence of two trends: a strongly government-supported and well-established instrumental 'informatisation' policy on the one hand, and a presumably weaker and more contingent 'democratisation' policy on the other. The emphasis between these two dimensions may vary from case to case. In any case, the core question in this discourse seems to have become the need to assess and recognise new and more appropriate ways of using ICTs in the process of revitalising democracy. In Tampere, this e-transformation in democratic governance has played an important part in the overall development agenda of the city since the mid-1990s.

The culture of informational polity

The development of information society has a profound impact on the socio-cultural sphere of society. Most practices and patterns of behaviour are likely to change due to the radicalisation of information society development. So far, we have seen only the prelude of this transformation (e.g. Dutton 1999). Life can be expected to become more competitive and also increasingly polarised. The material foundations of society, space and time are being transformed, organised around the space of flows and timeless time, leading to a qualitative change in the human experience, as expressed by Castells (2000).

One interesting aspect of this transformation is the changing nature of territorial communities, citizenship and everyday life. One of the most widely discussed topics in this respect is the digital divide, as the issue of inclusion vs. exclusion is fatal for the development of information society (Loader 1998, Mossberger et al. 2003). This transformation has been followed with great interest in Finland and in Tampere. Among the most interesting areas is the use of ICT applications and communication tools to facilitate everyday life.

Materials included in this collection

We have arranged the articles to be published in this collection beginning with two papers discussing the problems of innovative regions on a general theoretical level. Manuel *Castells* presents in an extremely concise form certain key results of the absolutely unique work he has done in analysing the dynamics of innovative milieus in the context of the ongoing information technology revolution. Philip *Cooke* analyses some of the world's foremost centres of bioscience. He points out the increasing significance of the so-called 'open innovation' model, in which companies rely increasingly on research work done by academic scientists and other organisations. This model is also gradually spreading to other businesses, including IT and automobile manufacturing. Gerd *Schienstock* presents the results of a study analysing the competitiveness of eight European regions, including the region of Tampere. Analysis based upon a company survey does not provide an entirely clear picture of the competitive positions of the various regions included in the study. Some regions with high R&D intensities show rather modest rates of growth, whereas other regions with high shares of non-innovative firms have reached much higher rates of growth. Global competitiveness thus appears a rather complex phenomenon, and it is difficult

to draw a clear divisive line between 'high road' and 'low road' regions.

In his article, Antti *Ainamo* continues the discussion of regional economies by introducing the new growth-node approach, which is based upon the Castellsian idea of 'spaces of flows'. He starts from an assumption that Tampere, which has been the birthplace of Nokia, can very well be regarded as a European growth node whose development has been driven by the very strong ICT cluster. The analysis shows that even if the experiences of the local developmental efforts may not have been entirely unequivocal and the fastest period of growth may be over, the concept of the growth node has shown its fruitfulness as an instrument of analysis. Furthermore, the networks of cooperation that have been developed in Tampere provide a good starting point for future efforts to meet the challenges of global competition.

After these more broad-ranging analyses we have included several articles that take a closer look at the historical roots and present economic developments in Tampere. Pertti *Haapala* opens this section by discussing the early historical roots of the city's informational developments, while Marjatta *Hietala* and Mervi *Kaarninen* complement this picture with an equally history-oriented analysis of the growth of Tampere into a modern industrial centre. They point out the fact that in several stages this progress has been based on lucky coincidence involving several factors, although an important aspect characterising all development has been the high value of education. In addition, this article stresses the significance of the region's rich cultural tradition.

Markku *Sotarauta* and Juha *Kostiainen* write about the concept of an enabling development model which has, according to them, served as the basic approach in the recent modernisation efforts in the Tampere Region. The authors describe the key

actors in collaboration and the strategies they have been implementing during the past years. Their initially very ambitious objectives have not necessarily been achieved completely, but the authors conclude that in principle the enabling approach seems to have been an adequate choice for the purposes of Tampere. Combined with the right kind of leadership, the enabling model may still prove much more efficient than the more traditional organisation-centred approaches. Jari *Kolehmainen* places his main emphasis on the role of knowledge institutions in local innovation environments. In addition to a conceptual discussion of the various levels of innovation environments and types of knowledge institutions, the author takes a closer look at what he terms specialised development organisations with the digital media agglomeration in Tampere as a concrete case. His main conclusion is that both general and specialised knowledge institutions have played an important role in the development of this particular cluster. He also stresses the importance of specialised development organisations that enable actors to better capitalise on the potential of local educational and research institutions in the region's economic development.

Hannu *Jungman* and Tommi *Rasila* focus on another local institution, the eAccelerator, which strives to help start-up companies through an important stage in their transformation into more firmly established economic actors. The eAccelerator constitutes an attempt to bridge the gap that has emerged between new small companies in their early stages and the notably more mature firms that can hope to gain investments from venture capitalists. Despite the authors' statement that the organisation will probably not be able to attain all the objectives set for it for the period 2001–2005, the concept itself has proved its usefulness, and its real impacts can be assessed only during a more significant time span. Marko *Seppä*, Hanna *Martin* and Johanna *Tommila* analyse one particular Tampere-

based knowledge institution, the eBusiness Research Centre, and particularly the annual research forums it has organised between 2001 and 2005. The topics addressed in these forums serve as an example of the transitions in modern business thinking in the era of an increasing 'electronisation' and 'knowledgisation' of advanced industrial economies. According to the authors, these developments require a continuous renewal of the existing approaches to business modelling.

Markus *Laine* and Lasse *Peltonen* open an entirely new field of analysis in their article in which they focus upon the historical development of political culture in Tampere. This analysis is intended to help understand the context in which the recent local developmental strategies have emerged. According to the authors, since the Second World War the local political scene has been dominated by what has been termed the 'brothers-in-arms axis', a close collaboration between the key political actors of the local conservative and social democratic party organisations. All major decisions made in local politics have required the acceptance of this small circle, and they have also become known as the men who have actually transformed Tampere into a modern centre of different kinds of industrial and post-industrial activities. The authors analyse this development against the backdrop of newer urban regime theories, and how recent societal changes have led to a partial erosion and renewal of this particular system of dominance.

Ari-Veikko *Anttiroiko*, Päivi *Kuusisto* and Jari *Seppälä* complement the analysis of changes within the local political regime by focusing upon the recent efforts to create new channels for citizen participation by using electronic networks. The City of Tampere has tried to promote e-democracy by, for instance, creating a special Participatory Portal through which ordinary citizens have the opportunity to discuss topical issues that are currently being processed in the various branches and levels of the

local government apparatus. The authors present a concise history of the development of different kinds of web-based activities from 1995 to 2005 and analyse the efforts made to provide as many citizens as possible with the skills and means required to participate in these activities. The authors conclude that the City of Tampere has been active and innovative in its efforts to promote e-democracy but that no actual transformations can be said to have occurred the local political culture.

Tapio *Häyhtiö* and Auli *Keskinen* analyse the development of e-democracy in Tampere against the backdrop of recent theoretical discussions regarding participatory democracy, the deliberative democracy theory and theories of e-governance. The authors conclude that thus far the e-democracy initiatives of the City of Tampere have managed to gain only relatively modest results in the activation of citizens. One reason for this is that the preconditions for administrative participation discourse have shown only a limited capability for answering to the challenge of authentic citizen politics. In this respect, local civic participation through the internet has introduced alternative meanings and practices from the grass root level, and this seems to have functioned as a better channel for performative political action. In her analysis, Sirkku *Kotilainen* presents results from an action research project which has had an important role in the creation of civic-oriented websites and digital discussion forums. The author's main object of study has been the Manse Square project, which has been in existence since 1998. One of her main conclusions is that a positive attitude towards learning together is a necessary prerequisite for gaining significant results from comparable initiatives. Even if these terms are met, it is important to remember that the process takes time. The project must be open to experimentation, and visionary people are needed in order to maintain the momentum of activities through the more difficult times also.

In her article on e-learning, Tuuli *Kurkipää* opens the next section concentrating on the social and wellbeing-related aspects of developmental activities going on in Tampere. The author points out that the initial expectations about the use of electronic networks in education were vast, and in recent times new applications have been developed from a more realistic standpoint. Similar experiences have also been gained in the Tampere Region, with a rather long tradition of innovative projects on all educational levels. Different actors in the field have come together in the form of the eLearning Cluster, whose task has been to promote network cooperation. At present, e-learning is transforming into a mainstream aspect of education, but much more work is still needed in order to avoid the emergence of new divisions in this area. Hannu *Eskola* writes about local developmental activities in the area of e-health. His article shows the multiple activities going on in this field which, in the future, may also produce a strong new cluster of dynamically developing enterprise activities.

Tommi *Inkinen* explores the social uses of information and communication technologies among citizens living at the Tampere Region in his article. His analysis, based on a survey conducted in June 2004, shows that the use of new information and communication technologies has become an established part of the daily lives of citizens living in this region. Digital divides, based on factors such as age or other socioeconomic or demographic characteristics, are gradually losing their significance. At the same time, however, the author points out the possibility of new divisions emerging based on varying levels of expertise in the use of the new information and communication technologies. Marika *Lehtonen* and Hannu *Soronen* focus on the problems of e-inclusion. They point out that important differences still exist, for instance, between different socio-economic groups and geographical areas in the spread of broadband connections, even if

the declining costs and the building of new networks may correct the situation somewhat. They also analyse the various ways in which Internet use has been promoted in the Tampere Region, and they emphasise the future significance of mobile solutions.

Pirjo *Rautiainen* highlights the ways in which young people in Finland are using new information and communication technologies, especially mobile phones. Teenagers have clearly played a pioneering role in the development of an entirely new kind of communication culture, and although this culture has later spread to all age groups, the use of the media seem to continue to have special importance for the development of the identities of young boys and girls. Despite recent wide universal developments in the area, Finns still appear to figure as a nation with positive attitudes towards different new technologies.

Ajeet *Mathur* starts a section of articles discussing the future perspectives of the information society both locally and on a more general conceptual level. His article deals with the future of international business in the Tampere Region, and in it he adopts a rather critical stance towards the eTampere initiative and other similar development projects guided by grand visions on the region's future growth potential. He points out that many such projects are based more upon myth than any real business activities, and that when one project fails to fulfil the expectations the leaders tend to respond by launching a new one driven by slightly different rhetoric. Despite these critical comments, the author notices that the region also has certain real strengths, and with the correctly chosen internationalisation strategies it might be able to achieve some tangible results. Antti *Kasvio* questions whether the concept of an information society has in recent times lost its earlier status as the grand societal project of advanced industrial countries. After all, the whole economic and societal situation has changed significantly since the late 1990s, and general optimism with regard to the future has changed into

a much more sceptical attitude towards our civilisation's ability to solve its most acute problems.

The collection ends with a short concluding chapter written by the editors.

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II
Innovative Regions

Manuel Castells

The Informational City in a Global Perspective

Cities, and spatial forms are a fundamental dimension of society, and thus change and evolve with society. So, the transition from the industrial society to the information age is also manifested in the transformation of cities. The Information Age, although obscured by ideology and hype, refers to a fundamental transformation of the social structure, around the interaction between culture, economy, institutions and the new technological paradigm resulting from the revolution in Information and Communication Technologies (ICT), a revolution that took shape from the 1970s onwards, with its historical epicenter in Northern California. We know that there is no technological determinism. But as the industrial society could not develop without new sources of energy, so it happens with this new social structure, that I have theorised as the network society, in relation to microelectronics-based ICT.

As an introduction to the analyses presented in this book, I will briefly elaborate on the interaction between the different dimensions of this transformation and the process of urban change.

I will do so in a global perspective because in a society based on networks, networks are global, they know no boundaries. They connect and disconnect at the same time in an uneven geography of inclusion and exclusion of people and localities, so that all societies are integrated in this structure that commands the logic of our life, even if many people, in fact most, remain disconnected. To study cities in the information age is to analyse the spatial form of the network society in its different dimensions.

After reviewing what we know on the basis of scholarly research, I will conclude with the implications of this analysis in the practice of planning and urban design.

ICT and spatial forms and processes

Research shows that there is no direct link between new ICTs and spatial forms. In fact, rather than assisting to a dispersal of human settlements thanks for increased communication capacity we are experiencing the largest wave of urbanisation in history, with the population of the planet having crossed the threshold of 50% of urban population, and moving fast towards at least 2/3 of urban population by 2030.

New technologies allow for the simultaneous concentration and decentralisation of settlements and activities, connecting places through networks.

The new emerging spatial form is the Metropolitan Region that is supported by fast transportation and telecommunication systems, including the Internet and wireless communication. Around the world, the process of new industrialisation is being organised around major metropolitan regions that concentrate an increasing proportion of the urban population, in China, India, Latin America. In Africa, metropolitan regions also grow mainly as a consequence of the rural exodus from people who cannot survive in the countryside.

Wireless communication allows a new practice of urban space, giving birth to a hybrid space, made of flows of communication and places of experience. We observe the rise of the hypercommunicated city, and of an individually-centered pattern of urban life: ME++ as in the name proposed by William Mitchell (2003), the premier analyst in the study of communication technology and urban design.

Knowledge economy, innovation, urban space

The wealth of nations, and of cities, depends on innovative capacity. The study I did with Peter Hall on the technopoles of the world in 1994 (Castells & Hall 1994), and Peter Hall's own book *Cities in Civilization* (1998) show that innovation is rooted in cities, and particularly in large cities and metropolitan areas. This was expressed in the concept of milieu of innovation, that Philippe Aydalot, Peter Hall and myself elaborated and published in 1984, long time before it would become popularised in the business schools under the notion of 'clusters' (Aydalot 1986). In our perspective, milieus of innovation were territorially rooted, but there was an essential cultural and organisational component at the source of their dynamics. They key was, and is, the networking capacity of the milieu of innovation, both internally and externally. Thus cities, and particularly major metropolitan areas are the sources of innovation, and knowledge, and then network with each other to expand their innovation synergy.

Urban communities, virtual communities, and the role of the Internet in networked individualism

In the new technological paradigm, the spatially centred community does not disappear. But on-line communities add new forms of sociability, particularly the model of sociability that has been conceptualised as the networked individualism, using both selective spaces and selective ICT communication; and place-based community. Wireless communication expands the networking capacity of individuals, making community a more diverse reality. Informational cities are not pure spaces of flows, but a complex articulation of on-line interaction and face-to-face interaction.

Because of the importance of communication technologies in our cities, there are new forms of poverty, in relationship to the digital divide

The digital divide refers to differential access to connectivity, and even more to broadband connectivity. But even more important is the fact that in a society in which access to information and communication becomes essential for individual development, even more important than technological inequality is the cultural inequality that conditions the ability to use the Internet, and sets up the limits of its fruitful use. Thus, the school system becomes crucial to undo the digital divide. And the school system often follows a pattern of social stratification rooted in spatial segregation, and this depends on spatial patterning.

Identity and the local meaning

The local community is still a strong source of meaning and identity. This is the case of ethnic communities, of immigrant communities, and of neighborhood-based communities as sources of solidarity and social relationship in many societies. Place-based identity essential in all societies, even in North America. On the other hand, the Internet allows for cultural transnationalism, and for the building of cultural communities at a distance. Often, immigrant children play a crucial role in building the bridges of communication between the cultures of origin and the cultures of the receiving society.

Urban social movements

Networked social movements, such as the anti-globalisation movement are increasingly local/global, and they use the Internet as a debating and organising tool. Autonomous grassroots mobilisations are using wireless communication technology

to spur instant mobilisations that use information turbulences to build political autonomy. So, Putnam's decline of voluntary associations is only one dimension of social change. Because at the same time we observe an increase in social protest, social movements, and grassroots autonomous intervention bypassing the media and the political system. Formal politics is being reshaped, as in the case of Spain in March 2004.

Environmental issues are highlighted in the informational paradigm because of the stock knowledge that we now have on the consequences of urban development, and because of our capacity to model and project, then connecting to the rise of ecological consciousness. The environmental movement is a science-based, culturally oriented social movement. The interaction between culture and nature becomes a critical dimension of the dynamics of cities. Productivism is revealed as an ideology, not a necessity, as calculation of costs and benefits adopts new principles of value. Thus, metropolitan growth becomes an endless political and legal battle between economic interest groups, the boosterism of the local elites, the not in my backyard reactions, and the forward looking environmentalists. Through environmentalism, urban growth becomes a contested field, and planning a political issue.

Implications for urban planning practice, urban design, architecture

There is no turning back, we are living in *a metropolitan world*. Small towns and rural localities become networked with these metropolitan regions. Even if the growth is faster in some countries, small localities are not absorbed, but connected. Regional metropolitan planning must assure these interconnections, in a way that is compatible with local planning.

The wealth of cities depends on innovation, knowledge, human resources and connectivity. This requires: infrastructure,

strong investment in education, universities and research, and institutional and cultural openness, rooted in tolerance, and often in immigration. Economic development policy is a combination of creating conditions for the production and distribution of knowledge, and assuring the institutional, cultural and financial conditions for the growth on entrepreneurialism. In this, Silicon Valley still leads the world.

A dynamic, non-bureaucratic urban welfare state is a stabiliser and a provider of productive labor and quality of life. Social Planning is a key part of Metropolitan planning.

For spatial patterning, three major issues need to be tackled:

* *Multimodal communication capacity*, including travel mobility, is the key for access to labour markets, real estate markets and services in the metro region. And this is a public good that requires cross-subsidisation.
* *High density* allows for more efficient services. Sprawl needs containment.
* *Public space* is needed as the space of urban social life. However, public space should be distributed.

Consequently, the three key areas of planning are:

– *Planning of mobility and connectivity* that is not just transportation, not just the current land use-transportation planning link, but also the connection to wireless communication and ubiquitous Internet as forms of relationship for people and activities. Not telecommuting, but a hybrid space of multilayered communication.
– *Environmental planning*, as the holistic understanding of the various dimensions of life in settlements. Uses of science and channeling of citizen projects of quality of life.

– *Urban design and the architecture of the city*, to restore meaning and mark places all around the metropolitan landscape. Not just the signature monuments, à la Gehry, or from the Guggenheim to Chicago's Millennium Park, but making meaningful infrastructures (Calatrava's airports, bridges, telecom towers), and decentralising public art to the working class neighborhoods. Integrating urban design in the formation of public space, and architecture in the restoration of meaningful communication between different cultures by sharing the symbolic space of a given metropolitan area. Confronting punctual corporate monumentality with pervasive urban design. Creating new social identity rather than faking imagined identity.

Conclusion

Ultimately all this depends on *political capacity to act on behalf of society at large*, instead of representing a narrow segment of interests. Urban planning has always been an activity in the public service. It is difficult, however, to rely on politics as the only source for effective planning, given the worldwide crisis of political legitimacy, the professionalisation of politics, and the defensive withdrawal of most people into their parochial interests. Thus, probably, urban innovation and social change will have to push governments, rather than being their result of their policy. Under these conditions, the classic alliance of professionals and concerned citizens may, again, be called upon to shape cities in the Information Age on behalf of their citizens. *Some things do not change, with or without the Internet. If you want a better life, including a better urban life, you have first to invent it, then fight for it.*

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Philip Cooke

Benchmarking International Best Practices in High Performing Clusters[1]

Introduction

In this paper, the evolution of biotechnology clusters will be used to show how a new model of industry knowledge organisation and management grew from the 1970s and how the model migrated to other industries under the rubric of 'open innovation' in the 1990s and 2000s. Key to the processes in question were the pursuit of innovation by all main businesses but especially large firms competing in global markets. Shareholder sentiment has found R&D in knowledge-intensive industry expensive and it has increasingly been outsourced to knowledgeable firms and institutions. These are found in combination in knowledge-based industry clusters. Large firms began first to acquire such firms, but clearly could not acquire, only sponsor, universities and their research. Such has the quality of university research risen above both government and in-house industry research of late, frequently subsidised by large government funded research programmes, that what began as a matter of disciplinary capability in bioscience – because pharmaceuticals is chemistry, not biology and this, perhaps surprisingly, had serious implications for the pharmacy knowledge-base – that the 'open innovation' model is migrating to electronics, automotives and even domestic products as practised by Procter & Gamble. University knowledge clusters and their spin-off businesses thus became magnets for late twentieth and early twenty-first century economic growth and development.

In the following, I shall try to trace these processes with particular reference to the growth of biotechnology clusters. In the first section, I ask the question where and why certain locations became leading biotechnology clusters. The section that follows offers a simple theoretical explanation of the processes involved. These unify over time concepts of specialisation and diversification in innovation, on the one hand, with issues of market transactions between science and firms and the effects of 'open science' conventions among scientists themselves 'over the garden fence'. Out of this was borne what Chesbrough (2003) dubbed 'open innovation'. He has no cluster sensibility in his analysis, but it is simple to demonstrate the centrality of clusters to, for instance, biotechnology and ICT, also now increasingly to automotive engineering and other industries including agro-food science. Reference is made to this in the last section before conclusions about the value of benchmarking clusters to global economic activity and competitiveness are drawn.

What defines successful or promising bioregions and where are they?

The simple answers to the questions raised in the title of this sub-section are that *scale* is the normal ranking device among relevant variables like numbers of dedicated biotechnology firms (DBFs), size of research budgets, investment finance or number of life scientists. On such counts, the answer about *location* is North America, primarily the USA. But there are obvious weaknesses in taking scale at face value in some respects. Thus qualitative considerations that go beyond mere numbers of firms into another scale question regarding their turnover, sales or employment enters the discussion. Similarly, a DBF (or a bioregion) with biotechnologically-derived products already on sale in healthcare markets, having passed through the three

trialling phases and won US Food & Drug Administration approval, would presumably rank higher than a larger DBF or bioregion with mainly pipeline products. Similarly drugs are considered more important than diagnostic kits. Such nuances as these cannot be satisfactorily dealt with from the quantitative data that can be mobilised thus far. They can be broached in more qualitative, possibly less systematic accounts of qualities of specific bioregional milieux, and wherever this proves possible it is done.

It can be shown theoretically that the definition of a successful economic region is that it possesses all or most of the key value-adding functions of a specific sector as well as reasonable diversification of the economic base into other separate or connected sectors. It thus combines depth and breadth in its industrial capabilities.[2] The role of spillovers or what are more traditionally known as external economies is important here. Why would firms cluster geographically in bioregions if there was little or no functional advantage, while according to normal supply and demand rules overhead costs would be higher than if clustering had not taken place? The obvious answer is that they gain advantage from the knowledge network capabilities that bioregions contain. These exist in the human capital 'talent' trained in local research institutes and university laboratories; the presence of 'star' scientists and their research teams; the possibilities for collaboration with like-minded research teams or other DBFs; and the presence of understanding financial investors also attracted to the 'ideas market' that a biotechnology cluster represents.[3]

Just as there is debate, that may be approaching resolution, regarding the primacy of regional specialisation or diversification for innovation (see fn. 5) favouring the former in the early phases of an industry's development, and the latter in the later phases, so there is an emerging debate about market versus social

characteristics of successful or potentially successful biotechnology clusters. The 'market' perspective is propounded by Zucker et al. (1999) while a good example of the 'social' perspective is provided by Owen-Smith & Powell (2004). The former generate data to show the following regarding the propensity to cluster by DBFs and research scientists, notably those of 'star' status:

- Especially in the early years, commercialisation of biotechnology required the mastery of a very large amount of basic scientific knowledge that was largely non-codified. Thus DBFs became inordinately dependent on research scientists to 'translate' for them. The latter were well attuned to working with industry, hence receptive to such interaction. Locations with concentrations of such knowledge to transfer thus became magnets for DBFs as big pharma, an early user and facilitator of research discovered their own absorptive capacity problems deriving from their origins in fine chemistry not biology
- 'Untraded interdependencies' or pure knowledge spillovers (non-pecuniary) do not seem to apply in biotechnology. Discoveries do not transfer swiftly through social ties or informal seminars but rather display high 'natural excludability'. This means biotechnology *techniques* are not widely known, so 'stars' exploit this by entering contracts with DBFs to exploit surplus profits. Localisation arises as the scientist interacts with proximate DBFs because she usually retains affiliation to the academic home base.
- The innovative performance of DBFs is positively associated with the total number of articles by local university biotechnology 'stars'. However, further data disaggregation of 'stars' into those contractually tied and untied to local firms show the positive association only

applies to contractual collaborators, while the coefficient loses both significance and magnitude for the others.

Finally, regarding the commercialisation dimension, that is the advantages of proximity to firms that 'make it happen' i.e. help turn a scientific finding into a firm that commercialises a drug, treatment or diagnostic test, namely venture capitalists, specialist lawyers and consultants, there is econometric and case study evidence that these knowledge demands cause them to locate their investment a mean distance of one hour's driving time from their office base for the most part.[4] These are 'pipeline' type relationships, sealed from prying eyes and ears.

This 'market' perspective focuses specifically on those contractual relationships where exacting transactions involve potentially large returns to partners from academe and enterprise. But the other 'social' position observes, albeit with social anthropological data, a different characterisation of the successful or potentially successful bioregion. That success is based on the practice of 'open science' transformed into a cluster convention of knowledge sharing rather than secreting. These authors examined the Boston biotechnology cluster and highlighted the following as key processes by which dynamic place-based capabilities are expressed in research, knowledge transfer, and commercialisation of bioscience.

- The difference between 'channels' (open) and 'pipelines' (closed). The former offer more opportunity for knowledge capability enhancement since they are more 'leaky' and 'irrigate' more, albeit proximate, incumbents. Pipelines offer more capable means of proprietary knowledge transfer over great geographical distances based on contractual agreements, which are less 'leaky' because they are closed rather than open.

- Public Research Organisations are a primary magnet for profit-seeking DBFs and large pharmaceuticals firms because they operate an 'open science' policy, which in the Knowledge Economy era promises innovation opportunities. These are widely considered to be the source of productivity improvement, greater firm competitiveness, and accordingly economic growth.

Over time the PRO 'conventions' of 'open science' influence DBFs in their network interactions with other DBFs. Although PROs may not remain the main intermediaries among DBFs as the latter grow in number and engage in commercialisation of exploration knowledge and exploitation of such knowledge through patenting, they experience greater gains through the combination of proximity and conventions, than through either proximity alone or conventions alone. This is dynamic knowledge networking capability transformed into a regional capability, which in turn attracts large pharma firms seeking membership of the 'community'.

These propositions each receive strong support from statistical analyses of research and patenting practices in the Boston regional biotechnology cluster. Thus:

> Transparent modes of information transfer will trump more opaque or sealed mechanisms when a significant proportion of participants exhibit limited concern with policing the accessibility of network pipelines…closed conduits offer reliable and excludable information transfer at the cost of fixity, and thus are more appropriate to a stable environment. In contrast, permeable channels rich in spillovers are responsive and may be more suitable for variable environments. In a stable world, or one where change is largely incremental, such channels represent excess capacity. (Owen-Smith & Powell, 2004)

Finally, though, leaky channels rather than closed pipelines represent also an opportunity for unscrupulous convention-breakers to sow misinformation among competitors. However, the strength of the 'open science' convention means that so long as PROs remain a presence, as in science-driven contexts they must, such 'negative social capital' practices are punishable by exclusion from PRO interaction, reputational degrading or even, at the extreme, convention shift, in rare occurrences, towards more confidentiality agreements and spillover-limiting 'pipeline' legal contracts.

The pioneer bioregional model of the knowledge transformation process

We may conclude the following from the foregoing analysis. Of key importance is the combination, not the opposition of two sets of competing explanations of successful bioregions. First, as with the *specialisation* versus *diversification* debate on knowledge spillovers which was concluded by observing the time difference in the prominence of one over the other in the evolution of the cluster, so we conclude that transactions are 'pipelines' when legally binding, confidential, contractual business is being transacted but is otherwise subject to 'open science' conventions. This is represented in Figure 1 below. To explain what the figure shows, it suggests the following.

	Specialisation	***Diversification***
Pipeline	1. Embryonic	4. High Success
Open Science	2. Innovative	3. High Potential

Figure 1. *Characterisation of successful and potentially successful bioregions*

In the early stage (1) of a technology, there will be few firms or academics with the requisite combination of scientific and commercialisation expertise for technology exploitation. However when the two come together and the market potential of what has been discovered is realised, there will be a 'pipeline' type transaction to patent, arrange investment and create a firm. This was exactly the history of Genentech after Recombinant DNA Nobel Laureate Herb Boyer and partner Stanley Cohen met Robert Swanson, venture capitalist with Kleiner, Perkins, Caufield & Byers in 1976 before any cluster existed in San Francisco. Thereafter (stage 2) more DBFs formed as scientific research evolved and new DBFs sought to emulate Genentech's success. These included Biogen in Cambridge, Massachusetts and Hybritech in San Diego in the 1970s and early 1980s.[5]

Once this process has begun, the sector remains specialised but more DBFs and their employees who retain, as do founders, close affiliation with their host university, open 'channels' and knowledge spillovers are accessed to create a highly innovative environment around 'open science' conventions. The third stage is reached when diversification begins and specialist suppliers, on the one hand, but more importantly, new technology research lines and DBFs form – for example after a breakthrough like decoding the Human Genome – on the other. Large research

budgets are by now attracted to leading centres and this stimulates further 'open science' communication, cross-fertilization through knowledge spillovers and further DBF formation.

When, finally, on top of this, many serious entrepreneurial transactions occurring through 'pipeline' relations with big pharma take place, trialling proves successful and licensing deals for marketing a healthcare product are regularly struck between big pharma and DBFs on the one hand, and regarding further R&D, big pharma with public-funded leading research institutes, on the other, then a potentially successful bioregion can be said to have become a highly successful one. As the data presented in the following tables show, the pioneering bioregions – first, Cambridge & Greater Boston, second San Francisco-Silicon Valley, and third, San Diego are today the most successful bioregions. It is crucial to recognise that 'pipeline' and 'open science' practices co-exist in successful Bioregion, not that one Bioregion is 'pipeline' and another 'open science'. Thus Boston's 'open science' does not deter high pharmaceuticals 'pipeline' expenditure among its DBFs.[6]

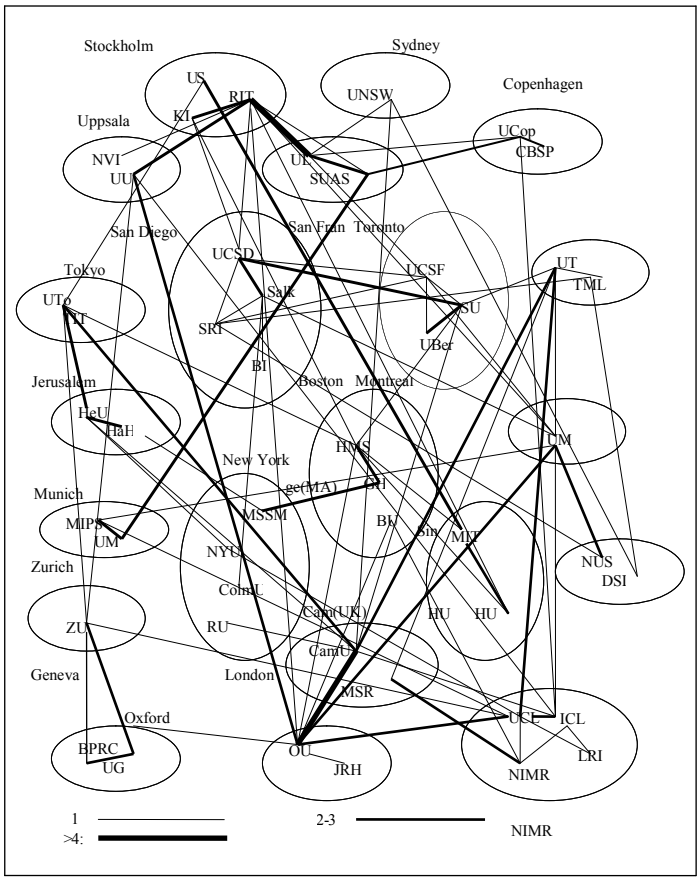
Global research networks among bioregions

This is further underlined with respect to Graphics 1 and 2 which map collaborative publishing between leading scientists in important or potentially significant Bioregions worldwide 1998-2004. Graphic 1 refers to collaborative publication aimed at 5 representative European biotechnology journals, Graphic 2 registers them for the 4 representative US journals.[7] Graphics 3 & 4 provide comparisons for eight leading (in the Science Citation Index top ten) journals, four each from Europe and the US. Three things are of special interest here. First, strong Bioregions in Europe and the US collaborate significantly and intensely in collaborative publishing in US journals. Second, intensity

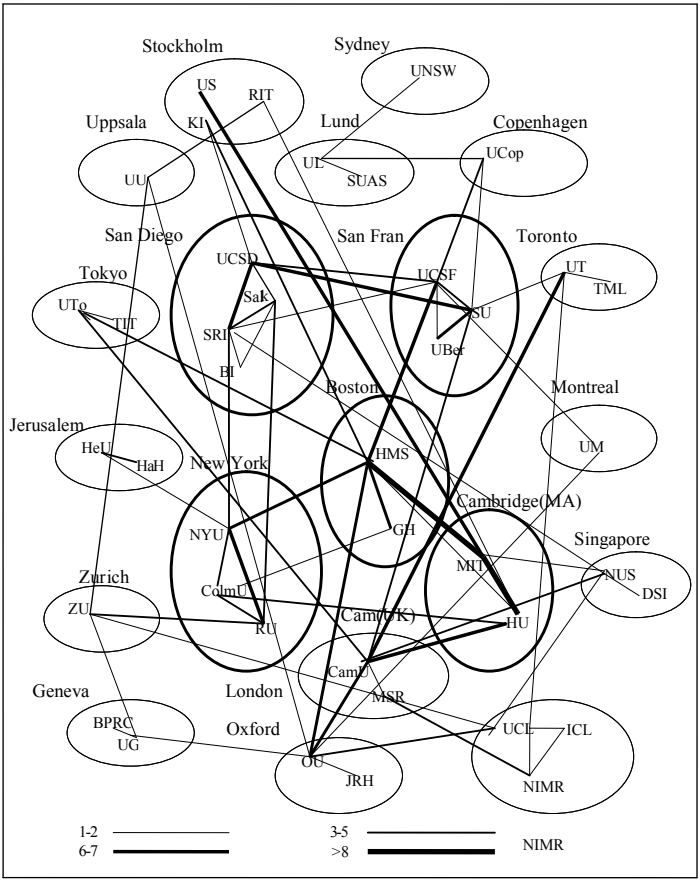
of collaboration among European Bioregions (and Canadian) is more pronounced in leading European journals than US collaborations. Third, collaboration activity for publication in leading European journals (e.g. Nature Biotechnology) is less intense than for US journals (e.g. Cell). Interestingly, the co-publication patterns are similar among representative and leading co-publications.

However, in either case the main Bioregions listed below are the most active collaborative publishing bases, even though in cases like New York and London, they score less highly regarding commercialisation indicators than might be expected. A further point worth noting, which underlines commentary on Japan's weak showing in current Bioregion analysis, is that Tokyo is far less active than might be expected, and involved comparably to Uppsala, Zurich or Jerusalem but far less than Cambridge or Oxford. Graphic 1 has the nodes and networks for five leading European journals.

In Graphic 2 the network dynamic is to a considerable extent inverted, in that the US collaborative publishing Bioregion 'nodes' are much more active, and the European and other 'nodes' are more active towards them than the reverse in Graphic 1. This is thus an excellent way of demonstrating the operation of power in network relationships. This is because Boston and Cambridge, Massachusetts are clearly the most active research publication collaborators, Boston being the location of leading research institutes related to Harvard Medical School. The University of California Scripps Institute and Stanford nodes interact significantly both internally and with regard to each other. Inter-nodal collaborations with Harvard Medical School from UC San Francisco Medical School are strong, but so are those from UC San Diego and Scripps with New York University and Rockefeller University, a specialist medical and bioscientific campus once headed by retroviruses Nobel laureate David Baltimore.



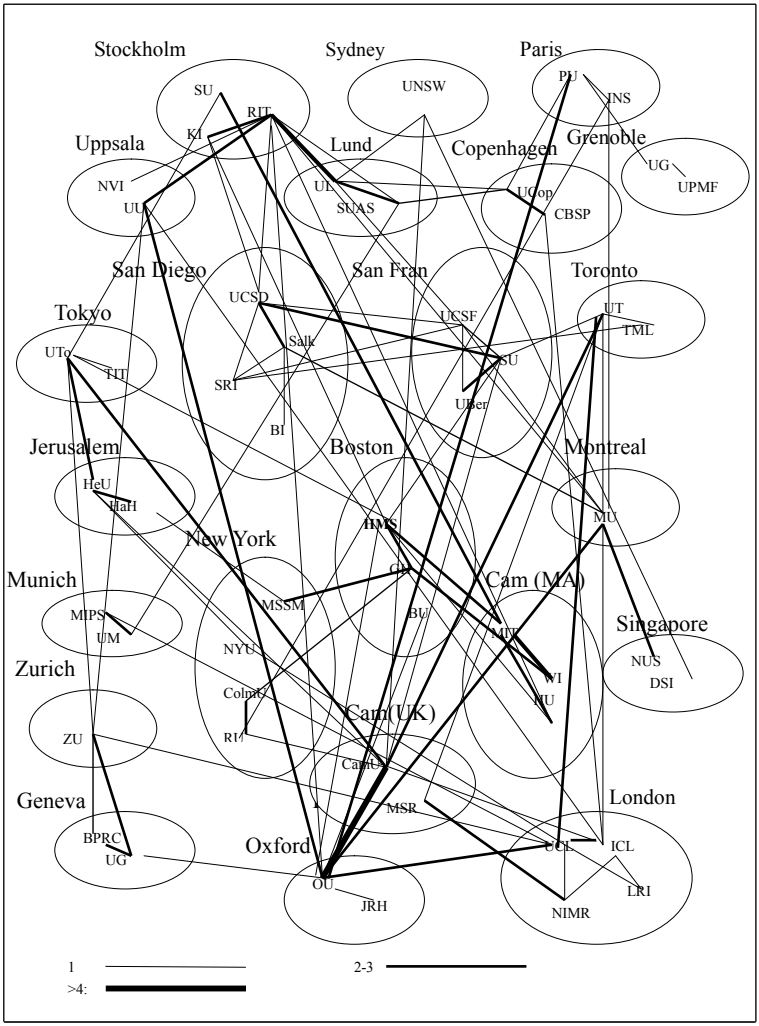
Graphic 1. *Publishing collaborations in five representative European bioscience journals*



Graphic 2. *Publishing collaborations in four representative US bioscience journals*

To test the extent these patterns changed when a more tightly structured sample involving eight of the top ten Science Citation Index journals was examined, Graphics 3 and 4 are presented. Note that French involvement, with its leading bioregions of Paris and Grenoble included, appears in these Graphics. France, like Japan, is somewhat peripheral in the global bioregions co-publication system. Again, it is worth remembering that a key point at issue here is not quantity but quality, as elite scientific network linkage structures on a global scale are the prior category to be anatomised. The four journals from Europe and the four from the US are ranked in the top ten by Science Citation Index criteria (See Appendix 3). The journals in Graphics 1 and 2 are more mixed, with some well-ranked and some less so (Appendix 1). There are, of course criticisms to be made of using scientometrics although the quality versus quantity question has been dealt with by re-asserting that this global bioregions analysis necessarily focuses on the leading clusters. More difficult to identify are concerns that may be justified about the extent to which a journal like *Cell* for example favours articles from its Harvard home base. The comparisons do not produce significantly different results. Further, as yet unpublished research into publishing in the seven bioscientific fields used in the VINNOVA (2003) study of bioscientific publication shows Harvard Medical School (HMS) to be orders of magnitude more productive in the top three cited journals in many of the seven areas of Immunology; Molecular Biology; Microbiology, Neuroscience; Biotechnology; Cell & Development Biology; and Biochemistry & Biophysics

For example, if we examine publication (not co-publication) by institutions in the leading bioregions in the three highest 'impact factor' journals in the seven listed fields, then regarding Immunology, HMS published 10% of the articles in the three

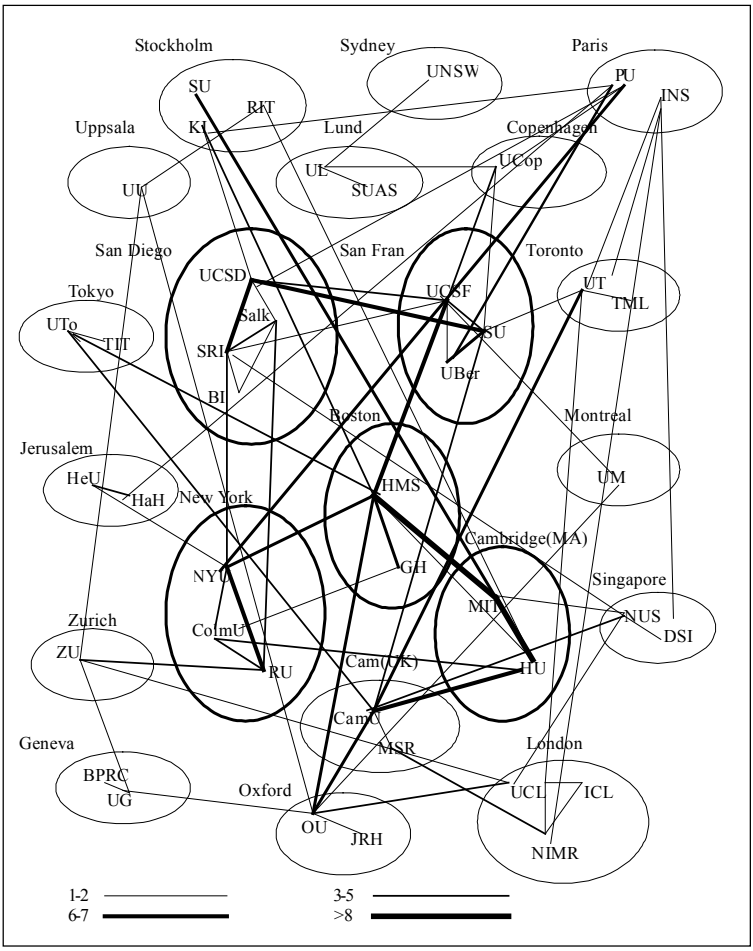


Graphic 3. *Publishing collaborations in four leading European bioscience journals*

most cited journals, with Stanford on 4.5% and UCSF on 3.5%. Karolinska Institute led Europe (tied with Salk Institute) at 1.2%, followed by MIT on 0.8% and Cambridge University on 0.5%.

HMS topped the share of Molecular Biology articles in the top three journals in 1998–2004 with 6% of the relevant share, with MIT well behind on 1.7%, UCSF at 1.4% next, then Cambridge and Stanford Universities tied at 0.9%. Of those scoring above 1% Salk Institute, Rockefeller University and UC San Diego follow. Finally, in Microbiology HMS is again first on 6% followed by The Scripps Research Institute on 3.4%, Stanford University on 3% and Karolinska Institute on 2.4%. For Neuroscience, UCSF is first at 4.5% but HMS is second on 4.1%, Stanford is third on 3.8%, Rockefeller follows on 3.3% while Europe's highest entrant is Cambridge University on 3%. Karolinska Institute is tenth on 1.3%. To conclude, in Biotechnology HMS is fifth 4.1% after University of Toronto (5.5%) and The Scripps Research Institute (5.4%) and Stanford and Cambridge Universities equal on 4.5%. These are followed by Zurich University (3.7%), UCSF and Rockefeller tied on 2.8% and UCSD at 1%. Thus in these five key bioscientific fields alone HMS is first three times, second once and fifth once. Clearly, with or without control of house journals HMS is the leading quality publishing centre for biosciences in the world.

Regarding differences between, for example, Graphics 1 & 3, on the one hand, tracking inter-cluster co-publications by 'star' scientists in elite European journals and Graphics 2 & 4 tracking the same for US journals, three points are worth making. The first is that as between Graphics 1 and 3 Swedish co-publishing declines in intensity as between representative and leading European journals. For instance, linkage between Lund and Munich is stronger for representative compared to leading journal co-publication.



Graphic 4. *Publishing collaborations in four leading US bioscience journals*

The same is also true for many of the more peripheral bioregions. However intra-Sweden co-publication remains at the same relatively high intensity. Second, while UK links, particularly with Cambridge MA and Boston remain strong for European journal co-publication, those involving Californian co-publications in leading European journals diminish somewhat as do Stockholm's links with Harvard. Finally, regarding the comparison between representative and leading US journal co-publication, the re is a concentration in the main routeways or network linkages with the Stockholm-Cambridge (MA)-Boston-New York-Cambridge-Oxford connection strengthening somewhat, but broadly-speaking these two Graphics show less differentiation than the European journal co-publication networks. In this way we know, in ways that perhaps industry does not know quite so systematically, where and why the best bioregional clusters in medical and biopharmaceutical sciences are physically located.

Building on research benchmarking to produce global rankings

To characterise the achievement of bioregional success more broadly we begin with a summary of one US study (Cortright & Mayer, 2002) that guides the effort that follows, to perform broadly comparable indicator-based analysis for key non-US clusters. In Table 1 a summary is given of comparative institutional and business strengths in seven leading US biotechnology clusters. This shows in some detail the kinds of network nodes in reasonable proximity that give the possibility of systemic innovation to such locations. The predominance of Boston and San Francisco and the differences between the former (also New York) and the Californian centres are strikingly revealed by these data. Boston's life scientists generate of the order

Table 1. *Profiles and key indicators of US biosciences clusters*

Location	**Life Scientists** (1998)	**NIH $** (2000)	**NIH $ Labs** (in top 100, 2000)	**Pharma Alliances** ($ 1996-2001)	**Biotechs** (2001)	**VC** (2000)
Boston	4,980	1.42 billion	10	3.92 billion	141	601.5 mill.
New York	4,790	1.38 billion	8	1.73 billion	127	151.6 mill
N. Carolina	910	0.47 billion	2	0.19 billion	72	192.0 mill.
San Diego	1,430	0.68 billion	2	1.62 billion	94	432.8 mill.
San Fran /SV	3,090	0.70 billion	3	1.21 billion	152	1,063.5 mill.
Seattle	1,810	0.50 billion	2	0.58 billion	30	91.1 mill.
Wash-Balt.	6,670	0.95 billion	3	0.36 billion	83	49.5 mill.

Source: adapted from Cortright & Mayer 2002
NIH = National Institutes of Health;
VC = Venture Capital

Table 2. *Performance indicators for US biosciences clusters*

Location	**NIH/Life Scientist**	**Pharma/Biotech**	**VC per Biotech**
Boston	$285,000	$27.8 million	$4.26 million
New York	$288,000	$13.6 million	$1.18 million
N. Carolina	$510,000	$2.0 million	$2.66 million
San Diego	$480,000	$16.1 million	$4.60 million
San Fran/SV	$226,000	$8.0 million	$7.00 million
Seattle	$276,000	$19.3 million	$3.03 million
Wash-Balt.	$145,000	$4.3 million	$0.60 million

Source: developed from Cortright & Mayer 2002. These variables are derived by simple division of columns 2 & 3, 5 & 6, and 6 & 7 in Table 1.

of $285,000 each per annum in National Institutes of Health research funding (New York's generate some $288,000). San Diego's considerably smaller number of life scientists generates $480,000 per capita, substantially more than in Northern California where it is some $226,000. North Carolina, with the smallest number of life scientists in Table 4, scores highest at $510,000 per capita, although Seattle, at $276,000 is comparable to Boston, New York and San Francisco. How to interpret these statistics? One way is to note the very large amounts of funding from 'big pharma' going especially to the Boston, and to a lesser extent New York and both Californian centres.

A second noteworthy indicator is that Boston and San Francisco/Silicon Valley captured half the venture capital invested in the seven places listed in Table 1 for the year 2000. In other words, it may be a question of maturity versus immaturity as San Francisco and Boston are the earliest biotechnology locations, firms have grown and wider funding opportunities have arisen from private investors, making for less reliance upon NIH grants. Hence, as Table 2 shows, while San Diego performs well on all three key indicators, it does much less well than Boston regarding 1996–2001 'big pharma' funding per DBF, faring worse than even relative newcomer Seattle on that indicator, though noticeably better than San Francisco/Silicon valley. Contrariwise, San Diego marginally outperforms Boston on the venture capital per DBF indicator, but is in turn, outperformed massively by San Francisco/Silicon valley, as is Boston. Thus interestingly the USA's three main high-performing biosciences clusters reveal:

- Boston being the favoured one for 'big pharma' licensing and associated milestone payments,
- San Diego being highly successful in receipt of NIH funding per life scientist,
- San Francisco/Silicon Valley being the most venture capital driven of the three.

Of further interest are the indications that newcomers North Carolina and Seattle most resemble the San Diego and Boston models respectively. Knowledge management and knowledge spillovers may be expected to vary according to these distinctive 'governance' models, with 'pharma' more prominent in the first, research management in the second and venture capital in the third.

Confirmation of the relativities of basic research funding in biosciences is provided in Table 3, which nevertheless throws up some puzzles. The leading position of Johns Hopkins University is not well reflected in the performance of the Baltimore and Washington cluster. This is probably because the number of life scientists is boosted enormously by the National Institutes if

Table 3. *Top ten national institutes of health funded research institutions, 2000–2003*

Rank (2000)	Institution	Funding 2000	Funding 2003	Rank (2003)
1	Johns Hopkins University	$419.3 million	$555.9 million	1
2	University of Pennsylvania	$321.2 million	$434.5 million	3
3	University of Washington	$302.5 million	$440.9 million	2
4	U. of California, San Francisco	$295.2 million	$420.7 million	4
5	Washington U., St Louis	$279.5 million	$383.2 million	5
6	University of Michigan	$260.4 million	$362.1 million	6
7	Harvard University	$250.4 million	$301.6 million	11
8	UCLA	$243.5 million	$347.0 million	8
9	Yale University	$242.7 million	$303.5 million	10
10	Columbia University	$226.6 million	$291.3 million	13

Source: National Institutes of Health N.B. New entrants to Top Ten 2003: University of Pittsburgh $348.2 (7th); Duke University $345.8 million (9th)

Health that, while conducting intramural as well as extramural research, clearly are engaged in other activities that depress the ratio of NIH funding per life scientist (Feldman & Francis 2002).

Other centres, like the University of Washington, UCSF, Harvard and Columbia are key contributory factors to the cluster strengths of the places listed. Moreover, North Carolina's campus at Chapel Hill is listed at 13 with $207.1 million and Duke University is at 15 with $197.2 million. San Diego's outstanding contract research performance is explained by the presence of the Science Applications International Corporation[8] at 14 with $198.9 million and UCSD at 16 with $190.5 million. The Scripps Institute enters at 26 with $138.8 million and the Salk and Burnham Institutes lower but with a combined contribution of $72 million. In the case of Boston, Table 4 shows the other key research institutes that contribute to what it is merited to call its top bioregion status.

Thus it is clear that from the perspective of medical and bioscientific research the Greater Boston area has in reasonable proximity at least a further ten substantially funded specialist research institutions that, with nationally seventh placed Harvard University brought in for the year 2000 funding to the value of $1.09 billion. Examples of research and exploitation partnerships between these and DBFs in the region include: *Curis* and Harvard University (genetic signalling); *Genzyme* and Massachusetts General Hospital (HIV/AIDS), Dana-Farber Cancer Institute and Beth Israel Medical Centre (melanoma clinical trials), and *Ariad* with the Whitehead Institute, Massachusetts Institute of Technology and Harvard University (Cell Sequencing research).

Three key things have been shown with implications for understanding of knowledge management, knowledge spillovers and the roles of collaboration and competition in bioregions. The first is that two kinds of proximity are important to

Table 4. *Principal NIH-funded research institutions in Massachusetts after Harvard U., 2000–2003.*

US Rank	Institution	NIH Funding 2000	2003	Rank
17	Massachusetts General Hospital	$180.5 million	$292.5m.	17
22	Brigham & Women's Hospital	$162.5 million	$220.3m.	25
38	Boston University	$108.2 million	$292.5m.	13
47	Dana-Farber Cancer Institute	$87.2 million	$122.2m.	51
53	Beth Israel Deaconess Medical Centre	$82.1 million	$103.3m.	56
54	Whitehead Institute for Biomedical Research	$81.3 million	$100.9m.	57
60	University of Massachusetts Medical School	$73.9 million	$96.1m.	58
58	Massachusetts Institute of Technology	$75.0 million	$94.2m.	64
74	Children's Hospital	$52.9 million	$85.4m.	70
86	Tufts University	$37.5 million	$68.6m.	82

Source: National Institutes of Health

the functioning of knowledge complexes like biosciences in Boston and the northern and southern Californian clusters. These are geographical but also functional proximity (Rallet & Torre 1998). The first involves, in particular, medical research infrastructure for *exploration* knowledge as well as venture capital for *exploitation* knowledge, i.e. for research on the one hand, and commercialisation on the other. The second point is that where *exploration* knowledge infrastructure is strong, that nexus leads the knowledge management process, pulling more distant 'big pharma' governance elements behind it. Where, by contrast,

exploitation knowledge institutions are stronger than exploration, they may, either as venture capital or 'big pharma', play a more prominent role. But in either case the key animator is the R&D and exploitation intensive DBF. DBFs are key 'makers' as well as 'takers' of local and global spillovers; research institutions are more 'makers' than 'takers' locally and globally; while 'big pharma' is nowadays principally a 'taker' of localised spillovers from different innovative DBF clusters. It is then global marketer of these and proprietorial (licensed or acquired) knowledge, generated with a large element of public financing but appropriated privately.

The global benchmarking dimension

For obvious reasons to do with scale, especially of varieties of financing of DBFs from big pharma on the one hand, and venture capitalists, on the other, we conclude that Boston, San Francisco and San Diego are the top US bioregions that also have the greater cluster characterisation of prominent spinout from key knowledge centres, an institutional support set-up like Boston's Massachusetts Biotechnology Council, San Diego's CONNECT network and San Francisco's California Healthcare Institute, and major investment from both main pillars of the private investment sector. We have attempted to access comparable data from many and diverse statistical sources that justify and represent the successful or potentially successful clusters from outside the US, and these are shown in Table 5 excluding the four lesser or unclustered of the seven US bioregions.[9] Global cities like New York, London and even Tokyo have relatively large numbers of DBFs but they are dotted around in isolation and have no established Bioregional promotional bodies (such as BioCom in San Diego or the Massachusetts Biotechnology Council in Cambridge) rather than clustered close to key universities as in the listed Bioregions.

Table 5. *Core biotechnology firms, 2000: Comparative US and European performance indicators*

Location	DBFs	Life Scientists	VC	Big Pharma Funding
Boston	141	4,980	$601.5 m.	$800m./annum 96-01
San Francisco	152	3,090	$1,063.5 m.	$400m./annum 96-01
San Diego	94	1,430	$432.8 m.	$320m./annum 96-01
Toronto	73	1,149	$120.0 m.	NA
Montreal	2	822	$60.0 m.	NA
Munich	120	8,000	$400.0 m.	$54 million (2001)
Stockholm-Upp.	87	2,998	$90.0 m.	$250 million (2002)
Lund-Medicon	104	5,950	$ 80.0 m.	$300 million (2002)
Cambridge	54	2,650	$250.0 m.	$105 million (2000)
Oxford	46	3,250	$120.0 m.	$70 million (2000)
Zurich	70	1,236	$57.0 m.	NA
Singapore	38	1,063	$200.0 m.	$88 million (2001)
Jerusalem	38	1,015	$300.0 m.	NA

Source: NIH; NRC; BioM, Munich; VINNOVA, Sweden; Dorey 2003; Kettler & Casper 2000; ERBI, UK, Lawton Smith 2004; Kaufmann et al. 2003.

We can say quite unexceptionally that Canada's bioregional clusters challenge many elsewhere in the world regarding cluster development. The process of bioregional cluster evolution has occurred mainly through academic entrepreneurship supported by well-found research infrastructure and local venture capital capabilities. In Israel, there is a highly promising group of bioregions including also Rehovot and Tel Aviv as well as the main concentration in Jerusalem, where patents are highest although firm numbers are of lesser scale. In Europe those in Table 5 are regularly listed as main concentrations in consultancy

and governmental reports.[10] In relation to Switzerland, however, new data have been accessed that show Switzerland along with Sweden and possibly Denmark to be high potential bioregions.

Based on numbers of DBFs, relations with indigenous and overseas big pharma, and not least rates of publication per head of population these countries are clearly making an active contribution to European biotechnology. Finally Singapore has been included because it is, after Israel, one of Asia's stronger biotechnology presences and its government is, as we shall see, highly committed to making Singapore a success by investing significant public funds in building a biotechnology presence of global proportions by attracting foreign investment, headhunting foreign 'talent' and stimulating indigenous spinout activity.

Three further, interesting and useful statistics that support the focus upon the specific bioregions listed above are the following. First, of the 211 new active substances (NAS) launched from 1996–2000, 76% were invented in five countries: US (81), Japan (31), UK (22), Germany (21), and Switzerland (13). Second, most Dutch, UK, Swiss and Swedish big pharma R&D is performed abroad. Third, 92% of big pharma R&D expenditures worldwide are accounted for by firms from the US, Japan, Germany, France, UK, Switzerland Italy and Sweden. Japan is unusual in having a weak DBF set-up but a strong big pharma presence.[11] France has some DBF presence in Evry near Paris, but lost its leader Genset to acquisition by Swiss global top-three DBF Serono. France also has two mid-size or smaller pharmas, Aventis (the Franco-German merger vehicle formerly Hoechst and Rhone Poulenc) and Sanofi-Synthélabo that in 2004 acquired Aventis. This happened as the French government refused to allow Novartis or another foreign buyer to acquire Aventis, preferring to build on its past, failed tradition of creating a 'national champion'.[12] Sanofi-Aventis is now the third largest pharmaceuticals firm, behind Pfizer and Glaxo.

Some supporting evidence from other industries

Agro-food Bioregions are less widely present, less developed and less researched than those in biopharmaceuticals. However, as Table 6 makes clear, while there are many claims made, only a few can be considered significant Agro-food BioRegions, especially when judged by the important criterion of the percentage of agro-food biotechnology businesses. Having discriminated mainly on those grounds it is worth noting that large chemical or food corporations are often more important as innovation leaders in agro-food biosciences. In the former group, corporates like Monsanto (now Pfizer), Aventis and Bayer stand out, with as we have seen Novartis also active. In the latter category Unilever and Nestlé for example are responsible for leading much agro-food biotechnology research.[13]

Saskatoon is an interesting case of a remote cluster, the origins of which lie in the activities of large scale organisations that have given rise to specialist spinout innovators and related supplier industries. These act as 'cluster anchors'. Saskatoon's primacy grew based on public research into rape-seed oil (in 1978 copyrighted in Canada as *canola*) over the 1940–1970 period conducted by Agriculture & Agri-Food Canada (AAFC). By the 1980s the federal National Research Council-Plant Biotechnology Institute (NRC-PBI) engaged in private partnerships with agro-chemicals firms like Monsanto to exploit the genetically-modified variants that were beginning to have apparent commercial potential. The University of Saskatchewan, AgWest biotech, SABIC and the Saskatchewan Canola development Commission are other key institutional actors assisting in sustaining the bioregion's agro-food commercial activities, about a third of which involves core agro-food biotechnology exploration, examination and exploitation. Much of the last-named commercial activity occurs elsewhere in seed and plant science firms in North America and

Table 6. *Selected agro-food bioregions*

Countries	Bioregion	Brand	Actors*	%Ag-Bio	Market Focus
Canada	Saskatoon (Sk.)	'Innovation Place'	115	29	Canola, Flax
	Guelph (Ont.)	'Agrifood Quality'	41	49	Corn
USA	Connecticut	'Bioscience Cluster'	110	1	Corn, fruit
	Raleigh-Durham	'Rsch.Triangle Pk.'	145	3	Corn, soybean
	St. Louis	'BioBelt'	1183	24	Corn, soybean
	San Diego	'Biotech Beach'	700	3	Forestry, fruit, veg.
Europe	Scotland	'Innov. Triangle'	428	2	Transgenics, potato
	Sweden	'Skåne Food Cluster'	60	25	Functional foods
	Fr-Ger-Switz.	'BioValley'	459	6	Cereals, cotton, livestock
	Netherlands	'Food Valley'	48	60	Food genomics
Australia	Brisbane (QL.)	'QBio'	43	5	Forest, aqua, hort.
	Sydney (NSW)	'BioHub'	28	18	Livestock, cereal
	Melbourne (V)	'Bio21'	24	4	Plant/an.genomics
	Adelaide (SA)	NA	25	44	Wine, plant/an.gen.
	Perth (WA)	NA	27	20	Wheat, lupins

Source: Ryan & Philips (2004); Svensson-Henning (2003); Invest Skåne (2004); www.plant.wageningen

*NB: Food producers; R&D institutes; raw materials & ingredients suppliers; packaging firms; industry institutes; government agencies; food organisations

further afield. Hence Saskatoon's is a scientific research-driven cluster in the main, where proprietary technologies are imported, assembled into new crop varieties, then exported as germplasm or as intermediate product to global markets. Collaborative scientific publication equally has 30% of NRC collaborators located outside Saskatchewan. The research emphasis is reflected in new projects such as that initiated by Genome Prairie *'The*

Abiotic Stress Project' on ethical, social and environmental aspects of the genetically modified organism (GMO) debate. Most importantly, the cluster network has recently been joined by Canadian Light Source Synchrotron Inc. (CLSI) that enables synchrotron capabilities to be available for needed bioimaging. CLSI anticipates attracting a further 2,000 scientists.[14] Amongst the most important members of the Saskatoon cluster, measured by IPR portfolios are the following private actors: Aventis, Biostar, Dow Agrosciences, Enviro Test Laboratories, Fytokem Products, Monsanto, Performance Plants Inc., Philom Bios, Pioneer Hi-bred International, and VIDO. Key public organisations are; AAFC, NRC-PBI, Saskatchewan Research Council, and the university of Saskatchewan Crop Development Centre. Between them, these actors hold some 375 patented innovations of which 232 are only protected in Canada (Ryan & Phillips 2003).

Finally, a case from a different industry that captures the fundamentals of the model in Fig. 2 concerns Procter & Gamble that, in 1999 established a Director of External Innovation under a programme called 'Connect & Develop'. Internal research by the firm's nearly 9,000 scientists continues, but if after three years research results are not utilised they are made available to other firms, including direct competitors. 'P&G's R&D department used to be like the Kremlin. Now we're more like the Acropolis – all ideas are welcome and get a fair hearing.' Thus Nabil Sakkab, Senior Vice President of Research and Development in Procter & Gamble's Fabric and Home Care division, describing the way P&G's R&D department has transformed itself into an externally focused 'Connect & Develop' – C&D (rather than R&D) organisation. Although retaining significant R&D capability, with approximately $2 billion invested annually, the company has created some 20 different global 'communities of practice' that bring distinctive scientific capabilities together, encouraging and rewarding knowledge transfer from one business area to another.

P&G leads in the reapplication of technologies, products and business models from suppliers, universities, entrepreneurs and institutes. 'C&D is about shared risk and interdependence', explains Sakkab, 'we'll licence, we'll collaborate where it makes sense' (http://www.eu.pg.com/news/2002/europeanresearch2002.html).

Clearly, there are two kinds of 'regional' innovation occurring in these examples. The first is geographically proximate, the second is functionally proximate. Thus Millennium Pharmaceuticals, one of Chesbrough's (2003) key cases that moved from disgnostics to drug manufacture by recognising the great wealth opportunities from selling core technology rather than services to key customers has many but by no means all present in Cambridge, Massachusetts, although AstraZeneca, Wyeth and Bayer (formerly) have R&D laboratories in proximity. However, Millennium's acquisitions included LeukoSite which was a Cambridge firm while COR Therapeutics was from San Francisco. Nevertheless, as demonstrated by *inter alia* Cortright & Mayer (2002), Zeller (2002) and Cooke (2004b; 2004c) the two Cambridges and San Francisco are among the world's leading bioscientific *exploration* and *exploitation* knowledge complexes. Hence we also see a paradigm case of functional integration among highly capable knowledge clusters, animated in this case by companies but in others by, for example academe, through co-publication by 'star' scientists and their institutional colleagues involving these same clusters. In other words we see very clearly the process of 'globalisation of bioregions' as proposed by Cooke (2004a). In the P&G case the key clue lies in reference to the 'communities of practice' bringing specific scientific capabilities together in 20 distinctive but functionally related global locations. These too are knitted together globally at the behest of P&G practising 'open innovation' in conjunction with scientific communities possessing appropriate localised knowledge

capabilities. This evolving practice has become common among the likes of Cisco Systems, Lucent, Nortel and Microsoft in ICT (Chesbrough, 2003) and Nokia and Ericsson depend heavily on clusters of ICT spinout firms in Nordic science parks for their technical innovation (like SMS text messaging that originated in a Helsinki university spinout). Schamp, Rentmeister & Lo (2004) show 'open innovation' to have revolutionised the organisation of the German automotive industry with most automotive engineering consultancy and design for all producers concentrating in Frankfurt, not Hitherto an automotive region. The proximate cause of this is the outsourcing of project management to specialist design and engineering consultancy firms that were historically located in Frankfurt along alongside much of Germany's financial and other producer services industry.

Conclusions

To conclude this paper it is worth pointing to three key findings about bioregions. The first of these is that bioregions are relatively few. Only a handful of countries have a significant pharmaceuticals industry, and of those, one – Japan – has no noticeable DBF concentration into bioregions, while another, France seems to stagnate somewhat. Second, bioregions are not found in proximity to major pharmaceuticals headquarters like New York or London. Rather bioregions are found in proximity to biotechnology 'megacentres', meaning university and research institute complexes that depend on public research funding, with incubators, science parks, venture capital, 'knowledgeable attorneys' and various consultancies, management accountants, patent lawyers and elements of the biosciences 'knowledge value chain' like hospitals, clinical research organisations, biomedical and specialist biosoftware companies, and possibly a synchrotron

(atom collider) and other bioimaging or bioreaction facilities and firms. It is to these few locations, many listed in Tables 2 and 5, that big pharma is itself attracted in most cases as we shall see in accounts of, particularly, North American bioregions in the next section. Finally we have seen how potentially or actually successful bioregions evolve, an insight derived from economic geography theory by juxtaposing four knowledge capability and spillover characteristics: specialisation, diversification, open and closed (pipeline) science. Then historical and contemporary evidence was mobilised to test the model and it was found to be a correct guide.[15]

Thus this model of outsourcing and open innovation has proved highly successful in bioscience, a complex, knowledge-intensive research-driven activity. Other research-driven sectors absorbed knowledge about the functioning of 'open innovation' at the time their returns from in-house R&D were in decline. Philips, the Dutch electronics giant adopted 'open innovation' as part of its move towards medical technology (like GE and global combustion engine R&D specialist AV List from Austria) and global re-branding as 'Sense & Simplicity' in 2004. Clusters such as Silicon Valley that cornered global knowledge capabilities and expertise acted as cross-over knowledge transfer environments because they co-locate ICT and biotechnology. Global competition and benchmarking cause organisational knowledge of successful models to transfer across sectoral boundaries. These extend to even rather remote sectors like domestic products, although Procter& Gamble does have historic connections to routine pharmacy. Then the model is discovered and not only by other sectors but in other global locations. German automotive 'open innovation' having been occasioned by Japanese competition and an overdependence on in-house design and production that had to be out-sourced to cut production costs. Thus we see how clustering itself now provides the benchmark

across many industries for efficient and effective knowledge transfer in research-driven economic activities.

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Appendix I: Sources of Data

I: European Journals

1. **Current Opinion of Technology**; 1998–2004, Vol. 8–15, around 960 articles were checked,
2. **Nature Biotechnology** (2002–2004): around 288 articles in this journal were checked
3. **Biotechnology Advances** (1998–2002, Vol. 16–22): around 210 articles were checked
4. **FEMS Microbiology Letters** (1998–2004, Vol. 158–213): around 2750 articles were checked
5. **EMBOJ (European Molecular Biology Organization Journal)** (2003–2004): around 750 articles were checked

II: US Journals

6. **Cell (2002–2004):** around 1275 articles were checked
7. **Scientist (1998–2004):** around 1030 articles were checked
8. **Proceedings of the National Academic of Sciences (2002–2004):** around 950 articles were checked
9. **Genes and Development (2000–2004):** around 346 articles were checked

Total number of articles checked: 8450

Appendix II: Abbreviations

BPRC: Biomedical Proteomics Research Centre (Geneva)
BI: The Burnham Institute (San Diego)
BU: Boston University
CamU: University of Cambridge
CBSP: Copenhagen Business School of Pharmacy
ColmU: Columbia University
DSI: Data Search Institute (Singapore)
EBI: European Bioinformatics Institute (Cambridge)
GH: General Hospital (Boston)
HU: Harvard University
HeU: Hebrew University (Jerusalem)
ICL: Imperial College of London
JRH: John Radcliffe Hospital (Oxford)
KI: Karolinska Institute (Stockholm)
LRI: London Research Institute
MIPS: Munich Information Centre for Protein Sequences
MIT: Mass Inst Tech
MSR: Microsoft Research (Cambridge, UK)
NIMR: National Institute of Medical Research (London)
NYU: New York University
NUS: National University of Singapore
NVI: National Veterinary Institute (Uppsala)
RIT: Royal Institute Technology (Stockholm)
RU: Rockefeller University (New York)
Salk: The Salk Institute for Bioscience Studies (San Diego)
SRI: The Scripps Research Institute (San Diego)
SU: Stanford University
SUAS: Swedish University of Agricultural Sciences (Uppsala)
TIT: Tokyo Institute of Technology
TML: Toronto Med Lab
UCL: University College of London
UCSD: University California, San Diego

UCSF: University California, San Francisco
UG: University of Geneva
UL: University of Lund
UM: McGill University
UMu: Munich University
US: University of Stockholm
UT: Toronto University
UTo: University of Tokyo
UU: Uppsala University
UZ: Universtiy of Zurich
USy: University of Sydney
UNSW: University of New South Wales

Appendix 3: Sources of Data for Graphics 3 & 4

I: European Journals

10. **Nature** (1998–2004): around 305 articles were checked,*
11. **Nature Biotechnology** (2000–2004): around 520 articles in this journey were checked
12. **Nature Genetics** (1998–2004): around 810 artilces were checked
13. **EMBOJ (European Molecular Biology Organization Journal)** (2000–2004): around 2050 articles were checked

II: American Journals

14. **Cell** (2002–2004): around 1275 articles were checked
15. **Science** (1998–2004): around 1030 articles were checked*
16. **Proceedings of the National Academic of Sciences** (2002–2004): around 950 articles were checked*
17. **Genes and Development** (2000–2004): around 346 articles were checked

The total number of articles checked: 7286

* For these multi-subjects journals, only articles limited to the field of bioscience were selected.

Endotes

[1] Presented at The Competitiveness Institute Conference on *'Building Innovative Clusters for Competitive Advantage'*, Ottawa, September 27–October 1, 2004

[2] There is a stimulating debate between two schools of innovation thought on this. One says sectoral *specialisation* produces the best results, the other says diversification. The former position is associated with Glaeser et al. (1992) and Griliches (1992) who see specialised knowledge 'spillovers' as key growth propellants. The latter view begins with Jane Jacobs (1969) and is supported by, for example Feldman & Audretsch (1999) who show sectoral diversity is most strongly associated with regional innovativeness. The specialisationists emphasise *markets* while the diversificationists give greater weight to institutional infrastructure (innovation support system) and microeconomic linkages across agents and firms (networks) thus supporting a regional innovation systems perspective. Most recently Henderson (2003) shows specialisation effects on knowledge spillovers to have strong but short-lived impact in high technology industry while diversification effects persist far longer. This suggests that as they evolve biotechnology clusters first specialise then later diversify, firms taking distinctive advantage of external economies in the process, e.g. at first, research spillovers, later investment or ICT knowledge spillovers.

[3] On knowledge network capabilities, the early work of Penrose (1959) has given rise to the economics sub-field of studying 'dynamic capabilities' of firms to understand regional and other growth processes (Teece & Pisano 1996).

[4] This is a widely accepted norm in most locations testified to in research by Zook (2002) and Powell et al. (2002) among many others. It is because of the venture capitalist's need for a 'hands-on' relationship with her investment, possibly 'at the drop of a hat'. The greater the distance away from the investment the greater the uncertainty about management control. As a case in point, Kleiner Perkins Caufield, Byers, the leading US venture capitalist, has 80% of its so-called 'keiretsu' investments in biotechnology and ICT within an hour's drive of its Sand Hills Road headquarters in Palo Alto.

[5] In those days the leading DBFs were all associated with leading scientists. Alongside UCSF's Boyer with Genentech were Walter Gilbert of Harvard with Biogen, Ivor Royston of UCSD with Hybritech, Mark Ptashne of

Harvard with Genetics Insitute, and William Rutter of UCSF with Chiron. In the 1980s Nobel Laureate David Baltimore (MIT) founded SyStemix, Malcolm Gefter of MIT founded ImmuLogic, and Jonas Salk, Salk Institute San Diego founded Immune Response (see Prevezer, 1998)

6 In Chesbrough's (2003) book entitled *Open Innovation*, these outsourcing of R&D characteristics are shown to have become common in industries outside biotechnology, notably ICT and homecare products. Accordingly, in-house R&D in the largest US firms is shown to have declined from 71% in 1981 to 41% in 1999. Meanwhile that conducted in small firms rose from 4% to 23% at the same time.

7 The journals are listed in Appendix 1; abbreviations are in Appendix 2. Graphics 3 & 4 journals are listed in Appendix 3.

8 Science Applications International Corporation is based in San Diego but it performs most of this research outside its home base as a research agent for US-wide clients. Thus it warrants mention but is excluded from these rankings. This is not done in the Milken International report 'America's Biotech & Life Science Cluster' June 2004 thus seriously weakening its claims for San Diego's top US cluster position.

9 It is arguable they should stay in Table 5, but they can in any case be compared by those who are interested. The justification for including these bioregions is argued in Cooke (2004a).

10 For example they appear in the UK government (DTI, 1999) report op. cit. as well as those published annually by Ernst & Young on *Entrepreneurial Life Sciences Companies (ELISCOs)*.

11 The position in Japan is rapidly changing. The Japan Bioindustry Association shows the number of DBFs to be up from under 100 in 1994 to 387 by 2003. There are agglomerations of 203 start-ups in Tokyo, 77 in Kansai, and 45 in Hokkaido plus Bio valleys and other such plans in Shizuoka, Tohoku, Toyama, Okinawa, Hiroshima and Fukuoka. However, the brief history of this belated effort is testimony to the absence of evolved Bioregions in Japan. I am grateful to Lennart Stenberg for this information.

12 The data on NAS and R&D appear in C. Zeller (2004) 'North Atlantic innovative relations of Swiss Pharmaceuticals and he Proximities with regional biotech arenas' *Economic Geography*, 80, 83–114. For the Sanofi-Synthélabo takeover bid of Aventis and the French government's hostility to Novartis coming in as a 'white knight' see M. Arnold & G. Dyer (2004) 'France vows to block bid by Novartis', *Financial Times*, March 25, p.30.

[13] Valentin & Lund-Jensen (2003) show how large food companies are leaders in R&D, mostly conducted in-house, in agro-food exploration, examination and exploitation. Thus Danisco and Danone have been leaders in lactobacter nutraceuticals like *Benecol* and *Actimel*. While global corporates like Unilever and Nestlé conducted biological research in-house from their earliest days. Thus this industry does not display as many DBFs as biopharmaceuticals. Sweden's leader ProViva was discovered in academia (Lund University) and developed by local firm Probi.

[14] The role of synchrotrons in the future of Bioregions has been noted. In the UK, government invested $500 million with partners in a replacement for its nuclear age synchrotron near Manchester. The new Diamond Synchrotron is being constructed near Oxford's biosciences cluster. The old one is being adapted for bioimaging uses. Recently (March 2004) the UK's Birmingham University announced its strategy of purchasing an upgraded synchrotron.

[15] The following quotation from the vice-president of the Genomics Institute of the Novartis Foundation (GNF) in San Diego clinches the strength of 'open science' for innovation but pipeline science for exploitation: 'I think there is still a certain level of scepticism within Novartis that confidential information, in particular if it disseminates into GNF, would disseminate to the rest of the world' cited in Zeller op. cit., p.101.

Gerd Schienstock

Regional Competitiveness: A Comparative Study on Eight European Regions

1. Introduction

Since Womack et al. (1990) published their book *The Machine That Changed the World*, in which they propagated the message that European car-makers have fallen far behind Japanese and also US firms, there has been animated discussion about international *competitiveness*. There is increasing evidence that a society's economic growth and social welfare is linked to its international competitiveness (Nelson 1992).[1] The concept of competitiveness is, however, not very well established although a lot has been published on this issue lately (Buckley, Pass & Prescott 1990; Nelson 1992; OECD 1996; Oxford Review of Economic Policy 1996; Hämäläinen 1998). There are only fragmented approaches, no comprehensive theoretical framework for analysing competitiveness has been developed so far. Major problems with the concept stem from the fact that the issue attracts researchers from different disciplines with varied research interests and approaches. They have focused on different aspects and levels of competitiveness (Buckley et al. 1990).

Particularly controversial is whether the notion of competitiveness can be used to analyse economic collectives, such as nations or regions. Krugman, for example, maintains that the concept of competitiveness becomes meaningless when applied to national or regional economies (Krugman 1994, 30). One could argue that economic collectives do not compete, at least not in the same way as companies do. There is no market on which economic collectives could compete. Competition, however,

takes place insofar as economic collectives try to influence the investment strategies of firms. By improving their setting of supportive organisations and institutions, economic collectives try to attract new and particularly innovative companies to settle in their territories and to keep strong local firms in their territory from moving production to other parts of the world. Taking this into account, Castells argues that competitiveness is an attribute of economic collectives, while for firms the traditional notion of 'competitive position' seems to be more adequate (1996, 86–).

Due to the globalisation of markets, competitiveness is more and more linked with innovativeness. Globalisation has caused the rules of the 'competition game' to change. Nowadays all global players must be capable of producing the required number of quality products, just-in-time, within a reasonable cost framework. Locally acting companies have to fulfil the same competition criteria pressured by their larger customers. However, these criteria develop more into entrance barriers to the global market, while economic success depends on the companies' capability to innovate rapidly and develop continuously new products that meet the demands of the customers. Customised innovation is the number one factor in global competition, particularly as the life cycles of products in some industries are decreasing quite drastically.

In the following, the concept of competitiveness will be used to evaluate the quality of regional innovation systems. So far, only few attempts have been made to analyse the functioning of a regional economy.[2] This paper is based on a company survey conducted in eight European regions in 1998. The following regions took part in the research project: Baden-Württemberg (Germany), Basque Country (Spain), Brabant (Netherlands), Centro (Portugal), Styria (Austria), Tampere Region (Finland), Wales (UK) and Wallonia (Belgium).[3] Before presenting the

empirical results, I will shortly discuss the concept of region and the new role that the regions play in the globalising economy.

2. The new economic role of regions

The increasing globalisation of markets has changed the environment of companies significantly. They are confronted with intensive price, time, quality and innovation competition, not just abroad, but also at home. To stay competitive, companies cannot rely on exports only; instead, they are forced to look for the most supportive environment world-wide. Due to intensive global competition, companies break down their value chains into discrete functions and locate them wherever they can find specific local advantages (Ernst & Lundvall 1997, 11). This is not only true for larger companies; medium-sized supplier firms have to follow their customers in globalising their production process. New transport and information technologies facilitate the global organisation of companies' production and innovation processes.

Moreover, as production becomes more science-based, advantages like a developed research infrastructure, a highly qualified workforce or a culture open for innovation and technological progress are becoming more important as environmental factors than natural resources, which means that a supportive environment for innovative companies can be created deliberately (Pyke & Sengenberger 1992; Piore & Sabel 1994; Storper 1998). To become attractive for companies, regions and localities can set up specific institutions to support their innovation activities (Maskell et al. 1998). In this respect, it may be that 'region-states'[4] are now more appropriate for designing supportive environments than nation-states. The 'region-state', as Ohmae (1995; see also Kennedy 1994) argues, is the 'natural' economic area since it represents genuine communities of economic interest and can take advantage of true linkages

and synergies (economies of scale and agglomeration) among economic actors. Regions may be more suited than nations to develop untraded interdependencies and relational capital as sustainable competitive advantages (Storper 1997, 19; Porter and Sölvell 1998; Howells 1999).

Although it has been suggested that regional economies are becoming more important, there is little consensus on how to define a region. It is important to mention that a regional classification is an intellectual concept. It exists only in terms of the criteria by which it is defined. The following four criteria are often used to define a region: (1) a region must not have a limited size; (2) it should display homogeneity in terms of specific criteria; (3) it can be distinguished from bordering areas by a particular kind of association of related features; and (4) it must possess some kind of internal cohesion (Cooke & Schienstock 2000). It is also important to mention that the boundaries of regions are not fixed once and for all; regions can change, new regions can emerge and old ones can perish. Therefore, to analyse a region, criteria that define a functioning unit within a specific time must be found.

From an economic perspective, the concept of 'industrial cluster' may be used to define a region (Porter 1990). Clusters are dense networks of economic actors, interacting closely and with intensive exchange relationships. The boundary of a region can be drawn where co-operation becomes less frequent. We can also argue that functioning regional economies need to have a common culture.

The economic criterion for defining a region became less reliable as large corporations restructured their activities on a global scale. Also, cultural homogeneity is less powerful than it once was. For the present, a tendency towards pragmatism has taken the lead in the field, especially in the European context in which administrative boundaries at the sub-national level

increasingly double as designations of regions. In instances such as the German Länder or even the Spanish and Italian cases, some degree of regional distinctiveness based on the effects of regional economic and other policies seems to be emerging. And among the policies which seem to have some influence in creating a new regional distinctiveness are those which support innovation within regional economies.

3. Indicators used in the research

The use of survey data to research competitiveness has often been criticised. The main argument against the use of this method has been that the collected data will be biased for several reasons, such as palliation, hiding strategies or simply different answering practices in filling in questionnaires. On the other hand, the survey method gives the opportunity to cover a broad range of different aspects of competitiveness. Surveys can give information on subjective judgements and objective facts. Both types of indicators will be used in our analysis on regional competitiveness. The subjective indicators reflect the competitive advantages that firms assume to have, compared with their competitors. Concerning the objective indicators, we distinguished between input indicators, such as R&D expenditure of companies, and output or performance indicators, such as innovations announced by companies. Furthermore, we used both static indicators, such as R&D expenditures measured by turnover, as well as dynamic ones, such as the development of R&D over a specific period of time. Concerning outputs, we used direct indicators, such as product and process innovations carried out by companies as well as indirect indicators, such as the development of employment and turnover in a specific period.[5]

For both input as well as output indicators, major measurement problems have been mentioned in literature

(Buckley et al. 1990; Hatzichronoglou 1996). Therefore, the concept of structural competitiveness indicating the development potential of regional economies has also been applied in the project (OECD 1990, 15). Here the focus is on criteria, such as skills level of employees and modernity of firms' techno-organisational structures; as these aspects represent competitive advantages difficult to copy, we may also use the term sustainable competitiveness (Porter & Sölvell 1998; Hämäläinen 1998). To apply a more dynamic perspective, the intensity of co-operation among firms and with support organisations is taken as an indicator for analysing competitiveness; we may speak of process competitiveness.

Table 1. *Indicators of competitiveness used in the survey*

Subjective indicators	– competitive advantages firms assume to have
	– strategies to sustain competitive advantages
Objective indicators	
input factors	– R&D intensity (R&D budget by turnover and R&D personnel by the whole workforce)
	– changes in R&D budget and in R&D personnel
performance factors	– new product and process technologies
	– employment and turnover
structural competitiveness	– new organisation forms and management practices
	– qualification level of the workforce
process competitiveness	– co-operation among firms and between firms and supportive organisations

4. Empirical results

4.1 Subjective factors of competitiveness

Our research clearly indicates that European firms perceive quality as their most important competitive advantage. Nearly 80 per cent of all companies in the overall sample argue that their strength in global competition is the quality of their products or services. About 50 per cent of all companies assume they have an edge concerning time of delivery as well as innovativeness, and 40 per cent of all firms define after-sales services as their competitive advantage.[6] On the other hand, only one third of all companies perceive themselves as being ahead in price competition. Likewise, very few companies define user-friendly products and ecological aspects as their competitive advantage.

These findings seem to indicate that firms in Europe have already adapted quite well to some post-Fordist competition criteria. On the other hand, they seem to have more problems in staying ahead in traditional price competition. Besides this, customer orientation is obviously a weak aspect of European firms' global competitiveness, indicated by the low share of companies that see user-friendliness of products and after-sales services as their advantage.

Concerning quality, the most frequently mentioned competitive advantage, European regions do not differ very much. Only in the Basque Country less than 50 per cent of all firms report a specific advantage in quality competition. Differences become bigger when we look at time of delivery, the second most important competition criterion mentioned by firms. Here Wales, Styria, Tampere Region and Centro share the first place, while Wallonia and Baden-Württemberg score rather low. If we look at innovativeness, Baden-Württemberg is the leading region, while the Basque Country and Brabant are far behind the other regions. Concerning price, the weakest competition criterion of

European firms, Wales is doing quite well, whereas Wallonia and Baden-Württemberg seem to have major problems.

Table 2. *Competitive advantages by region (%)*

Competitive advantage	Region Wales (UK)	Styria (AU)	Wallonia (BE)	Brabant (NL)	Tampere (FIN)	Basque Country (SP)	Baden-Württemberg (GER)	Centro (PRG)	Total
Price	52	22	18	40	36	23	19	27	30
After-sales service	43	63	37	28	29	19	52	59	40
Quality	85	82	73	72	78	46	84	86	76
Time of delivery	65	66	45	58	66	51	49	63	59
Technical standards/ Innovativeness	68	75	54	34	46	30	86	59	56
User-friendly products	31	25	8	17	32	12	41	27	25
Ecological aspects	15	25	9	8	20	10	21	27	17
Other advantage	6	16	11	9	14	8	3	4	10
(N)	(103)	(107)	(89)	(86)	(139)	(78)	(81)	(56)	(739)
Competitive advantadvantages*	3.6	3.7	2.6	2.7	3.2	2.0	3.5	3.5	3.1

* Average number of competitive advantages per firm in region of eight competitive advantages

Based on the firms' own judgement about their competitive advantage, we can distinguish between four types of companies:[7] innovators, strong competitors, weak competitors and marketers. The 'strong competitors' represent the biggest group of firms, whereas the firms characterised as 'innovators' form the smallest one.

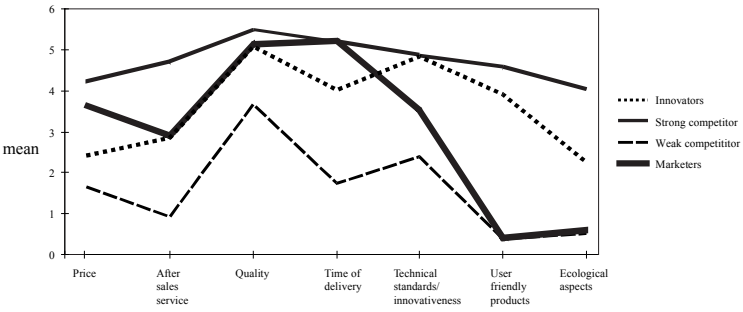

Figure 1. *Profiles of companies' statements on their competitive advantage*

One third of all companies in Baden-Württemberg can be characterised as 'innovators', by far the biggest share in all regions. In Brabant, there are only few 'innovators' (8%); in this region the 'marketers' form the biggest group (38%). We can find the same share of 'marketers' in Wallonia; this region also has the biggest share of 'weak competitors' (35%). More than 50 per cent of all companies in Centro classify themselves as 'strong competitors', here only Styria comes close.

Table 3. Region by strategic groups (%)

Region	Cluster 1. 'Innovators'	2. 'Strong comp.'	3. 'Weak comp.'	4. 'Marketers'	(N)
Wales (UK)	19	38	16	28	(101)
Styria (AU)	20	45	6	30	(107)
Wallonia (BE)	18	9	35	38	(87)
Brabant (NL)	8	26	28	38	(86)
Tampere (FIN)	14	33	27	25	(139)
Basque Country (SP)	17	21	32	31	(78)
Baden-Württemberg (GER)	33	32	22	12	(81)
Centro (PRG)	18	54	11	18	(56)

European companies obviously see a skilled workforce as a guarantee to sustain their competitive advantages. Nearly three out of four companies mentioned a skilled workforce as an important factor that can help them compete successfully on the global market. To increase R&D is also seen by companies as a promising measure to keep up with their competitors. The third important factor in sustaining competitiveness is organisational restructuring. Although companies admit being rather weak concerning customer orientation, they are still not prepared to put more emphasis on marketing.

Table 4. *Measures to sustain competitive advantages (%)*

Strategy	Region: Wales (UK)	Styria (AU)	Wallonia (BE)	Brabant (NL)	Tampere (FIN)	Basque Country (SP)	Baden-Württemberg (GER)	Centro (PRG)	Total
Internal R&D	49	51	45	34	66	42	68	39	51
Owning basic patents/ licenses	18	12	18	4	3	12	21	7	12
Marketing	39	37	31	22	66	19	42	41	39
Skills/knowledge of labour force	70	70	67	73	85	27	67	41	66
Organisation of production	58	39	61	25	50	39	49	66	48
Close co-operation with firms	55	46	30	26	50	27	28	18	38
Support of other institutions	21	5	6	6	18	4	3	5	10
(N)	(103)	(105)	(87)	(82)	(139)	(74)	(81)	(56)	(727)

On the regional level some differences occur. Companies in the Tampere Region in particular stress that to have a highly skilled workforce is an important strategy in sustaining competitiveness (85%), whereas in the Basque Country (27%) and in Centro (41%) less than a half of all companies are of the same opinion. In Baden-Württemberg (68%) and in the Tampere Region (66%), many companies give high priority to increasing R&D as a strategy to sustain competitive advantages. Tampere Region is the only region where more than 50 per cent of all companies mention improvement of marketing as an important strategy in this respect. Particularly, companies in Centro (66%), Wallonia (61%) and in Wales (58%) perceived organisational restructuring as a promising strategy to sustain competitiveness.

4.2 The analysis of objective indicators

4.2.1 Input factors: R&D -related indicators

As has been said earlier, the analysis of objective factors of global competitiveness may include different types of factors. I first concentrate on input factors; these are factors related to R&D activities.[8] Although most regions faced a severe crisis during the 1990s, only few companies in the overall sample reduced their R&D activities during 1990–1995, regardless of whether we choose the R&D budget or R&D personnel as an indicator. Only some 10 per cent of all companies reduced their R&D budget or R&D personnel during that time, while at the same time nearly 70 per cent of all companies spent more money on R&D, and some 50 per cent of all companies increased their R&D personnel.

We must admit, however, that the R&D intensity of companies is often rather low. Some 40 per cent of the companies which mentioned that they perform R&D activities must be characterised as less R&D-intensive in 1995, whether we consider the R&D budget by turnover or R&D personnel by the whole workforce. On the other hand, some 30 per cent of all companies can be classified as R&D-intensive if we choose the R&D personnel indicator and about 35 per cent if we look at the R&D budget indicator.

Baden-Württemberg has by far the highest share of R&D-intensive companies measured by the R&D budget related to turnover in 1995, while only about 15 per cent of all companies in this region must be judged as less R&D-intensive. The opposite situation can be found in Centro. Only 10 per cent of all companies in this region show high but nearly 60 per cent low R&D intensity. The situation in Brabant is quite similar; here more than 60 per cent of all companies have an R&D budget that is below 1 per cent of their turnover. A more polarised

situation can be found in most other regions. If we measure R&D intensity by the share of R&D personnel compared to the whole workforce, we get a slightly different picture. Here Baden-Württemberg is placed only in the middle of the sample. In Centro, which is placed last in this respect, two out of three companies must be judged as showing low R&D intensity. Wales (53%) also has a rather high number of less R&D-intensive companies.

Table 5. *R&D intensity (R&D budget of turnover and R&D personnel of whole workforce) in 1995 by region (%)*

	Region								
R&D intensity	Wales (UK)	Styria (AU)	Wallonia (BE)	Brabant (NL)	Tampere (FIN)	Basque Country (SP)	Baden-Württem-berg (GER)	Centro (PRG)	**Total**
R&D budget intensity*									
Low	58	30	42	62	33	43	16	57	39
Medium	11	28	27	15	33	23	27	33	25
High	31	42	31	23	35	33	56	10	36
(N)	(84)	(81)	(52)	(26)	(89)	(30)	(68)	(21)	(451)
R&D personnel intensity**									
Low	53	39	41	40	38	48	26	65	43
Medium	18	27	38	14	27	39	47	19	28
High	30	34	22	46	35	13	27	16	29
(N)	(95)	(70)	(37)	(35)	(92)	(31)	(62)	(37)	(459)

* Low $x \leq 1$, medium $1 < x \leq 4$, and high $x > 4$ per cent of turnover.
** Low $x \leq 3$, medium $3 < x \leq 10$, and high $x > 10$ per cent of total number of employees.

Baden-Württemberg, although very R&D-intensive, has the highest share of companies having reduced their R&D budgets (23%) and/or their personnel (33%), followed by Styria. On the other hand, in the Tampere Region more than 80 per cent of all companies show an increase in their R&D budgets, and about 70 per cent in their R&D personnel.

Table 6. *R&D budget and personnel changes 1990–1995 by region (%)*

	Region								
R&D change 1990–1995	Wales (UK)	Styria (AU)	Wallonia (BE)	Brabant (NL)	Tampere (FIN)	Basque Country (SP)	Baden-Württem-berg (GER)	Centro (PRG)	**Total**
Decrease in R&D budget	1	15	4	–	6	4	23	–	8
Stability in R&D budget	56	16	17	48	11	26	9	47	26
Increase in R&D budget	43	69	79	52	82	70	67	53	66
(N)	(77)	(55)	(48)	(21)	(79)	(27)	(64)	(15)	(386)
Decrease in R&D personnel	6	12	3	–	6	9	33	4	10
Stability in R&D personnel	61	40	40	71	27	50	23	39	41
Increase in R&D personnel	33	48	57	29	67	41	44	57	48
(N)	(87)	(50)	(30)	(24)	(89)	(22)	(61)	(28)	(391)

4.2.2 Output indicators

4.2.2.1 Direct indicators: Innovativeness

Among the output-related indicators of competitiveness, innovativeness measured by the reported new products and process technologies is the most important one.[9] Some 25 per cent of all companies in the overall sample introduced no innovation, neither new products nor new processes in the last three years (1992–1995). The share of non-innovative firms increases quite significantly if we only count the innovations new to the market; then 50 per cent of all companies in the overall sample must be judged as non-innovative.

The companies that have introduced both new products and new process technologies during the last three years can be defined as highly innovative firms. It is often the case that major product innovations can only be introduced if new process technologies are installed at the same time. If we count innovations new to the company, we can classify nearly 40 per cent of all companies as highly innovative. The number of companies having introduced both products and process technologies new to the market is, of course, significantly lower; then only 10 per cent of all companies can be classified as highly innovative.

The highest share of non-innovative companies can be found in Brabant. About 50 per cent of all companies in this region did not introduce any type of innovation, neither new products nor new process technologies during the last three years. This share increases significantly if we count only innovations new to the market; then three out of four companies in Brabant were not innovative. The distance to the other regions is quite significant. Surprisingly, the greatest share of highly innovative companies can be found in Centro; here more than 50 per cent of all companies report introducing both process and product innovations during the last three years, while only 10 per cent of all companies in the

region must be judged as non-innovative. The picture changes slightly if we only look at innovations new to the market. Here the share of non-innovative companies is lowest in Baden-Württemberg (34%). At the same time, more than 50 per cent of all companies in this region introduced product innovations that are new to the market, either alone or together with new process technologies.

Table 7. *Introduction of innovations in the last three years (1992–1995) by region which are new to the firm and which are new to the market (%)*

	Region								
Innovation	Wales (UK)	Styria (AU)	Wallonia (BE)	Brabant (NL)	Tampere (FIN)	Basque Country (SP)	Baden-Württem-berg (GER)	Centro (PRG)	**Total**
New to firm									
No	25	23	19	50	18	21	22	11	24
New process	13	10	7	13	6	8	–	13	9
New product & new process	39	33	35	15	42	49	39	54	28
New product	24	34	39	22	34	22	39	23	30
(N)	(102)	(97)	(83)	(82)	(138)	(72)	(79)	(56)	(709)
New to market									
No	46	44	47	73	59	65	34	45	52
New process	9	7	8	6	12	6	–	7	7
New product & new process	11	14	10	2	9	8	13	16	10
New product	34	34	35	18	21	21	53	32	31
(N)	(102)	(97)	(83)	(82)	(138)	(72)	(79)	(56)	(709)

The question of whether R&D intensity has an impact on the innovativeness of companies is one frequently addressed in relevant literature. Based on our research, we can conclude that such a relationship indeed exists. Among companies with low R&D intensity, we can find the highest share of non-innovative firms (about 35%). Regardless of which indicator we choose, the figure is about 10 per cent only among companies investing more or heavily in R&D. Companies having introduced new product and process technologies concurrently can be more often found among firms with medium or high R&D intensity, again regardless of the chosen indicator. This trend becomes even more evident when we look only at innovations new to the market.

Table 8. *Introduction of innovation by R&D intensity (%)*

	R&D budget intensity				R&D personnel intensity			
Introduction of innovation	Low $x \leq 1$	Medium $1< x \leq 4$	High $x > 4$	**Total**	Low $x \leq 3$	Medium $3< x \leq 10$	High $x > 10$	**Total**
Introduction of innovation new to the firm								
No	32	13	11	20	29	9	14	19
New product	26	39	35	33	25	36	39	32
New product and new process	30	43	49	40	35	51	41	41
New process	12	6	5	8	12	4	6	8
	100%	100%	100%	100%	100%	100%	100%	100%
(N)	(172)	(110)	(156)	(438)	(192)	(124)	(132)	(448)
Introduction of innovation new to the market								
No	62	46	33	48	60	44	42	50
New product	26	36	43	34	25	36	36	32
New product and new process	7	12	17	12	8	14	14	11
New process	6	7	6	6	7	7	8	7
	100%	100%	100%	100%	100%	100%	100%	100%
(N)	(178)	(110)	(156)	(438)	(192)	(124)	(132)	(448)

2.2.2.2 Indirect indicators: Employment and turnover

The development of employment and turnover, of course, is only indirectly related to innovation activities. Still, it is useful to integrate these aspects into the analysis of regional competitiveness. An indicator was used[10] which compares the development of turnover with the development of employment during the last five years (1990–1995). Slightly more than 20 per cent of all companies in the overall sample can be characterised as rapidly growing firms with an increase in turnover and employment of more than 50 per cent in five years. Brabant has by far the highest share of these rapidly growing firms (36%). Styria (14%), Wallonia (15%), Baden-Württemberg (16%) and Centro (18%) have a comparably low share of such dynamic firms. If we take into account all companies that have increased turnover and employment, Wales (64%), Brabant (68%) and the Tampere Region (64%) are ranked highest, while Baden-Württemberg (37%) has the lowest share. On the other hand, by far the greatest share of companies with decreasing turnover and employment can also be found in Baden-Württemberg (38%), followed by Wallonia (25%).

Table 9. *Turnover and employment change 1990–1995 by region (%)*

Turnover & employment change	**Region** Wales (UK)	Styria (AU)	Wallonia (BE)	Brabant (NL)	Tampere (FIN)	Basque Country (SP)	Baden-Württemberg (GER)	Centro (PRG)	**Total**
T+&E+ over 50%	32	14	15	36	24	25	16	18	22
T+&E+	32	33	44	32	40	28	21	38	34
T+&E-	26	36	15	26	25	35	25	27	27
T-&E-	11	17	25	7	12	13	38	18	18
(N)	(66)	(66)	(59)	(31)	(96)	(40)	(68)	(34)	(460)

When looking at the relationship between R&D intensity and the indirect output indicator, no clear trend can be identified. Our findings suggest that firms with high personnel R&D intensity may see a slightly more dynamic growth of turnover and employment. We can also find some indication that the more innovative firms are also the more dynamic ones. Furthermore, we can find the highest share of companies having lost turnover and employment during the last five years among the companies not having introduced any innovation, whereas the share of very dynamic companies with an increase of more than 50 per cent in both turnover and employment is highest among the very innovative companies which have introduced new products and new process technologies concurrently.

4.3 Structural and process competitiveness

The concepts of structural competitiveness and process competitiveness have been introduced in order to analyse the regional development potential. The qualification level of the workforce, the application of modern ICTs as well as the introduction of new organisation forms and management practices have been used as indicators to analyse structural competitiveness. In the evaluation of process competitiveness, co-operation patterns and co-operation intensity have been used as indicators.

4.3.1 Qualification of the workforce

We have already mentioned earlier that companies of almost all regions rely heavily on the skills and competencies of their workforce to keep or improve their position on the global market. Therefore, to evaluate structural competitiveness, an indicator combining the educational level and the actual qualifications of the workforce has been applied.[11] In the overall sample, the

share of companies with a predominantly unskilled workforce is 32 per cent; more than 40 per cent of all companies employ a majority of skilled workers. On the other hand, less than 10 per cent belong to the category with a majority of highly educated workers having a university degree.

The share of the companies with more than 50 per cent unskilled workers is the highest in Centro (50%), Wales (49%) and Wallonia (48%), which means that these three regions must be defined as less competitive. On the other hand, Baden-Württemberg (11%) and Brabant (8%) can be characterised as highly competitive if we take the skills level as an indicator of structural competitiveness. We have to stress, however, that in Baden-Württemberg we can find only very few companies with a majority of well-educated workers, in other words in which more than 50 per cent of the workforce has a university degree. Here Styria and Wales dominate (11% and 13%).

Table 10. *Qualification level within companies by region (%)*

	Region								
Qualification*	Wales (UK)	Styria (AU)	Wallonia (BE)	Brabant (NL)	Tampere (FIN)	Basque Country (SP)	Baden-Württem-berg (GER)	Centro (PRG)	**Total**
Highly educated	11	13	2	7	8	7	4	–	7
Further educated	13	23	2	49	5	34	6	5	21
Skilled	27	41	23	37	50	24	80	45	41
Unskilled	49	23	48	8	37	36	11	50	32
(N)	(75)	(87)	(52)	(74)	(96)	(62)	(55)	(40)	(541)

* % of firms in which ≥50% of the personnel belong to one of the categories

4.3.2 New organisation forms and management practices

By using the number of new organisation forms and management practices introduced by firms, we can get an impression to what extent companies have become more flexible and decentralised. The overall picture shows that only some 10 per cent of all companies applied restructuring practices more extensively while, on the other hand, nearly 50 per cent of all companies had hardly started with such a renewal process.

Table 11. Introduction of organisational practices by region (%)

Number of introduced organisational practices	Region: Wales (UK)	Styria (AU)	Wallonia (BE)	Brabant (NL)	Tampere (FIN)	Basque Country (SP)	Baden-Württemberg (GER)	Centro (PRG)	Total
None or few	46	42	47	51	44	47	42	48	45
Some	39	45	42	42	39	42	53	36	42
Many	15	13	11	8	18	10	5	16	12
(N)	(102)	(98)	(83)	(67)	(142)	(78)	(81)	(56)	(707)
Av. number of org. practices per firm	4.3	4.6	4.1	3.7	4.3	3.9	4.2	4.2	4.2

In our analysis, we differentiate between three types of new organisation forms and management practices[12]: those that are related to the setting up of intra-organisational network structures, those that indicate the evolution of inter-organisational networks, and those that have been introduced to secure high quality production. Besides this, we will analyse to what extent companies have introduced modern ICTs, assuming that through increased technological connectivity, exchange of knowledge and information will grow, which will then speed up the innovation process.

Companies in Europe focus their organisational renewal activities more on new intra-organisational and new quality practices than on new inter-organisational practices. Looking at each new organisational practice separately, we can see that only total quality management, group work and ISO 9000 ff were introduced by more than 50 per cent of all companies. On the other hand, inter-organisational networking, the concept of system suppliers, outsourcing and interdisciplinary development/ design teams were introduced by less than 25 per cent of all firms, which again indicates that companies are particularly slow in transforming their inter-organisational forms of market-based co-operation into more stable network-like relationships.

We cannot find major differences concerning the introduction of new organisation practices at the regional level. While companies in Brabant seem to be ahead in transforming their inter-organisational market-based relationships into network relationships, companies in Styria, the Tampere Region and Baden-Württemberg have progressed most in turning their intra-organisational bureaucratic into an internal network structure. Companies in Wallonia, the Basque Country, Centro Region and Wales seem to take quality more seriously than companies in other regions, as they have introduced quality standards such as ISO 9000 ff or total quality management more often than firms in other regions. Concerning the introduction of new ICTs, companies in the Tampere Region and in the Basque Country are in a leading position.

Table 12. *Introduction of new organisational practices (%)*

Organisational practice	Region: Wales (UK)	Styria (AU)	Wallonia (BE)	Brabant (NL)	Tampere (FIN)	Basque Country (SP)	Baden-Württemberg (GER)	Centro (PRG)	**Total**
Total quality management	52	36	59	46	43	67	51	65	51
Group work	29	60	53	58	59	61	50	47	52
Profit or cost centres	45	26	36	30	32	21	29	57	34
Inter-organisational networking	15	25	15	27	30	10	11	18	20
Benchmarking	32	29	53	9	22	29	9	51	28
Flat hierarchies	33	72	11	52	49	13	74	29	43
Interdisciplinary design teams	25	14	17	6	46	14	20	24	23
Just-in-time delivery	46	37	68	39	30	49	24	37	41
Outsourcing	22	34	13	47	15	16	41	14	25
System suppliers	9	18	10	15	15	7	19	35	15
ISO 9000 ff	72	61	54	23	57	79	69	53	59
Information technology	61	51	25	23	73	69	25	31	48
(N)	(100)	(97)	(83)	(66)	(130)	(70)	(80)	(51)	(677)
Ave. number of external practices	0.9	1.1	1.0	1.3	0.8	0.7	0.9	0.9	1.0
Ave. number of internal practices	1.3	1.7	1.2	1.4	1.7	1.0	1.7	1.4	1.5
Ave. number of quality practices	1.5	1.2	1.7	0.8	1.1	1.6	1.3	1.5	1.3

It is often argued that modern ICTs can be seen as opening up opportunities for introducing new and more flexible organisation forms (Fulk & DeSantis 1993; Schienstock 2000). They support the development of a new network economy. From our findings, however, we can draw the conclusion that those companies that have introduced modern ICTs have not yet taken advantage of the flexibility potential of these technologies. They have not been more radical in organisational restructuring than those companies not having introduced new ICTs.

4.3.3 Co-operation patterns

Firms can start co-operating with other firms and support organisations for two reasons: to stay informed about new technological developments or to get support in concrete innovation processes. Our findings clearly demonstrate that, in both cases, firms are much more important as co-operation partners than supportive organisations. For example, 50 per cent of all companies report customer firms and 36 per cent supplier firms as important sources of staying informed about innovation opportunities, while all types of support organisations are mentioned as a key information source only by some 10 per cent of all companies.

Table 13. *Source of information on innovation by region (%)*

Source	Region								Total
	Wales (UK)	Styria (AU)	Wallonia (BE)	Brabant (NL)	Tampere (FIN)	Basque Country (SP)	Baden-Württemberg (GER)	Centro (PRG)	
Journals/technical literature	52	55	45	29	39	23	52	54	44
Conferences/ exhibitions/fairs	43	57	54	24	50	46	70	69	51
Customer firms	45	55	30	51	59	50	70	30	50
Supplier firms	40	50	39	25	35	29	26	35	36
Consultants	9	4	3	5	6	6	1	10	5
Industrial associations	21	4	12	10	10	13	12	13	12
Technology transfer agency	4	2	2	3	6	26	6	9	7
Universities	19	15	13	8	15	6	7	4	12
Higher education institutes	8	–	2	1	1	3	4	–	2
Other	10	11	6	3	6	3	4	4	6
(N)	(103)	(105)	(87)	(75)	(135)	(70)	(81)	(54)	(710)

Firms are even more important as partners in concrete innovation projects. There are only few firms that do not co-operate more directly in one way or the other with customer firms (12%) or suppliers firms (25%) in innovation processes. Among the supportive organisations, universities (39%) and consultants (35%) are the most important co-operation partners for firms in innovation processes.

Table 14. *Main partner in innovation processes by region (%)*

	Region								
Main partner	Wales (UK)	Styria (AU)	Wallonia (BE)	Brabant (NL)	Tampere (FIN)	Basque Country (SP)	Baden-Württemberg (GER)	Centro (PRG)	**Total**
Customer firms	82	95	63	96	93	85	99	85	88
Supplier firms	72	76	75	64	65	82	85	94	75
Consultants	36	43	26	16	17	50	56	58	35
Contract research organisations	17	40	9	3	32	44	53	52	30
Universities / HEIs	39	51	34	16	30	37	53	64	39
Technology transfer institutions	11	20	9	10	6	63	48	44	22
Providers of (venture) capital	11	31	1	18	12	13	38	42	19
Providers of subsidies	19	50	28	18	33	2	44	50	31
Government agencies	32	19	22	12	4	41	38	48	24
Trade associations, similar institutions	24	46	22	22	7	22	44	50	27
Training programmes /institutions	26	33	17	15	9	46	38	60	27
Other	8	15	8	3	3	2	11	10	7
(N)	(100)	(93)	(76)	(67)	(138)	(54)	(73)	(52)	(653)

If we look at co-operation among companies within innovation projects, we can hardly find regional differences. For companies in Wallonia (63%) customer firms are less important as co-operation partners than they are for companies in other regions. The same is true for companies in Brabant (64%) and the Tampere Region (65%) with respect to supplier firms. Regional differences become

more visible when we look at firms as sources of innovation-related information. Customer firms (70%) are most often mentioned by firms in Baden-Württemberg as important sources of staying informed about technological progress, while the share of companies that see supplier firms as key informants on innovation opportunities is the highest in Styria (50%).

Only in some regions, mainly Wales and the Basque Country, can we find single supportive organisations that play a significant role as a source of information on technological progress. In Wales, these are industrial associations (21%) and universities (19%), and in the Basque Country, these are technology transfer agencies (26%). When looking at support organisations as partners in concrete innovation projects, regional differences become more significant. Companies in Baden-Württemberg, the Basque Country and Styria mention supportive organisations more often as key partners in innovation projects and processes than companies from other regions.

No more than 10 per cent of all companies use universities as important sources of staying informed about technological progress. The share of companies co-operating is higher than the average in Wales (19%) and particularly low in Centro (4%). Of all companies, 40 per cent mention universities as key partners in innovation processes. Here we can find companies in Centro in a leading position, as 2/3 of all companies see universities as a key partner in the development of new products and process technologies. But also in Baden-Württemberg and in Styria more than 50 per cent of all companies mention universities as key partners in innovation projects. In the Tampere Region and in Wallonia, this group comprises only about 30 per cent of all companies, and in Brabant this group is even smaller (16%). In general, companies prefer to co-operate with regional and national universities. Only in Styria and to a lesser extent in the Basque Country, companies have chosen more often universities

from other European countries and from abroad as their main co-operation partners in innovation processes (43% and 17%).

4.3.4. Co-operation intensity

There are only two regions, Centro (46%) and Styria (43%), in which more than 40 per cent of all companies are co-operating quite extensively with other firms. Wallonia, on the other hand, has the highest share of non-co-operating firms (27%). The number of firms that co-operate intensively with support organisations is the highest in Wales (24%), Styria (21%), the Basque Country (23%) and Centro (19%). The other extreme is represented by Wallonia and by Brabant in particular; in Brabant only 2 per cent of all companies co-operate extensively, while the great majority of companies in the region (62%) have hardly any contact with supportive organisations.

In general, co-operation of companies with universities is not very intensive; three out of four companies have only weak ties with universities, if any. Only in Styria can we find a significant number of companies that co-operate quite extensively with universities (26%). At the other end we have Brabant and Centro, both regions in which about 90 per cent of all companies have only little or no contact with universities.

When we look at the relationship between co-operation and innovativeness, we can identify a clear trend: intensive co-operation of any kind has a positive influence on firms' innovation activities.

Table 15. *Co-operation intensity by innovations new to the firm and new to the market (%)*

	Innovations new to the market									
Co-operation	No	New product	New product & new process	New process	(N)	No	New product	New product & new process	New process	(N)
Overall co-op.										
Low	35	32	25	8	(229)	63	25	6	6	(229)
Medium	19	32	39	10	(277)	48	31	13	7	(277)
High	10	27	55	8	(184)	40	39	13	9	(184)
Co-op. with firms										
Low	33	22	34	12	(101)	56	27	7	10	(101)
Medium	22	36	33	9	(324)	54	32	9	5	(324)
High	12	29	52	8	(231)	41	36	14	9	(231)
Co-op. with organisations										
Low	28	35	28	10	(267)	59	29	7	6	(267)
Middle	15	32	46	7	(263)	42	37	13	8	(263)
High	8	26	56	10	(98)	42	35	14	9	(98)
Co-op. with univ.										
Low	26	32	32	10	(484)	57	28	9	6	(484)
Middle	12	22	60	6	(123)	33	39	16	12	(123)
High	6	36	50	8	(72)	32	47	11	10	(72)

4.4 Regional profiles

The following table gives an overview of the advantages and disadvantages of the regions involved in the survey.

Regional profiles

	Wales	Styria	Wallonia	Brabant	Tampere	Basque Country	Baden-Württemberg	Centro
Competitive advantage								
price	++	-	-	+	+	-	--	=
quality	+	+	=	-	=	--	+	+
innovativeness	+	++	=	--	-	--	++	=
Challenges faced by companies								
price	+	++	+	--	-	=	++	-
quality	-	=	=	-	=	=	+	++
technological challenge	+	+	=	-	--	=	++	+
market dynamics	+	++	-	=	=	-	-	=
Measures to sustain comp. advantage								
R&D	=	=	-	--	++	-	++	-
skills	=	=	=	+	++	--	=	-
Responses to challenges								
organisational restructuring	++	=	++	-	+	-	-	--
cutting costs	=	=	+	--	-	=	++	=

	Wales	Styria	Wallonia	Brabant	Tampere	Basque Country	Baden-Württem-berg	Centro
Input factors:								
R&D								
R&D budget decreasing [1)]	-	+	=	-	=	=	++	-
R&D budget increasing [2)]	--	=	++	-	++	=	=	-
R&D budget intensity	=	=	=	-	=	=	++	--
Output factors:								
Innovation								
new products to the market	=	+	=	--	-	-	++	+
Turnover and employment								
incr. in turnover and employm. > 50%	+	=	-	+	=	=	-	=
decr. in turnover and employment [3)]	-	=	+	-	-	-	++	=
Structural indicators								
unskilled workers [4)]	++	-	++	--	=	=	--	++
introduction of new organisation forms	=	+	=	-	=	-	=	=
Co-operation								
with firm	=	+	-	=	=	=	=	+
with support organisations	+	+	-	--	=	+	-	=
with university	=	++	=	--	=	=	=	--

[1)] fewer companies than on average have decreased their R&D budget
[2)] fewer companies than on average have increased their R&D budget
[3)] fewer companies than on average have decreased turnover and employment
[4)] fewer companies than on average have a mainly unskilled workforce

5.6. Conclusions

The results of the research are somewhat puzzling. The picture they give is far from clear. Baden-Württemberg, a region with companies showing the highest R&D intensity has at the same time the highest share of companies which lost turnover and reduced their workforce. Another region, Brabant, in which the number of non-innovative firms is extremely high and in which companies do not assess themselves to be very competitive regarding innovativeness, has the highest share of very dynamic companies that have increased both turnover and employment by more than 50 per cent within a period of five years. Centro, a region with a fairly large share of companies with a predominantly unskilled workforce is the most innovative region according to the judgement of the firms themselves. In the case of the Tampere Region, where companies show a fairly high dynamics in R&D activities, innovativeness, at least if we only count products and process technologies that are new to the market, is comparatively low.

All these examples demonstrate that global competitiveness is a rather complex phenomenon that cannot adequately be analysed by one-dimensional measures. If we apply a multidimensional concept, however, it becomes less clear, which regions are more and which are less competitive. One can also have some doubts as to whether a clear distinction between 'high road' regions and 'low road' regions (Pyke & Sengerberger 1992, 12–) can be drawn. Based on our results, we may classify Styria and Baden-Württemberg as high road regions, whereas the Basque Country, Wallonia and Centro may be characterised as low road regions. However, regional strategy formation is obviously more complex, as most regional strategies include high road as well as low road elements.

Our research findings seem to indicate that for regions there is no 'one best way' towards global competitiveness. Regions are different and they may be forced to apply different strategies to retain or regain global competitiveness. At least two aspects have to be taken into account in this respect: structural differences and differences in the stage of economic development. The first aspect concerns, for example, the industrial and size structure of companies in the region. With respect to the second aspect, we have to take into account that regions with newly emerging industrial clusters need other development strategies than regions with maturing industries. Regarding the first aspect, Brabant is a good example. The sample characterises Brabant as a region with a clear focus on small and medium-sized firms. One may have doubts whether for companies of this size the capability to innovate continuously can become a competitive advantage at all, as innovating is often also a very costly undertaking. For small supplier companies it may be more important to improve the quality of their products and to deliver their products and services more rapidly to their customer firms.

Concerning the second aspect, we may learn something from Baden-Württemberg. For this region, the innovativeness of the local companies seems not to be the most pressing problem. Their R&D intensity is fairly high and the companies define innovativeness as their major advantage. Still, the region has the highest share of companies that reduced employment and turnover or even both. This could be seen as indicating that the region needs to expand into new industries with more growth potential in order to come to grips with the unemployment problem. Then the concept of an innovation system with close and exclusive ties may actually become a hindrance to economic growth and more employment.

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Endnotes

[1] In the following, I will not discuss the relationships between competitiveness and economic growth and social welfare, although I am aware of the fact that competitiveness is not an aim in itself but rather a means to achieve other aims.

[2] Here I do not deal with the institutional environment, which is part of a regional innovation system. Support organizations are included only through looking at the interaction of firms with support organizations.

[3] As the intention was to have a representative sample of the region, the samples differ significantly concerning both firm size and industries. The concept of industrial districts assumes, however, that in successful regions the same kind of effective organization forms and institutional structure will develop independent of specific industrial structures (Pyke & Sengenberger 1992).

[4] Here I deal with regions as sub-national units.

[5] This analysis would actually need a panel analysis, as the impact of innovations on employment and turnover in general occurs some times later after the innovation has been introduced.

[6] Multiple answers possible.

[7] Groups means for four-group K-means cluster solution*

	Cluster			
Variable	1. 'Innovators' (n=133)	2. 'Strong competitors' (n=234)	3. 'Weak competitors' (n=163)	4. 'Marketers' (n=205)
Price	2.41	**4.22**	1.66	3.65
	6	6	4	3
After-sales service	2.85	**4.70**	0.92	2.91
	5	4	5	5
Quality	5.09	**5.47**	3.66	5.13
	1	1	1	2
Time of delivery	4.01	5.17	1.73	5.20
	3	2	3	1
Technical standards/ innovativeness	**4.83**	4.82	2.40	3.53
	2	3	2	4
User-friendly products	3.92	**4.57**	0.37	0.40
	4	5	7	6
Ecological aspects	2.24	**4.01**	0.52	0.60
	7	7	6	7

* Numbers in bold indicate the highest group centroid for that variable. The rank order of importance of this competitive factor within the group.

[8] To analyse global competitiveness, R&D-related indicators are quite often used. Here I use indicators that are related to the R&D budget and the R&D personnel. For both R&D budget and R&D personnel we constructed a static and a dynamic indicator. For the R&D budget I analyse how this has developed during the last five years (1990–1995). The static indicator measures R&D intensity; it compares companies' R&D budget with their turnover in 1995. Concerning R&D personnel, I also analyse how this has developed during the same period; the R&D intensity indicator compares the share of R&D personnel of the whole workforce in 1995.

[9] A product as well as a process innovation may be new only to the company that has introduced it, or also new to the market. Of course, companies will announce fewer innovations new to the market than those only new to them

[10] We differentiate between companies with an increase of both turnover and employment, those that increased turnover but reduced employment, and companies that reduced both turnover and employment. Furthermore, we split the first group of companies counting separately those companies that had an increase in both turnover and employment of more than 50 per cent concerning both aspects. They can be defined as highly competitive firms.

[11] A high share of companies which have a workforce of more than 50 per cent unskilled workers is seen as indicating low structural competitiveness.

[12] By intra-organisational practices we mean group work, profit or cost centres, flat hierarchies, and inter-disciplinary design teams. Inter-organizational practices included inter-organizational networking, just-in-time delivery, outsourcing and system suppliers, and quality practices included total quality management, benchmarking and ISO 9000 ff.

Antti Ainamo[1]

Nokia Corporation and the New Economy in Tampere

Introduction

Economic geographers and regional scientists have long tried to understand why and how economic growth tends to be concentrated into some exceptionally dynamic regions with the idea of 'growth poles'; that is, local agglomerations of large-scale industrial and other activities (Perroux 1970; Parr 1999). With advances in information and communication technology and the 'new economy', the theory of increasing returns was developed (Arthur 1996). According to this theory, information and communication have network effects by which their value grows rather than diminishes with use. In this framework, the critical aspect of agglomeration became global connectivity, rather than localised scale economies. Castells represented successful regions to be the dynamic outcomes of 'spaces of flows' rather than of geographically fixed 'spaces of places' as was the traditional conception (Castells 2000). A conceptual understanding has thus begun to emerge which states that a successful region benefits similar activities going on elsewhere, while the activities in other locations, in turn, benefit them (O'Callaghan 2002; Nachira 2002). Regional activities involve both internal 'learning' and external 'innovative' activities (Boekema et al. 2000).

However, while the conceptual understanding and describing of the new economy have thus advanced, as of yet there have been relatively few case studies of the precise ways of why and how the new economy, or the 'spaces of flows', actually impact on a particular region or specific actors within the region. In this paper,

we continue our work in the G-NIKE project (O'Callaghan 2002; Boisot 2002; Mansell & Ainamo 2003; Ainamo, Kasvio & Kukko 2003; Ainamo, Heinonen & Kasvio 2003; Dutton et al. 2004). In the spirit of the *longue durée* or the long-term (cf. Braudel 1982), we revisit the history of the city of Tampere, which in the old economy developed specialised manufacturing, knowledge production, localised learning, and innovation skills and competences in traditional industry, such as textiles, forestry, and machine industries. We focus on the role of the Nokia Corporation to show how and why this business organisation has been a regional champion actor that has served to balance exploitation of old competences developed in the Tampere Region in the past and exploration and exploitation of new competences in information and communication technologies. At the end of this paper, we will discuss the difficulty of drawing implications for public and private policy. We will also discuss why there is a need for research in terms of the key 'why' questions that appear to be interwoven into the case of Tampere and Nokia, on one hand, as well as experimentation and learning by doing across regions by which to feed data into such research, on the other hand.

The growth-node framework

Castells's macro conceptualisation of the world economy is that it consists of 'spaces of flows'; that is, money, people and information that are continuously moving from one place to another. O'Callaghan (2002) extends Castell's theses with the concept of 'growth-nodes'. He proposes that 'growth-nodes' are successful regions that engage in continuous production and sharing of knowledge both locally and with actors operating in other nodes. These kinds of regions attract complex and rich informational activities from organisations outside the region,

and also representatives to keep in contact with the region. On the inside of the region, they function as an integrated cluster of business processes that are, in a large part, organised locally (Castells 2000, 440–448). Within this view of both external and internal connectivity, these kinds of regions enjoy both economic growth by virtue of resources and energy flowing to it from the outside, and also prosperity by virtue of the effectiveness and efficiency of the ways that local activities are carried out (cf. Florida 2002). Information and communication technologies (ICT) and their use act as catalyst for connectivity. The catalytic potential of ICT works best when it is supported by face-to-face contact, social learning, and shared understanding about the institutions and rules of the game regarding the particular kinds of connectivity that are at play. It is, in part, by good fortune in terms of imprinting conditions and emergence, and also in part by the occasions created by historical path dependency, that some regions have become established as key nodes within the globally networked 'world system' (Meyer, Thomas, Boli & Ramirez 1997). The foregoing research ideas of a 'new economy', 'spaces of flows' and 'growth-node' are schematically summarised in Figure 1. On the basis of the above schematic understanding, it is clear that the Tampere Region, being the birthplace of Nokia (Häikiö 2001; Ainamo 1997; Lovio 1997), is a growth-node, at least to some broad extent (Mansell & Ainamo 2003; Ainamo, Kasvio & Heinonen 2003).

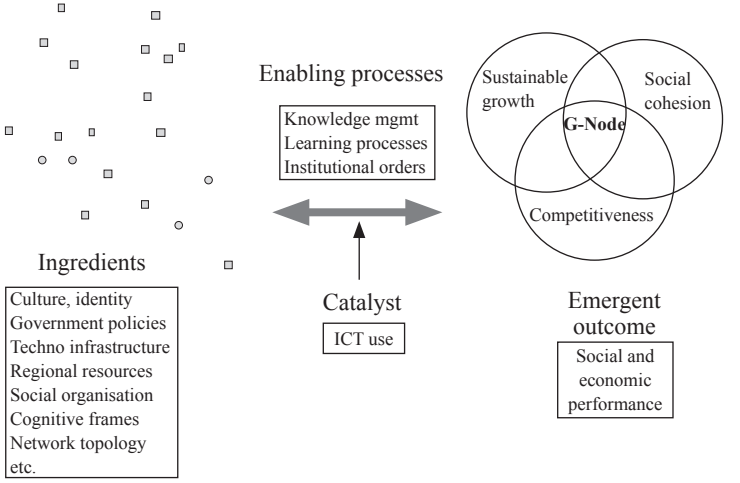

Figure 1. *Main features of a growth-node*
(Based on: O'Callahan 2002; Boisot 2003)

At the same time, and as this paper will attempt to make clear, the broad theme of external and internal connectivity at the macro-level takes several variations when more than one level of analysis is taken into account. On one hand, it is known from earlier studies that the theme of connectivity is supported in the occasions that technological standards or rules of the game are clearly established, and when organisations, representatives, and the actions and artefacts of these actors can operate seamlessly (Arthur 1996; Varian & Shapiro 1998). Organisations can also operate with other organisations and their representatives outside the region while still remaining 'close' in terms of ongoing organisational processes (cf. Uzzi 1997). Established standards enable companies to institutionalise the main rules of the game, thus freeing energy for pursuits other than thinking about these rules (Djelic & Ainamo 1999; Djelic & Quack 2003).

Organisational representatives, or other actors that fully share understanding of the underlying business and governance models that they are dealing with and the room for variation within those models, require only limited face-to-face contact on a daily basis (North 1981; Ainamo 2005).

On the other hand, there will always be occasions characterised by imperfectly shared understandings, where seamless activities are possible only to a lesser extent. To get other regions in the world system to connect to one another by connecting first and foremost with one's own region, (cf. Boli & Thomas 1997) can also demand visionary strategy and true skill (Djelic & Ainamo 1999, 635). The roles of 'social knowledge' (Mansell & Steinmueller 2000; Mansell & Ainamo 2002), 'personalised exchange' (Ainamo 2005), and face-to-face contact rise correspondingly with the increase in uncertainty and risk (Nummelin 2005). Thus, both the global macro-level and the local micro-level matter equally in all areas, especially in the long term. However, their significance can vary from one particular occasion to the next (Djelic & Quack 2003).

As we will show in the next section of this paper, in the Tampere Region Nokia has enjoyed specific occasions, traditions, advanced communication benefits, collaboration skills, competences and tools. This has made it possible to carry out various information and knowledge exchange projects and ways of working together in an effective manner, in terms of its general interaction with other organisations and actors in the Tampere Region as well as, more specifically, with its global operations with other locations.

Data and methods

This paper is one of the publications emerging from the G-NIKE (Growth Nodes in Knowledge-based Europe) project

(e.g. O'Callaghan 2002; Boisot 2002; Mansell & Ainamo 2003; Ainamo, Kasvio & Kukko 2003; Kasvio, Heinonen & Ainamo 2003) where, in 2002 and 2003, we collected and analysed data on five European regions – Barcelona, Brabant, London, Ruhr, and Tampere – for the purpose of creating a research roadmap for the European Commission. One of the starting points of this research collaboration was the fact that growth-nodes can be analysed as complex adaptive systems (see Boisot 2002; Ainamo et al. 2003). A second was the importance of 'social knowledge' (Mansell & Steinmueller 2000; Mansell & Ainamo 2003). Finally, a third starting point was that growth-nodes are 'nearly decomposable' (Simon 1982; Djelic & Ainamo 1999); that is, they are regions that are close to each other in terms of their business relationships, even though they may be geographically distant.

To analyse the Tampere case within G-NIKE, in 2002 and 2003 we gathered statistical information to support and/or confront the opinions and views given by the interviewees and other stakeholders in meetings held to further develop understanding of Tampere's rise into a world-class industrial cluster of research and industrial activities in ICT in the 1990s (Ainamo, Kasvio & Kukko 2003; cf. Castells & Himanen 2001).[2] We organised several meetings with local stakeholders in the city of Tampere, the core of the region. Within this context of data gathering, we carried out and transcribed five interviews with key city administrators in Tampere, which are listed in the references. The city administrators interviewed expressed their opinions as 'pure fact. Obviously, this kind of data puts a different bias on findings to those built on statistical data, but we believe that such a bias has a role in a thorough analysis of Tampere as a growth-node.' However, we favoured an ethnographic approach, i.e. a preference of secondary historical artefacts in local books and museums, stories and opinions told in meetings, and interview

data over alternative data and methods. We believed this would provide key insights, directions and guidelines about past policy choices and developments.

In the G-NIKE project of 2002 and 2003, our main intentions were to identify possible European growth-nodes, analyse their developmental dynamics and transform these experiences into more general policy guidelines. One way of looking at knowledge creation was to analyse how it works horizontally and vertically. In terms of these broad goals of G-Nike, by analysing our data we found that the vertical lines in the Tampere Region were in general functioning rather well. This was the case, for instance, within the institutions of education, inside companies as well as within the public sector. In the end, we found that the horizontal dimension posed more challenges: its operation depended largely on how people thought about society and the extent to which knowledge had spread from regional policy makers. This created the challenge of, as one city administrator told us, how to 'carry knowledge [of city administrators] to ordinary citizens'.

A point that came through from this analysis was that by analysing the cluster's knowledge creation processes, it was clear that Nokia's role in the regional innovation system of Tampere was important in describing (and explaining) the rise of Tampere's ICT cluster (Ainamo, Kasvio & Kukko 2003; as well as, more generally, the transformation of the Finnish system of innovation, cf. Castells & Himanen 2001; Ainamo 1997; Lovio 1993). Our initial expectation, as researchers of regional economy, had been that the local operations of Nokia, a global corporation, would function as a rather independent enclave in the local economy. However, our informants insisted that this was not the case. For them, Nokia's activities in Tampere were a key part, if not the key part, of the company's global operations in the view of these informants. To understand why this might be the case, we tracked

the co-evolution of Tampere and Nokia (Ainamo, Kasvio & Kukko 2003), a story which we will revisit here for the purposes of further elaboration.

Nokia's imprinting conditions and evolution in the Tampere Region

Going back in time, the self-organised emergence of a dynamically developing ICT cluster in Tampere was hardly a self-evident outcome. With a slowly growing population of three hundred thousand in 2005, Tampere has always been a rather small city, far away from the world's leading centres of high-technology industry. The climatic conditions are not very cosy – a fact that holds especially true in wintertime – and for most foreigners the Finnish language is a rather exotic means of communication. In partial contrast to the above limits of geography, location, and climate, for more than a hundred years Tampere has been a place with development of specialised industrial expertise and skills. The city was founded in the 19th century, and given a strategic location by the Tammerkoski rapids that served to power machinery for a textiles industry. Tampere quickly developed into Finland's leading manufacturing centre with forest industry, machinery and automation as the leading branches. Nationally Tampere became known as a modern and growth-oriented city with an interesting cultural atmosphere, and received immigrants from other parts of the country, and abroad.

The Nokia Corporation also traces its existence to the time and place above. Nokia takes its name from a rubber-processing factory, high technology at the time, that was established in 1865 in the township of Nokia, twenty kilometres westwards from the city of Tampere (cf. Häikiö 2002, 49–51). Many of the early meetings of what is now known as the Nokia Group were held at the Tammer Hotel in downtown Tampere, which

was a key breeding ground for information exchange between business entrepreneurs and other key stakeholders in the Tampere Region. Exchanges between all stakeholders were not always as cooperative. A strong working-class movement emerged as an integral part of the strong industrial culture that was developed. Tampere became the capital city of the 'reds', or communists and socialists of the country, that rebelled against the oppression of the monarchist and capitalist 'whites' in the bloody Civil War of Finland, from 1917–18.

During and after the Second World War, the types of close local social networks that had characterised the relationships between industry and city administration became characteristic across different sectors of the community. The culture that emerged was that 'everything depends on cooperation', 'there is strong trust between the actors and versatility' which were 'further influenced by history as an industrial city' and 'a broad variety of possible leisure activities' (including active theatre, sports, music, and political scenes) (G-NIKE stakeholders meeting 2003).

The above fusion of engineering and administration and leisure culture also came to characterise Nokia's activities, which emerged in the region in tandem with the other collaborative networks that grew between local companies and other local stakeholders. When the University of Tampere was established in 1960 (see e.g. Kostiainen 2002, 235–242), it provided a new site for such new areas as usability research, technical communication, software design, programming etc., for the emergent electronics industry of Finland. Nokia's operations in the electronics business date back to the same year (cf. Lovio 1993). The Tampere University of Technology was established in 1966, and became another key agent in the technological development of Nokia and the Tampere Region. Digital signal processing, developed at the city's two universities, became one of local industrial strengths of location.[3] Finland faced structural challenges such as

heavy taxation, a high rate of unemployment and modest levels of productivity in traditional economic sectors (e.g. IMF 2002; OECD 2003; Employment Working Group 2003). The technical university started to develop information technology as its main focus area (Kostiainen 242–249). This was fortunate as, from the 1970s and 1980s, like several other manufacturing centres in Finland, Tampere experienced a decline of its traditional textile industry. Unemployment rose to a high level, especially during the early 1990s.

Finland, Nokia and Tampere in the 1990s

While many other western European countries also faced similar structural challenges, Finland's situation in the early 1990s became the direst. In 1991 the Soviet Union was a source of much export revenue for Finland's economy. The fall of this empire was a major source of economic and societal shock all around Finland. Finland went through a serious economic crisis in the early 1990s (e.g. IMF 2001).

The rise of Nokia

It was during this time that Nokia began to transform itself from a largely traditional-industry conglomerate into the world's leading manufacturer of mobile phones (see e.g. Lovio 1993; Pulkkinen 1997; Ainamo 1997; Häikiö 2002; Ainamo, Kasvio & Kukko 2003). The electronics industry activities created in Finland in the early 1990s were concentrated to a large extent in a few growth centres such as Helsinki-Espoo, the Salo region, Tampere and Oulu (Sotarauta & al. 2002; Chakrabarti 2003). Nokia's executives were well aware of the existence of a specialised skill pool and culture of local collaboration in the Tampere Region. Collaboration with the local innovation system was

institutionalised in terms of global projects with professors at the Tampere University of Technology, sponsored by Nokia and some other companies. Nokia's research directors divided their time between academic work within the university and project work at Nokia's research centre. For instance, Yrjö Neuvo studied and worked for eighteen years at the Tampere Technical University before becoming vice president for technology at the Nokia Corporation. The cooperation with other companies, the local technology centre, the technical university and the major research institutions functioned very fluently, and the cost of hiring IT professionals was reasonable for Nokia. Tampere was a small city, but it had an international airport and well-functioning transport connections to other parts of the world. The Tampere Region developed into a central location for Nokia's digital signal processing and some other R&D activities at Nokia. The local ICT cluster functioned as the main motor of the region's economic development.

During the economic recession, social and regional disparities opened up and deepened in Finland (see e.g. Information Society Advisory Board 2000, 43–54; Castells & Himanen 2002, 81–85; Blom et al. 2002). The emergence and growth of a 'new economy', characterised by spaces of flows and scale economies, led to increasing returns for some people and decreasing returns for others. Despite serious turbulences in worldwide telecommunications, Nokia was able to maintain a very robust level of profitability and to redistribute wealth to its employees and stakeholders. Between the years 1994 and 2000, Nokia made a global breakthrough. It became the world's largest manufacturer of mobile phones. The growth rate of the Finnish economy rose to almost five percent. The number of ICT jobs in the Tampere Region increased two and a half fold. The growth was also expected to continue at a high level in future; after all the whole world seemed to be moving towards a wireless information society

in which everybody would be continuously on-line. Nokia was expected to function as one of the main providers of the devices and applications that would be needed in the realisation of that vision, and Finland was expected to serve as a living laboratory in which the new solutions would be taken into use before others (see e.g. Silberman 1999). The introduction of third generation mobile telephones was seen as an important step towards a new era. Nokia became classified as a socially responsible corporate player of Europe's 'new economy' that collaborated extensively both locally and worldwide with others, and a paradigmatic example of what the modern networked enterprise should be like (Castells 2002, 72–73).

Tampere's reputation grew more slowly than that of Finland

Finland's economic growth began to be concentrated very much around the telecommunications cluster. The rate of productivity growth in Finland rose during the late 1990s, higher than in the United States (Jalava & Pohjola 2001; Paija 2001). The whole Finnish economy became dominated to a large extent by Nokia. The company's market value was about one half of the total market value of all companies quoted at the Helsinki stock exchange, and a large majority of the total turnover within that exchange consisted of trade with Nokia's stocks. Even when Nokia employed less than one per cent of the country's total labour force, its R&D accounted for roughly one half of Finland's total private sector R&D expenditures (Ali-Yrkkö & Hermans 2002, 2). The growth of Nokia's business contributed about one third of Finland's yearly GDP growth during the late 1990s (see Ali-Yrkkö et al. 2000). Finland was ranked highly, both in terms of overall competitiveness (World Economic Forum 2003a; IMD 2002) and networked readiness (World Economic Forum 2003b). The information sector share grew by sixty percent from 1995 to 2000. Besides Nokia, other strong players in this sector included

Fujitsu, which was actually Nokia Data before it was sold to ICL and Fujitsu. Finland's leading tele-operators TeliaSonera and Elisa had R&D activities in Tampere. Alma Media was a leading Finnish media company, particularly strong in business journalism and digital media. The Finnish broadcasting company Yle located one of its two national TV channels in Tampere. The amount of jobs available had increased by 21.9 per cent.

If we compare Tampere's figures with those of the rest of Finland, the difference is notable. The information sector share in 2000 was 9.3 per cent and the increase in jobs was 15.7 per cent (Association of Finnish Local and Regional Authorities 2002). A full sixty-nine per cent of people in Tampere had an email address and almost three out of four had an Internet connection (Taloustutkimus 2002). The share of people connected daily or almost daily to the Internet was fifty-seven per cent. Most of this usage dealt with sending or receiving email or looking for information with search engines (Taloustutkimus 2002). The use of ICT among the ordinary citizens in Tampere had been self-organised, but could be made increasingly policy-led.

Nonetheless, to a high degree Tampere remained a typical second city, in the sense that Finland's public sector organisations, most company headquarters, professional services and national cultural institutions remained in the capital-city region of Helsinki. The headquarters of Nokia had long since moved there, and the company's main Finnish production facilities were in Salo, whereas the local presence of national headquarters of foreign companies in Tampere was limited. Tampere continued to suffer from problems caused by the decline of its traditional industries. The rate of unemployment in the Tampere Region remained at a somewhat higher level than was the national average. The growth of the ICT business opened new job opportunities mainly for the better qualified people, but many of the region's job-seekers who were without

any particular skills remained unemployed. Tampere functioned principally as a location for R&D activities, such as those in digital-signal processing. Within this context, local teleoperators, other business enterprises and public authorities became eager to organise developmental processes with national and European research funding bodies, such as Tekes, the Academy of Finland and, later, the 'information and social technologies' (IST) programme of the European Commission. The local actors shared the conviction that the use of computers and the Internet was a good indicator in judging how deep information, communication and technology had enabled 'design for the information society' (cf. Ainamo & Pantzar 2000) and penetrated ordinary citizens' lives. For them, Tampere was an example of how regions other than Helsinki, the national capital, had 'not yet' experienced the expected growth effects that were to follow from developments at Nokia which, moreover, was the 'local company'. As weak signs of 'arrival' on a higher plateau in the near future, they underlined that by autumn 2002 about sixty-nine percent of the Tampere population had a computer at their disposal. Half of the people had a computer at work. Less than twenty percent said that they do not have a computer at their disposal.

Rising recognition as a model

The Tampere public administrators knew that their city had successfully undergone a challenging process of industrial transformation. The region's leading companies, universities and research institutions had intimate contact with one another. Thousands of good jobs had been created in the fast-growing sectors related to performing technological development in the information and communication technology sector of the economy during the late 1990s. Also, local and regional authorities, as well as some national research funding bodies such as the National Technology Agency, Tekes, and the Finnish Fund

for Research and Development, Sitra, had exerted an active role in the execution of these transformation processes (Kostiainen 2002, 249–254). The region had built a good image both among businesses and the citizens of Finland, and the financial situation of the local city had also improved significantly because of the increasing tax incomes.

They also knew that despite its process of successful transformation, few new business activities had been developed in information and communication technology, or in any yet new businesses such as in digital media or biotechnology. The restructuring had been based upon the region's traditional strengths, so that forest industry engineering and related industrial automation had maintained their role as central areas of expertise. Within this context, in spring 2000 the city administrators discussed the possibility of starting new active measures with the target of continuing and strengthening further the development of the information society within the region. They were able to raise the interest of world famous regional economists Castells and Pekka Himanen, who perceived that Tampere might be a potential model region in terms of the synergies to be gained from cross-pollination between the 'new economy' and the welfare state – a proposition that these two recognised scholars tested and could then accept (Castells & Himanen 2001, 10–18, 140–150). The proof for this proposition included the fact that the share of the Tampere Region in the R&D costs in Finland in 1998 was over ten percent. In terms of R&D expenses in proportion to population, the Tampere Region was the first in Finland (FIM 8,477 or EUR 1,426 per inhabitant) and the Helsinki Region came in second place (FIM 7,656 or EUR 1,288 per inhabitant). The Finnish average was FIM 3,866 or EUR 650 per inhabitant. The businesses in the Tampere Region invested an aggregate sum of FIM 681.4 million or EUR 114.60 million in their R&D operations. In 1999, the national aggregate estimate

of R&D costs was FIM 22.3 billion or EUR 3.8 billion, of which Nokia's share was FIM 6 million or EUR 1 million (The Council of Tampere Region 2000).

The core political idea that emerged out of a growing international reputation was to develop strategic co-operation between local stakeholders in order to strengthen the region's economic growth and to distribute the benefits in a socially beneficial manner. The City of Tampere carried out a number of interesting experimental projects to study how to bring about a prototype for a new kind of society, using Tampere as a unique laboratory. As an example, it distributed five thousand smart cards, which people could use to pay for different kinds of delivery and various public services (e.g. fee for the swimming pool and use of public transportation) in the Tampere area.

The city administrators desired to increase their share of the redistribution of wealth further than one-off experimental projects. They designed a five-year programme in January 2001 called the 'eTampere' programme, which was launched in autumn 2002 (Kostiainen 2002). The mission was to invite different actors into strategic collaboration to continue growth of new economic activities and the use of the new ICT in a manner that would help achieve the social, cultural and environmental objectives of the region's future development. Tampere was to be transformed into one of Europe's most advanced information cities by the end of 2005, a significant amount of new ICT jobs were to be created, and unemployment was to be reduced. New information and communication technologies were to be utilised in a manner that would strengthen social cohesion and open new possibilities for active citizen participation (City of Tampere 2000). The city was to make the initial financial inputs, while the local business community, and the region's leading research institutions and universities, were to participate actively to realise the programme's objectives.

The fall of the inflated valuations in mobile telephony and dot.com

During the 1990s, Europe fell badly behind the United States in terms of general economic development and also in terms of the use of new information and communication technologies. The growth of a 'new economy' remained mostly an American phenomenon (e.g. OECD 2000, 61–71). In spring 2000, the European Commission responded to these developments with ambitious plans to re-mobilise Europe's economic development, deciding in Lisbon that Europe shall be transformed into the world's most competitive economy by the year 2010. The plan was do this in a socially and environmentally responsible manner (see European Council 2000). Despite this plan, Europe has developed modestly in economic terms during the first years of this decade, and fell further behind the United States, for instance, in terms of productivity growth (van Ark, Inklaar & McGuckin 2003; EU Commission 2004). The optimistic expectations that had triggered the eTampere programme collapsed with the burst of the dot.com bubble in 2001. There was a crisis in the entire worldwide ICT sector. In Finland Sonera, the leading Finnish teleoperator of the time, was driven into major difficulties after the huge investments it had made in German UMTS licences in particular, and in autumn 2002 it was merged into the Swedish Telia. Many smaller Finnish ICT companies also suffered serious losses and were forced to cut down their operations. The growth of Finland's economy slowed down with the rate of unemployment on the rise again after having bottomed at about nine percent.

Furthermore, in the space of two years Nokia's market value fell to less than one quarter of the highest reached in spring 2000. It aggressively pursued productivity gains, cutting down on its operations in Tampere also. Once Nokia's situation started to improve again, it continued to expand its activities mainly

abroad, rather than in Tampere or in the other locations within Finland (cf. OECD 2003; IMF 2003). Nokia, or the rest of the ICT cluster, never cut down on R&D activities as dramatically as many other companies did in their manufacturing activities in other sectors in Tampere, but they stopped recruiting new personnel. While the financial situation of the city remained fairly healthy, the difference in contrast to expectations was huge. The number of Nokia's employees within the region stayed well below three thousand people, a miniscule part of the total labour force of the city of 300,000 inhabitants, and the surrounding region.

The local Chamber of Commerce conducted a study in 2002 to map the current 'e-state' of SME companies in the local region, vis-à-vis the broad goals of the programme. The results were not very promising. Utilisation of Internet connections remained 'quite limited' (e-Business Research Centre 2002). 'eTampere' had reached only a minority of the local businesses; only twenty-six percent of the businesses interviewed had ever participated in any of the 'eTampere' programme projects in any active way (ICT Barometer 2002) before most of the momentum of the 'eTampere' programme had already been lost. It was small consolation that this meant that companies in the region could 'still be satisfied' with the possibilities of recruiting skilled personnel (ICT Barometer 2003).

Local stakeholders' reflections

While an outsider might have argued that the various 'eTampere' projects were, on balance, not formidably successful, those on the inside of the region thought otherwise. Local regional identity was strengthened (Ainamo, Kasvio & Kukko 2003). The regard for Tampere within the Nokia Corporation increased (see e.g. Ainamo, Tainio & Moilanen 2005; Ainamo & Tainio 2005). With the 'eTampere' programme, the connections between Nokia and Tampere became explicitly discussed and reflected upon.

Perhaps for the first time, regional actors explicitly discussed why and how social and geographical proximity had transformed into a means of localised collective learning in Tampere. While ICT companies operating within the Tampere Region had their headquarters elsewhere, this had not prevented the local ICT node from developing its own particular features and competitive strengths. Actors within the local ICT cluster had learned to enjoy a certain amount of functional autonomy, which they have used, for instance, in developing collaboration with other instances in the region (Ainamo, Kasvio & Kukko 2003; Kosonen 2001). The 'eTampere' projects and the activities of the local Chamber of Commerce had provided forums for frequent exchange between the representatives of different enterprises, academic institutions and regional authorities.

The local city administrators still saw a growing trend in the region's ICT business, in the attractiveness of the 'living region', the growth of the population and the good relations of co-operation between business life and universities, as key reasons for the city's transformation into an ICT-based growth-node. As one interviewee put it, one 'must not forget that the Tampere spirit is about much more than just ICT' (G-NIKE stakeholders' meeting 2003). The city administrators emphasised Nokia's collaboration in Tampere with IBM, Cisco, SAP, Fujitsu and TietoEnator, for example, on new kinds of mobile platforms for different business users and for public sector organisations (Ainamo, Kasvio & Kukko 2003). Nokia and its SME subcontractors within the region were developing new wireless applications for large-scale industrial facilities and for office uses (Kukko & Ainamo 2004).

Nokia collaborated more openly than ever before with other companies within the region. It continuously exchanged information with the region's universities, research institutes and other educational institutions, especially polytechnics, which were trying to supply the company with adequate amounts of

electrical engineers, programmers and other types of skilled labour force. Nokia acknowledged that it had initiated and carried out all the way through to delivery development projects entirely within Tampere. Many projects had been carried out at least partly with the help of external funding and in collaboration with other companies, universities and/or research institutes. In partial contrast, projects that had not been based solely on local technological expertise but also needed business-critical technologies that could be found only from elsewhere had, obviously, also required expertise and skills from Espoo, Oulu, Dallas and Beijing, for example (G-NIKE stakeholders 2003). From 2004, Nokia's representatives were also open for the first time about the fact that the company's Tampere unit had to a large extent, with Nokia's units in Oulu, developed among other things the first Nokia 'Communicator' or multimedia device (see Ainamo, Kasvio & Kukko 2003) and the first GSM imaging phone (Ainamo, Tainio & Moilanen 2005; Ainamo & Tainio 005).

In summary, the advantage of 'eTampere' for many local stakeholders in both city administration and within Nokia was due to the fact that most of the key actors had been around from the start, and could profit from the advantage of knowing each other fairly well and the resulting mutual trust. While this development created the risk of having proceeded a little too far in that there are signs of too many small inclusive clubs where the mutual pecking orders mattered more than business concerns, the general feeling was nonetheless that the well functioning relations of co-operation and trust undoubtedly enabled effective knowledge creation and learning in terms of ICT technology to take place (G-NIKE stakeholders' meeting 2003).

Conclusions

Company networks have begun to function as the key movers of contemporary economic development (Castells 2000, 214). With their profits squeezed, large firms formerly responsible for being the key movers of contemporary economic development are trying to focus their business activities into only the most strategic areas, and in adopting such a strategy they become involved in numerous networks and consortia in which they share responsibilities with other corporate actors (Castells 2000, 187; Castells 2002, 67–72; Nachira 2002). While there has been research on the transfer of manufacturing into low-cost locations and local collaboration by relatively small and flexible enterprises, there have been few case studies of the role of local champion firms in a regional economy, such as the role of Nokia in the Tampere Region (Ainamo, Kasvio and Kukko 2003; see Ainamo and Cardwell 1998 for the role of Hansabank in the regional economy of the Baltic countries).

This paper contributes to the new understanding that a successful region is not only a large agglomeration of resources but also a 'growth-node'; that is, a platform for external connectivity and cross-fertilisation of innovation, lessons, and competences between internal and external environments that result in innovation and learning. We can thus conclude that the analysis presented in this paper shows that the 'spaces of flows' and the growth-node approach provide useful conceptual tools that are operationalisable when we are trying to understand today's world-system and dynamically developing businesses and regions within it. The growth-node concept is a way of explaining why and how the particular features of today's world system, new economy, and 'spaces of flows' impact upon a particular region, and what policy makers and other actors within that region can do about it. 'Spaces of flows' and 'growth-nodes' appear to involve

very complex processes where many kinds of factors contribute to the final outcome.

Positive synergies appear to exist between the 'new economy' and the welfare state, for example, but these synergies are neither realised automatically nor easily captured. Relatively fast growth rates for a few years time do not appear to guarantee that the growth will continue on such a high level in the future also. In the highly volatile economic conditions of 'spaces of flows', one year's winners may surprisingly turn into the next one's losers, and vice versa. Analysis of the histories and co-evolution of Tampere and Nokia in *the longue durée* suggest that the emergence of growth-nodes can be a self-organising process, but it can also, in part, be facilitated through agency and strategic cooperation between the key actors. In Tampere, action was needed at various levels: at local, regional and at national and corporate levels. Challenges arose due to the fact that the objectives of key actors differed at least to some extent from each other. Some actors paid attention primarily to the region's characteristics as a business location, whereas others put the emphasis upon social or cultural development objectives. Inside the latter group, some actors were actively concerned with the spreading of new affluence across the whole region, whereas others tended to look at the growth strategies mainly from the perspective of the region's central areas. Despite these obvious challenges, a history of working together, the presence of high-level R&D resources, a well developed transport and communication infrastructure, a good supply of skilled labour force, possibility to find competent local cooperating partners and the existence of signals of a local cultural atmosphere favourable attitude towards business activities (G-Nike 2 2003; for comparison see also Porter 2002) worked to secure a good localised platform of various catalytic, social, and institutional ingredients, as well as a productive, sustainable, and good working environment for a global firm like Nokia.

Taking into account the highly complex character of the actual developmental processes it is not reasonable to present any general policy guidelines or strategies of action through which new growth-nodes could be created. It remains a challenge for policy-making practitioners to find ways to renew the existing institutional arrangements through which the requirements of economic efficiency, social solidarity and environmental sustainability could be reconciled successfully with each other. Findings of the G-NIKE final report (2003) suggest that every region must find its own strengths and particular ways of mobilising these strengths in a manner that is in accordance with the overall objectives of Europe's social and economic policy for the coming years. Instead of trying to copy recipes of success, it is more advisable to try to create spaces for mutual learning and to open new channels for a lively exchange of experiences between the different European regions that are striving towards similar goals. One concrete case study blending longitudinal and active research serves to underline the need for research on the concept of the growth-node, in terms of increasing understanding of the ingredients, enablers, and drivers that make for exceptionally well performing economic regions. It can be used as one reference point for studies using the case study method, as well as for studies using alternative research methods.

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Endnotes

[1] The author wishes to thank Francesco Nachira and the European Commission IST program for resourcing the G-NIKE projects, the G-NIKE main researchers – Manuel Castells, Max Boisot, Jo Groebel, Antti Kasvio, Robyn Mansell, Ramón O'Callaghan, Martin Smids – the other members of the Tampere team – Marja Heinonen, Marianne Kukko, and Carolina Pajula – as well as Mikkel Ovenby who provided useful comments when finalising the paper.

[2] The research is based upon materials gathered at Information Society Institute, University of Tampere as part of the EU-funded road mapping project G-Nike realised during the years 2002–2003. The project was led by the Open University of Catalonia. The materials consist of e.g. semi-structured interviews, documentary materials, statistics etc. and they have been gathered by Marianne Kukko, Carolina Pajula and Marja Heinonen

[3] Within this area the expertise hasn't recently come only from local sources. For instance the Tampere Technical University has been able to attract lots of excellent mathematicians from the former Soviet Republics and Rumania. Also Nokia's R&D personnel in Tampere is nowadays fairly multinational.

III
Historical Perspective

Pertti Haapala

History of Tampere: The Very Long Road to Informational City

The perspective

Historians do not usually believe in historical continuity, instead they consider it their duty to remind and warn wider audiences not to rely too much on linear development. There is evidence enough to claim that historical processes are mostly based on unexpected changes and that the prediction of the future has been for the most part a series of Utopias. On the other hand hopes for and fears of the future seem to be very similar from time to time. The logic determining how people analyse their conditions and possible futures and intentions repeats itself. Perhaps it is one of the lessons of history that our patterns of thinking change surprisingly slowly – even in the Information Age.

When we look back on 200 years of economic history, we can easily find analogies to the current world and to our expected future. None of the features of social developments, which now have new names (such as globalisation, competition, networks, knowledge, information, social capital, innovation, communication, regulation etc.) are new phenomena. People in the 19th century realised, for example, that success in business was based on knowledge, calculation and markets, not simply on material resources and regulation. It is a typical blind spot in historical understanding that we describe our world by representing the past as something different from, often exactly opposite of, today.

I make these remarks to justify my standpoint that looking at history might offer rewards even if we do not believe in the

possibility of finding the true past or any precise advice for the future. Past experiences offer at least interesting analogies which may clarify our understanding of the current world. Thus, the short history of Tampere below does not try to make a full analysis of a historical process, but rather brings together a selection of facts, features and conclusions which seem to relate to the theme of the book: what the informational city is about and how it has become feasible. This analysis focuses on infrastructure, economic networks and institutions and their more or less accidental changes and interplay, and regards the history of industrial society as a history of changing contexts rather than a study of the stages of development. The history of Tampere is analysed in three dimensions: as empirical economic history with actors and resources, as an experience with subjects and as conceptual history of an industrial society concerned with making generalisations about the development of the city (about the approach, cf. Haapala 2004).

The city of Tampere was founded in 1779, about the same time as the USA, and a decade before the French Revolution. These last two historical events are usually regarded as representing great shifts in the history of Western societies, i.e. the emergence of capitalism and democracy. In the case of Tampere, these big events had no immediate impact, but in the long run the social change in Tampere followed the same patterns as in all industrialising countries. In the first history of Tampere, written by Väinö Voionmaa one hundred years ago, the author takes the outspoken perspective of the birth of industrial capitalism and democracy. Besides economic factors, living conditions and political mobilisation, Voionmaa emphasised the role of the education of the masses. For him, a moderate socialist himself, the labour movement was 'fruit of the 19th century economic progress, democracy and education'. Though critical to capitalism, his idea of combining economic growth and civilisation was a

fresh and clear view compared to later historiography in which the ideas of class struggle and nationalism have dominated the historical imagination (Voionmaa 1903–1907, cit. Voionmaa 1936, 10).

Another striking point in Voionmaa's analysis was that he paid no attention to the fact that Finland and Tampere were located in a European periphery. Perhaps, as a specialist in economic geography, he was interested not in distances but in connections and communications, and how they change society.

In today's perspective, Voionmaa made two interesting conclusions. First, the location of Finland on the European periphery did not offer a relevant explanation for the economic history in the time of 'poor communication'. In fact Tampere was surprisingly well connected to European flows of production and information, and its industrialisation followed the same major patterns as elsewhere. Secondly, he based his idea of social progress on the same variables, i.e. economic growth, active civic society and broad education, which shape today's idea of the 'democratic information society'.

The beginning

The industrial history of Tampere began with high hopes. The city was founded as a 'free city'. The charter of the city, given in 1779 by Gustavus III, the king of Sweden, granted the coming inhabitants several special privileges in order to encourage economic activity in the area. Tampere was to become a new centre of commerce and industry in Finland, the first major inland city of its kind. Among the many chartered privileges (mostly involving lowered taxation) the most important liberated the city from guild regulations. Every man was free to move in and start an enterprise. The only problem seemed to be the fear

that the city would grow too rapidly – the charter provided for lots only for 400 inhabitants.*

Unfortunately the idea, state-ordered freedom of enterprise, did not work. Only a few artisans moved to Tampere, and, as soon as people were settled, they founded guilds and began to regulate the economic activity in the city, that is, the number of workers and burghers, trade and prices. One of the innovations of the time was to set maximum wages for workers in order to impede 'unhealthy competition'. In that way the burghers – within the privilege of local self-governance – secured their livelihood. Their action was absolutely rational and accepted by the community. As a prominent member of the city court explained, 'it certainly is not the purpose of the Emperor that the burghers eat each other' (cit. Wallin 1902, 34). Despite its status as a free city, Tampere never experienced a boom of small-scale industry. Growth came only at the end of the 19th century as a result of the population growth and new demand, both outcomes of big industry.

How did the crown of Sweden get the idea to build a new city between two lakes, but actually in the middle of nowhere – the site of only a tiny village, some flour mills and an annual fair for rural people? The area could lay claim neither to industrial activity, merchants nor remarkable manors generating industrial activity, such as saw mills or iron works. Still, the crown hoped to make Tampere a centre of iron production. Planners expected

* The text here is based on my long-time (and still ongoing) work on the history of industrial communities. References to original sources and company histories are left out here. Much has been written about the overall history of the city but no works analyse on any conceptual level the city's economic history before the 1990s. The article by Sotarauta and Kostiainen (2003) is an informative exception but their historical analysis relies too much on inadequate literature and lacks broader national context. A basic history on the technological development in Tampere is *Tekniikan Tampere* (1993).

to find plenty of iron ore in the lakes, ore that could be smelted in furnaces fuelled by the charcoal available in the surrounding forests. The ultimate goal was to increase state revenue by exporting iron, which was so important for the kingdom of Sweden throughout the 18th century (Voionmaa 1903).

That policy failed, too, because of the lack of resources, and Tampere remained a tiny village of few hundred people. The only larger business in the city was a state distillery. The crown maintained a monopoly in producing and selling spirits. The state distilleries bought grain from the farmers and sold them back alcohol at a good price. Even that enterprise proved to be a poor business. It was a mere accident but illustrative enough that the first lease holder of the state distillery of Tampere was executed as a rebel by Gustavus III in 1790. The incident cost the king his life two years later.

Another beginning

Things began to change in Tampere only after Finland was annexed to Russia in 1809 as a result of the Napoleonic wars. The occupation of Finland was based on the agreement between Napoleon and Alexander I in Tilsit in 1807. Though Finland became a Grand Duchy of Russia, the Swedish legislation in Finland stayed in force, and the institutions were not Russified. Instead, Finland enjoyed a central administration of her own including the senate, state budget, customs area and economic policy. All this autonomy affected Tampere greatly, especially when Alexander I reinforced the privileges of the city of Tampere. He visited the city, and a memorial plaque of the time tells how he 'ordered the natural forces, the rapids of Tampere, to serve the purposes of man' (Voionmaa 1905).

The words of the Emperor did not help much. Anyway, the government, the new senate of Finland, and the Emperor,

intended to develop Tampere along the lines of the Privilegium Tammerfors, i.e. encouraging economic growth through freedom of enterprise. The new letter of privilege included exemption from customs fees for importing machinery and raw materials from the Western countries. Here lay quite an opportunity, because Russia had high barriers for trade. Unfortunately there were no capitalists in Tampere who could take advantage of these benefits – until James Finlayson came to town in 1820.

Finlayson was a Scotsman who had moved to Russia and served as a director of imperial cotton mills in St. Petersburg. His connections to Finland and Tampere were based, however, on the Quaker community. After becoming aware of the possibilities in Tampere, Finlayson applied for and received a state privilege to found a machine shop, and later a cotton mill. His privilege included the land by the rapids, licence to hydro-power, and release from customs fees in importing machinery and raw materials and in exporting goods to Russia. To start a business he was given a generous state loan. His vision was now to make Tampere a centre of machine manufacture. What happened? Almost nothing. Finlayson proved to be a poor businessman, and, after many tries, he gave up. His small business went bankrupt, and he left for Scotland in 1835 (Lindfors 1938).

Again, Tampere did not seem to be an ideal place for large-scale industries. There were the river and rapids, but nothing else – no raw materials, no skilled labour force and poor communications. Later historiography has often repeated the story of Tampere's exceptional natural resources, i.e. the chance to exploit the rapids as a cheap energy resource. That explanation forgets some important facts: Finland was full of rapids; the steam engine was in wide use already; and, above all, no one had yet devised a scheme to make use of that imagined resource.

Greater forces

The third start of industrial development in Tampere began in the late 1830s, sixty years after the founding of the city and thirty years after the annexation of Finland to Russia. Two Baltic-German businessmen who lived in Russia, Carl Nottbeck, a merchant of textiles, and Carl Rauch, a personal physician of the Emperor, bought James Finlayson's company. What they actually got was the privileges of the company. They received some new privileges as well, such as freedom of religion and freedom from taxes for foreign specialists. Nottbeck and Rauch began big business in Tampere and built the first real factory in Finland, a cotton mill starting with 500 workers. They succeeded in creating the largest and the most profitable company in 19th-century Scandinavia. Finlayson & Company (the name was retained) was a modern capitalist enterprise bringing together strict calculations of productivity, technological innovations and market analysis. The number of workers soon exceeded 1,000 and grew to 3,000 by the end of the century (Haapala 1986, 22–33; Rasila 1984).

Nottbeck and Rauch themselves had no big fortunes, but they were financed by the state of Russia and by some British investors. In practice, all the start-up money came from European banking houses such as Rothschild. Machines for the new cotton mill were imported from Belgium and Germany, technicians and foremen came from Britain and Sweden, and the bookkeeper was a German protestant. The raw material, cotton, was imported from the USA and brought from the coast of Finland to Tampere by horse, and later on railways. Most importantly, the products found a market in St.Petersburg, the rapidly growing Russian capital. The demand was strong, the prices were good, and, in particular, the Finnish-produced goods were protected from Western competition (Lindfors 1938; Heikkinen 1994, 127 ff.).

The resource basis of the new start of the Finlayson company was more than typical. The only local resource was the labour force, made up mostly of children of rural workers from the nearby countryside. All technology and know-how had to be imported. In those days that meant people coming to Finland, and soon Tampere had a small and a highly respected community of foreigners who did not associate much with local people. The Nottbeck family moved to Tampere but lived in luxurious privacy, spending much of their time out of the country and educating all their children abroad (Rasila 1984).

The success of Finlayson & Co encouraged other entrepreneurs to begin their business in Tampere. Without repeating the history of other companies, we can safely conclude that, without the conditions that benefited Finlayson & Co, most importantly the institutional position of Finland as a Grand Duchy of Russia, Tampere would not have industrialised as early, as quickly or in the way it did. In 1900 the number of factory workers in Tampere exceeded 10.000, most of them employed in textiles, metal works and paper mills (Haapala 1986; Rasila 1984).

In present-day terms, Tampere was made a 'special economic zone'. The privileges enjoyed by Finlayson and the city practically negated all existing legislation. The only way to encourage industrialisation in the regulated economy was to grant special privileges. Thus the successful industrialisation of Tampere was not a victory for free competition or an open economy, but instead depended on direct and indirect support from the state. On the other hand, the tool for generating growth was the free movement of people, capital and information, especially when almost all resources had to be imported. In its own limited way the 19th-century Tampere was an open economy and society.

So Tampere was an exception, but not as great an exception as is usually believed. All Finnish producers benefited from

reduced tariffs when exporting to Russia while in many cases Russia imposed on Western products tariffs of 70% or even higher. Russian entrepreneurs and politicians often criticised Finland's special position, but without result. Finland remained a separate and privileged customs area until its independence at the end of 1917 (Heikkinen 1994). A major question mark is, of course, why the Emperor favoured industrialisation in Finland – and often at the expense of Russian entrepreneurs. The motive was simple: Finland was regarded as an essential and eternal part of the Empire. It was close to the capital and, compared to other parts of Russia, rather well developed. Thus the success of the Finnish economy would strengthen the Empire and help it compete with other nations. The political goal of granting Finland special status was to pacify Finland, separate Finland from Sweden and reward Finns for their loyalty. As Nicholas I put it: 'Finland is the only province in my great realm which has caused me no anxiety or dissatisfaction.' It is contradictory only in a later political and ideological perspective that the interests of Russia were such a key factor in the industrialisation of Finland.

The growth of industry in 19th-century Tampere shared many features with colonial economies: the dominance of outsiders, the importance of foreign resources and the exploitation of cheap local labour. But, in fact, development went in quite a different direction. Russia occupied Finland but did not colonialise it: industrialisation was not based on local material resources, and there was no capital flow out of the country. And above all, industrialisation in Tampere was an economic and social success story, not just for the owners but also for the local people who experienced it primarily as progress and as increasing well-being. When Tampere was called the 'Manchester of Finland', people felt positive pride in the nickname (Haapala 1986; Heikkinen 1997).

National and international context

Tampere was the first and foremost industrial city of Finland in the 19th century and continued to be that in the 20th century. It was also the most typical industrial city but not the only one. Legislation concerning economic activity and mobility was gradually liberalised, and this liberalisation supported economic growth starting in the 1870s. Urban populations increased rapidly, and home markets grew: by the 1880s Finlayson already sold more in domestic markets than in Russia. Machinery production found new markets in Finland though exports to Russia remained remarkable until the end of the Russian rule. Industrialisation in Finland expanded radically in the 1880s when paper and pulp production gave birth to dozens of small and half-agrarian industrial sites. The legendary Finnish paper industry was fully dependent on privileged Russian markets and especially on the growth of St. Petersburg. Over 90% of exported Finnish paper went to Russia (Pihkala 2001).

The nature of the Finnish economy and its position in the world economy at the turn of the 20th century may be described by the division of markets: Finnish consumer goods were mostly sold in home markets, investment goods (machines) were sold in home markets or exported to Russia, primary goods (butter and other foods) had important markets both in Britain and in Russia, and exports of raw wood to Western Europe were as extensive as paper exports to Russia. Finland imported most of the consumed grain from Russia, machinery from Western Europe and luxury goods from Europe and Russia. A simplified picture of the Finnish national economy was that Finland sold raw materials and other low-tech products to the Western markets and finished goods to Russia and imported technology from the West and raw materials from Russia. An explanation for this composition is that Finnish products were not (yet) competitive in the Western

markets but survived in home markets and in Russia due to exceptional customs rules (Haapala 1995).

All that was true for the Finnish economy in general, was true in Tampere in an intense and specific way. Still, the success of large-scale industry in Tampere did not result simply from huge (and hidden) subsidies. The other dimension of Privilegium Tammerfors was the idea of freedom. In fact, Tampere was an open economy, and its history cannot be understood without including that factor. Entrepreneurs were international by background, or they were educated abroad. They had good contacts and the capacity to quickly transfer technology. Tampere and Finlayson were among the first to have electric light in Europe in 1882, because Carl Nottbeck, the son of the factory owner, worked as an engineer in Edison's laboratories in New York. Then again, one could simply travel to Germany, buy machinery or make copies, though there is no reason to underestimate local technological skill. Tampere companies took active part in industrial exhibitions in Europe and Moscow and had considerable success (Björklund 1993).

Economy and community

Several, and often contradictory, factors strengthened the stability of the society through rapid industrialisation in the 19th century. Bureaucratic administration and restrictions, conservative patterns of thinking and behaviour (norms, values and mentalities) of the ancient regime set clear limits to harsh capitalism. Security and continuity were regarded as the basic rules in the community. Even though development didn't always go smoothly and environmental problems and social tensions arose, it was crucial that the community reacted to these threats as vigorously as possible. On the other hand, the growth and mobility created by industrialisation offered many more

opportunities and prospects than disappointments to people in a new environment (Haapala 1987). Most of the good new things seemed to come together with the factories. Industrialists were the initiators bringing telegraph, railroad, banks, telephone and a college of technology to Tampere. Most of the civic activities (schools, newspapers, libraries, cultural societies etc.) started as their philanthropic enterprises. Some industrialists were active in local politics, some were not. Though Tampere experienced an intensive political mobilisation and severe political conflicts between 1905 and 1918, the big companies characteristically searched for consensus between workers and employers. In spite of their great economic power, the companies could not escape or significantly challenge the values of a paternalistic society. On the workers' side, exceptional job security made for loyalty and pride of the company (Haapala 1986; Jutikkala 1979; Rasila 1984).

The independence of Finland brought a radical change in the political and institutional framework of the Finnish economy. The contacts with Russia were cut suddenly after decades of deepening integration. The Carelian Isthmus suffered from this break and declined economically, but by the early 1920s crucial paper exports to Europe had compensated for the loss of Russian markets. High import tariffs protected other industries and agriculture and these sectors survived on growing home markets. The Finnish economy was, in the interwar years, actually less open than before independence (Pihkala 2001). Finland adopted a policy of national industrialisation by improving the infrastructure and supporting exports, and this policy succeeded, due largely to the fact that the country already enjoyed a rather developed industrial base. In this respect Tampere was in a good position to take advantage of 'industrial nationalism'. The times were especially favourable for the development of mechanical engineering thanks to increasing construction of railways, power stations, power lines, bridges, ships and paper-making machinery.

Local research and development work proceeded, but as essential were the growth of engineer education and wide contacts to international knowledge, especially through Germany.

Finland was an exception among the newly independent small states in Europe. Even though Finland went through a bloody Civil War with close to 40,000 deaths, it became a politically stable consensus society in the interwar years. The Reds, who lost the war, did not lose their political rights, and a series of social reforms were carried out after the war. These included bills of land reform, communal democracy, working conditions, public education, tax reform etc. Unfortunately, Finnish historiography has put too much emphasis on the activity of extreme political movements in the 1920s and 1930s and has overlooked the opposite trend toward social cohesion (Haapala 1995; Haapala 2003).

Tampere again offers a striking example. The industrial city dominated by big companies was run by a socialist majority immediately after the Civil War. That leadership and taxation reforms meant growing investments in public education and health care, social security and environment. An American journalist who visited the city in the early thirties wrote that Tampere was 'not the Manchester of Finland but the White Pittsburgh of Scandinavia'. The city officials and its people adopted an identity of 'The Beautiful City of Factories' (Harjula 2003). This may be called a social innovation of the time. The growth of industry was not seen as a socially destructive force (cf. Lewis Mumford and urban sociology of the time) but as civilisation. In a way this idea repeated the 19th century vision of a utopian industrial future. Most important for Tampere's well-being was that the community adopted a shared positive identity and did not give up on environmental problems or tendencies of inequality. One can find many drastically opposite patterns of

urban development in large and more diverse industrial societies like Germany, Britain and the USA (Haapala 2003).

The local consensus in Tampere was based on three groups of actors: a strong and well organised labour movement, institutionally owned (i.e. bank-owned) big industry, and a nationally-minded, educated elite. Strange but true, in Tampere these forces of socialism, capitalism and nationalism succeeded in creating a model of social development which secured both economic growth, democracy and stability.

To generalise, one could conclude that in a small country where the resources were limited, people realised that better performance could be achieved by reducing social barriers. In the end, that realisation produced new economic, social and cultural activity. This logic is self-evident today and was an important argument in favour of the welfare state in the 1960s, but before that it was a choice of a new perspective. Tampere happened to be a good environment for that choice.

Old and new industrial city

Tampere did not suffer much in WWII. Instead, the city was an important site of the armament industry, and certainly benefited from the special conditions. During the war and after it the old industrial structure of Tampere continued to strengthen, the city produced more textiles, shoes, machines and paper. Much of the increase came from the newly opened exports to the Soviet Union. In the 1950s and 1960s Tampere was one of the key areas affected by the bi-lateral trade agreements between Finland and Soviet Union. The 19th century pattern was repeated as the companies did not have to compete in the Western markets. Though engineering was at fair international level, in the transfer of technology Tampere was on the receiving side. High production levels were achieved in areas where Finns had to

compete with foreign companies though the markets were in Finland (like paper-making machines and hydro power stations). Though no specific studies exist, it is evident that the relative level of technological knowledge in the industries of Tampere declined in the fifties and sixties. In the 1970s signs of industrial crises became visible, paralleling the pattern of decline of old industrial cities around the world. But the traditional big industries survived until the 1980s. Again the explanation for survival lies in exports to the Soviet Union and Eastern Europe and in the so-called closed market economy of Finland, i.e. regulatory and protective industrial policy, including subsidies to big industry and the dominance of institutional ownership of big industry (Rasila 1992; *Tekniikan Tampere* 1993).

In the 1960s and 1970s Tampere was a double-faceted industrial city. On one hand it continued to be 'the city of factories' recruiting another new generation of industrial workers. On the other hand the promise of modernisation was in the air. The city was willing to invest in higher education and research. Two universities were founded, and they grew rapidly, giving the city a new academic respect (see the article of Hietala and Kaarninen). These two worlds, industrial and academic, hardly met but lived side-by-side. When looking back now, it was a lucky situation: the new base of know-how was developing gradually, and the city avoided an economic crisis which could have ruined the high hopes for a new industrial future.

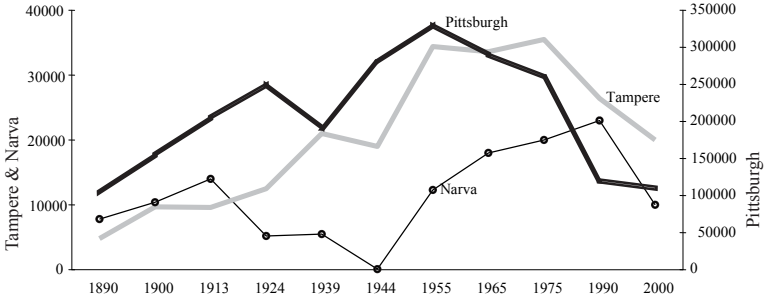

Figure 1. *Number of employed in manufacturing in Tampere, Pittsburgh and Narva in 1890–2000*

When traditional industry finally collapsed in the late 1980s and early 1990s, Tampere was sufficiently prepared. First the social network of the welfare state saved most of those who lost their jobs. Workers were offered early retirements and re-education. In the more serious situation of the 1990s the high-tech industry became the saviour. It brought new jobs and remarkable tax revenue for the city. Most interestingly, much of the 'old' industry survived through its ability to develop new high-tech products within traditional fields. Several companies were innovative and strong enough to compete globally. The long-time co-existence of the old and new economies and their gradual merger gave Tampere an exceptional basis for its competitive 'knowledge economy'. In this sense the industrial history of Tampere never ended but still continues today. Neither has the social organisation of the city changed that much. It seems to rely successfully on the old structure: growing industrial production, wide public sector and political consensus. The products are new as well as the intensity of technological development. The other factors are not as new as one would expect.

Summary

Tampere has in many ways a lucky economic history. It was favoured by the regimes of Sweden and Russia, it benefited from Russian protectionism of the 19th century, and from Finnish protectionism in the 20th century. Tampere has been in a lucky position in the world market for 200 years (Hjerppe 1989). Even two world wars favoured its industrial development.

It is said that good guys have good luck. It is true that people and companies in Tampere have made their success themselves – given favourable market conditions and institutional framework. The social and political structures have supported stability and continuity, which have, in turn, made the local community strong enough to generate both loyalty and faith in the future. These factors have again supported openness and innovativeness. Tampere has enjoyed – and still does enjoy – a good mix of stability, including a rather homogenous social structure, and mobility, including good career possibilities. All this has produced a widely shared, positive and future oriented mentality and identity, which can be called *modern thinking*. What is less common in our world, perhaps, is that in Tampere modernity has meant to so many people both material good, civilisation and equality.

The most important long-term local factors supporting the economic and social success of Tampere – failures have not been studied here – and fostering its development towards the 'informational city', have been the capability to develop new products and maintain productivity, and the capacity to master social changes, for example to maintain social mobility and cohesion. If one wants to find a single factor most productive of Tampere's good harvest and most instrumental in explaining the connection between economic and social performance, one needs look no further than the belief in education. That belief

has persisted in Tampere simply as a belief, often without precise detail or long-term vision. The local spokesmen of both capitalism, nationalism, socialism and modernism all expected the world to become better through wide education. While that logic is certainly self-evident now, one needs an example to believe it.

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The Foundation of an Information City – Education and Culture in the Development of Tampere

Introduction

> I had, in the year 1812, spent some days at Tamerfers, in that country, and had remarked its admirable advantages for machinery, operations of any description. It was pleasantly situated, in a fruitful district, with immense, nay, in exhaustible water power. I had pointed out its great advantages to my friend, who was anxious to see the place. (Paterson 1858)

This is how clergyman and evangelist John Paterson (1776–1855) from Glasgow described Tampere in his memoirs published in 1858. James Finlayson came to Tampere for the first time with him in 1819 (Rasila 1988, 558–559). By the 1860s, Finlayson had developed into a major company even by international standards. One out of five Tampere inhabitants worked at Finlayson. Finlayson was a town within a town with its factory halls, schools, churches and hospitals. A century later the structural transition of Finnish society had a severe impact, especially on the traditional textile industry of Tampere, but new elements grew from the core of the old industry.

Starting in the early 1990s, Tampere has developed into an information city. The development of the Finlayson factory area symbolises the change from industrial production to the production of services. In the beginning of the 21st century the area housed many new media companies, becoming a large centre of leisure with its many cinemas, museums, art exhibitions,

restaurants, and cafes. The latest newcomer is a book fair organised every winter.

In this article we look at Tampere's development into an information city using a long time-span analysis to show how Tampere has invested in education and culture over the decades. This investment has built a firm foundation for creative innovation. Many researchers have shown the connection between education, new technology, and productivity (Webster 2001, 27–31; EU project http://pareto.uab.es/wp/2004/63504.pdf).

The development of Tampere bears out their conclusions. The educational history of Tampere started in the 1760s with a modest spinning school which operated for a few years. Tampere became a university town during the 1960s, and now, in 2005, the University of Tampere and the Tampere University of Technology boast a total of some 27 000 students.

We also analyse Tampere's image – the picture it has wished to present of itself in different eras – and the long evolution through which that image has gone from the 'beautiful city of factories' to an e-city. Image is a key part of city marketing (Webster 2001, 32). (See Sotarauta & Kostiainen 2005: Tampere seemed to have a magnetism that attracts population growth, the growth of jobs in the new economy, the expansion of innovative activities and strengthening of the image, among other things. The good image supported the improvement of the city's appeal.) We will also look into the city's visibility abroad. Creativity and innovation have manifested themselves in different ways at different times. We will highlight certain individuals and institutions whose innovative and creative activities have had a decisive impact on the development of the city.

Theoretical aspects of innovativeness

According to Charles Landry, an innovative community consists of creativity, good organisation and various support services, such as traffic and communication networks. These are what Landry calls hard infrastructure. Another part of innovative community is soft infrastructure, which consists primarily of social networks, unofficial organisations and civic organisations, such as clubs and societies (Landry 2000, 87–90).

In the broadest sense, innovativeness stands for creative attitude and ability. While in the past innovation was commonly associated with invention, today it is increasingly used in a broader sense, as in social innovation and innovative, creative environments. Researchers such as Manuel Castells emphasise that democracy and a strong national identity create the necessary premises for innovativeness. In his books on 'Information Society' Castells argues that non-hierarchical practices and low borders between different social groups facilitate both innovations and the adaptation and dissemination of innovations. These factors can in part account for the success of the Finnish information society (Castells & Himanen 2002). Mobility, another characteristic of an innovative society, encourages Finnish innovativeness. In Finland the public sector has had a significant role in promoting the mobility of the experts, especially in following up the latest know-how. Examples of this kind of mobility can also be found in Japan and New Zealand (Hietala 1992, 275–279; Bell & Hietala 2002, 183–189, 294–302).

In Richard Florida's latest work (Florida 2005, 37–39), which deals with creativity in American cities, the keys to success and competitiveness can primarily be found in high technology and education. He also adds to the list of prerequisites an atmosphere of openness, pluralism, and tolerance.

Florida builds a measurement system based on three Ts, the first of which is 'Talent'. Talent is calculated according to the percentage of the total work force employed in creative jobs and the rate this percentage grows, the percentage of 25- to 64-year-olds with at least lower-level university degrees, and the proportion of employees doing research. The second T stands for 'Technology', calculated by combining the research and development portion of the Gross National Product and the amount of technological innovation, measured through patent applications. The third T is 'Tolerance', which measures the attitudes towards minorities, the traditionalism or modernity of values, and the expression of self, which includes human rights and democracy. Florida's culture of creativity refers to a society with talented and tolerant people. The following indicators for Technology can be found in Tampere and in Finland. The feature of rapid adoption of the newest technology can be detected throughout.

1837 Finland's first modern factory building (Finlayson)
1843 Finland's first paper machine (Frenckell)
1882 The first electric light in Scandinavia (Finlayson)
1900 The first locomotive manufactured in Finland
1909 The first automobile manufactured in Finland
1923 Finland's first national radio broadcast
1965 Finland's first ice hall
1974 The world's first NMT phone call
1984 The world's first biodegradable implant
1991 The world's first GSM phone call
1995 The world's first walking forestry machine
1996 The world's first Communicator (Personal Digital Assistant, Nokia)
1998 The world's first second-generation communicator (Nokia)

The first phase

All books dealing with the history of Tampere's industrialisation describe James Finlayson's (1771–1852) arrival at the banks of the Tammerkoski Rapids in August, 1819, a time when Tampere had a little over 900 inhabitants. Finlayson's arrival is portrayed as a hallowed industrial legend. Finlayson was an experienced machinist, and in Tampere he saw that the natural conditions provided a good foundation for industry. After many preparations Finlayson began to build a factory by the Tammerkoski rapids. Both the town officials and the crown/emperor protected Finlayson. They understood his importance as the herald of new knowledge and expertise, and loaned him start-up money provided he assume a distinct teaching obligation. He was to educate skilled workmen for Finland from the poor local children accepted as apprentices in the foundry. He was also obliged to let any Finnish man come to the factory, see the machines and equipment, and receive useful information about their operation (Voionmaa 1903; Haapala 1986; Rasila 1988).

The factory's foremen and machinists came from England or Sweden since there was no skilled Finnish labour available. Artisans learned their professions through work as apprentices and then journeymen within a framework regulated by the guild institution not through formal technical education. Although the first technical institutes had been founded in Europe towards the end of the 18th century, none existed in Finland when Finlayson began operations. The world's first technical institute, the École Polytechnique, was established in France in 1795 and served as a model for technical institutes elsewhere in Europe – for the technological institute of St Petersburg, for example, founded in 1828. While a plan to establish a Finnish technical institute existed already in 1835, the project was considered too ambitious considering Finnish circumstance – elementary education was

lacking and the overall educational level of the people was poor. Only the university provided higher education in Finland at that time, and it trained officials for the needs of the bureaucracy, not experts for the needs of industry. Finnish industry made use of technology imported from elsewhere, as the example of Tampere shows. The Finlayson factory was a good school for machinists who later took to other places in Finland the information they acquired in Tampere (Nykänen 1998, 12–18, 54–59).

National aspirations to develop Finnish industry and improve the nation's economy led to the beginning of formal technical education in 1848 with the opening of the Helsinki Technical Realschule, which became the Helsinki Polytechnic School in 1872 and the Polytechnic Institute in 1879 (Bell & Hietala 2002, 93).

By the late 1830s Tampere had assumed the image of an industrial city; many visitors came to admire the factory buildings, and newspapers wrote about them. During the 1850s Finland's industrial committee suggested the founding of a technical institute in Tampere. The issue was later taken up by Agathon Meurman (1826–1909), a manor owner, farmer leader and Fennoman, who lived in Kangasala near Tampere. Writing, in 1857, about the importance of technical education, he claimed there was something wrong with the society if the children of officials and soldiers were educated only to be officials and soldiers, and he emphasised that technical schools would enhance the industrial spirit in Finland. In Meurman's opinion, Tampere was the most suitable location for a technical institute. The city already had several factories, and new ones would surely follow (Rasila 1984, 654–655; Nykänen 1998, 96–100).

In its initial phase, the creation and enhancement of the educational system was linked first and foremost to the development of professional skills and the production of skilled labour for the Tampere area industry. In 1845–1852 young

MA and journalist Zacharias Topelius wrote his book *Finland Framställdt i teckningar*. He described Tampere as the Manchester of Finland, presenting readers with Finlayson's six-storey factory building and an industrial landscape of smoking factory chimneys rather than the static idyll of other towns and villages (Maisemia Suomesta, 73). The notion of Tampere as Finland's Manchester lived on for several decades in literature written on Tampere. For example, the extensive Finnish encyclopaedia *Tietosanakirja*, published in the 1910s, states: 'After the 1850s, Tampere reached the status of the country's real industrial city that earned it the exaggerated honour of being called the Manchester of Finland' (Kuusi 1917; *Aamulehti* 20 June 1911).

Connections: Traffic, information, communications

The latter half of the 19th century was an era of great economic, social, and cultural development in Finland. That era saw the introduction and adoption of many innovations and inventions that have had a major impact on people's everyday lives. During this period Tampere got water pipes, sewers, and electricity as well as two theatres, several newspapers, and five schools providing university preparation.

At the end of the 19th century mutual co-operation across national borders was being established, first on a regional, and then on a national basis; soon this cooperation bloomed into an international phenomenon. In autonomous Finland (1809–1917), before Finland's independence, towns played a decisive role because of Russia's oppressive policy. Every big city in Finland had networks and reference groups of its own. The biggest Finnish cities, Helsinki (in 1905 100 000 inhabitants), Tampere (41 000), and Turku (43 000) followed keenly the latest know-how.

Representatives of big cities and decision-makers observed and learned from each other, thus facilitating the inter-city transfer of innovations, be they changes in municipal institutions or technological applications. Exhibitions and professional congresses that the officials attended furthered this exchange, as did the professional journals they read, and the systematic records and statistics that they kept. Exhibitions and international congresses provided professionals and experts in various fields, people working in town planning as well as in engineering, with opportunities to meet one another and exchange ideas. Towns acted as messengers of the government as their officials travelled to city exhibitions abroad, whose number increased rapidly after the 1890s (Hietala 1987, 396–406).

In the late 19th century, steamboats and trains replaced horse carriages and sailboats, transporting both people and goods much more rapidly. Connections to Helsinki were especially important, as the capital was home to central government, government offices, and the university. In the early 1870s travel from Tampere to Helsinki (a distance of some 200 kilometres) took one day, first on a boat to Hämeenlinna, and then on a train to Helsinki.[1] The extension of the railroad from Hämeenlinna to Tampere began in 1874, and passenger traffic began two years later. The journey by train from Tampere to Helsinki then took six hours (Rasila 1984).

Along with the railroads, the telegraph spread around the world. The telegraph line between St Petersburg and Helsinki was finished in 1855 and reached Tampere in 1865. The Tampere telephone exchange opened in May 1882. Private telephone companies were established in 1882 in Helsinki, Turku, Tampere and Viborg, and within the next three years such companies were operating in 19 Finnish cities and towns. By 1900 all Finnish cities and towns had a telephone company linked to some 2000 kilometres of national telephone lines, and by 1916 the density

of telephone networks in Finland was higher than that in Russia (Turpeinen 1996, 167–168).

Knowledge, skill, and education – Tampere as a school town

During the late 19th century Tampere began to gain status as an important school town, both on the regional and the national level. Since the beginning of the 19th century local officials and citizens had made several attempts to improve the training possibilities in the city, and as a result practically all children attended municipal elementary school decades before passage of the compulsory education act of 1921. From the 1880s onwards, several secondary schools where the pupils could eventually pass their matriculation examinations had opened in Tampere. A realgymnasium was founded in Tampere in 1883, a school for Finnish girls in 1894, a coeducational secondary school in 1895, and a classical gymnasium in 1901. The following numbers of pupils enrolled in these schools during the first two decades of the 20th century.

1905/06	1351
1909/10	1646
1913/14	1724
1917/18	1728

The most significant vocational institute in Tampere was Tampere technical school, founded in 1886. This school was important for the industrial town, because the future foremen and clerical employees of Tampere metal and textile industries received their education there. The school managed to recruit to its board famous local industrialists, businessman and entrepreneurs. In

addition, several vocational institutes were founded in Tampere in the early years of the 20th century. Still Tampere students wanting to further their educations beyond their matriculation examinations had to leave the city; most secondary school graduates moved to Helsinki to pursue their studies. In the late twenties this exodus inspired a number of initiatives for founding a teacher's college for men and women in town (Kaarninen 1995, 148–154, 206–207; Valorinta 1986, 63–72).

In Finland and elsewhere in Europe, various scientific societies and associations have played an important role in city development, leading lagging city organisations in proposing significant innovative processes In keeping with this tradition, Tampere Technical Society, established in 1893 and made up of engineers, architects, and businessmen, worked hard to improve technical education in the region. An initiative of the society made during its first years resulted in the 1912 founding of a technical institute in the city. This institute became prestigious and trained a large number of skilled professionals for the industries of Tampere as well as for the rest of the country. An excellent point of comparison for Tampere is Manchester, where various societies made initiatives to found a university many decades before the project was realised (Charlton 1951; Thackray 1974, 675).

Tampere was a pioneer in organising opportunities for study and self-improvement for the working population. The Tampere City Library began as a private library but was taken over by the city 1861. Popular lectures intended for the working population were organised as early as the late 1860s and plans for more regular lecture activities were made in the 1890s. Tampere city founded the country's first workers' institute, after the model of Stockholm, and it opened in 1899. The programme consisted of basic education as well as lectures and debates on scientific and social issues (Rasila 1984, 686–687; Jutikkala 1979, 262–263).

Tampere becomes a university town – ideas and initiatives

Demand for a second university in Finland had begun already at the end of the 19th century and had its origins in the language question. Since the main language of teaching at Helsinki University was Swedish, the aim was to establish a specifically Finnish-speaking university. Furthermore, proponents of a second university understood the regional importance of such institutions (see e.g. Sörlin 1996; Sörlin 2002, 377–388). They saw that the university could operate as a regional well of ideas and innovations if it got support from local sponsors. In this way, the university could benefit local and regional economies.

The years 1910 and 1911 saw a university movement in Finland: an enthusiasm for universities manifesting itself in the form of university committees being appointed in several small towns like Lahti, Jyväskylä, Turku, Mikkeli, and Kuopio. The committees set out to market the university idea and to make plans for getting a new, Finnish-speaking university in their towns. Helsinki newspapers and several local newspapers around the country issued articles and campaigned for a new university. Local university committees made plans and calculations. In Tampere the issue had not been approached until the local newspaper *Aamulehti* took it up. *Aamulehti* wanted to hear the opinions of municipal life, trade and education experts about whether a university or some other institute of higher education should be founded in Tampere and what the city could do to promote such a scheme.

Tampere did not witness the kind of enthusiasm that emerged, for example, in Turku, Lahti, and Jyväskylä although Tampere Mayor K. Hj. Schreck considered it important to get a university or an institute of higher education in the city because he was aware of the connection between higher education

and local progress and prosperity. According to Schreck, the development of the city had regressed after the end of the free city right and the yearlong general strike (*Aamulehti* 17 June 1911). Other important Tampere figures remained unenthusiastic about the university issue. Some of them thought that Tampere should concentrate on improving the industrial school.

From Tampere's point of view, the discussion on higher education became more lively in 1919 when there were attempts to get the Technical University to move from Helsinki to Tampere because the Technical University was in search of new location. This suggestion gave rise to lively debate in newspapers in 1919. The city was ready to provide the lot for the university building (*Aamulehti* 5 March 1919; 7 March 1919; 19 March 1919). In the end, the Technical University stayed in the capital, and the lively university discussion that had begun in the 1910s came practically to an end in the beginning of the 1920s, when two new universities were founded in Turku: the Finnish-speaking Turku University and the Swedish-speaking Åbo Akademi. Tampere had to wait four more decades for its own institute of higher education (Tommila 2002, 102–124).

Some key trends emerge in the analysis of Tampere's educational strategies at the turn of 20th century. The aim was to strengthen Tampere's industry through education by increasing the technical know-how of its citizens and by attempting to secure the availability of a skilled labour force. On the other hand, the Fennoman language policy and aspirations to create a Finnish-speaking educated class also shaped strategy. General and vocational education were pursued side by side and simultaneously in the city, creating the infrastructure of education. A simple justification for both was that now there was no need for the town inhabitants to move from their hometown to study elsewhere. The same justification was still used in the 1950s.

The image of Tampere – City of factories, city of theatres, university city

Among the illustrations in the book *Tampere – kotimarkkinateollisuuden kaupunki* (Tampere – City of domestic market industry) published in 1934, we see the factory hall of the Tampere engineering shop. The legend calls it 'Temple of Work'. Along with industrial scenes, water is always an important and visible element in pictures of Tampere. We can also see glimpses of the Tampere Theatre, opened on the city's main street in 1913, and the statue of the national author, Aleksis Kivi.

The image of a city has proved to be an important part of city marketing, and it can also be an important political tool (Webster 2001, 32; Niemi 2001, 13–27). In the 1920s and 1930s Tampere continued to construct a self-image of an industrial city, the Manchester of Finland. In an illustrated book about Tampere published in the 1920s we read the following:

> As the train approaches Finland's most typical industrial city, the Manchester of Finland, one instinctively envisages a forest of factory chimneys, black and sooty smoke rising from every one of them. Tampere – Finland's Manchester – is a beautiful and interesting industrial city in beautiful and interesting Häme district.

In the beginning of the 1920s Tampere was considered the centre of Finland's industry for the domestic market. During the inter-war period Tampere made itself known by participating in Finnish fairs and exhibitions in various European countries. Although the city was one of the candidates to host independent Finland's first fair, that event actually took place in Helsinki in 1920 and 1921. Textile factories in Tampere such as Suomen Trikoo, Tampere Verkatehdas and Lapinniemi Puuvillatehdas all had their own stands. Finlayson exhibited a spinner that was

occasionally turned on during the exhibition (Röneholm 1945, 99–119).

Plans had also been made to organise the 12th general agricultural fair in Tampere in 1922. Eventually that fair merged with the third national fair, albeit in a truncated form. The architectural design for the fair was commissioned from architect Alvar Aalto. The fair exhibited mainly products from the wood industry and the home industry as well as the machining industry. The audience could also see competitions related to craftsmanship and exhibitions ranging from carving a shaft of an axe to patching a pair of mittens. The stands of Tampere businesses received much attention. For example the Tampere-based belting factory and safe factory represented the rationalisation of work (Röneholm 1945, 128–135).

In 1923 Tampere was invited to participate in an exhibition organised in connection with the 300th anniversary jubilee of Gothenburg. The city sent drawings and town plan replicas to the exhibition. An English Week, connected with the English Week organised in Helsinki, was organised in Tampere in 1933. Two years later Tampere participated in the Brussels World Fair and exhibited pictorial material, which particularly highlighted Tampere's industrial milieu alongside the rapids (Annual Reports of the Tampere Municipal Administration 1920–1939). Tampere businesses had a strong presence at the Finnish Fair in 1935 in the new Exhibition Hall of Helsinki (Röneholm 1945, 352, 404).

Tampere constructed international networks on many levels. Tampere sent annually several municipal officials and experts on study trips in Europe in order to search out the newest advances in city planning and infrastructure. This practice was common in other major Finnish cities too, particularly in Helsinki (Hietala 2005, 127; Bell & Hietala 2002, 113–133, 183–189). The Scandinavian countries were the favourite destinations for groups

from Helsinki as well as from Tampere. Tampere also annually received representatives from many different professional groups; the city provided programmes and hospitality for them (Annual Reports of the Tampere City Administration 1920–1939).

New era, new challenges

After the Second World War and the reconstruction period in the early 1950s, a huge social construction programme began in Tampere. The town was involved in a central hospital project, new municipal kindergartens were under construction, the home for the aged was being extended, a sports centre was built, sewage and water networks were being constructed and a new workers' institute was erected. The town leaders wanted to build a city that would be an attractive place to live.

In the early decades of the 20th century a small number of writers had lived and worked in Tampere, but the late 1940s witnessed the birth of a Tampere school of writers (The Mäkelä Circle). This group included some of the most significant Finnish writers, most notably the novelist Väinö Linna and the poet Lauri Viita. The Tampere school differed from the capital's literary circles both stylistically and thematically. In the field of visual arts, a Tampere group known as 'Group 9' emerged in the 1950s, the key figure being Erik Enroth. The group also included Kimmo Kaivanto, the most famous Tampere visual artist for the next decades to come. With the help of writers, visual artists, and the theatre, Tampere gradually became known for its culture as well as its industry (Rasila 1992).

From the 1940s to the 1960s, Tampere is portrayed as a beautiful city of factories. But aside from pictures of factories and rapids, public buildings such as schools and theatres as well as the city's public monuments begin to gain more and more visibility

in books introducing the city. These publications increasingly highlight the Pyynikki area and Tampere lake landscapes as central elements characterising the city (e.g. *Tampere – tehtaitten kaunis kaupunki* 1943).

In the 1940s and 1950s planners presented visions of Tampere that would reach far into the future, all the way to the 1990s. These plans included major construction schemes like congress halls, churches, hotels, roads and railroads (Rasila 1992, 42). From the point of view of Tampere's development in the years and decades to come, the most important scheme by far proved to be the plan to turn Tampere into a university city, a plan hatched in the late 1940s. A particularly active proponent of this project was Erkki Lindfors, mayor of Tampere 1957–1969. In 1947 the City of Tampere set as its public local political objective an institution of higher education. Lindfors and other town leaders wanted an institution of higher education in the city for several reasons. One of the reasons was the image of Tampere, how the city was known in Finland and abroad. Helsinki, Turku and Tampere were the largest cities in Finland. Helsinki and Turku were cultural centres. Tampere was known for its factories and working population.

But the traditional industries could not guarantee the city's success; something new was called for to increase its attractiveness. Citizens of an industrial city catering to the needs of the domestic market had a demand for services too. All in all, the new demands increased. Certain leaders of the city avidly supported university education and academic careers since Tampere, with its many secondary schools, had by the 1940s grown into an important provincial centre for education where the youth of the surrounding countryside came for their matriculation examination. A university in Tampere would keep local students and their money from leaving the city as well as attracting students from the surrounding rural areas.

In order to support the city's industry, local authorities took as their first goal establishing a technological university in Tampere. But when The School of Social Sciences in Helsinki, founded as a Civic Academy in 1925, was struggling with both economic and premise problems, the City of Tampere actively sought the transfer of this university-level School to Tampere. The city's campaign was complicated by the fact that Helsinki University had founded a Faculty of Political Science which both the teachers and students of The School of Social Sciences found appealing.

The City of Tampere was prepared to make great sacrifices in order to get the institution. It tempted the institution with economic favours, and after nearly a decade of debates and negotiations, the School of Social Sciences was opened in Tampere in 1960 and the new building was inaugurated in 1961.

The rapid growth process in the School of Social Sciences started in the early 1960s. In 1960 the institution only had a faculty of social sciences. The faculty of humanities was founded in 1964, the faculty of economics and administration in the following year 1965, and the faculty of medicine in 1972. Additional plans to found a faculty of mathematics and natural sciences failed. The institution ceased to be a school specialising in social sciences, and in 1966 it received university status. The city of Tampere provided important economic support especially to the funding of new teaching posts (Rasila 1973, 213; Kaarninen 2000, 20–25).

Paavo Koli, the rector of the School of Social Sciences, was an innovator with many ideas and the capacity to realise large-scale schemes swiftly in co-operation with mayor Lindfors and the financial aid of Tampere. Lindfors and Koli were among the visionaries who had courage and faith in Tampere's future as an attractive university city and centre of culture. In a short time Koli was able to devise several plans that have in retrospect

proved to be exceptionally far-sighted. Koli's grand idea was to create an international university that could serve as a meeting place for researchers from different countries. Koli had negotiated on questions related to grounds and premises with town manager Erkki Lindfors already in 1964. In 1967 Koli vigorously started to plan an international university and research centre in Tampere. The objective was to create an international research centre of high standard where researchers from around the world could pursue their work.

Paavo Koli's important idea was that the university should educate experts for the various fields of society. This notion resulted in the founding of new chairs then unknown in other Finnish, and even some Scandinavian, universities. Koli for example initiated calculations on how many ADP planners and programmers would be needed in Finnish society in future years to cope with the practical work. Based on those calculations, the first chair in computer science in Scandinavia was founded in Tampere. The chair took academe by surprise, as similar chairs were not founded in Helsinki and Jyväskylä until two years later (Kurki-Suonio 1990, 1–5). The school recruited experts from the electronics department of the Finnish Cable Factory (Suomen Kaapelitehdas, owned by Nokia), where various kinds of electronic equipment were being designed. At the time Finland's best expertise in computer technology resided precisely at the cable factory, a part of the Nokia company. In Tampere, the connections to Suomen Kaapelitehdas were very significant in terms of developing the university's computer centre and computer science (Kaarninen 2000, 33–35; Häikiö 2001, 34–36).

Another institute of higher education came to Tampere in the 1960s. The city had looked into the prospects of teaching in technical fields, and local industry was firmly behind the scheme. A branch of the Helsinki University of Technology started in

Tampere in 1965 and became independent in 1972. In the mid-1970s, the Tampere University of Technology began to plan and organise teaching in the field of electronics. Microprocessors were a new invention, and training related to them was arranged for businesses as well as for students. Small and large businesses were very eager and enthusiastic to start using information technology. Computer science grew fast, and prominent Finnish scientists worked at the university as lecturers and professors. Many partners, among others the Tampere Chamber of Commerce, helped the University stay in contact with the world of business (Ahonen 1993, 371–377).

The University of Tampere and the Tampere University of Technology have participated in making Tampere an important centre of education and research with international appeal. As a university rector, Paavo Koli was ahead of his time. Most of his ideas became reality by the beginning of the 21st century. In the beginning of the 21st century, the universities of Tampere are international (Hietala 2005, 127–142) even though it is not quite possible to talk about the kind of research centre Koli had envisioned. Due to the growth of these universities, the level of education in Tampere has increased, e.g. in 2003 29 per cent of Tampere inhabitants over the age of 15 had received some higher education. The corresponding national figure was 26%. It seems that Tampere had met the criteria of high educational level in Richard Florida's prerequisites for creative cultures.

Culture as a factor in the city's success

At the moment, research has been increasingly directed at cultural factors behind successful innovative societies. This research seeks to discover and articulate the significance of culture in economic growth and regional attraction. In *Kulturen i kunskapssamhället: Om kultursektorns tillväxt och kulturpolitikens utmaningar*,

Sverker Sörlin examines the significance of the cultural sector to innovativeness. According to Sörlin, the cultural sector is notable in employment first, because producing contents requires experts from various cultural fields; secondly, because cultural events and festivals offer a meeting place for people of different age groups, areas and professions; and thirdly, because cultural services increase the attractiveness of the area.

Peter Hall's book titled *Cities in Civilization* includes several historical examples of innovative cities (Hall 1999, 279–309). Innovative cities can be found in the Northern Italy during Renaissance. Dutch cities during 16th and 17th centuries and Vienna, London and Manchester in the 18th century are also part of this group. During this period, London became a global port city and business centre, which attracted entrepreneurs and merchants. From the 1780s onwards Vienna attracted musicians from German-speaking countries, especially from Germany (Hall 1999, 159–200).

Increased marketing of Tampere begins in the 1960s[2]

The Tampere city strategy 2001–2012 places a strong emphasis on cultural services in terms of the city's success. According to the strategy: 'The city's cultural structure is an essential part of the city's attractiveness and provides important surroundings for the environment's innovative education, research, and business life. Tampere is an innovative city in sciences and in arts.' The cultural structure mentioned in the Tampere strategy was born during a period of more than a century, but since the 1940s and particularly in the 1960s many new events emerged that made Tampere known nationally and internationally.

During the 1960s Tampere became a centre for theatre and many other cultural fields. Erkki Lindfors was interested in increasing the visibility of Tampere. Tampere actively participated

in international exhibitions, created the Tampere International Theatre Festival and started the Tampere Illuminations. Together with Helsinki and Turku, Tampere organised an exhibition in Vienna. The exhibition circulated in Germany, France and the Nordic Countries. This exhibition was an exchange exhibition to a Vienna exhibition organised in Helsinki, Turku and Tampere in 1964.

The exhibition opened in Vienna in April 1965, and Erkki Lindfors went there from Tampere. The Austrian foreign minister Kreisky attended the ceremony and in his opening address emphasised the importance of Finland's model of neutrality and co-operation between the EFTA countries. Austrian television was interested in filming a documentary about Finland, among others 'Kennst du das Land?' and a programme about the vigil for neutrality in Finland, one of the three neutral countries in Europe, and her defence establishment.

The exhibition was organised in a central location at the Volkshalle des Rathauses. It aimed to focus the attention of Vienna inhabitants on Finnish cities and polish of the image of Finland. This goal was realised in cooperation with certain important businessmen representing Finnish products in Austria. A sales week was organised in department stores and shops in the heart of Vienna. For example Philipp Haas et Söhne, the main customer of Finlayson's interior textiles, was prepared to post advertisements in display windows in nine shops in Vienna and six shops in the capitals of other Austrian provinces.

The Vienna exhibition included industrial products from Tampere, such as Finlayson textiles, and three miniature models of suburbs in Helsinki as well as a miniature model of the new Tampere Ice Hall, the first ice hall in Finland. The intention was to advertise the world championship tournament of ice hockey and the world championship tournament of wrestling to be organised in Tampere in the spring of 1965 (Rasila 1992, 543).

After Vienna the exhibition circulated in German towns (Essen, Bremen, Hanover, Cologne, Nuremberg, Munich, Frankfurt am Main, Lübeck, Hamburg) and France (Paris, Nancy, Strasbourg, Caen), it went to the USA and Canada. In addition, the committee planned a new round trip of a renewed exhibition to Sweden in 1967. Further plans were made for circulating the exhibition in England, the Benelux countries, Switzerland and the Soviet Union.

West Side Story takes Tampere to Europe

The most important cultural events were the West Side Story shows by Tampere Theatre, lectures arranged at people's college Urania, and a poetry evening. The press covered Finnish design, arctic life and music on many pages. The *Arbeiter-Zeitung*, the Austrian Social Democrat Party organ, published on April 4, 1965 a Finland supplement edited by Alois Brunnthaler, correspondent for the Scandinavian press. He had visited Tampere during the winter 1964. The paper made positive remarks about Finland's technological progress and mass transportation and praised the way the country kept up with technological developments. The examples mentioned were Finnair's six new Super-Caravelle airplanes and the modern equipment of the Star pharmaceutical factory in Tampere. The articles dealt with the cities of Tampere, Turku, and Helsinki; Finnish standards of housing; the political status of Finland, Austria's EFTA partner; sauna; and Finnish design. Tampere was depicted as a green and lively city ideally situated between two lakes.

In addition, the Viennese *Die Presse* issued a special Finland page. Tampere was praised for her theatres and ice hall, an excellent outdoor theatre and its rotating auditorium. Turku presented her two universities and the Turku stall also exhibited

Finland's biggest dockyard in Turku (*Die Presse* 3 April 1965; *Volksblatt Wien* 4 April 1965).

One of the most important cultural events during the week was Tampere Theatre's West Side Story (Rajala 2004, 479–485). The actors from Tampere arrived on April 6, 1965, and performed three times at the Theater an der Wien. 'The premiere in Vienna on April 8, 1965, had a great ending: the audience gave a standing ovation! After 18 minutes of applause I interrupted the audience for some reason . . . but the applause, thumping and shouts lasted only for 15 minutes after our other shows. . . . However, even that was by far the longest and loudest in our experience before and after the trip to Vienna.' Few could have imagined that the musical filmed in the late 1950s could have been brought to the stage, let alone by Finns.

The visit of the West Side Story was advertised on radio and television in Austria, the theatre manager Rauli Lehtonen and conductor Juhani Raiskinen were interviewed; Tapani Perttu playing the part of Tony and Kaija Sinisalo playing the part of Maria were praised and photographed; and hordes of autograph hunters besieged them. One factor contributing to the musical's success was the fact that it was performed in the restored premises of the Theater am Wien.

The *Volksstimme* described Tampere as Finland's Salzburg. According to the paper the secret lay in the actors' enthusiasm, which is a huge benefit in a musical (*Volkstimme* 10 April 1965). The Wiener Zeitung headlined its review of the evening: 'Welcome theatre guests from Finland' (Wiener Zeitung 10 April 1965). The wide repertoire presented in the programme leaflet of Tampere Theatre, celebrating its 60th anniversary, was also received favourably (*Arbeiter-Zeitung* 10 April 1965). The *Arbeiter Zeitung* compared the stage performance with the movie and commented that the Tampere actors had no cause to be ashamed

of their production. 'The theatre of a small Finnish town has shown how to perform a musical.'

Franz Hitzenberger described the Finnish West Side Story as brilliant (*Neues Österreich* 10 April 1965). The reviews also paid attention to how many production varieties the theatre had discovered (*Die Presse* 11 April 1965; *Kurier* 9 April 1965). The only negative remarks were made in connection to the actors' singing skills (*Volksblatt Wien* 4 May 1965).

The positive international reviews created a demand for Tampere Theatre, and after Vienna a flood of invitations came in from Canada and the United States, Norway and Copenhagen. Due to shortage of funds, those tours were not as successful as the Vienna trip, where the support of the City of Vienna was decisive. In Vienna, the use of the local theatre premises and its entire personnel cost nothing. There was also support from the City of Tampere and Finland's Ministry of Education.

Theatres in the summer of Tampere

Ever since the 1960s, theatre has played an increasingly prominent role in the summer image of Tampere. Summer theatre performances were held on Pyynikki Ridge in Tampere in the 1950s. Pyynikki Summer Theatre got massive national publicity when in 1960 the City of Tampere built the theatre a unique rotating auditorium, making possible the use of exceptionally beautiful lake landscape during plays.

The Tampere International Theatre Festival was organised for the first time in the summer of 1969, when the audience amounted to 40 000. The festival is linked to the attempt to create a series of Finnish cultural events with only one event per field of art. One of the first examples was the Jyväskylä Festival began in 1956. One important promoter of the idea was Olavi Veistäjä, journalist for the local Tampere newspaper *Aamulehti*.

He was an esteemed cultural critic whose voice was heard. By writing an *Aamulehti* article where he described other, already existing cultural events and commenting that the Finnish summer was already filled with events, he participated in the founding of the Pyynikki Summer Theatre and Tampere Museum of Modern Art.

The Tampere International Theatre Festival caused emotional upheavals in the early 1970s when Olavi Veistäjä welcomed free theatre groups. A new kind of opening was to invite exotic groups like the Abafumi theatre from Uganda, later also domestic theatres and famous foreign artists. Tampere became the city of Italian Dario Fo after he had made his audiences laugh in the shows he directed (Lehtola 1989, 242–244). Criticism against the theatre festival and Veistäjä continued relentlessly, but it also served to keep the theatre critics on their toes and Tampere in the public eye. In the beginning of the 21st century the Tampere International Theatre Festival is one of the largest Finnish cultural events alongside the Helsinki Festival, Pori Jazz Festival, and Kotka Maritime Festival (*Kulttuuritilasto* 2003).

The first Tampere International Short Film Festival was organised in 1971, only two years after the birth of the theatre festival. The City of Tampere was involved in this project and supported it financially.

Tampere Illuminations

A third event to stir the hearts of Tampere inhabitants and visitors in the 1960s was Tampere Illuminations, where the main streets were illuminated with electric light ornaments. The birth of the Illuminations was inspired by Tampere's twin city Essen, where the first Illuminations festival was organised in 1949. In autumn 1965, Erkki Lindfors invited a group of Tampere entrepreneurs to look into an opportunity to follow the example of the twin

city Essen and organise Tampere Illuminations to liven up the business district during the quiet autumn season. In order to make the festival happen, a society was founded and received funding from the city. Some 200 companies joined the society. The light ornaments were ordered from Essen, and they lit up the streets in October 1965. The society owned the ornaments, as it does today, and paid for the electicity. Tampere Power Utility was in charge of installing, maintaining and repairing the light ornaments. When the Illuminations had its 30th anniversary in 1995, the town was lighted by 184 different light ornaments employing nearly 37 000 light bulbs. While designing the ornaments, special attention was paid to ageless themes, style and harmony of the lighted themes. Leaf patterns, floral patterns, tulip patterns and various animal shapes have become familiar to townspeople as well as tourists (*Tammerkoski Journal* 9/1966, 228).

The Tampere Floral Festival was planned as a major summertime attraction. The Tampere Tunnetuksi ry (Publicity for Tampere Association) has annually organised the Tampere Floral Festival in June and August to enliven street sales. The festival was intentionally organised to coincide with the Tampere International Theatre Festival. Special subject days were planned and the shops were given an opportunity to sell their products in the streets. More street cafes were built. In addition to the Tampere Tunnetuksi Association, the City of Tampere and Tampere Chamber of Commerce are also involved in the organisation (*Tammerkoski Journal* 1/1984, 41).

The Tampere Hall was inaugurated in September 1990 after a long planning process that began in the 1950s. It became the largest concert and congress hall in Scandinavia. Tampere Hall strengthened the city's music life and turned Tampere into an internationally prestigious city of meetings and congresses. The University of Tampere and Tampere Hall as the university's

next-door neighbour provide good settings for international conferences (*Tammerkoski Journal* 9–10, 1996, 12–13).

Conclusion

The novelist, professor Zacharias Topelius described Tampere and her inhabitants in 1873:

> Millions the rapids devoured, but it multiplied them and lifted them back on its banks as if they were golden sands. Now its labour spins and weaves cloths of wool, cotton and linen, mixes rags into paper, sets up machine shops and all manners of other factories. More than 6000 heed the call of factory bells; their offspring gather in schools, the sailboats carry more fresh troops to add to the growing number of the townspeople. Time has it taken before the freedom-loving folk grown up in desolate forests has gotten used to the milling throng in the factories, the stale air and the monotonous work. But the patient, tolerant Finnish character, so willing to learn, has gradually accustomed to it, and from Tampere a new form of culture – factory industry – has spread past the southern and western corners of our land. (Topelius 1998, 90)

Factory industry raised people who had to learn to live at the pace of the factory whistle. The factory determined the life order. Information technology, computers, mobile telephones, communicators – microprocessors have once more made people adopt a new kind of behaviour. In this new life Tampere was one of the pioneers. With the help of the university's data processing and the technical university Tampere got an edge as the place where ADP experts were educated and the field was being developed. The use of computers became common in society in the 1970s and 1980s, and the fact that specialists in the field were available in Tampere was extremely important. In an information society people process information, fetch it, shape it.

The information technology industry has created the proper tools to accomplish these tasks. The key objective is to communicate new information faster. This also means that in principle people should be constantly available. They also should get there faster. Citizens should possess skills of performing everyday tasks like paying bills or checking timetables through the Internet. Tampere universities, comprehensive schools, high schools, libraries and people's institutes have educated people into a new way of processing the existing information.

The industrial heritage has not been forgotten in Tampere; instead, museums have been erected at the birthplaces of the oldest industry. Tampere was being shaped into an important school town ever since the late 19th century, and a permanent foundation for the future was created in this shaping. Tampere culture was backed up by the library institution and the first Finnish centre of popular education, the workers' college. Around the same time Tampere began to become an important centre of theatre.

The city image of Tampere has been modified systematically since the 1950s and 1960s. There have been intentional attempts to portray Tampere as a university city and an original cultural city with her theatres, writers, and visual artists. Tampere theatres were a phenomenon in their own right in Finland of the 1960s and 1970s. The University of Tampere contributed to the city's cultural climate. The university and the other institutes of higher education attracted new inhabitants to the city. In the 1970s, Tampere saw the birth of an original music phenomenon called Manse rock that received wide national attention.

Creativity is not born in confinement, as the Tampere International Theatre Festival and the success of Tampere Theatre around the world show. Creative people and creative cities have to have faith in the future and the courage to take risks. The many ideas of marketing Tampere have been created by individual

agents such as theatre directors Eino Salmelainen and Rauli Lehtonen, mayor Erkki Lindfors, culture critic Olavi Veistäjä, and the representative of the academic world, rector Paavo Koli. They have had this faith and courage.

Public sponsorship has been an important factor in Tampere's cultural life. The city agreed to sponsor Tampere Theatre's conquest of the world with the West Side Story, the Tampere International Theatre Festival and Tampere Illuminations. These events provided Tampere with an unprecedented amount of attention and respect. It is difficult to measure the impact of culture on a city's attractiveness. Still, in the case of Tampere, we should take notice of the huge amount of positive theatrical reviews in national and international press as well as the vast audiences the events have attracted to Tampere. The cultural events that started in the 1960s brought unprecedented fame to Tampere alongside the products of the Tampere textile industry. The construction of the Tampere Hall as a centre of culture, exhibitions, and congresses can be seen as a direct continuation of the city image construction that began in the 1960s. The same category also includes the construction of Tampere's new library and the excellent library services provided to the citizens by eTampere.

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Notes

1 In 2005, the journey from Tampere to Helsinki takes 1.5 hours by train.

2 The analysis of the exhibitions of three towns Helsinki, Turku and Tampere is based on annual reports by the Tampere City Council, archives of the organising committee of the exhibitions 1965 (The City Archive of Tampere), unprinted documents such as promemorias by ambassadors of Finland, correscondence between ambassdors of Finland and organisers of exhibitions (The archives of the Ministry for Foreign Affairs: MFA) and articles published in newspapers and journals in Finland and in Austria.

IV
Knowledge Economy

Markku Sotarauta and Juha Kostiainen

Organising for Futures in the City-Region of Tampere: Network Management and the Enabling Development Model

Introduction[1]

The strategy of knowledge-based development has wide support in Finland. Universities and other institutions of higher education are believed to be the drivers of regional development, the Centre of Expertise programmes have become very popular as development tools, technology is seen as a change agent, and every self-respecting city has built its own technology centre. Various development agencies not only emphasise strategies and development programmes to direct their development efforts, but also partnership, networks and interaction to mobilise a wider spectrum of competences and resources. In the 1990s, networks indeed became the magic word for development activities, a symbol of fruitful co-operation and one of the leading principles of development activities.[2]

Networks have thus enjoyed wide popularity, and for a reason. It seems quite clear that mobilising the resources of any city-region requires the decisions, resources, expertise and commitment of several organisations and many different people. Promotion of economic development is, all in all, an odd world in that the borderline between dynamic action and the repeating of ritual-like mantras is thin and delicate indeed. Thin also is the isthmus between the flood of memos and meetings caused by excessive networking and genuine collaborative action. Leadership and the ability to organise have risen into a central

role in promotion of economic development in city-regions (see Sotarauta 2005).

Up until the recession of the early 1990s, the regional development system was, to a great extent, led by public administration. Stress was laid on resource allocation on the basis of pre-scripted criteria. The recession forced both Finnish companies and public actors to look for new strategies and new modes of organisation. Since then, significantly more emphasis in promotion of regional development has been placed on strategic planning, co-operation between firms, public development organisations and research and educational institutions. Consequently, new problems have emerged. Development agencies have not always been able to improve their competencies at the same pace as the operating environment and companies have changed, and network-like co-operation has proven difficult and time-consuming. It has become clear that making effective use of new action models and strategies also calls for new organisation forms, as well as more competent leadership and more highly-skilled management than earlier.

In this chapter, we will look at the development activities of the Tampere city-region, first and foremost, from the perspective of organisation and network management. We begin with the notion that development is about facing the unknown and creating something new, and that a new strategic grip ought to replace the earlier 'bureaucratic and mechanic attitude'. Promotion of economic development of a city-region is too often left at the level of administering development activities. In the background of this chapter, as well as the entire book, lie notions of a creative, learning and informational city (see Castells 1989; Florida 2002; Kostiainen 2002; Sotarauta et al. 2003). This chapter aims to answer the following questions in the framework of network management: a) how is the promotion of economic development organised in Tampere, b) what are the advantages

and disadvantages of the organisation model, and c) why has the promotion of economic development been organised in the way that it has.

This chapter is based on a project entitled 'The analysis of the development network in the Tampere city-region', the findings of which have been published in the report entitled 'Interpretative promotion of economic development and creative cities' (Sotarauta et al. 2003). Moreover, the findings are based on practical experiences gained in developing the organisational model of Tampere. One of us, Juha Kostiainen, first worked in the 1990s as the managing director of Finn-Medi Research Ltd and then in 1997–2001 as the director of business development of the city of Tampere. One of his most important tasks was to renew the development model in the city-region of Tampere. Markku Sotarauta also participated in the discussion of development strategies and the organisational model. Therefore, the analysis and notions in this chapter are founded on both research and experience gained in practice. We have sought to balance our data so that the evaluations of the functionality of the model are based on the above-mentioned research project and, most importantly, on the 35 interviews[3] and other research material gained during the project. The selected quotations are from the interviews, and they represent the main observations of the study. The experiences of Juha Kostiainen, and partly also those of Markku Sotarauta, are used to identify and present the basic assumptions and principles underlying the enabling development model of the Tampere city-region.

Network management in the promotion of economic development

Promoting economic development in a city-region is a complex interaction process between many actors, through which

economic development policies emerge. All actors have their own strategies and goals, which in practice means that managing the development process is by definition an 'activity between strategies and goals'. Even though Finnish city governments often play an important role in the economic development of their city-regions, they are in no position to direct or control the strategies of enterprises, organisations or families, for instance. The management of development efforts cannot be described as 'top-down', or 'direct and control' models, nor is strategic management able to easily define and implement 'objectives to serve the common good'. Strategy preferences are more often than not formed and reformed by balancing different interests and seeking third solutions. Often they emerge from dynamic processes, and are thus also dependent on the logic of the situation and political judgement as to what is feasible and what is not (see Healey et al. 1995). The various development strategies and programmes are hence not top-down policy formulations, ready to be implemented, but arenas for discussions, battles and quarrels. It is in these processes that new policies and development projects often emerge to be later legitimised in the official policy arenas. Consequently, the economic development of a city-region cannot be controlled by a single actor, and it cannot be founded on hierarchical power relations. In this sense, it can be seen to constitute a more network-like activity (Sotarauta 2000, 130; Klijn & Teisman 1997, 98), often affording development networks a crucial position in the launch and implementation of new processes.

The term network here is simply defined as the social relations that represent varying degrees of intensity, and that are organised in different ways between mutually dependent actors with the aim of promoting common interests. The emergence of network relations demands the recognition and acceptance of mutual dependence. A network does not rely on hierarchical

relations, but on ties characterised by loyalty, solidarity, trust and reciprocal support. The notion of the development network refers to the actors who through their own activities and mutual co-operation have a strong influence on the development of a city-region. A development network often constitutes a loosely coupled and organised strategic network. It can be characterised as a typical policy-network (see more Sotarauta 2001; Kostiainen 2002; Linnamaa 2004). As Kickert et al. (1997a, 6) state, policy-networks are more or less stable patterns of social relationships among interdependent actors, and they take shape around policy issues and/or policy programmes.

With development networks, it is not always possible to find distinct leaders or management responsible for collaborative activities. Rather, management can be construed as the effect of different actors on themselves and each other, and thus in principle, several network leaders can be identified at one time (Kickert et al. 1997b, 167–168). This does not, however, mean that all actors have the same amount of power in the network. In practice, some participants may carry more weight and dominate more than others, due to possession of important resources, crucial information, networking skills, and so on. All in all, it is characteristic of network management to have strong orientation towards facilitating interaction processes, communication among different actors, and orientating to goal-searching rather than goal-setting.

According to Klijn & Teisman (1997), network management may address perceptions, actors, and institutions and the relations between them. Perceptions refer to differences and similarities in the actors' values, goals and perspectives on a given issue. The inclusion of perceptions as one of the focal points in network management is based on the fact that actors do not react directly to reality, but to internally constructed perceptions of reality (van der Hejden 1996; Sotarauta 2001). Contrary to what is

often expected in Finland, management by perceptions does not necessarily aim at a consensus, but at creating a common base for joint decisions, while accepting and respecting the positions and perceptions of other actors. The focus on the actors intends to influence the individual games and combinations of actors in the entire network (those who are included and those who are not included) as well as the interaction between actors. Moreover, the actors' goals and preferences may change in the course of the process. Thus, it is difficult for the actors to know in advance which goals will be achieved in the process, and what will be the results of the strategy process. Actors are required to learn from their own and other actors' goals and strategies in the course of the process (Klijn 1997, 32; Sotarauta 2001).

The term institutions refers to the relatively permanent modes of operation, rules and resources and the organisational field which give the network its external form. When orienting to institutions in network management, the aim is to indirectly influence all present and future actions as the 'architecture' of the network changes. So, the aim is to develop institutions so that interaction between actors can be arranged to ensure optimal success of development efforts (Klijn & Teisman 1997). Next, we will discuss the ways in which the various development actions of Tampere, and its emerging development network, have been organised, and why. It is possible to think of the process as the first steps in conscious network management in Tampere, with the aim of acting in society through institutions and perceptions, and the co-operation of various actors engaged in development efforts.

Change in the development strategies of the city of Tampere

Knowledge intensity has become the spearhead in the development strategies of the city of Tampere, and the whole city-region which comprises seven autonomous municipalities. In the economic development strategy drawn up in 2002, the vision of the city is to become one of the most attractive environments for knowledge-intensive companies and living environments for skilled people (*Kyä lähtee* 2002). Thus, the most recent economic development strategy continues to highlight the aspect of knowledge intensity, already firmly established in previous documents. At its core lies the idea that Tampere should be able to maintain and continue to create high-quality innovation environments in selected fields of business and research. However, it is also worth noting that the emergence of a knowledge base and the development of structures and thought models supporting it have been long processes. They have not emerged in one strategic plan or development programme but as the outcome of several plans and, most importantly, of individual perseverance and years of work (see Kostiainen & Sotarauta 2003).

The birth of a knowledge-based economy in the city of Tampere could be construed as follows: from the 1950s to the 1980s, its structures were reinforced based on the development view of individual people along with small active groups, and accelerated by the active co-operation of these actors. By the end of the 1980s, the city had progressed to developing both a knowledge-based economy and an information society, though not using these concepts. Still, in the mid-1990s, a certain formalisation and systemisation of the new thinking were still missing. The general spirit of the times, as well as the strong perceptions and interaction relationships shaped by industrial culture and tradition, slowed down the transition

from emphasising the traditional industry to a sharper focus on innovation and expertise. In the 1990s, with the national economic depression and the change in the spirit of the times in Finland as a whole, the significance of the knowledge-based economy began to be more broadly understood in the city. With the support of previous structures and institutions, more emphasis was afforded to technology and innovation activities. In other words, the innovation system was consciously strengthened (more about the development of Tampere, see Kostiainen & Sotarauta 2003; and other chapters in this volume).

After the mid-1990s, the knowledge-based economy was institutionalised to become part of the development thinking and development activities of Tampere through strategic planning. The aim of the earlier strategies had been mainly to create new jobs, whereas the new strategy, published in 1998, placed the emphasis on the dynamic interaction between jobs and a skilled workforce. In other words, on the fact that, particularly in sectors requiring high-quality expertise, the provision of a skilled workforce attracts companies and new jobs, and not only vice versa, as had been believed earlier. In a certain sense, at that time, the City of Tampere started to take its first steps towards building a creative city in the Floridian spirit (see Florida 2002). What was felt to be particularly important was that the strategy included a clear definition of the clusters whose development should be focused on. The Centre of Expertise Programme prepared earlier laid the foundation for choices made in the strategy process, mechanical engineering and automation,[4] healthcare technology, information technology and tourism were selected as focal points (*Tampereen kaupunkiseudun…* 1999). The Centre of Expertise Programme and the economic development strategy were the central forums in selecting the clusters considered to be important from the viewpoint of future development.

The areas of expertise selected for the Centre of Expertise Programme received a certain local 'strategic status'. In addition, the programme boosted the co-operation of key actors in the selected areas of expertise, and the Centre of Expertise Programme has thus become one of the most central interaction forums (see e.g. Kautonen et al. 2002; Martinez-Vela & Viljamaa 2004; Sotarauta et al. 2003). The choices made in the Centre of Expertise Programme were also suitably complementary. In Tampere, mechanical engineering represented the traditional area of expertise in which internationally significant companies were already operating. In the 1990s, information technology was in turn starting to grow fast alongside Nokia, and with regard to healthcare technology, the Finn-Medi Research Ltd for support of firms in the field was about to be completed. In addition, there was already a strong belief in the prospects of medical informatics both in Tampere and in the whole country. The Centre of Expertise Programme also provided a good development impetus to the transition into cluster-based thinking, accentuating horizontal co-operation.

Upon preparing the new Centre of Expertise Programme in 1998, the areas of expertise introduced were information technology, mechanical engineering and automation, medical informatics, communication and digital and new media, and knowledge-intensive business services (*Tampereen seudun osaamiskeskusohjelma* 1998). The significant role of knowledge-intensive services had been acknowledged in some studies after the mid-1990s.[5] The first Finnish study on the topic was conducted in Tampere in 1998 (Kautonen et al. 1998). However, the national selection board failed to accept knowledge-intensive services as part of the programme, even though all of the other areas were included. In Tampere, the importance of developing knowledge-intensive business services was nevertheless believed in, and therefore a decision was made to continue developing

them with local funding, without an official programme status or government funding. Finally, in 2002, knowledge-intensive business services were officially included among the Centre of Expertise areas of expertise.

Making knowledge intensity the base of development activities and raising the target level can be illustrated by comparing the 1998 economic development strategy to the 1987 and 1990 economic development policy programmes. The central differences in the perceptions behind the strategies are that the 1998 strategy shifted to cluster-based development and identified those strategic clusters that needed to be developed. The earlier programmes talked about sectors, but no choices in regard to the focal points in the development had been made. In addition, there is a clear difference in how the city sees its own regional role. In the 1987 programme, the City of Tampere is seen as a 'regional centre' and as a 'location of some state functions'. In addition, the strategy talks about the 'label and right of an industrial city'. In 1990 the emphasis was already on 'know-how', which in the year 1998 was changed into a more clearly defined 'knowledge intensity', and into developing the city into an 'exemplary European city of lifelong learning' (*Tampereen elinkeino-ohjelma 1987–2000*; *Tampereen elinkeinotoimintojen kehittämisohjelma 1990–1995*; *Tampereen tulevaisuus…*; Kostiainen & Sotarauta 2003).

After the rise of the information society thematic into the core of both Finnish and European rhetoric at the turn of the year 2000, the City of Tampere started began to look for a new approach to accelerate the development of the information society. In Tampere, the information society was not only seen from the viewpoint of economic development. The aim was to develop the information society comprehensively as a driving force that would renew the entire local community. Thus, at the end of the year 2000, the eTampere Programme saw the light of

day. It consists of seven different sub-programmes and its budget amounts to EUR 132 million (Kostiainen 2001; www.etampere.fi). This large development programme has attracted broad national and international attention. Based on the same line of thinking, a seven-year development programme in biotechnology, BioneXt Tampere, was launched in 2003 with a budget of EUR 100 million (for more information, see www.bionext.org).

The main significance of the new strategic thinking established at the end of the 1990s lies in the fact that it helped:

- to establish, formalise, and systemise the development activities built on expertise, technology, innovations and knowledge. The collective development view was strengthened when more and more actors saw that development was being built on knowledge intensity. This was especially strongly influenced by the change in the spirit at the time in Finland towards emphasising innovation
- to continue to raise institutional thickness by establishing new specialised development agencies to answer for the development of the selected focal points
- to create new co-operation forums for development activities (for engaging a wider spectrum of actors to development activities) – interaction among key actors began to develop step by step into a more network-like activity
- to raise the ambition level of the promotion of economic development. The eTampere programme aimed to make the city of Tampere a 'world leader in the research, development and application of the information society', and a hub in global networks instead of being a provincial centre. Raising the ambition level has affected perceptions by forcing people to think about their own actions in broader contexts than earlier, and in a more demanding operating environment. At the same time, an increasing number of

actors have realised that these more far-reaching aims can only be reached through co-operation.

Basic assumptions underlying the enabling development model of Tampere

The new economic development strategy for Tampere, and the thinking on which it was based, also required a new mode of organisation.

In Tampere, as well as elsewhere in Finland, one of the main problems in development activities lies in that often the organisations (and people) engaged in developing a region look at development at an overly general level, as a whole, and therefore do not have much in-depth knowledge or understanding of the dynamics and logic of the targets of development. In the 1990s, a need to deepen substance knowledge in economic development was identified in Tampere. Consequently, Tampere has step by step created a network-like mode of action which aims to create innovation environments for selected clusters by deepening substance knowledge and increasing networking skills in development activities. In the early 2000s, the organisation of the economic development policy in Tampere is based on what we have labelled the *enabling development model*.

First of all, enabling refers to the idea that economic development policy should employ several different resources and channels that best suit each situation, time and place. Enabling is implemented at two levels: a) General development agencies enable specialised development agencies to specialise in developing their own focus clusters. At the strategic level, the task of general development agencies, in particular the city of Tampere, is to steer the activities of specialised agencies by developing the institutional structure and by acting as financiers and strategic leaders of development activities. b) Specialised

development agencies aim to bring about the emergence of as good an innovation environment as possible for their target clusters, and in this way to create preconditions for enterprises and intra-cluster co-operation.

The enabling development model is largely based on the activities of specialised development agencies. The main specialised development agencies of Tampere and their specialisations are as follows:[6]

- *Technology Centre Hermia Ltd* – automation and mechanical engineering, information and communication technology
- *Finn-Medi Research Ltd* – healthcare technology, co-ordination of the BioneXt Programme
- *Media Tampere Ltd* – new media and communications, co-ordination of the eTampere Programme
- *Professia Ltd* – knowledge-intensive business services
- *Tuotekehitys Ltd Tamlink* – technology transfer
- *Tampere Convention Bureau* – tourism
- *Ensimetri* – advisory services for new business enterprises
- *Sentika Partners Ltd* – venture capital services for enterprises (funds: Pikespo, Tasku)
- *Innofinance Ltd* – venture capital services for the seed phase (fund: Tamseed)
- *Tampere Science Parks Ltd* – provision of facilities for enterprises

If we look at the Tampere development network as a whole, we would also need to include the Employment and Economic Development Centre for the Tampere Region, The Council of the Tampere Region, the University of Tampere, Tampere University of Technology, the polytechnics, the Tampere Chamber of

Commerce and the Regional Organisation of Pirkanmaa Private Enterprises.

The enabling model is based on the following four basic assumptions.

- *Development is organised around clusters*

Organising development activities around clusters began with identifying the central clusters and entrusting the development of each cluster to a specialised development agency. As mentioned above, the strategic clusters (complemented with tourism in the economic development strategy) have been identified in the Centre of Expertise Programme. The aim is to gain sufficient specialisation to deal with the strategic issues of the cluster in question. The purpose here is to prevent the role of the general development agencies from becoming too strong in development activities, since this might create a danger that substance knowledge will not develop sufficiently. On the other hand, it is believed that the strategic responsibility for developing the city-region has to be in the hands of the municipalities, and that it is not possible to leave it in the hands of specialised development agencies living, quite largely, on demand. Vision would then remain narrow, and the needs of some clusters may be over-emphasised. Therefore, the steering and strategic leadership of the economic development policy is still kept as part of local government decision-making, which makes it possible to co-ordinate zoning, service provision, etc., with economic development policy measures in the spirit of a comprehensive development policy.

The purpose of building development activities on clusters and specialisation is:

- *development activities are based on the best possible substance knowledge and expertise*

One of the most central ideas in the enabling development model is that economic development and business services have to be taken as closely as possible to enterprises, or some other focus groups, to support the development of their competitiveness. The assumption is that only sufficient specialisation and the substance knowledge that it enables can guarantee that development agencies are considered as credible partners with enterprises and other organisations. The assumption is that investing in substance knowledge makes it possible to earn the confidence of enterprises. Expertise-based credibility is also considered to be important in the long run; as the economic operating environment is globalising, the development agencies of Tampere have to be credible actors in global forums as well.

Regional development runs a continuous risk of locking in on old structures, thought models or, say, received benefits. Lock-ins may prevent actors from recognising threats in the environment and/or capitalising on new technological and scientific knowledge (Kautonen et al. 2002, 13). A very central question is then how it is possible to create a continuously self-renewing dynamic development model, and thereby prevent the lock-ins from emerging. In Tampere, the goal of making the promotion of economic development itself innovative and dynamic has been pursued

- *by creating options and internal competition within the enabling development model as well as by strengthening the internal motivation of the development agencies to improve their own expertise.*

This principle has been implemented so that specialised development agencies are independent actors that must able to maintain profitable business operations. Thus, the aim is to 'marketise' the development services so that their financing is

not exclusively public. Specialised development agencies are at the same time both actors engaged in the economic development policy, and independent enterprises. The basic idea is that in the enabling development model both municipalities and enterprises buy development services from specialised development agencies. From them, the city of Tampere and other municipalities buy development services and implementation of certain segments of the Tampere economic development policy. Municipalities can, in theory at least, submit the administration of the different sub-areas of their economic development policy to competitive tendering among other actors too. This is assumed to provide the possibility to intensify functions and if needed to shut down functions that are not working or that are useless, more easily than if they were part of municipal organisations. For enterprises, the model provides an opportunity to find the best possible expert help from among several different options for their own development processes. Although specialised development agencies are in a special position, in the long run we can see a situation in which purely private expert enterprises also have sufficient substance knowledge, when they too can take part in the competition over the implementation of the projects and programmes, in accordance with the legislation governing public acquisitions.

Within the model, the reverse side of the overlapping of competition and co-operation as well as the relatively broad independence of specialised development agencies is the risk that the activities disperse. It is therefore assumed that the economic development strategy and the Centre of Expertise Programme will form a backbone for the enabling development model. In other words

- *the economic development strategy steers all development activities and the enabling development model. The Centre of Expertise Programme in turn directs the creation of cluster-*

specific innovation environments, and large development programmes are used to create long-term competitive advantage.

What is essential then is that the economic development strategy has been prepared in co-operation with regional development agencies, educational institutions, universities, and business enterprises. The actual responsibility for execution and implementation lies with either specialised development agencies, or with other co-operation partners. In other words, developing each cluster requires its own development strategy which should be in line with the overall economic development strategy, and which at the same time makes it more precise.

Behind the enabling development model lies the idea, the wish and the aim that the promotion of economic development would become dynamic, flexible and continuously self-renewing. This dynamism has been further increased by the eTampere and BioneXt programmes, both of which operate cross cluster boundaries and increase in-depth specialisation. Although the responsibility for their co-ordination lies with designated development agencies, a particular management system has been created for them in which the role of research institutes is stronger than that in the Centre of Expertise Programme. The logic behind the enabling development model is summarised in Figure 1.

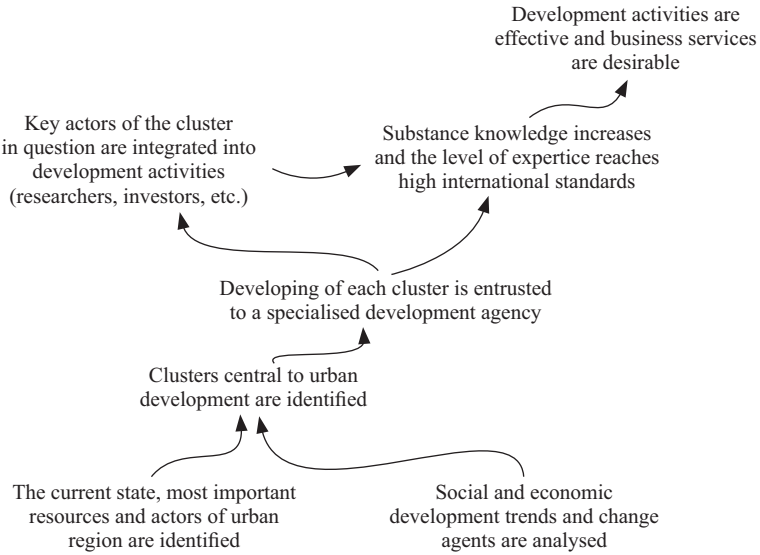

Figure 1. *The logic behind the enabling development model of the Tampere city-region*

In the 2000s, the promotion of regional development in Finland is clearly more network-like than in the 1980s. In practice, however, the current mode of organisation is more or less hierarchical and network-like simultaneously, because in addition to the attempt to network, its action models are still strongly influenced by the hierarchy of the national development machinery (see Sotarauta & Lakso 2000; Virkkala 2002). Behind the model based on buying and selling the development services, we can see an attempt to build a development model that is based on markets and networks.

Evaluating the functionality of the enabling development model

Roughly speaking, the attitudes of the interviewees towards the enabling development model can be divided into three groups: those who think that the model is good, those who want to renew it, and the ignorant or indifferent. In any case, the most positive attitudes have been shown by those who have participated in the creation of the model in one way or another, and who have attained an understanding of the basic assumptions and principles underlying it. In the interviews among those taking a positive stand, as well as among those taking a less positive stand, were some that were in any case seemingly willing to continuously develop the enabling model which they considered not to be optimal as yet.

In the following section we will look at the most central factors contributing to the functionality of the enabling development model. These are unfamiliarity with the model, tension between decentralisation and centralisation, specialisation and development of expertise, the relationship between mechanicality and dynamism, and the significance of management and leadership.

Unfamiliarity

The enabling development model of Tampere seems quite unorganised and partly confusing to many actors. Only a few people understand its basic principles, the network behind it and the roles of actors belonging to it as a whole. The basic principles of the model are understood only by those actors who through their work look at it as a whole, or by those who are responsible for developing the model, or a part of it. Other actors see mainly those parts that touch the activities of their own organisation, and all that is outside seems confusing. The largish size of the

Tampere city-region and the largish number of actors obviously make it difficult for many interviewees to evaluate the enabling development model as a whole. The development activities are by necessity dispersed, which means that different actors act in a certain part of a network but have no ability to be involved in the activities of the entire development network.

The basic assumptions behind the model have not been widely discussed, and therefore these principles and assumptions, and the practices emerging along them, are understood only by few key individuals. To others, it appears as a series of single events and a number of separate organisations. In practice, there have been no vigorous attempts to make the enabling development model in any way visible as a whole. At the same time, it has to be noted that from the start the creation of the model has hardly taken place consciously and it has hardly been based on the presented basic assumptions. At the beginning, single organisations were founded to meet some practical needs and in the course of time a more comprehensive grip has begun to be built slightly more consciously on the existing organisations and action models.

Dispersion

One of the themes that have brought about the most intense discussion is the dispersion of the model: is it already too complex and fuzzy?

The enabling development model consists of several fairly independent organisations, and those actors who feel that the model should be renewed view it as already too dispersed into too many parts. Some actors stress the need to have a more clearly articulated and structured development model (see also Kautonen 2002, 94), and according to them the promotion of economic development should be concentrated in one organisation, and thus form a strong organisation responsible for developing the

city-region instead of a network of several agencies. In the current model, volume and effectiveness have, however, been pursued in another way, by building large development programmes.

A dynamic enabling and network-based model in turn stresses the organisations' capability to compete and co-operate, and their responsibility for their own operations, leadership, individuals and teams as well as the ability to create something new and strategically adapt to changes in the environment. The enabling model does not pursue centralised, optimal and co-ordinated knowledge production. Information acquisition and the creation of new knowledge are part of every organisation's tasks. Creation of new knowledge needed in promotion of economic development is, first of all, seen as an interactive process in which what is crucial is not the formal position but the ability to acquire, produce and apply new knowledge. What brings tension in the discussion is that the enabling development model is based on the dynamic organisation mode, but in practice it is a part of a development system of public administration that is used to the mechanic mode of organisation. Excessive dispersion can also be caused by model-internal competition, which is believed to increase the dynamism of development work, but that in practice can also further disperse activities.

> There are many actors that compete for the same money. Of course competition does ensure quality. We may still ask if it makes sense to use an awful lot of resources to acquire money through competition and then be left without funding in the competition. Also, preparations have to be invested in a lot, and then there will often be no resources left for implementation. In other words, this development system and its efficiency should be called into question.

Some actors in turn feel that excessive concentration of functions would stiffen renewal, and leave the activities at an overly general

level. Therefore the dynamism of the development activities might suffer.

> If there's one operative actor, then it should be the business development office . . . business development agency or a technology centre ltd, so if everything is concentrated in it, it follows that the activities are still more general than what they as cluster-influenced activities would be. The closer we get to the operations of firms, the more substance-centred the development is. It can get to practical matters, it has operational credibility, and it makes things move.

In the mechanic mode of organisation, the essential question usually is 'how well does the organisation serve the system'. In Finnish regional development policy arenas, there is a strong belief in the system and it is still believed that the task of many organisations is to serve the development system. However, the enabling model, which is based on dynamic understanding on organisation, is also based on shared power. The roles and tasks of the actors are only partly based on official positions, but more clearly than earlier on people's skills, expertise and ability to co-operate. Therefore the question becomes more and more about how the development organisation serves the individuals and teams that cross organisational borders – what kind of working environment and creative problem-solving environment[7] are they able to offer to the experts of the field.

The fear of dispersion becomes concrete, as several interviewees ended up analysing at length the role of other organisations as part of the development system. In these contemplations, we can see a wish to achieve as clear roles and agreed division of labour in advance as possible, and there is indeed a reason to take the danger of dispersion seriously. However, the question here should not be about how the organisation is made to serve the system, but how the network

serves the organisation, and vice versa, and in turn how the whole that emerges from this serves the development of the city-region. The discussion of the enabling development model is largely crystallised in different views on a good model of organisation arising from different perceptions over economic development and how to direct it. Simply put, the aspects accentuating mechanic systems, on the one hand, and the dynamic, more organic network, on the other hand, seem to be set against each other. From the viewpoint of the enabling development model of the Tampere city-region, two questions emerge: a) should the activities be concentrated in one development agency or in a couple of development agencies, or b) should the enabling model be made more visible, and should better leadership and network management skills be learnt?

Specialisation and in-depth expertise

Those who think that the enabling model is good emphasised, most of all, its built-in aim to specialise and to create preconditions for in-depth expertise.

> 'Here we have somehow understood as a centre the municipal business development offices; in other words that they [business development offices of the municipalities in the city-region] attend to general local economic development policy. For sector-specific development these specialised agencies have then been founded, to get better expertise in each theme than what it would be possible to get in one organisation. Exploiting them makes it possible to speed up and increase development activity, create efficient projects. In my opinion, this model is extremely effective.'

> 'In my opinion, this economic development policy model works well here in the Tampere city-region, I don't think that we could have reached the same results by using another model.'

The enabling development model creates the preconditions for in-depth expertise, but the increase in expertise needed to reach the level required by the model is a long process, and many actors' skills and competencies are not yet developed to the level of the organisational model. The intensity of development activities can mainly be considered fairly good. Development activities involve several people who take their work seriously, and who do it with 'great passion' and with a high level of expertise. However, what makes the model vulnerable is the fact that the intensity and expertise related to development activities lie with fairly few individuals.

Recruiting adequately qualified individuals for promotion of economic development is often difficult. The results are achieved slowly, the activities seem slow and stagnating and in public administration the pay cheque is usually not a competitive asset either. One of the basic ideas behind the enabling development model is that the specialised development agencies can create the kinds of working environments in which professionals can be paid the appropriate wages and offered challenging tasks. At the same time, however, the question can be raised whether the development model of the Tampere city-region and its development agencies are all in all sufficiently attractive.

Summary

Finnish economic development is characterised by a strong belief in knowledge, technology and universities, as well as in the network-like mode of action. In the city of Tampere, the knowledge-based economy began to be developed with, more or less, a clear goal in mind several decades ago, but only in the 1990s were knowledge intensity, cluster-based development of innovation environments, and an action model based on specialised development agencies formalised and systemised as a

central part of the development strategies. What was significant in this was the Centre of Expertise programme, which in 1994 provided the selected clusters a certain strategic status, and which has been central all along. In 1998, the aim of the economic development strategy was to improve the competitiveness of the city-region, not to create new jobs as such, for example. At the same time, attention was paid more clearly than before to the dynamic interaction between the workplaces and the skilled workforce. The aim of the eTampere programme and other strategic development programmes has been to raise the target level and ambition of the development activities. Raising the target level was a message sent to the people and organisations acting in Tampere and to those outside the city. A new time calls for larger and more efficient measures as well as more intensive co-operation than earlier among universities, enterprises and public development agencies.

The form of what we here have labelled the enabling development model first took shape partly on its own. Later it was more consciously developed into a network-like mode of action, where specialised development agencies play a central role. These are mainly public or semi-public companies that are specialised in developing certain clusters and that have the municipalities of the Tampere city-region among their main clients and directors of activities. The idea is that specialised agencies also have other clients and that they thus are also market-based actors.

The enabling development model of the Tampere city-region is mainly considered to be good, but the point with most criticism in it seems to be the dispersion of the model. From the mechanic organisation point of view, the enabling model is indeed dispersed and blurred. From the viewpoint of the dynamic model, dispersion and lack of clarity may, with the right leadership and management, be factors of innovativeness and dynamism. At the moment, these are not the aims, the model as

a whole not being known well enough, and the new management and leadership skills being still to emerge. The arguments of those considering the model to be good and of those who take a more critical attitude towards it, are based on a relatively narrow view on the enabling model and its good and bad sides. Therefore, what is once again needed in Tampere is an open debate on the future, and on how to organise the development activities for the future emerging in front of our eyes every day. The enabling model, based on continuous self-renewal, thus sets entirely new requirements for management, because it cannot be managed by direct command relationships. The enabling model requires leadership, conscious management of networks and continuously open channels of communication among the development agencies and other actors. If there is wide awareness of the basic assumptions and principles of the model, there is a good chance that it will develop into an as dynamic and continuously self-renewing model as hoped for. If it remains foreign to even those organisations that are part of it, it is very likely that the functionality of the model suffers and it also remains fuzzy among the partners (e.g. enterprises).

With good management and strong leadership, it might be possible to combine sector-specific substance knowledge, creation of general-level competitiveness and new strategic openings with each other. Because the model is heavily specialisation-oriented and manifold, its co-ordination is still relatively difficult if the capabilities of the City of Tampere and other key leading network actors do not develop to meet the new requirements. In management emphasis should not be laid only on understanding the whole cognitively, but also particularly on communication skills and social skills. The ability to create a believable interpretation of the future, the ability to create an inspiring vision and energise the actors with continuous, rightly-timed communication and the ability to create trust

relationships between fairly different actors. The whole cannot be 'under control' in a traditional sense either, and therefore certain uncertainty just has to be tolerated. The model also easily causes conflicts of interest and makes organisations and actors seek their own interests. To counterbalance the trust relationships, a strong ethical vision and ability to tackle problems are needed as the activities are ultimately financed through public funding.

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Endnotes

1 This chapter is translated from Finnish by Ms Marjukka Virkajärvi.

2 On networking in Finnish urban development, see e.g. Linnamaa 2004.

3 Interviews were conducted by Reija Linnamaa. The authors of this chapter claim responsibility for interpretations made of the data.

4 During the first programme period automation was removed from the focal point of information technology and linked to mechanical engineering.

5 See e.g. Miles et al. (1995).

6 Specialised development agencies are typically owned by public sector bodies like City of Tampere, local universities, Tampere Region Hospital District and national development agencies SITRA and Finnvera Plc. In Oy Media Tampere Ltd and venture capital companies ownership is mostly private.

7 See Raunio (2001).

Jari Kolehmainen

Knowledge Institutions in the Local Innovation Environment: Case Digital Media Agglomeration in Tampere

Introduction

Innovation and learning appear increasingly crucial to the success of firms and localities. Very broadly speaking, focusing on these matters is the only way for companies to succeed or even survive in the globalising economy. Schienstock and Hämäläinen (2001) conclude that innovation is a recursive process which concerns all activities from the search for a solution to technical or other problems to a situation in which a new product or production process has been launched on the market (see also e.g. Schienstock & Kuusi 1999). They also emphasise that the concept of innovation should not be restricted only to technical innovations (e.g. new products and technical enhancements of production processes), because social innovations – including organisational, procedural and institutional innovations – are of great importance. The notion of the significance of institutional innovations links this innovation approach directly to the local and regional economic development and innovation policy.

Companies are not alone in this, because regions and nations are also under the same pressure. In the global network economy, localities and regions compete with each other and, according to a modern scientific view, regions are trying to catch their share of global capital, investments, inhabitants, etc (see. e.g. Kostiainen 1999; Sotarauta & Linnamaa 1997; Cooke & Schienstock 2000). The focus in debate concerning the regional development has lately been quite strongly on external competitiveness. In

addition, attention should be paid to the internal or endemic development dynamics of localities and regions. However, from innovation activities point of view, these two issues do not differ that much: an externally competitive locality or region is usually dynamic also in its internal development.

Improving competitiveness and creating innovations are common challenges to companies and regions alike. This common challenge culminates in companies' local operational environment. It can be argued that a good local innovation environment can have a positive effect on the innovation potential of firms. At the same time, a good local innovation environment increases the external competitiveness of a locality. Consequently, it is natural that local authorities are taking actions that aim to enhance local companies' possibilities to innovate. Increasing attention has been paid to this particular dimension in the ensemble of the local business development policy. This dimension can be called regional or local innovation policy. It is good to remember, however, that regional innovation policy is often rooted in national and regional science and technology policy. Support for the development of local knowledge institutions constitutes an important part of local or regional innovation policy.

In this article, the role of knowledge institutions as part of the local innovation environment is discussed. The concept of knowledge institution refers here especially to the educational and research institutions and other institutions that are closely linked to them, such as science parks and so-called special development organisations. Moreover, some future challenges are highlighted and, from this angle, some broader innovation and economic development issues are dealt with. The empirical part of the article is based on the research project 'Networks, Innovation Milieus and Regions' (VIA[1]). The article is organised as follows. First the concept of local innovation environment

is introduced and then the role of the knowledge institutions within it is discussed. After the theoretical discussion, the case of a digital media agglomeration in Tampere is dealt with to provide an empirical illustration of some of the theoretical issues. It has to be underlined that the empirical data do not allow in-depth evaluative analysis of the knowledge institutions of the digital media agglomeration in Tampere. In the end some concluding remarks are presented.

The concept of local innovation environment

Territorial agglomeration as a basis

Economic activities seem to have a tendency to concentrate on some locations and this holds true also for the new knowledge-intensive activities and for the activities of the so-called 'new economy', for example. This phenomenon can largely be explained by the classical agglomeration economies. In this article, the concept of territorial agglomeration refers to the spatial accumulation of economic activities of the same kind, more specifically the accumulation of companies belonging to the same branch or industry and immediate branches or industries in a certain geographic locality or region. However, in the sense of geographical scales, it is used very flexibly, which could also be a problem from the point of view of empirical research. In the Finnish context, it is relevant to focus on city-region-wide territorial agglomerations, which consist of a significant number of companies belonging to the same branch or immediate branches and which are of great importance from the point of view of the regional economy (cf. Kautonen & Kolehmainen 2001, 94–95). Accordingly, the concept of territorial agglomeration in this paper refers to relatively local economic activities.

The basis of a territorial agglomeration is usually formed by the agglomeration economies – external to all companies – which

exist because of geographic proximity even in a competitive environment. These classical and most obvious reasons can be summarised as follows (cf. Marshall 1890/1920; Krugman 1991; Gordon & McCann 2000; Arrow 1962; Porter 1990):

- *decreasing transaction costs* (e.g. transportation and communication costs)
- *specialised local labour force* (e.g. decreasing search costs and accumulation of human capital)
- *branch-specific resources and infrastructure* (e.g. specialised services and presence of demanding local customers)
- *maximal flow of information and ideas* (e.g. mobility of labour, knowledge spillovers, informal contacts between companies)

Three levels of local innovation environment

The territorial agglomeration is usually a basis for the local innovation environment. In other words, the agglomeration economies, especially those related to the branch-specific resources and infrastructure and the information flows, are essential elements in the localised innovation activities of firms. However, the concept of local innovation environment takes also other factors and elements into account from that perspective. These factors and elements should be analysed on three different levels: *1. the structural and institutional level, 2. the level of organisational relationships* and *3. the level of individuals.* Each level has certain characteristics and dynamics that are necessary to make a local innovation environment (e.g. territorial agglomeration) innovative. A brief presentation of these three levels is provided on the following, with emphasis on the structural and institutional level.

The structural and institutional level. The basic business and institutional structure of the agglomeration has a significant

influence on its dynamics, also from the point of view of innovation activities. Therefore, when analysing a local innovation environment, attention should be drawn at least to the following factors and elements: the number and nature of companies and business units, educational institutions, science and technology base (e.g. universities, research institutes and private R&D units), specialised private, semi-public and public business services (e.g. financing, consultancy, technology transfer and incubation services) and interest groups (e.g. trade and entrepreneurial associations, chambers of commerce), and local authorities. When considering the institutional setting, the concepts of local *institutional density* and *institutional thickness* become very interesting. These concepts refer to the local presence of numerous different institutions collaborating synergetically to attain a somewhat common goal, guided by partly shared norms, values and understanding (cf. Amin & Thrift 1996; see also Powell & DiMaggio 1991). The role of institutional thickness in more general terms in the development of high-tech clusters has been recognised also in empirical studies (see e.g. Keeble & Wilkinson 2000), although the role of formal (e.g. public) institutions is not always very strong or direct (cf. May et al. 2001). The institutional approach emphasises the role of non-organisational institutions and, in this perspective, institutions can be understood as 'rules of the game' (see e.g. North 1990). However, in this article, the emphasis is on organisational institutions.

The level of organisational relationships. A city or an agglomeration does not innovate by itself, but it can support the innovation activities of organisations. The structural and institutional setting of a local innovation environment forms one possible basis for these activities which are increasingly inter-organisational and network-based in nature. Consequently, when analysing the local innovation environment from the point of view of companies, attention should be drawn to the presence of

demanding customers, advanced suppliers and subcontractors, technology and other partner companies and universities and research institutions, for example. Naturally the local presence of these kinds of organisations is not enough, because their nature (e.g. the level of know-how, ability to co-operate and resources) determines whether or not there is opportunity for mutually synergetic co-operation. In addition to co-operative local inter-organisational relationships, local competition between different organisations, mainly between companies, can stimulate innovation activities.

The level of individuals. Inter-organisational relationships can to some extent be reduced to relationships among individuals working in organisations. This notion set up the argument that the role of individual people is very remarkable in local innovation environments. The social nature of inter-organisational relationships is only one dimension of the role of individuals, because skilled workers and experts usually have extensive, work-related personal networks which facilitate the seeking of rare, reliable, or in other ways valuable information and knowledge, for example. From the spatial point of view, it can be argued that proximity does matter in the formation and utilisation of these individual contacts despite the advanced information, communication and transportation facilities. However, from the point of view of individuals, the local innovation environment cannot be reduced to a mere 'platform' for localised social networks and relationships. There are also other dimensions. For example, for the individuals, the local innovation environment should also be 'a creative problem-solving environment', which is a concept that refers to the presence of diverse and high-quality career and further education opportunities (see Raunio 2001).

A closer look at knowledge institutions

The role of educational and research institutions

Based on several empirical studies, Cooke (2004) argues that there are two types of a Regional Innovation System (RIS), namely the Institutional (IRIS) and Entrepreneurial (ERIS). It can be argued that the IRIS is usually characterised by intensive R&D activities, incremental technological innovations, close user–producer relationships and network collaboration. Correspondingly the ERIS is characterised by serial start-ups, supply of venture capital and possibly disruptive innovation activities. According to Cooke's (ibid.) view, the regional innovation systems consists of two subsystems, the 'Knowledge Generation' and 'Knowledge Exploitation' subsystems. This very rough division provides a good starting point for further analysis.

The educational and research institutions – the core of the knowledge generation subsystem – are seen as increasingly important actors in societal and regional development due to a variety of reasons. On the most general level, the so-called information society development raises the educational and research institutions in the focal point. On the one hand, this development manifests itself in the increasing demand for new information and knowledge that is developed within research and development activities. On the other hand, higher education institutions are considerable producers of human skills and competences. However, the societal role and position of educational and research institutions is changing. For example, there is a development trend that erodes the traditional institutional boundaries between the industry, government and (higher) education and research institutions. In research and development activities, multifaceted inter-organisational networks and hybrid organisations involving researchers and experts from science, governmental and business sectors come to

the core. In this respect, the notions of a 'new mode of knowledge production', 'Triple-Helixes' and 'entrepreneurial universities' have been dealt with (see e.g. Gibbons et al. 1994; Etkzowitz & Leydesdorff 1997, 2000; Etkzowitz 2003).

These academic debate items have also their practical societal and policy counterparts. For example, the debate on the universities' 'third commission' has been very vivid in Finland. The 'third commission' refers to the intensification of relationships between universities and the ambient society. It is not only about the economic exploitation of academically produced knowledge (e.g. commercialisation) and university-industry interaction, but it refers to broader effects of universities' basic activities which are scientific research and education based on that. In that sense, the 'third commission' is not a separate commission, but a view on the universities basic activities (for more, see e.g. Virtanen 2002; Kankaala 2004). In many cases the 'third commission' is linked to the role of universities especially within their own regions and to the potential that universities have in terms of regional development. From this perspective, the regional innovation activities are of great importance.

It can be claimed that the role of educational and research institutions – the core of the knowledge generation subsystem – is especially important in local innovation environments based on high-tech-related or knowledge-intensive agglomerations, in other words, 'technopoleis' (cf. Gibson & Stiles 2000). Kautonen et al. (2002, 196–198) have dealt with this issue from the point of view of regional innovation policy. They argue that there are two basic development concepts, visions or models concerning regional innovation policy. These concepts are the 'Technopolis' and the 'Learning Economy'. Nevertheless, these two models should not be seen as mutually exclusive but complementary. The Learning Economy Model focuses on interactive learning and innovation processes, which may not only be more incremental

but also continuous by nature. This model aims to enhance the competitiveness and surviving preconditions of all types of regions and industries by building their innovation capabilities. The Learning Economy Model covers all the branches (e.g. traditional industries and services) and can therefore be applied in small towns and rural localities.

Correspondingly, the Technopolis Model is appropriate for the development of high-tech and knowledge-intensive branches and agglomerations. Consequently, this model is mostly applicable regionally in large university cities and in high-technology and knowledge-intensive industries. This policy model is based on more traditional, linear technology-push processes. The basic idea in this model is to create and commercialise global top expertise in certain science and technology niches. The commercialisation process should be effective and competitive on a global scale so that the locally produced technology and expertise creates new wealth and jobs in the region. Therefore, a strong science and technology base is fundamental, but not enough. There should be different kinds of 'management competences' locally available, so that the technology and ideas develop into new products and services. Typical innovation policy concerns in this model are related to technological entrepreneurship, the availability of R&D finance and risk finance (e.g. venture capital), immaterial property right issues and the internationalisation of the companies (Kautonen et al. 2002).

The models introduced above are naturally over-simplifications. It was mentioned that the Technopolis Model is based on the linear innovation model, the 'cascade model'. However, this view must be elaborated further, because the innovation processes of high-technology and other knowledge-intensive companies are usually interactive in nature. This means that also university-industry linkages are two-way and companies do not only use and commercialise the knowledge produced in

universities, although, according to empirical research in the Finnish context, companies consider the commercial utilisation of knowledge, acquiring new scientific knowledge and monitoring technological development as the most important goals for university collaboration (Nieminen & Kaukonen 2001).

Kolehmainen et al. (2003) deal with the role of educational and research institutions in their location regions from a broader standpoint. They suggest that these institutions can have at least three different roles: *1. the anchor, 2. the dynamo,* and *3. the magnet.* An educational or research institution has the *anchor role* if it is able to tie up the (key) companies in the region by creating versatile and intensive collaboration relationships (e.g. joined research projects, educational planning) with them. Respectively, the institution has the *generator role* if its activities generate new businesses by commercialising the results of basic or applied research (e.g. spin-off companies and joint ventures). Pioneering educational activities can also significantly stimulate the entrepreneurial activities. To fully utilise the generating potential of educational or research institutions, the entrepreneurship-supporting services and mechanisms (e.g. incubation services, finance, consultancy in intellectual property rights) should be available and of high quality. The *magnet role* of an educational or research institution refers to situations in which the institution is able to attract external (foreign) investments into the region because it has unique or otherwise special research and educational activities. The magnet role can be supported regionally by taking care of the issues considered in the typical investment decision-making processes (e.g. supply of business services and suitable premises, subsidies) (Kolehmainen et al. 2003).

In conclusion, the economic significance of educational and research institutions is very considerable and it is growing. However, the direct contribution of the universities (and

other educational and research institutions) to the companies' innovation activities should not be exaggerated (see e.g. Revilla Diez 2000). It is also important to notice that different companies have different needs and capabilities with respect to collaboration with these institutions. For example, small and medium-sized companies (SMEs) are different from large corporations. Not even all the SMEs are alike, but they can be at different levels of sophistication in terms of innovation as Benneworth and Dawley (2004) points out. They also stress the fact that universities may require multiple responses to ensure that companies at all sophistication levels can access the innovation support assets and capacities within the universities. The responsibility of making these assets and capacities more available to different kinds of companies lies also partly on the so-called specialised development organisations that are dealt with next.

Specialised development organisations in a local innovation environment

Contextualising science parks in a local innovation environment

Science parks as an element of the local innovation environment can be approached from two perspectives that augment each other. First, they can be seen as a part of territorial agglomerations described above. Consequently, attention should be paid also to the so-called micro agglomerations that can be seen as a kind of special 'condensations' within territorial agglomerations. Kautonen et al. (2002) define a micro agglomeration as a group of companies and other organisations that is geographically concentrated in some certain definable area and that has frequent internal interactions. Science parks and technology centres are typically thess kinds of micro agglomerations, although they can result also from other kind of processes, such as a physical

concentration of an industrial plant and its subcontractors. In any case, it is necessary that the organisations perceive themselves as members of the micro agglomeration. It is also important that the 'membership' bear some benefits to the organisations belonging to the agglomeration. However, these benefits can be higly varied: cost advantages, information sharing and knowledge spillovers, image and visibility, etc.

Second, the science parks are usually a crucial part of the institutional setting of the local innovation environment. Cooke (2004) states that in many cases knowledge generation and exploitation subsystems of regional innovation systems are linked together quite weakly. It can be argued that the local innovation environment has the same subsystems as regional innovation systems, although the approach is slightly different. Cooke (ibid.) points out that different regional innovation systems have different linking mechanisms and organisations. In entrepreneurial innovation systems venture capitalists are in the key role also in this respect, whereas in institutional innovation systems some public organisations or agencies bridge these two subsystems. Cooke (ibid.) introduces different kinds of 'boundary-crossing' instruments in regional innovation systems. He concludes quite strongly that all the different 'boundary-crossing' institutions should be outside direct public sector control, because *'all involve some degree of risk-taking that functionaries are by and large neither trained nor competent to perform'.*

It should be stressed that this division of organisations and other actors into two broad categories is very artificial, because most of the organisations are 'knowledge generators' and 'knowledge exploiters' or 'knowledge users' at the same time. This notion is quite obvious, especially from the point of view of interactive innovation approach. However, a part of the institutional setting of the local innovation environment, as described above, belongs to the knowledge generation subsystem

and a part belongs to the knowledge exploitation subsystem. Still, many of the organisations belonging to the institutional setting of a local innovation environment act as links between these two subsystems. Science parks are usually seen as these kinds of institutions.

Science parks were a hot topic in research in 1980s and early 1990s, because the concept was new at that time. At that stage, many different concepts and terms delineating the same kind of arrangements and developments emerged. Still there are several slightly different terms used to describe similar arrangements, such as 'Technology Park', 'Business Park', 'Research Park', 'Innovation Centre', 'Technology Centre', 'Technopoles', etc. (cf. e.g. Monck et al. 1988; Castells & Hall 1994). In addition, the term 'Technology Centre' is used. Usually these concepts refer to enterprises based on real estate businesses that aim at fostering the formation and growth of knowledge-based branches and increasing the number of these kinds of knowledge-intensive companies. In other words, the basic idea is to accumulate knowledge-intensive organisations in a certain location to boost innovation and entrepreneurship. Additionally, close operational relationships to universities, public research institutes and other higher education institutions are a crucial part of the concept of science parks and technology centres. Some of the science parks are thematic in the sense that they host and provide services only for companies belonging to a certain branch or cluster.

There is a plethora of evaluative studies on the effectiveness of science parks, especially from the point of view of new company formation, incubation activities, support for (technology-based) SMEs and networking building (see e.g. Joseph 1994; Vedovello 1997; Mäki & Sinervo 2001; Colombo & Delmastro 2002; Löfsten & Lindelöf 2003; Chan & Lau 2005). These evaluative studies are usually quite restrained concerning the actual effectiveness of the science parks. For example, in many

cases, only few statistically significant differences can be found, although usually the science park companies seem to be better off than similar companies outside science parks. According to these studies, science parks seem unable to generate all the benefits to companies located in them that they are expected or claimed to produce. For example, the role of networking and clustering within science parks is usually exaggerated. In addition, science parks are criticised also from other points of view. For instance, Massey et al. (1992) argue that science parks promote social polarisation in geographical terms by decoupling scientific production and technological development work from physical production.

In conclusion, from the point of view the local innovation environment, the role of science parks is twofold. First, they are some kinds of 'micro agglomerations' that have their own internal dynamics also in the terms of innovation and new company formation. This is the case especially in the 'thematic' science parks or technology centres. In this respect, science parks are a crucial part and a kind of crystallisation of the local innovation environment. Second, the companies and other organisations running science parks are in many cases in charge of development activities and projects that are not directly linked to the science parks or companies and other organisations locating in them. Consequently, instead of focusing on the science parks only as physical, geographical ensembles, increasing attention should be based on the development organisations that are somehow linked to the science parks. These organisations are usually so-called specialised development organisations. There are also specialised development organisations that are not based on real estate business. These organisations together are an important element in the institutional setting of a local innovation environment and that is why they are examined in more detail.

Specialised development organisations and their activities

Development organisations are organisations whose mission is to facilitate the development of the whole region or locality or the development of certain remarkable sector of that region or locality. These organisations may have this mission 'by definition' (e.g. many regional state agencies or agencies established by the local government) or they may have this kind of mission because they want to contribute to the development because of their internal aspirations and motives (e.g. many universities and educational institutes). In general, different kinds of development organisations have activities and offer services that can be described as 'boundary-crossing' or 'boundary-spanning' activities. It can be argued that the dimension is not as important for all the development organisations but for those which can be characterised as specialised development organisation.

Namely, according to Sotarauta (2000), development organisations can be divided into two groups: *1. general development organisations and 2. specialised development organisations.* The general development organisations are responsible for the development of a region in its entirety and they should be able to analyse the forces affecting the region as well as to allocate the development resources to the most important targets. Cities, municipalities and regional councils are typically this kind of general development organisations on the regional or local level. The general development organisations can direct the activities of specialised development organisations by financing and goal setting. On the other hand, the specialised development organisations can direct to some extent the regional development work as whole by their own actions (Sotarauta 2000).

Correspondingly, specialised development organisations' task is to develop a certain sector or branch of the region. The main task of the specialised development organisations is usually to act

as an intermediary between and among companies, educational and research institutions and general development organisations. For instance, they channel information and knowledge, skills and financial resources. To be capable of acting as an intermediary, the specialised development organisations have to have a very good understanding of their own field, both in terms of the nuanced substance and from the more general point of view. In other words, they are network weavers that try to combine the resources and competences of different actors for the benefit of the particular field they are responsible for (Sotarauta 2000; Sotarauta & Kostiainen 2005). Many specialised development organisations can be labelled as intermediary organisations due to their intermediary role.

In Finland, specialised development organisations are usually established to respond the local needs that differ naturally from each other. Usually these organisations are 'implementation tools' of local and regional economic development and innovation policy. Also their juridical forms vary. Some of these organisations are public authorities, some publicly owned companies, some public-private partnerships and some even totally privately owned companies. This means that they are not all under the same kind of political control and tutelage. Consequently, the specialised development organisations are not in the same position in terms of funding either. For these reasons the field of specialised development organisations is very heterogeneous, which is possibly a problem from the central government's point of view. It may be a problem because these organisations are also important actors in terms of national innovation policy. In this respect, it has been suggested that the central government bodies should pay attention in more unified way to these specialised development, or in other words, intermediary organisations to make the local, regional and national policy making more efficient and effective (cf. Koskenlinna 2004). In principle,

this is a good aim, but the increasing national co-ordination should not cause any hindrances to the natural development of the specialised development organisations (for more about intermediary organisations in Finland, see Koskenlinna 2004 and Koskenlinna et al. 2005).

Some of these specialised development organisations can be described distinctively as 'cluster organisations', whose main aim and responsibility is to organise cluster activities, for example by removing barriers to collaboration and arranging meetings (cf. Lagendijk 2000). Correspondingly, the cluster activities are specific events in which clustering, especially collaboration in innovation, can take place. Consequently, clustering can take place also without the contribution of cluster organisations, but they may facilitate the emergence of clusters considerably. These kinds of cluster organisations usually implement in practise the cluster policies which can be divided into three classes: *1) support for existing clusters, 2) support for businesses that already collaborate and 3) establishing new collaborations between non-co-operating businesses* (Benneworth et al. 2003).

The activities or services provided by the specialised development can be roughly divided into two categories: *1. support services for companies* and *2. boundary-spanning activities for many kinds of actors.* First, the internal support services are usually aimed at people (e.g. university researchers) with a business idea, newly established companies or more mature companies that have some problem or that are seeking for a new mode for the business. The two first-mentioned customer groups usually require so-called incubation services. In practise, the typical support services are as follows:

- evaluation of business plans
- evaluation of technologies and patents
- support for commercialisation of existing technologies and business ideas

- support for technology projects, project planning and management
- market research
- basic business counselling
- in-depth consultancy (e.g. strategy, legal issues, finance)
- educational activities and personnel training (e.g. training programmes for companies within the same branch)

These services are typical knowledge-intensive business services in the sense that they are delivered in close collaboration between the service provider and the customer. In many cases, active participation and openness is needed from both sides. The business environment of many new technology-based or other knowledge-intensive companies is usually very complex including considerable technological and financial risks. Most of the new companies aim at very narrow market that may have very specific characteristics and dynamics. In addition, new technology-based or other knowledge-intensive (e.g. expertise-based) companies suffer usually from the so-called competence gap, which refers to the lack or weakness of management capabilities related to issues such as sales, marketing and finance. Because of these features, provision of even very basic evaluation and consultancy services requires quite special skills and sensibility to the specificity of the companies and business ideas. These services are usually financed either by direct customer fees or public funding (e.g. the basic evaluation of business plans).

Second, the other field of activities of the specialised development organisations can be named as boundary-spanning activities. They could also be named networking activities, but the term boundary-spanning describes quite well the challenge of getting actors with many kinds of needs and motives to

collaborate together. Specialised development organisations can be mediators between or sometimes within the following groups:

- companies within the same branch (e.g. personnel training)
- subcontractors and main suppliers (e.g. development of subcontracting networks and 'mini-clusters')
- suppliers and end customers (e.g. marketing, sales promotion)
- companies that have complementary competences (e.g. technological partnership, development of 'mini-clusters')
- universities, research institutions and polytechnics and companies (e.g. licensing, technology transfer, collaborative projects)
- companies and financiers (e.g. finance of R&D activities, 'V2C activities')
- universities, research institutions and polytechnics (e.g. joint teaching activities, collaborative research projects)

The above list is not exhaustive, but the field of the specialised development organisations can be vast. These activities require special skills in areas such as networking and project and process management and a good sense of needs and expectations of different actors. General networking or cluster development activities and projects are usually financed mainly by public funding. The specialised development organisations provide also boundary-spanning services that are company-specific and thus chargeable.

Case: A digital media agglomeration in Tampere

Basic description of the agglomeration

The roots of digital media agglomeration[2] in Tampere go far back in history. In the early 1990s, there was only a clutch of separate companies in various branches that were loosely related to each other. After that the agglomeration grew very rapidly and reached its current form in the late 1990s. Also, many new business activities and companies emerged. For example, the 'Internet revolution' in the mid-1990s generated the new media business which has thereafter transformed drastically. It has even been claimed that there is no more such thing as new media. However, different digital-media-related branches have been growing rapidly and they have gradually come closer to each other – converged – forming an agglomeration, which is still quite loose and multifaceted.

In 1996, the agglomeration consisted of approximately 170 companies and business units with a total of 5,200 employees, when its total turnover was about 770 million euro. In 2000 the total turnover had doubled, amounting to 1.5 billion euro. The number of employees in private companies also increased rapidly. For example, it grew from 3,000 to 6,800 between 1994 and 1997, which means that the growth rate was approximately 125 per cent (*Tampereen seudun osaamiskeskusohjelma 1999–2006* 1998). By 2000, the digital media agglomeration employed 10,000 people (O'Gorman & Kautonen 2001). If the agglomeration is defined in broader terms (including e.g. all mass media and ICT wholesale and retail), the number of employees amounts to some 15,500. At the beginning of twenty-first century, the development of the agglomeration in terms of employment has been positive, but fairly slow. In comparison, the number of employees in the ICT sector has decreased during the last couple of years in Helsinki and Oulu. Relatively, the

development of agglomeration in Tampere has been quite good. In the near future, modest growth is the most likely scenario (cf. Mäkinen et al. 2004).

The business structure of the agglomeration is very diverse and dominated by the business units of large, international ICT companies, such as Nokia, Elisa Communications, TietoEnator, Sonera, and Fujitsu Invia. For example, Nokia Corporation employs approximately 3,700 people almost purely in R&D activities in Tampere. The agglomeration is oriented towards research and development, which concerns also the above-mentioned business units of large companies. On the one hand, this orientation is favourable, because R&D is a more stable business function than sales, marketing and production, for example. On the other hand, it would be beneficial to the development of the agglomeration if Tampere also had more 'headquarter functions' with close connections to international markets, investors, etc. It can be claimed that the remarkable role of large companies in the agglomeration has negative side effects as well. The agglomeration has one major weakness, namely a debilitated entrepreneurial atmosphere, which is in turn linked to the paucity of (new) companies aiming at fast growth and internationalisation (cf. Autere 2000). Naturally, there are many small companies competing among themselves and also some advanced growth companies, but they are few in number, especially regarding the strong science and technology base of the agglomeration.

The rapid development of the agglomeration results partly from the natural, rapid development of the whole digital media sector. On the other hand, digital media has been one of the most important focus areas of local (business) development and innovation policy in Tampere Region. Therefore, several visionary and resolute local collective actions have been taken by both private and public actors – often together – towards

facilitating and strengthening the agglomeration and especially its institutional setting and knowledge base.

In the following chapters, some institutional features of the agglomeration and policy activities related to it are considered in greater detail. Attention is paid especially to the educational and research institutions and to the role of local specialised development organisations.

Educational and research institutions[3]

The strong science and technology base and the educational institutions are among the major strengths of the digital media agglomeration in Tampere. The most important institutions in this respect are the Tampere University of Technology, the University of Tampere, Tampere Polytechnic, and VTT Technical Research Centre of Finland.

Tampere University of Technology (TUT) has a central role in the digital media agglomeration. It has traditionally had very close relationships with local commercial and especially industrial activities, as well as with other institutions financing technological research. It is therefore natural that external funding is very crucial for TUT. In year 2003, 41.0 per cent of TUT's budget consists of external funding, mainly from The National Technology Agency of Finland (Tekes) (13.3%) and companies (12.2%). TUT and local companies collaborate in educational and research activities alike. Additionally, new forms of collaboration have been developed: part-time professorships for experts and managers working in companies are examples of these.

When considering TUT's collaboration with companies, the role of Nokia Corporation cannot be ignored. Many departments and institutes of the Tampere University of Technology have close linkages with diverse units of Nokia. Typical forms of collaboration have been commissioning and joint research projects, providing positions for trainees as well

as for undergraduates writing their theses, collaboration in the planning of basic, post-graduate and supplementary education, consultancy, inter-organisational job rotation, joint seminars, etc. These forms of collaboration are not recently developed; they have existed for several years (see e.g. Haavisto 1996). The collaboration between Nokia and educational and research institutions, especially TUT, is of great importance in relation to the development of the whole agglomeration: this good state of collaboration is one reason for Nokia's strategy to locate a considerable number of its R&D activities in Tampere.

ICT-related education and research began to strengthen in the 1980s when computer science became a major subject in TUT. Since then, the volumes in information, communication and electro-technical education and research have grown very rapidly. For example, the number of degrees completed at the Department of Information Technology per year has roughly been decupled since the year 1990. Especially in the mid-1990s there was a dramatic increase. In addition to diverse basic-degree and post-graduate education, TUT also offers in-service training and supplementary education. The Centre for Continuing Education (Edutech) is in this sense a central organisation, although institutes also arrange these courses by themselves. For example, the 'project manager course' has been arranged by the Institute of Software Systems for ten years now and approximately 400 experts from companies and other organisations have attended it. Thus it has been an interesting forum for local networking in addition to its educational substance.

A major part of digital-media-related research work in TUT is carried out in the Digital Media Institute (DMI). Another very important unit in this respect is the Optoelectronics Research Centre (ORC). DMI is a matrix organisation consisting of the following institutes of TUT: Institute of Signal Processing, Institute of Digital and Computer Systems, Institute of Software

Systems, Institute of Communications Engineering, Hypermedia Laboratory, Medical Information Technology in Seinäjoki, Information Technology in Pori and Institute of Electronics. Thus the research of the above-mentioned institutes is carried out under DMI, but teaching is conducted traditionally. This kind of organisational solution brings together research and education, on the one hand, and critical mass and better public visibility and accessibility of research on the other. DMI employs more than 400 researchers and research assistants. It co-ordinates Technology Engine Programmes, which constitute a subprogramme of the eTampere Programme.[4] The aim of these programmes is to strengthen the ICT-related research in Tampere and to produce new, commercialiseable knowledge in various projects. DMI's total budget in 2003 was 14.9 million euros and it operates almost totally on external public and private funding. The National Technology Agency of Finland (Tekes) and the Academy of Finland are the main sources of funding and about one third of the funding is provided by private companies.

The Optoelectronics Research Centre interestingly illustrates the roles that a university institute can have in an agglomeration. Optoelectronics is an upward scientific sector, which also has vast commercial potential. ORC is an auxiliary institute operating under the Council of TUT and it has grown considerably during the few past years employing at the moment about 60 employees. The annual budget is some three million euros of which some three quarters consists of external funding. For instance, the City of Tampere finances ORC directly and the financial instruments of the EU are also used (ERDF, Objective 2). These investments in optoelectronics research are very well justifiable from the point of view of the local economic development policy: ORC aims explicitly to promote collaboration with companies and university spin-offs. It is also internationally oriented with research partners, both companies and university units, worldwide. Consequently,

ORC and its precursors have generated some succeeding spin-offs (e.g. Coherent-Tutcore) and attracted foreign investments in Tampere (e.g. Memscap S.A.).

The University of Tampere (UTA) has its roots in social sciences, but today it is a diversified university with approximately 12,500 first-degree students and 1,900 post-graduate students. Despite its emphasis on social sciences, UTA has long traditions in computer science and other digital-media-related fields of education and research. UTA started teaching activities in computer science in 1965, first ever in Nordic countries. Earlier the ICT and digital-media-related activities (e.g. computer science, information science, hypermedia) were dispersed in several faculties, but these were brought together under a new faculty, the Faculty of Information Sciences, in 2001. The reshaping of the faculty structure increases natural possibilities for synergetic action between different disciplines and makes them more 'visible' from the point of view of business life.

The Faculty of Information Sciences is an important unit in the agglomeration in terms of education and research. For example, there are about 90 employees in the Department of Computer and Information Sciences. Human-computer interaction is a very important area of research and there is even a separate Tampere Unit for Computer-Human Interaction (TAUCHI) and Usability Laboratory in the department for this purpose. The Usability Laboratory offers usability testing and evaluation services and training and consultancy related to usability matters. At the Department of Information Studies, for example, themes like information retrieval, seeking and management are researched. In addition to basic research activities, the department also offers research services in its main fields of competence.

The Hypermedia Laboratory also belongs to the Faculty of Information Sciences and it has grown significantly in the past

few years, employing currently about 50 experts. The Hypermedia Laboratory realises its research and development projects mainly in close collaboration with companies and other institutions. The main research themes of the laboratory are related to adaptive systems and contents, experience design, knowledge-creating systems (e.g. knowledge management tools) and learning (e.g. mobile learning and edutainment). Digital games and gaming is a rising field of research and teaching within the Hypermedia Laboratory. It has even established a Game Research Lab that focuses especially on game research from different viewpoints ranging from basic research to game concept development. The Hypermedia Laboratory is an important actor within Neogames, a locally rooted but national programme aiming to develop the Finnish digital game cluster (Kolehmainen 2004).

The second corner stone of digital-media-related activities at UTA is communication(s) theory and mass media. It has always been a very strong area in teaching and research within the university and in the past few years, the issues of new media (e.g. audiovisual media culture and education) have aroused great interest. Many researchers within social sciences and humanities have also become interested in issues related to digital media. From this perspective, the Information Society Institute (ISI) is a central organisation. ISI is a subprogramme of the eTampere programme and its main task is to promote research on the information society at UTA and TUT. ISI has been founded by UTA and TUT together, even though UTA bears the operational responsibility. Like ISI, the e-Business Research Center (eBRC) is a subprogramme of the eTampere programme and a joint venture of UTA and TUT. The aim of eBRC is to study different kinds of phenomena related to the electronic business activities in co-operation with the businesses themselves.

The Tampere Polytechnic completes the operations of the two universities in Tampere. It has a total of 17 training programmes

in the fields of engineering and transportation, business, culture and natural resources (forestry). Its diversified teaching activities support in many ways the development of a digital media agglomeration, although it is smaller than the two universities. Tampere Polytechnic has about 5,000 students and 400 teachers as well as three independent schools: the Business School, the School of Technology and Forestry, and the School of Art and Media. All of these schools carry out activities that are somehow connected with digital media. The School of Technology and Forestry produces engineers in the field of ICT and the Business School bachelors of business administration majoring in data processing (e.g. hypermedia and software business). Tampere Polytechnic also has a Teacher Education Center. The School of Art and Media was established in 1991; in 1996 it was affiliated to Tampere Polytechnic. The School of Art and Media has a very unique profile which combines art and communications, as well as the use of 'old' and 'new' technologies. It also has strong collaboration relationships to (local) media businesses: working life contacts are a crucial part of its education.

From the viewpoint of research, the units of *VTT Technical Research Centre of Finland* located in Tampere are important institutions in the digital media agglomeration. VTT provides technology and applied research services for private companies and other organisations. VTT Information Technology has made efforts to develop local collaboration, and a large number of its projects are conducted with local or regional partners. Its main customers are mobile phone manufacturers, teleoperators and small software companies. VTT Industrial Systems also has ICT-related activities in Tampere. For example, wireless data transmission technologies (e.g. WLAN), location technologies are researched. This unit is also responsible for the Research & Evaluation Laboratory (RELab), which is one of the subprogrammes of the eTampere programme.

The key research and educational institutions of the digital media agglomeration in Tampere and their major competence fields are summarised in Table 1.

Table 1. *The key research and educational institutions of the digital media agglomeration in Tampere and their major competence fields*

Organisation	**Examples of competence fields**
Tampere University of Technology • basic and applied research • education • commercial services	• Digital and computer systems • Electronics • Software systems • Optoelectronics • Signal processing • Communications engineering • Virtual reality • Research on e-business
University of Tampere • basic and applied research • education • commercial services	• Computer science (e.g. human–computer interaction) • Information studies (e.g. information retrieval and management) • Hypermedia • Journalism and mass communication • Research on information society and e-business
Tampere Polytechnic • education • development projects • commercial services	• Data-processing (e.g. hypermedia and software business) • Computer and software technology • Communications (e.g. interacting media)
VTT Technical Research Centre of Finland (units located in Tampere) • basic and applied research • commercial services	• Human interaction technologies and human-centred design • Wireless solutions • Integrated systems • Wellness Applications

Key special development organisations of the digital media agglomeration[5]

As mentioned earlier, digital media has been one of the key areas of local business development and innovation policy in Tampere. One of the main aims of policy actions has been to build a specialised business and innovation support organisation infrastructure. In this chapter, the key organisations in this respect are introduced. Although the basic technological knowledge and other competences of the agglomeration lie in companies, universities, research institutes and educational institutions, competent business support, development and intermediation organisation can harness these competences to better use and even participate in the process of creating new regional competences. When considering a certain agglomeration, the role of a specialised development organisation is emphasised, although a general development organisation (e.g. Employment and Economic Development Centres, the Business Development Centres of cities) can play an important role as an incidental opinion leader, financier, or strategist. However, this part covers only the most important specialised development organisations of the digital media agglomeration in Tampere: Tampere Science Park Ltd, Technology Centre Hermia Ltd, Hermia Business Development Ltd, Media Tampere Ltd, and Professia Ltd.

Tampere Science Parks Ltd was established in 2004 by merging all the business real estate businesses of City of Tampere. First, the business activities of Tampere Technology Centre Ltd were divided between two companies. Technology Centre Hermia Ltd carries out project and development activities and Hermia Premise Service Ltd took care of real estate business activities related to Hermia Science Park until it was merged with Finn-Medi Invest Ltd and Tampere Industrial Real Estate Ltd. These mergers resulted in the birth of Tampere Science Parks Ltd, which

is now responsible for the city council's real estate business related to its economic and business development policy.

As mentioned earlier, Technology Centre Hermia Ltd was established in 2004 and it takes care of its successor's – Tampere Technology Centre Ltd's – project and development activities. Tampere Technology Centre Ltd was established in 1990 and, in the beginning, its main aim was to develop the Technology Centre Hermia, which had been founded four years earlier. Later on, the tasks of promoting the development of high-tech companies and implementing the Regional Centre of Expertise Programme[6] also became significant. The first of the above-mentioned tasks includes producing, commercialising and developing services (e.g. licensing and business plan evaluation) for existing high-tech companies and beginning companies alike. Currently, this very task is carried out by Hermia Business Development Ltd, which is now, after recent ownership arrangements, a privately-publicly owned business development company. This kind of private-public partnership is a relatively new phenomenon in regional development policy. Hermia Business Development Ltd is also responsible for the operations of the eAccelerator, which is a subprogramme of the eTampere programme (see also Jungman & Rasila 2005). The aim of the eAccelerator concept is to launch 20 companies onto a very rapid growth track by coaching the chosen companies, matching them with suitable partners (e.g. financiers, customers, suppliers) and offering pre-seed finance. Partly due to the changes in external business environment, the eAccelerator has altered its focus, strategy and activities. For example, the eAcclerator is now concentrating on more mature businesses that are still growth oriented.

The second task, namely the implementation of the Regional Centre of Expertise Programme, is carried out by the Technology Centre Hermia Ltd. There are four official Centres of Expertise in Tampere, and Tampere Technology Centre is responsible

for two of them (mechanical engineering and automation and information and communication technology). In practice this responsibility includes building co-operation networks and co-ordinating different kinds of education, research and technology initiatives, projects and programmes which are generated on the basis of companies' needs. The Tampere Region Centre of Expertise Programme does not have a very large financial base, but it is still an important forum for local collaboration. It also enhances and builds up the image of the region's expertise and competences.

Technology Centre Hermia Ltd is focusing on ICT strongly and cumulating specialised expertise in that area. Neogames is a good example of this path of development. Neogames is quite an ambitious national development project aiming to facilitate the growth and internationalisation of the Finnish digital game industry and its co-ordination unit is organisationally located in Technology Centre Hermia Ltd. The digital game industry is a very difficult business environment because of its many distinctive and special features and dynamics. The activities and services of Neogames have to be adjusted to those characteristics (Kolehmainen 2004).

The main activities of Neogames community are: *1) the creation of a comprehensive network of players in the games field, 2) the development of games-related business, 3) the support and co-ordination of research related to and supporting the games field,* and *4) the improvement of the image of the games field and making the field better known.* Although the core activities are pronounced quite clearly, the concrete ways in which they are conducted are still partly under development and they will be kept flexible. In practise, the networking task of Neogames means arranging different seminars and establishing special interest groups, just to name a few. The business development activity of Neogames crystallises itself in services that are provided for the member

organisations. These services include business consultancy (e.g. financing and legal matters) and other support for the development of future entertainment applications and games (e.g. technology and concept design, testing). These services are produced partly by the co-ordination unit and partly by the external partners. Neogames provides also market information to the members and acts as an intermediary of marketing channels (Kolehmainen 2004).

As was shown, Technology Centre Hermia Ltd and Hermia Business Development Ltd attend to the development of high-tech companies, including ICT companies (e.g. software companies and component manufacturers). In addition to those organisations, Tamlink Ltd is also closely linked to the Hermia Science Park and the 'technological side' of digital media. Tamlink is a technology transfer organisation and it was established already in 1986. It is owned by SITRA (Finnish National Fund for Research and Development), the Tampere University of Technology, the City of Tampere and Finnvera Plc. Tamlink Ltd has many kinds of services, but it focuses especially on the design and implementation of RTD projects. Information and communication technology is one, but only one, of its fields of expertise. All these above-mentioned specialised development organisations have very close and multi-faceted contacts with the Tampere University of Technology (TUT) and the interaction between them is facilitated by the spatial proximity: TUT's campus and Hermia Science Park form together a considerable concentration of R&D and other innovation-related activities, just as the theoretical ideas concerning science parks imply.

The other major part of the digital media branch consists of companies whose competencies are related to digital contents, communication (e.g. web services) and other knowledge-intensive services that are linked to digital media (e.g. web-based marketing). Media Tampere Ltd is specialised in developing

digital media companies of this kind in Tampere.[7] Media Tampere Ltd is owned by Alma Media, Fujitsu Invia, Nokia Corporation, the City of Tampere, Elisa Plc and the University of Tampere Foundation. In practice, the development of digital media locally means establishing different kinds of development projects and facilitating co-operation between companies, educational and research institutions, financiers and other relevant organisations. These general networking and developing tasks are very much manifested in the implementation of the Centre of Expertise for Media Services, for which Media Tampere Ltd is responsible. Media Tampere Ltd also has its own R&D projects which are linked mainly to (public) web and mobile services.

Professia Ltd is a 'newcomer' in the support organisation infrastructure in Tampere. It was founded in 2000 and its focus lies in developing knowledge-intensive business service (KIBS) companies. Professia is owned equally by the City of Tampere, Tampere University Foundation, Finnvera Plc and Tampere Region Growth Foundation. Professia Ltd provides various kinds of consultancy services to beginning and already established KIBS companies, on the one hand, and to researchers and other personnel in universities and other institutions of higher education in Tampere on the other. This second task aims at advancing knowledge transfer from universities to companies and other organisations and the commercialisation of knowledge and expertise produced in research activities. In this respect, the focus is especially on the University of Tampere. Professia also offers typical incubation services for new companies within its thematic focus and currently it also runs Media Club Incubator, which was earlier more closely linked to Media Tampere Ltd. In addition to these more specific services, Professia Ltd bears the responsibility for the co-ordination of the Centre of Expertise for Knowledge-Intensive Business Services, which does not have the national Centre of Excellence status or the related financing from

the Ministry of the Interior. Instead, the centre is financed locally, as the development of the KIBS branch has been considered important. The key specialised development organisations of the digital media agglomeration in Tampere and their major functions and services are summarised in Table 2.

Table 2. *The key specialised development organisations and some examples of their functions and services*

Organisation	Examples of functions and services
Tampere Science Parks Ltd	• Provision of premises (e.g. Hermia Science Park, Finn-Medi)
Technology Centre Hermia Ltd	• Co-ordination of Centre of Expertise (Information and Communication Technology • Development projects and programmes (e.g. NeoGames, COSS)
Hermia Business Development Ltd	• Commercialisation of product and business ideas • Development of technology-based companies • Incubator • eAccelerator (a part of eTampere programme)
Tamlink Ltd	• planning of research and technology • development, implementation and management of (RTD) projects • co-ordination of EU and other consortium projects • technology evaluations and analyses and feasibility studies • business surveys and analyses
Media Tampere Ltd	• Product development (web services) • Consultancy and project management • Development of media and new media firms • Incubator (Media Club) • Co-ordination of Centre of Expertise (Media Services)
Professia Ltd	• Development of KIBS companies • Incubator (Media Club) • Co-ordination of Centre of Expertise (Expert Services)

Discussion and concluding remarks

First, economic activities seem to have a tendency to cluster in certain regions or localities because of different kinds of agglomeration economies. Consequently, the territorial agglomerations and their (internal) dynamics have aroused interest among researchers for a long time. Second, the great economic importance of innovations and learning has been recognised widely. Companies are naturally in primary roles in innovation processes that are very often recursive and interactive in nature, which accentuates the role of companies' customers, suppliers, subcontractors, partner companies, financiers, research institutes, semi-public and public development organisations, etc. Therefore, both explicit, inter-organisational innovation networks and weaker innovation-related social linkages have gained more strategic importance. The localisation of these innovation networks and social linkages augment the positive effect of 'pure' agglomeration economies, thus facilitating the flows of knowledge and innovation. However, these notions together invite us to further elaborate on the role of territorial agglomerations in boosting the local innovation performance.

It is often – though axiomatically – claimed that agglomerations boost the companies' innovation activities. It would be more accurate to state that a territorial agglomeration can be a basis for the development of a good local innovation environment. Consequently the agglomeration does not automatically and directly enhance the innovation activities of companies within it. The agglomeration and local innovation environment formed on it may make no difference at all, or they may even inhibit innovation. The ways in which local operational environment can promote innovation are very complex and intricate. It was argued that a local innovation environment consists of many interrelated elements ranging from the

institutional setting to the behaviour of individuals. It was also argued that the local innovation environment can be divided into three levels: *1. the structural and institutional level, 2. the level of organisational relationships* and *3. the level of individuals.* There are certain characteristics in each of these levels that are necessary for the local innovation environment to really set the scene for the innovation activities companies.

In this article, the role of the institutional setting of the local innovation environment was discussed more in detail. The focus was particularly on the knowledge institutions. On the one hand, the role of the educational and research institutions within a local innovation environment was dealt with. On the other hand, the different activities of so-called specialised development organisations were examined. The case of a digital media agglomeration in Tampere was used as an empirical illustration for the theoretical themes debated in article. The roots of the agglomeration go quite far back in history, but it grew very rapidly and reached its current form only in the 1990s. In conclusion, the case of digital media agglomeration in Tampere accentuates the importance of the institutional setting of the agglomeration and public policy measures.

It was noticed that educational and research institutions, universities in particular, have many roles within the local innovation environment. Primarily, on the very structural level, they are producers of human and especially intellectual resources by their basic tasks, namely research and education. In terms of direct links with the business world, the educational and research institutions do not only collaborate with local companies, but they can also generate and attract new businesses to the region. Still, these three tasks do not describe the role of educational and research institutions within a local innovation environment exhaustively. For example, these organisations usually have international linkages that channel new information

and knowledge to the local innovation environment. They are also important from the individuals' point of view: they are an important part of the 'creative problem-solving environment' mentioned earlier.

From the empirical point of view, it can be claimed that universities and other educational and research institutions have played a crucial role in the digital media agglomeration and also constitute one of its major strengths. For example, the versatile set of educational institutions has guaranteed the availability of skilled applicants for the companies during the stage of rapid growth of the digital media sector as a whole as well. In addition to the high volume of education, the diversity of educational activities seems to be an important feature of the digital media agglomeration in Tampere. The Tampere University of Technology, University of Tampere and Tampere Polytechnic augment each others' activities efficiently. Also with respect to research, the diversity of the agglomeration is notable and it has contributed to the development of the agglomeration. Many of the units of the universities and the polytechnic are quite advanced in their activities and practises with the (local) business world.

The specialised development organisations provide services that facilitate innovation within individual companies. However, these organisations have characteristically also broader assignments, such as networking different actors (e.g. universities and companies) together for different purposes. These activities can be named as boundary-spanning activities, because the term boundary-spanning describes quite well the challenge of acting as an intermediary between and among organisations with varying motives, interests, financial and knowledge resources, capabilities and practises, just to name a few differences. Furthermore, the institutions mentioned above can be seen as linking organisations also in broader sense. For example, the

cluster development activities are usually of that nature. Namely, cluster development is usually about creating open forums and circumstances for emergence of collective innovation processes and other collaborative activities, to mention a few examples. At the same time the common view of the cluster and its actors is built and strengthened to facilitate these processes and activities. Cluster development involves usually the building of external relationships and acts of external marketing.

The special development organisations also play a key role in capitalising on the economic potential of local educational and research institutions which is based on the knowledge they produce. That is one of the key arguments in this article. In this respect, the division between knowledge generation and exploitation systems within regional systems was highlighted. It was also emphasised that there are institutions – specialised development organisations – that tie these subsystems together. It is not always understood that this linking, or boundary-spanning, task is quite demanding, especially because of information and knowledge requirements related to it. This holds true also in the case of the high-technology and knowledge-intensive branches, which are usually very challenging business environments due to the rapid development and technological, financial, legal challenges and risks, for example. The specialised development organisation meets these challenges also when delivering support services to individual companies or interacting with them otherwise. Consequently, the requirements towards these development organisations are increasing. In addition to the branch-specific knowledge, the specialised development organisation needs also more general skills. The different fields of that expertise can be described as follows:

- *Technological and business expertise.* The specialised development organisations have direct contacts with customer companies and they offer many kinds of internal

support services. The customer companies have usually some kind of problem or challenge and they need assistance to solve the situation. These problems and challenges may be related to technology, finance, legal matters, production, organisation, human resources, networking and partnering, etc. The specialised development organisation is expected to have expertise on all these issues and the customer companies' expectations are usually very high. From the perspective of the development organisation the situation is very demanding: it should be able to consult the customer company in a very specific way and still to deliver services to a large number of companies. Furthermore, the consultancy service product range of the specialised development organisations is usually quite wide ranging from basic incubation services to very complicated technological and legal issues. Even this field of expertise is very broad and demanding.

- *Expertise in network management, boundary spanning and development processes.* Specialised development organisations 'weave' nets among companies and other organisations. These tasks require skills and competences in network management and management of development processes. Increasing attention should be paid to these competences and skills because well-functioning networks can be of high value in respect of actors belonging to them and in respect of regional development more generally (cf. Linnamaa 2004).
- *Institutional expertise and expertise in regional development.* The specialised development organisations are usually operative organisations that implement in practise broader definitions of regional or local economic development and innovation policy. However, these organisations also take

> part in the formulation of the definition of these policies. To be able to contribute to these processes, the specialised development organisations need to have competencies in regional development. This requires a broad picture of the whole development system, or, in other words, the regional innovation system or the institutional setting of local innovation environment. These organisations should also be deeply aware of the international, national and regional policy processes, development programmes, policy initiatives, etc. Regional development work is not only policy, but politics is also involved and understanding concerning its dynamics is necessary at least to some extent.

Due to the challenging nature of the specialised development activities, these organisations should be of high quality. In this respect, especially two issues are of great importance. First, it should be noted that the work done by the specialised development organisations is 'craftsmanlike' and highly dependent on the key people who are actually taking care of the customer companies and development projects. Consequently, the competences and skills of the development organisations are high embodied in employees. That notion highlights the importance of the recruitment and personnel development within these development organisations. Until recently, too little attention has been paid to these crucial issues.

Second, it can be argued that the specialised development organisations should be even more specialised and more focused to meet the needs of customer organisations better. The precondition for this kind of development is in many cases the broadening of their market focus in geographical terms to ensure a sufficient number of potential customers. This requirement leads to the national or even international focus. This notion

includes also the idea that the development work could be 'real business'. However, all the functions, activities and services of the specialised development organisations cannot be delivered totally on the market basis, but public financial support is needed. Business incubation services are typically of that nature. The precondition for the implementation of the more focused strategy and becoming business that could even export services outside the region is the enhancement of the competences in a very broad sense.

Development of competences refers here to the upgrading of all the activities of these organisations. It refers to the development of personnel's skills, enhancement of internal processes (e.g. knowledge management), broadening of networks (e.g. making new contacts with organisations of 'good quality'), consolidation of the economic basis (e.g. free assets that allows internal R&D and taking some financial risks). These are very challenging tasks, especially taking into account that the internal development of the specialised development organisation is usually gradual in nature due to many factors, such us scarce financial resources. In sum, all these notions of the challenges of the specialised development organisations call for capable and innovative management. To make the situation even more demanding, it has to be noted that these managers are not responsible only for their own organisations, but they may have more far-reaching role as leaders of the whole local or regional innovation environment. This role is not official or formal, but they use their influence, knowledge, networks and other personal assets when different kinds of regional strategies are formulated and implemented and initiatives are planned and launched. Managing innovation environments requires shared leadership and influencing the development through reshaping (institutional) structures, making new interpretations, activating 'energy' and developing the competences (Ståhle et al. 2004; Smedlund et al. 2005). The

competence development refers here to the regional competences that to some extent different from the organisational competences (see Sotarauta 2000).

The innovation support infrastructure, and especially the set of specialised development organisations, seems to be quite extensive and solid in the digital media agglomeration in Tampere. The empirical case also implies that several local collective actions have been taken by both private and public actors, often together, towards facilitating and strengthening the knowledge institutions that can be benefited by a number of companies. These actions indicate that many companies, or at least certain decision makers in those companies, have acknowledged the possibilities to intentionally build their local environment to match their needs of complementary and untraded assets. It should also be noted that the role of the City of Tampere and other public actors has also been crucial in the creation of the institutional setting of the agglomeration. Furthermore, the recent modifications of the institutional setting suggest that the policy makers are constantly developing it. There are also some pointers that some of the specialised development organisations are taking bold steps in developing their own services and businesses in line with the future directions that were suggested in this section. In any case, the aims seem to be high and means to attain these aims can be trailblazing.

Although the importance of knowledge institutions was stressed in this article, it is worth reminding that certain structures, institutional settings or policy activities alone cannot guarantee the innovativeness and innovation performance of a territorial agglomeration. For example, the actual role of knowledge institutions in the development of digital media agglomeration in Tampere is very difficult to evaluate. It is sure that especially the universities and other educational and research organisations have contributed to the development

considerably through their basic activities. On the other hand, the specialised development organisations have created forums for collaboration among companies and other organisations (e.g. Centre of Expertise Programme) and made the agglomeration visible to the companies belonging to it and to the rest of the world. In any case, it is good to bear in mind that the success of an agglomeration in terms of innovation results always from the innovativeness and innovation performance of companies and individuals belonging to the agglomeration. This holds true also in digital media agglomeration in Tampere. Still, knowledge institutions as a part of the local innovation environment can and should support the development of these companies and individuals. That is what they are for.

However, it is important to notice that gaining success and maintaining sustainable competitiveness in the 'global innovation competition' are becoming harder and harder due to the increasing internationalisation of the R&D and other activities. For example, there are several rapidly growing ICT agglomerations in China and India which are challenging the existing agglomerations holding the leading or prominent positions within the field of ICT. According to some quite recent interrelated foresight studies, the development of digital media agglomeration in Tampere seems to be fairly favourable, at least in the short and medium run (see Mäkinen et al. 2004; Sneck et al. 2004; Kautonen et al. 2004). There are many growth sectors and new opportunities within the field of digital media as is defined in this article (e.g. digital gaming, digital communication in health care, data security and other digital and electronic services). On the other hand, the challenges of internationalisation and increasing international competition were also recognised as well as the technological risks.

It can be argued that the increasing international competition has implications also for knowledge institutions.

The emerging growth areas have different competitive advantages in comparison with the existing successful agglomerations. The high-skilled labour force is there cheaper than in traditional ICT agglomerations and they are also catching up rapidly those agglomerations in terms of technological progressiveness and innovativeness. It can be argued that the knowledge institutions play a key role in this 'innovation competition'. Accordingly, the challenges of knowledge institutions are growing also in this respect. The knowledge institutions can enhance the competitiveness of the agglomeration only by being internationally competitive by themselves. That is possible only by developing competences and activities persistently and focusedly. This notion concerns research and educational organisations and development organisations alike. It can be seen as a huge challenge and an opportunity at the same time also for the knowledge institutions of the digital media agglomeration in Tampere.

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Professia Ltd	www.professia.fi
Tampere Polytechnic	www.tpu.fi
Tampere Science Parks Ltd.	www.hermia.fi
Tampere University of Technology	www.tut.fi
Technology Centre Hermia Ltd.	www.hermia.fi
University of Tampere	www.uta.fi
VTT Technical Research Centre of Finland	www.vtt.fi

Endnotes

[1] The VIA project was conducted at Work Research Centre, University of Tampere, and funded by the National Technology Agency of Finland (Tekes) (see the final report by Kautonen et al. 2002). The project was a part of the Technology Study Programme of Tekes and the Finnish Ministry of Trade and Industry. The basic description of a digital media agglomeration in Tampere and its innovation support infrastructure is mainly based on this VIA project. The main data consisted of 29 interviews of experts working in digital media related companies (11) and other organisations (18)

alike. Interviews were conducted in the years 2000 and 2001. In addition to interview data, a considerable amount of other written and electronic materials (e.g. statistics, bulletins, articles, websites) have been used.

[2] The digital media agglomeration in Tampere includes those actors that *1) produce digital or digitality-related products and service; 2) produce products and services whose production process is based on digital technology; 3) produce and disseminate digitality-based technology, knowledge and competencies (e.g.. educational and research institutes);* and/or *4) in some other way promote digitality-related business, entrepreneurship, research, educational or civic activities* and that are located within the Tampere city-region. In other words, the digital media is in this paper understood in its broadest sense and the concept of ICT cluster could have been used almost equivalently. However, the concept of digital media accentuates the role of digitalising content production in addition to the production of products based on digital technology.

[3] Updated details have been checked on the websites of organisations in question. The list of the relevant websites can be found below the bibliography.

[4] eTampere Programme is a five-year development project with a total budget of 130 million euro and it aims to provide an extensive and possibly the first local application for the EU-based eEurope Programme. The general objective of eTampere is to make Tampere a global leader in the research, development and application of issues related to the information society. To achieve this very bold goal, the programme focuses on three themes: 1) public online services will be developed and made available to all residents, 2) the knowledge base of research and training will be strengthened and 3) new business related to the information society will be generated. There are seven subprogrammes in this programme (co-ordinator / background organisation in parenthesis): *1. Information Society Institute (UTA), 2. eBusiness Research Center (TUT & UTA), 3. Research and Evaluation Laboratory RELab (VTT), 4. the eAccelerator (Hermia Business Development Ltd.), 5. Technology Engine Programmes (TUT / DMI), 6. Infocity (City of Tampere),* and *7. eTampere Office (Media Tampere Ltd.)*

[5] Updated details have been checked on the websites of organisations in question. The list of the relevant websites can be found below the bibliography.

[6] The Tampere Region Centre of Expertise Programme is a part of the national Centre of Expertise Programme co-ordinated by the Ministry of the Interior. The basic idea of this programme is to enhance the collaboration among companies and between companies and research and educational institutions in order to stimulate and develop high-profile business activities. Tampere has four officially and nationally recognised Centres of Expertise: Mechanical Engineering and Automation, Information and Communication Technology, Health Care Technology and Media Services. Besides the seed finance by the ministry, the programme is financed by National Technology Agency of Finland TEKES, the Council of Tampere Region, the City of Tampere and nine of its neighbouring municipalities.

[7] The Finnish Ministry of Education has contracted out an interesting mapping on the current situation of content production and Tampere was dealt with very visibly and positively in this report (see Pennanen 2002).

Hannu Jungman and Tommi Rasila

Striving for Innovations and Global Success: The Case of eAccelerator

Introduction

The importance of growth-oriented entrepreneurial companies and innovations to economic development and job creation is unarguable. However, the full growth potential of these ventures can rarely be realised without access to external resources. Traditionally, the providers of external resources, the enablers, have been venture capital (VC) investors, either formal or informal. Brophy (1986) has argued that it is unlikely that a country or a region can be competitive without a dynamic and vibrant venture capital community. In fact, investors who decide which new ventures are to go forward, and which not, play a crucial role in an economy.

However, both the supply of VC and the size of their minimum investment soared towards the end of last millennium in both the US and Europe. Even after the downturn in VC investment after 2000, there are two key features in this activity. First, new business ideas are increasingly more knowledge intensive, driven in part by the application of ICT as an enabling technology across industrial sectors. Second, the average size of a VC fund has increased more rapidly than the number of VC investment executives, resulting in a controversial situation known as Capital Gap: although there is more VC finance available than ever before it is not offered in small enough doses to meet the needs of many start-up and early stage companies. For example in Finland, the average size of seed stage investment rose from 85 000 € in 1997 to its peak of 450 000 € in 2001, remaining

at 180 000 € in 2004 (FVCA 2005); the formal venture capital industry has moved towards larger and later-stage investments. This trend is well-documented (see e.g. Bygrave and Timmons 1992; Sohl 1999; Murray 1999; Seppä 2000).

The two phenomena described above have resulted in a Knowledge Gap between prospective entrepreneurial ventures and the VC industry: in many cases the venture capitalists do not have the time and skills needed to nurture a start-up company through its early stages.

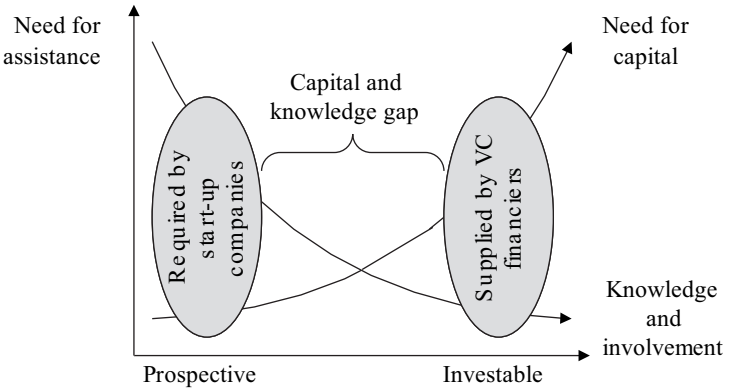

Figure 1. *Capital and knowledge gap (Rasila et al 2002)*

In the void between venture (V) and capital (C), a variety of players is now bridging the gap between entrepreneurs and venture capitalists. The actors refining prospective ventures to make them 'investable', in the eyes of the VC industry, include business angels, incubators, advisors, and corporate venturers. These players are referred to as Venture-to-Capital or V2C actors (Jungman et al. 2004; Rasila 2004; Seppä & Näsi 2001).

In addition to these traditional types of V2C actors, we have witnessed the emergence of new innovative V2C operating models.[1] In the knowledge society, the role of the enabling investor seems to be shifting from VC to V2C investors: from those who invest capital to those who invest knowledge ('sweat capital'). V2C actors like these are transforming from mere investors into co-entrepreneurs, assuming that their earning are tied to the success of the investee. These actors may prove to be just what is needed in Finland (Harrison et al. 2004).

This paper first discusses two elements of global success, innovation and international growth, and then introduces the concept of a business accelerator. It then describes and analyses the virtues and shortcomings of one innovative and bold accelerator attempt to bridge the Knowledge Gap – the case eAccelerator in Tampere.

Through innovation and international growth to global success

Companies pursuing global success must have both the ability to innovate and the willingness to grow. The European Commission (1995) defines innovation as follows: 'Innovation has a variety of roles. As a driving force, it points firms towards ambitious long-term objectives. It also leads to the renewal of industrial structures and is behind the emergence of new sectors of economic activity. According to that definition innovation is:

- the renewal and enlargement of the range of products and services and the associated markets,
- the establishment of new methods of production, supply and distribution, and
- the introduction of changes in management, work organisation, and the working conditions and skills of the workforce.'

Hence, innovations are continuous improvements rather than groundbreaking inventions. This difference between invention and innovation is shown in Figure 2, which illustrates the difference between research-intensive scientific research and market-oriented development work.

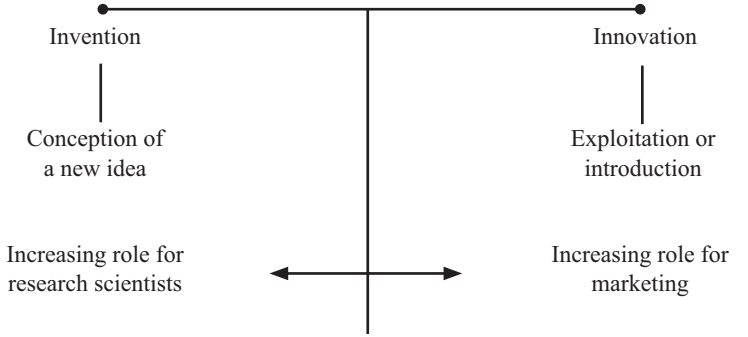

Figure 2. *Technology-source continuum (Riggs 1983)*

According to the EU's latest Innovation Index (European Commission 2004), Finland seems to be among the top innovators. However, Finnish developers are not satisfied with our ability to turn inventions and innovations into profitable innovations and start-ups. Yet a profitable innovation is the basis for most emerging growth ventures, and vice versa: new ventures offer a good breeding ground for innovations, be they subtle improvements or new technologies which will disrupt revolutionise the dominant market. It should be noted that, despite its creative nature, innovation can be done systematically, and many support mechanisms ranging from governmental policies to venture capital investments exist for this purpose (Rasila 2004).

In addition to innovation, international growth is crucial for global success – especially in the case of small nations such as Finland. Company growth is typically measured in terms of sales, employees or assets, with sales growth being the most typical measure for young technology-based companies (Salonen 1995). The growth of an organisation can also be considered to refer to its development and the simultaneous improvement in the quality of its operation, something akin to what happens inside the mind of a child when becoming an adult (Penrose 1995). One key driver in growth, especially regarding technology companies, is the timing of the market window. They are racing against other providers of the same or competing technology. These companies cannot be patient and grow organically. If they do, either the market window will close before they get in or the competitors will have already shared the market (Rasila 2004). Here, we define growth companies to be those who:

– need external funding to finance the growth
– are growing to a new level as organisations
– have to grow in order to attain a position in a new or growing market before competition (Rasila 2004), and
– are willing to grow and take advantage of external resources.

Companies in the early stages in most cases need support to survive through growth, especially when growing at excessive intensity. Early-stage managers, especially in the case of a founder-entrepreneur who is the original innovator and focused on creativity, seldom have the time and experience needed to cope swiftly with growth, not to mention to fully exploit the growth potential as would theoretically be the in best interest of the company (Rasila 2004). In fact, lack of management team's ability to manage further growth has been identified to be one

of the key restraints to growth (Hay & Kamshad 1994). The knowledge needed to grow internationally is often industry specific and cannot be adopted without first hand experience. Other growth and internalisation barriers identified by entrepreneurs are financing and the presence in the target market. Further concerns in Finland are the size of the home market, high cost of production, and the risk-taking abilities of both venture and capital. All these problems are realised after the product development phase (Ryynänen 2004). This is why a company is advised to take advantage of assistance available from outside; from venture capitalists or V2C actors.

As noted in the introduction, the traditional providers of external resources, venture capitalists, are looking for more mature companies than before. This has led to a situation where the criteria for an 'investable' company are set so high that they are often unattainable without other providers of external resources, V2C actors. These actors assist companies in their pursuit of global success.

One such a concept of an emerging V2C operating model to be presented in the following chapter is the business accelerator. As a case eAccelerator – one of the six sub-programmes of the eTampere programme, a five-year development project (2001–2005) costing €132 million with the overall objective of making Tampere a global leader in the research, development and application of issues related to the Knowledge Society – is introduced. The eAccelerator was launched, in 2001, as a sort of ambitious virtual incubator funded by the City of Tampere.

Concept of a business accelerator

According to the National Business Incubation Association (NBIA 2005) 'business incubators nurture the development

of entrepreneurial companies, helping them survive and grow during the start-up period, when they are most vulnerable. These programmes provide their client companies with business support services and resources tailored to young firms.' Even though the business incubation model was developed during the 1950s, the term business accelerator emerged only during the dot-com boom when business incubators gained popularity in the media (ibid.). The term was introduced to differentiate business incubation programmes with more ambitious goals and faster lead times than traditional incubators.

A limited amount of research has been done on business accelerators. This is, on the one hand, due to the newness of the term. On the other hand, it can be regarded as just another term for a business incubator. However, some researchers have made a distinction between traditional business incubators and business accelerators. Whereas business incubators provide a protective early growth environment, business accelerators provide an environment with specific and intensive inputs for growth. However, the accelerator approach is also highly selective and only interested in high growth ventures with a target of a fast IPO or trade sale. In order to achieve this accelerators opt for a strong hands-in management intervention. Further, commercial and professional expertise through an accelerator's networks plays a key role. For a successful accelerator it is also crucial to abandon ventures that cannot fulfil the high growth targets and hence concentrate its resources on the most promising ones only (Hannon 2004). All this leads accelerators to be less risk averse than incubators. The following table summarises the main differences between business incubator and business accelerator.

***Table 1**. Comparison of business incubator and business accelerator (amended Hannon 2004)*

	Incubator	**Accelerator**
Purpose	To provide a protective environment for early growth	To provide a controlled environment for rapid growth
Task	Monitoring and adjusting of inputs to achieve survival and growth rates beyond those in general environment	Monitoring and adjusting of inputs to achieve superior high growth and IPO
Supporting networks	Strong (local) networks	Extensive professional networks
Outputs	Sustainable new ventures	Exceptional growth rate of new ventures achieving significant returns on investment

In summary, accelerators are geared for high growth businesses whereas incubators are established to support businesses that may find it difficult to survive in market environment.

Case eAccelerator

Business concept

eAccelerator is operated by a leading business development agency in the Tampere Region, Hermia Business Development, which has been working closely together with the Hermia Science Park and the adjacent Tampere University of Technology. The target of the actor during the five-year project period, i.e. by end of 2005, is to assist up to 20–25 companies onto international markets, with €50 million of venture funding received by these companies (eTampere 2005). The objective also includes that the target companies grow to have a total personnel of 1,500 people and a turnover of €250 million (ibid.), for which the given time frame – if applicable – is fairly tight.

Nevertheless, growth potential is of the essence for the companies applying for the eAccelerator programme. The articulate criteria for eAccelerator companies are:

- ready made business plan
- technological excellence, idea is ready to be commercialised / implemented,
- entrepreneur is ready for fast growth, and
- entrepreneur commits to three year programme and undertakes to open ownership for chosen capital and knowledge investors (eTampere 2005).

The very idea of the programme is to assist the companies in their early stages in a manner which allows them to start fast growth earlier than without assistance, noting that sometimes fast growth is the only option. It has to be remembered that in Finland – as also more generally in Europe – the venture capitalists do not make investments in as early stages as in the US, where in many cases they are the medium accelerating the growth. Furthermore, the angel investor market in Finland is fairly thin, thus a public or subsidised operation to assist start-up companies can be justified. Nevertheless, as the name eAccelerator implies, the programme emphasises the importance of speed, as can be seen in the figure below (Rasila 2004). Typically the accelerator process is highly selective and by 'picking the pearls' aims at fast growth and realisation of investment sooner than would be possible with a conventional incubation process. Usually, this also results in faster incurrence of costs.

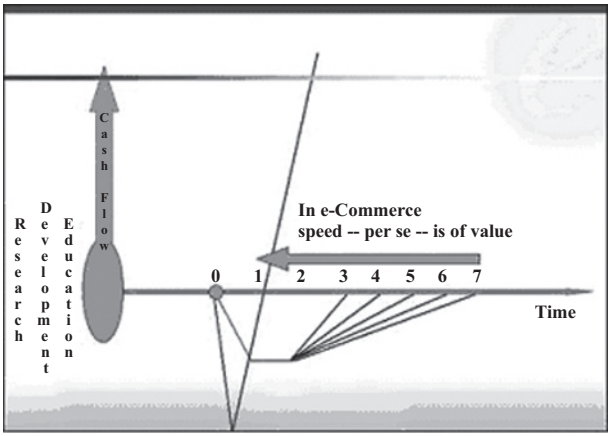

Figure 3. *Efficiency and speed as seen by the eAccelerator (eAccelerator 2003)*

Companies are screened in a normal manner with public funding, but also by use of a business plan competition promoting entrepreneurship. Once accepted, the entrepreneur has to commit to stay in the project for up to 36 months, which is also the explicitly mentioned maximum time before exit. At this stage, the contract still depends on its approval by the Advisor Board, consisting of more than 50 names of local experts divided into three categories; Finance, Growth and Technology. Contracts with accepted companies are tailored from case to case, with variable time span, deliverables and compensation method (Rasila 2004).

In addition to the various business development services by Hermia Business Development, ranging from patent consulting and market research to improving the business plan and raising capital, the deliverables may include a small amount of investment. The investment is not intended to cover operative

costs such as marketing or product development, and is too small for these activities anyway. Instead, it is to be used to cover the direct costs of the business development project such as use of other experts or patenting, according to the guidelines agreed in the contract beforehand (Rasila 2004).

The large number of people on the advisory board can moreover be used for networking. One of the acknowledged benefits of eAccelerator is its capability make contacts and facilitate strategic alliances. For these purposes eAccelerator has also partnered several supporting organisations from legal, recruitment, telecommunications, venture capital and consulting sectors (eTampere 2005). Naturally, marketing material also brings up the connection to the City of Tampere which participates in funding the programme and the Licensing Office of Stanford University, which has a minor equity stake in Hermia Business Development (eAccelerator 2003). Another minor shareholder of the company is Zernike Group, a Dutch technology transfer company.

The method of compensation is preferably straight cash, but a success fee or equity may be used as well. Payback is not immediate, but triggered by set milestones, such as VC funding or major sales deals. Payback may also be conditional, which brings more risk and incentive to the scheme. Compensation by equity stake also entails risk and incentive, but this can be seen in a positive light, since raising capital for the portfolio companies and preparing them to be attractive to the investors is one of the key ingredients of the programme (Rasila 2004). The business concept of eAccelerator is presented in the following figure.

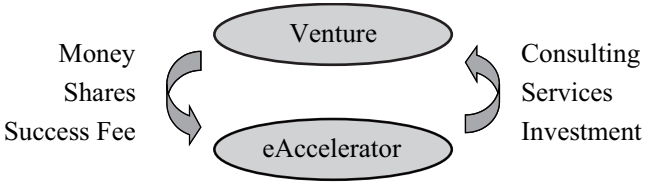

Figure 4. *The business concept of the eAccelerator (Rasila 2004)*

The business concept of the eAccelerator is a mixture of incubator, business angel, advisor and seed VC, which is natural, since its operation also bears features of all of these players. A traditional incubator would sell services for a fee, but not take part in risk-sharing or invest in the company. A business angel would give more money and only accept shares in return. Investment from a seed VC would be much less consulting-intensive and concentrate instead on the capital injection, while an advisor might give the same amount of consulting but not accept conditional or equity payback (Rasila 2004).

Achievements to date

In general, it has been hard to find public information about the eAccelerator as the website (http://www.hermia.fi/ekiihdyttamo/) has been under construction since January 2004. The eAccelerator presentation on the eTampere website (http://www.etampere.fi/eba/) gives some basic facts about the programme, but lacks information about the target companies. This secrecy may be intentional, but may also discourage aspiring entrepreneurs seeking to be selected for the programme. Most of the data presented here is based on interviews.

In June 2004, Heidi Huhtamella of the eAccelerator stated that most of the goals would be achieved. The personnel target of 1,500 employed by the target companies may prove to be

too high, and the measure for venture capital funding received has been extended to include all outside funding. Regarding the number of companies and turnover the goals will presumably be achieved. An interesting notion is that, as she says, the whole host organisation, Hermia Business Development, has in a way transformed into an accelerator to both achieve the goals and to respond to the changed business environment. Alas, the environment has definitely changed since 2000 when the project was planned and the goals set (Rasila 2004). So far 41 companies have participated in the programme (Huhtamella 2005) and a few have also entered international markets. At least the eAccelerator has been able to help turning innovations into international businesses. The following table presents the other targets set and the results achieved by the end of 2004.

Table 2. *Targets and results of the eAccelerator (Huhtamella 2005)*

	Target	**Results by the end of 2004**
Outside funding received by the assisted companies	€50 M	€33.4 M
Personnel employed by these companies	1.500	410
Turnover of these companies	€250 M	€115 M

An executive of eAccelerator, Pekka Jussila, stated in April 2004 that the eAccelerator has ownership in four of their customer companies. He continued that during the past year the programme saw some 200 investee candidates and screened some 80 companies more carefully. Four of these were accepted for their portfolio. This signals either poor quality of deal flow or rather low risk profile. The notion of risk profile was further confirmed when Jussila disclosed that in investee selection they

weight risk control (60%) over return potential (40%); a rather surprising feature for an accelerator aiming at achieving superior high growth and significant return on investment.

Discussion

With its original goal of finding VC funding for its customers, the eAccelerator clearly was a possible solution for the Finnish V2C market targeting the Capital Gap and Knowledge Gap. The agony of fulfilling the targets is well described with the decision to broaden the target to involve all outside funding. This may have decreased the pressure to grow fast and aim at IPO. However, according to the managers, most of the ambitious goals are likely to be achieved. Also, via co-operation programmes with Stanford University and Zernike Group the international networks seemed to be somewhat fairly well in place. Is this, however, enough for global success and successful accelerator programme, and was management able to take full advantage of the ingredients? In the following, the goals and the level they are achieved are assessed.

Performance vis à vis the targets set in 2000

It is clear that in 2000 the targets for the eAccelerator were set with high hopes and without a clue about the coming downturn. It already looks obvious that the programme will not achieve all of the targets, even though the executives are confident and it can be assumed that the peak in generating results is still to come. However, it does not simply mean that the ambitious experiment has failed but quite the contrary; there is a lot to learn. Further, the benefits for individual companies might have been remarkable taking, for example, forms of improved quality of operations and growth management. With the programme's aid companies have been able to launch innovations onto international markets. However, the growth of the target ventures has fallen drastically

short of the targets set and of what might have been expected from an accelerator (vs. incubator). Even with the number of assisted companies doubled from what was intended the results are lagging in almost every aspect.

Incentives of the eAcceterator and its personnel

Even though the eAccelerator sometimes takes ownership, the relationship is not comparable to that between an investor and an investee: in addition to equity, they still require payments from their services. This may tempt the V2C actor to remain as an advisor and not develop the relationship to the co-entrepreneurial level. This is because the incentive is not only in the long-term development of the investee company, resulting in a rise in share values, but also in generating short-term business for the V2C actor.

Nevertheless, when there is equity ownership involved the managers of the operative, Hermia Business Development, will presumably have a personal long-term interest in the well-being of the target company and the operative is a partnership where most of the personnel are shareholders. On the other hand, there are no published incentives for the other employees than partners or outside advisors involved in the process through networking. However, it certainly appears that the necessary professional network for the accelerator was available, but would it have been possible to achieve better results with a broader incentive structure in place?

Conclusions and future reflections

The eAccelerator is an interesting concept for a new generation incubator programme. It was established as a project for a period of five years with fairly ambitious goals, reflecting the climate at the time its foundation was laid in 2000. During these five years

from 2001 to the end of 2005 it will apparently not be able to achieve all the goals, but will nevertheless have an impact on the region by assisting several companies in tackling the challenge of growth. In a broader sense, it is questionable whether a large public-sector service organisation can ever run an exceptionally successful accelerator programme as a project; so far the best results in new business venturing have been achieved by private-sector venture capitalists i.e. entrepreneurial partnerships with a precise focus.

It remains to be seen what is to become of the programme after the project period: whether the eAccelerator will continue on its own in the same form, be transformed into a new actor possibly with an enhanced operating model, or merely cease its operation. The success of the operative responsible of the operation of the eAccelerator, Hermia Business Development, in the form of payback from target companies as well as the perceived value of the eAccelerator for the economic policymakers will play a crucial role when the future of this model is planned.

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Endnotes

[1] See Rasila (2004) for more detailed discussion and examples.

Marko Seppä, Hanna Martin and Johanna Tommila

Search for New Business Models and Solutions: Case eBRF (2001–2005)

Introduction[1]

Year 1995 witnessed the commercial launch of the Internet browser. Electronic commerce based New Economy was supposed to squash the old economy by the new millennium, and the argument has not completely faded even in the post-hype period (Hannula et al. 2001, 2002, 2003; Seppä et. al. 2004). Consequently, for the past ten years, it has been argued that a transformation process of kin to industrialisation is under way in society, world-over.

Whether business, and society at large, is faced with 'electronisation' or 'knowledgisation', is not the question. Services, production, marketing, procurement and delivery are digitised wherever possible. While businesses increasingly share information and create strategic networks, profit sharing and the launch of entirely new businesses become increasingly complicated. As business turns from capital intensive to knowledge intensive, and people increasingly find motivation from other than maximal financial income, understanding, framing and modelling business is becoming a critical competence (Achrol & Kotler 1999; Bengtsson & Kock 1999; Choi et al. 1997; Cravens et al. 1996; Eliasson 2001; Gulati 2000; Möller & Halinen 1999; Rasila 2004; Rust & Kannan 2002; Tikkanen & Halinen 2003).

The question is how the transformation will affect business and society on both the micro and macro level, both locally and globally, and both in terms of capital and labour. How will the transformation affect our conception of the enterprise, business

ownership, capital, and profit? What kind of public policies would best enable growth in the new era? And when and how is business, as a discipline, going to be renewed?

The search for new business models and solutions is no longer solely on the agendas of entrepreneurs, business development professionals and business scholars. The need for a 'common language' – for theories and frameworks or the maps for the explorers – is therefore greater than ever. Paradoxically, the number of languages spoken and the variety of maps constructed for the explorers is ever greater.

In every part of the world, an increasing variety of people from different ideological and contextual backgrounds engage in discussions and decision making concerning the future prospects of business activity and how to build business competence. While this is not an easy task, it is only the more important. It can be argued that, in the globalising economy, the prosperity of nations rests on their combined willingness and ability to create and maintain winning business models and solutions for both new and established businesses. On the other hand, poor decisions and ill strategic directions will have adverse effects. Consequently, business, university and government (B.U.G.) are urged to merge interests, cooperate and support the searchers of new business models and solutions – the great explorers of our time.

In this setting, the European Union crafted its ambitious vision of future, and strategy for 2001–2005, referred to as the eEurope programme. Simultaneously, albeit independently, the City of Tampere engaged in a parallel programme, eTampere, a local pilot of eEurope. eTampere comprises six independent sub-programmes plus the coordinating office. One of the six independent sub-programmes established was e-Business Research Center eBRC, a Tampere University of Technology and University of Tampere joint venture, a virtual organisation founded for a limited life (2001–2005) and with a mission related

to supporting the search for new business models and solutions as B.U.G. cooperation (Tommila 2005).

Research mission and strategy

The mission of this descriptive, ongoing exploratory study is to increase our understanding of what is being done and what can be done, in the context of B.U.G. cooperation, to support the search for new business models and solutions.

The study reports one effort to create a border-crossing forum for the searchers of new business models and solutions, for those who understand the importance of a common language and, consequently, the renewal of business as a discipline. The greater aim is to shed light on both the transformation and the search at hand, in order to provoke thoughts as to further steps in the entire B.U.G. sphere. The study is aimed at increasing our awareness or – at minimum – energizing the debate of what is fundamentally changing when searching for new business models and solutions in the era of knowledgisation, and what is not changing.

The study provides a longitudinal window on the phenomenon and builds on a five year B.U.G. experiment. It derives from a single case from Tampere, Finland: A joint venture research centre and one of its primary activities – an annual international business research conference. More precisely, the study reports experiences from within the e-Business Research Center eBRC, the B.U.G joint venture in question, and data collected during its life. The main data of the study comprises research work published or to-be published in Frontiers of e-Business Research FeBR, the eBRF conference proceedings, during 2001–2005.

Next, a general overview and discussion of theory development concerning business models is provided, and a

guiding theoretical framework constructed. Thereafter, the primary data of the study is introduced, and early evidence on the trends of the ongoing search for new business models and solutions is presented – followed by discussion and conclusions.

Evolution of theory frameworks for business models

The objective, herein, is to anchor the study, conceptually, to an existing theory domain, namely corporate strategy literature. In this study, business models and business modelling are viewed as derivatives of, if not synonyms for, strategies and strategising. The landmarks of strategy literature that have had the greatest influence on the authors' early conceptualisation of business modelling include – besides Näsi (1987), the seminal Finnish strategy cookbook – Ansoff (1965), Normann (1976), Mintzberg (1979), Porter (1980, 1985, and 1990) and Freeman (1984).

After the Second World War, the key challenge of the industry was to produce things more and faster. The destruction of war had created new markets and demand, and economics of scale was a working solution. By the mid-1950s decline in demand, increased competition, substitute production, and foreign threats were confronted which could not be tackled by the existing management techniques. Research followed demand. The first systematic exposition of corporate strategy, Ansoff (1965), offers a strategy tool encouraging expansion and diversification. Following the oil crisis of the 1970s and the emerging realisation of environmental limits of growth, the past three decades have permanently changed the challenge of the industry towards efficiency, profitability, and focus.

In seeking to address their business concept, Ansoff (1965) found companies identifiable by the characteristics of their product line, the underlining technology, and markets served. He anchored the strategy concept to fulfilling a mission through

product-market decisions that create competitive advantage. The 'Ansoff window' presents a choice between current vs. expanded product line and current vs. expanded markets. The Product Portfolio approach, copyrighted by the Boston Consulting Group, in 1970, paved way for increased corporate diversification, and eventually developed into a guideline of building and managing multi-business conglomerates (Abell & Hammond 1988).

Normann (1976) brought people, or leadership questions, into the strategy equation by attaching *organisation* (a company's way to operate) to Ansoff's product-market window. In the Business Idea approach, a system of dominance (of kin to competitive advantage) results from a fit between organisation, product system, and market related decisions. The Business Idea approach is a simplistic, yet comprehensive approach to describe and analyse the business model of a given entity. Organisation did not emerge as a key element in business modelling before the late 1980s, however. With the recent rise of the knowledge management domain, as a symbol of the knowledgisation era, human resource questions, competence and intellectual capital have become the key fabric in an increasing number of business models.

Porter (1980, 1985) enriched strategy thinking towards the notions of competition analysis and the importance of strategic positioning – not only relative to existing industry players, but to new entrants as well as substitute-providers. Porter's five forces of industry competition model shifted management attention towards the importance of a yet wider group of stakeholders in business modelling. Furthermore, Porter (1990) highlights the role of the national operating environment in the formation of competitive advantage. Regardless of increasing criticism, particularly regarding his notion of generic strategies, Porter (2001) has successfully defended the usability of his frameworks in the knowledgisation era. Also, by inserting a new column and

a new row to the Ansoff window, those of condensed products and markets, Näsi (1987) renewed this classic strategy tool to encourage and enable focus on core competence – the opposite of diversification.

Freeman (1984) can be said to have commercialised stakeholder thinking, the age-old Scandinavian tradition (Näsi 1995; Rhenman & Stymne 1965), to which the concept of corporate social responsibility is a close relative. Carroll (1989) observed that a body of investors sensitive to business's social, ethical, and financial performance was growing, that an ethical investment movement was flourishing. In fact, a fraction of stakeholder thinkers propose to view the firm as the property of a wider group of stakeholders, than just the shareholders (Wheeler & Sillanpää 1997). At extreme, stakeholderism constitutes for an alternative theory of the firm. Herein, rather than a source for new confrontations around corporate ownership, stakeholderism is viewed as the framework that addressed management and strategic control of a company's external resources, such as suppliers and distributors, thereby paving way for the management of value networks and external value creation.

Throughout his work, Mintzberg has widened our understanding of the strategy concept, made it more human – both in good and bad – by underlining how individuals differ in their conceptualisation thereof. Starting from his seminal work on the roles of the manager (Mintzberg 1973), where he studied what managers actually do, Mintzberg has been bringing the 'generals back to the strategy arena' by underlining the importance of individuals to strategy making. It is all in individuals' in-built logic of action and behaviour. The original Greek term – *strategos* – first referred to the role of a general in command of an army. Later, it came to mean the art of the general; first, his leadership related skills and, later, by 450 BC, his management related skills. By Alexander the Great (356–323 BC), the term had come to

refer to the skill of 'employing forces to overcome opposition and to create a unified system of global governance' (Quinn, Mintzberg & James 1988).

In summary, Näsi (1999) proposes a three-fold framework for strategy concepts: Norm and humane and, as the newest group, logic concepts – within which group Normann's (1976) business idea approach is referred to as the classic framework. Figure 1 provides the guiding theoretical framework of this study, the focus points in the analysis of the scholarly search for new business models and solutions, thereby anchoring the approach to logic concepts.

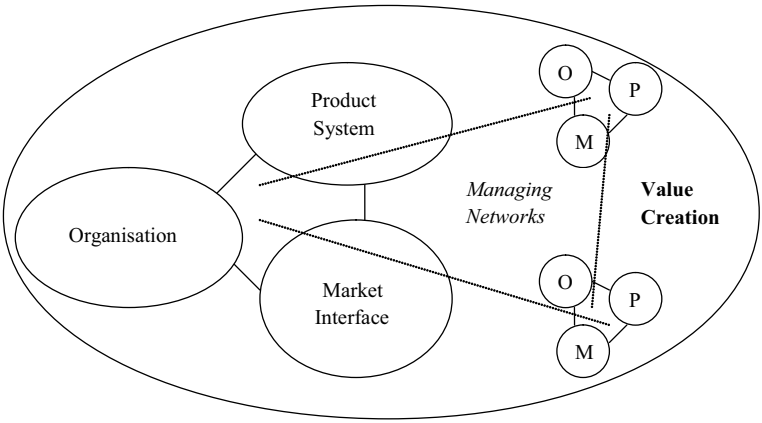

Figure 1. *Guiding theoretical framework of the study*

Ever since Taylor's (1911) principles of scientific management, the world has seen systematic expositions of the firm and strategy making. Over time, as many of the assumptions of the industrial era have fallen and knowledge capital has emerged, instead of financial capital, as the critical factor in business modelling,

new, methodologically riskier approaches to business research have become accepted and called for. From a richer variety of research strategies, some focus on the *product system*, production and logistics, in their search for new business models and solutions, while others emphasise the *market interface*, customer and competitor behaviour, as the key. Yet a third group zeroes on the *organisation*, leadership questions, and management of competence. An emerging group of scholars seeks to understand the dynamics of *managing networks* and partnerships. The search for new business models and solutions would not be complete without those looking at the *value creation* element, the revenue generation logic within the whole (Achrol & Kotler 1999; Bengtsson & Kock 1999; Cravens et al. 1996; Eliasson 2001; Gulati 2000; Rasila 2004; Tikkanen & Halinen 2003).

Introduction and analysis of data

This study derives from the five year experience of eBRC – a joint research centre between Tampere University of Technology and University of Tampere and part of the eTampere knowledge society programme – in launching and organising an annual international research conference in Finland. The conference, e-Business Research Forum eBRF, a research forum to understand business in knowledge society (www.eBRF.fi), has been organised every year since 2001. In the post eTampere and eBRC era, the organisation of eBRF has already been secured for 2006. The sixth eBRF will take place in Tampere, Finland in conjunction with the sixth International Conference on Electronic Business ICEB that has its roots in Asia.

From the beginning, eBRF has built on the recognition that new forums are needed to encourage B.U.G. interaction and to support the renewal of business as a discipline. This is a conference

to present work in progress, rather than completed research. After the conference, authors have several months to submit their final papers for publication in Frontiers of e-Business Research FeBR, the conference proceedings. The process is designed to enable the researchers to interact with one another, exchange comments and views with the business practitioners and governmental actors participating in the conference, and utilise the feedback and ideas in their final reporting.

The first eBRF, organised in November, 2001, resulted in 32 abstracts, 29 accepted presentations, and 26 published papers. Given the facts that eBRC was established in June of the same year and its strategy, including a plan of an annual conference, was formulated and approved during summer 2001, this was a fair beginning. With the fifth eBRF taking place in September, 2005, the total picture of the entire eTampere and eBRC era is now visible.

Cumulatively, during 2001–2005, eBRF has generated the following volume:

(i) 459 research abstracts submitted to eBRF 2001–2005,

(ii) 279 papers approved for presentation at eBRF 2001–2005, and

(iii) 238 final papers published in FeBR 2001–2004 or to-be published in FeBR 2005

Figure 2 provides the annual breakdown of the cumulated research work.

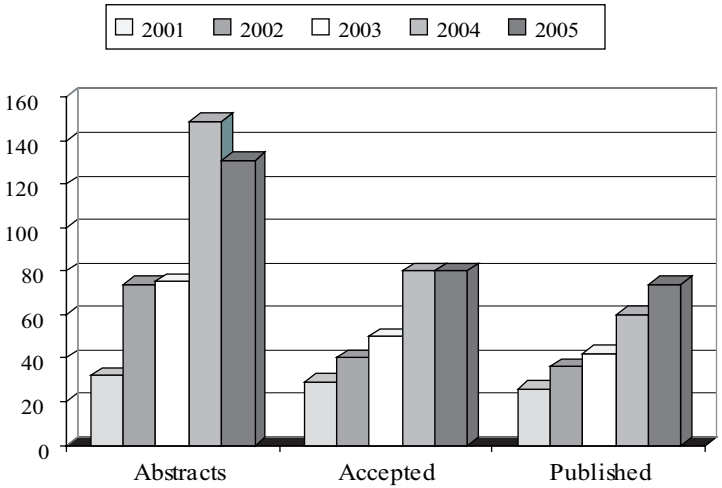

Figure 2. *Quantity of research work submitted and accepted for eBRF 2001–2005, and published in FeBR 2001–2004 or to-be published in FeBR 2005*

It can be noted that, in 2002 and 2004, the number of abstracts submitted doubled from the previous year, with low or no growth in the year that followed. Based on reviewer comments, the quality of the abstracts has increased significantly, over time. Altogether 62 professors or senior scholars from 37 universities from 15 countries have served in the eBRF Abstract Review Boards, during 2001–2005. Consequently, the number of abstracts accepted for presentation at eBRF has risen rather steadily through the 2001–2005 period, with the exception of 2004 as a clear peak. The growth in the number of final papers published in FeBR appears as almost linear. However, research marked as published for 2005 comprises abstracts eligible for publication (as finalised papers) in FeBR 2005. The final figure

for 2005 can be estimated to settle between 60 (the figure in 2004) and 74 (the total pool for 2005).

Closer contextual analysis was performed on the 238 papers either published in FeBR, in 2001–2004, or to-be published in FeBR 2005. By geographical origin, these 238 papers, the primary data of the study, were classified as either:

(i) Tampere based (in total 94),

(ii) other Finland based (in total 74), or

(iii) other world based (in total 70).

Table 1 illustrates a more detailed breakdown of the papers by geographical origin.

Table 1. *Breakdown of geographical origin of the research papers*

TAMPERE		OTHER FINLAND		OTHER WORLD	
		Universities		Canada	7
				China	2
Tampere		Helsinki/Hanken	4	Czech Republic	1
University		Helsinki/HESE	7	Denmark	1
of Technology		Helsinki/HIIT	1	France	3
(TUT)	52	Helsinki/HUT	12	Germany	11
		Joensuu	1	Ireland	3
		Jyväskylä	6	Italy	4
		Lappeenranta	10	Lithuania	5
		Oulu	12	New Zealand	2
University		Rovaniemi	2	Poland	2
of Tampere		Turku	2	Portugal	1
(UTA)	42	Vaasa	8	Russia	4
				Spain	1
				Sweden	2
		Corporations	9	Taiwan	1
				The Netherlands	4
				UK	10
				USA	6
TOTAL	94	TOTAL	74	TOTAL	70

'Tampere papers' refers to papers from either Tampere University of Technology (TUT) or University of Tampere (UTA). All authors and co-authors of papers classified as Tampere based are solely from either the TUT or the UTA. By coincidence, the number of contributing authors of the Tampere-based papers equals that of Tampere-based papers, namely 94, although as many as 39 scholars have contributed to two or more Tampere based papers, during 2001–2005.

'Other Finland' comprises papers where at least one of the authors represents other Finnish universities or entities. 'Other

world' comprises papers where at least one co-author represents non-Finnish universities or entities.

Papers with co-authors from several Finnish universities or entities were classified according to the author whose entity was least represented in the total list of contributing entities. Accordingly, papers with co-authors from several countries were classified according to the author whose country was least represented in the total list of contributing countries.

Altogether, authors from 20 different countries have contributed as authors in papers that are published in FeBR 2001–2004 or eligible for publication in FeBR 2005. The countries include 15 European countries topped with Canada, China, New Zealand, Taiwan, and the USA. Most of the other world papers derive from Germany (11) and the UK (10), followed by Canada (7), the USA (6), Lithuania (5) and Italy, Russia, and the Netherlands (4 each).

There are 52 TUT-based and 42 UTA-based papers in the data, 24 papers from Helsinki based universities, 12 from Oulu, 10 from Lappeenranta, 8 from Vaasa, 6 from Jyväskylä, and a 12 from Joensuu, Rovaniemi (Lapland), and Turku each. Nine of the other Finland based papers are from a corporate origin.

There is a rather good balance between papers from Tampere (94), other Finland (74) and other world (70). However, a closer look at the annual breakdown of the origin of the papers shows that the balance is only the product of the past two years, during which time the share of Tampere based papers has decreased from almost 50% to less than 30% of all. Figure 3 demonstrates how the share of other Finnish and, in particular, other world papers has been rising through the period 2001–2005.

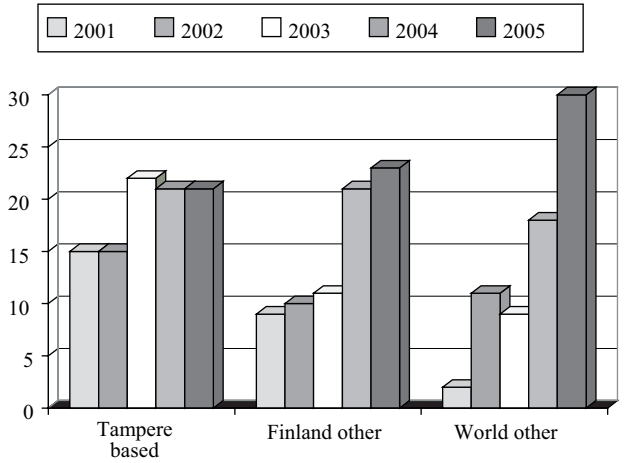

Figure 3. *Geographical origin of the research papers in the 2001–2005 period*

While almost all the papers clearly deal with business challenges and opportunities related to the transformation from the industrial society to knowledge society, there is nevertheless significant variation in their contextual orientation and ambition.

A contextual evaluation was performed on the underlying research, following the guiding theoretical framework constructed for the study. While the classification was largely exposed to a subjective assessment by the author, and is only tentative, by definition, because for the candidates of the 2005 publication, only limited editions (abstracts) were available, at this stage, one should review the results with caution. Nevertheless, some interesting notions and initial propositions emerge.

All papers were classified, in terms of context, in the one of the following categories:

1. Product (or service) system: Production, information systems, logistics (in total 51)

2. Organisation: Leadership, knowledge management (in total 39)
3. Market interface: CRM and other stakeholder interface (in total 41)
4. Managing networks: Strategic partnerships and networking (in total 50)
5. Value creation: Revenue generation models and growth venturing (in total 57)

Figure 4 illustrates the annual contextual breakdown of all the papers in the data through the 2001–2005 period. While there has been growth in every category, on absolute terms, the relative share of value creation papers has changed the most, from the top to the bottom.

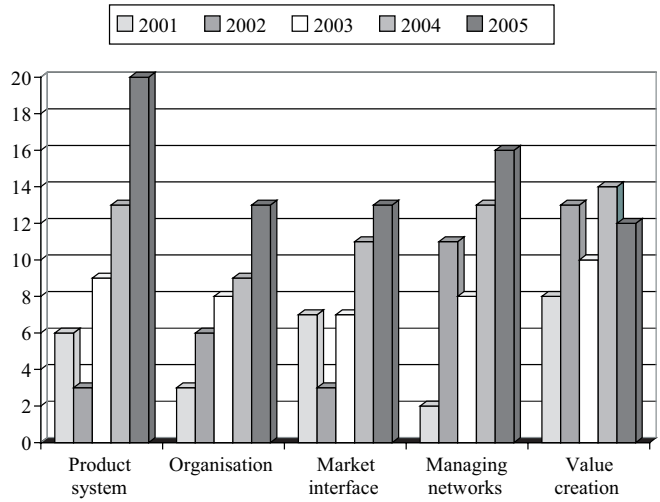

Figure 4. *Changes of contextual domain in the research papers during 2001–2005*

Looking at the contextual division between papers from different geographical origins, there are certain interesting differences. Value creation enjoys the greatest interest among the Tampere based papers, while managing networks hits highest for other Finland and product system for other world papers. While managing networks is high for both Tampere and other Finland papers, it hits the lowest for other world papers. Also, market interface appears to be far higher on the list of Tampere based papers than on the lists of the two other categories. Figure 5 provides a more detailed break-down.

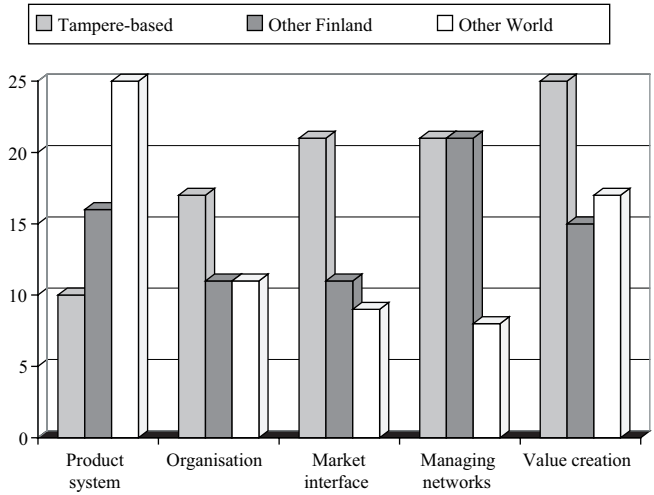

Figure 5. *Contextual domain vs. geographical origin of the research papers*

Based on a qualitative overall review of the 238 papers published in FeBR 2001–2004 or eligible for publication in FeBR 2005, the following propositions emerge:

– Product systems are in transition: Services & production are digitised where possible
– Organisation of business – the way to operate – is in transition: The trend is from financial capital enabled to knowledge capital enabled business reality
– Market interface is in transition: While consuming becomes increasingly digital, also marketing and distribution become digitised
– The structures of business are in transition: The trend and challenge in management is from single corporations to networks of several corporations
– The principles and missions of business are in transition: While value is created by networks rather than chains of communities their motivations are also changing

Based on the findings of the present study, the ongoing transformation of business models is marked by electronisation of the business infrastructure and knowledgisation of the business environment. Furthermore, the transformation engages different type (size, sector and shape) businesses and entire economies at a differing pace.

Discussion and conclusions

Industrialisation was marked by automation, organisation of production and labour, economies of scale, and the introduction of the corporation as the primary vehicle of capitalism. The corporation emerged as the vehicle for sharing risks and distributing profits, and as the legal person for contracting with a growing number of stakeholders of the expanding business activity. On the human level, the corporation brought together the providers of capital, the capitalists, and those ready to trade

part of their time for a piece of it, as employees. Before long, industrialisation became marked by the confrontation between capital and labour, and the rise of the political concept of the working class. This confrontation led to revolutions in Russia and China, among others, and, ultimately, to the Cold War that threatened all life on earth during almost half a century (1945–1991).

Civil applications of military technology and the war economy constituted for unforeseen growth, particularly in America, after the Second World War. Many similar effects can be observed in the post Cold War era – not least because, this time, the world appeared to be going the same way, both ideologically and economically. While the post World War boom lasted for almost 30 years – until the oil crisis of the 1970s – the post Cold War boom lasted for less than a decade, until 2000. Also, since September 11, 2001, an entirely new type and source of confrontation has emerged, in the world, in the form of terrorism. Nevertheless, the progress in information and communication technology and the subsequent changes in business reality have been so phenomenal, globally, in the post Cold War era that the argument for a major transformation process stands strong.

When analysing the evolution of business models, through this period, the *product system* (or the organising of production) remained the key element until the 1970s. The oil crisis called for more intelligent growth and raised the *market interface* (competition and the customer) into a critical role in business modelling. With the increased complexity related to market segmentation and tailoring of products and services, the *organisation* (the way to operate, leadership, incentives and the classic 'make or buy' question) emerged as the number one concern during the 1980s. Knowledgisation is marked by the challenge of *managing networks* and the 'stakeholder corporation': All the three key elements of a business model as a whole – and

not that just for one corporation, but for many, while *value creation* takes place in profit generating networks.

The era of industrialisation was marked by technological innovations that enabled ever more efficient production and distribution of material goods. Business models were based on straightforward product-market decisions. A business produced a certain product to a certain customer segment. At first, organisational challenges related to organising and supervising people around the factory beltline. People were a commodity, the most easily changeable mean of production. The most critical mean of production comprised of tangible capital, machines and real estate. The predictability of financial projections helped develop an efficient capital market. Gaining a public quotation in a major stock exchange made it possible to raise the necessary funding to capitalise on a new industrial innovation. Almost through the 20th century, business models could be planned on linear assumptions and rational thinking. People did not complicate the picture; their needs were predictable and role marginal.

In contrast, when designing and launching new business models and solutions in the knowledgisation era, knowledge capital or knowledgists, those possessing knowledge, replace financial capital or capitalists, those possessing (financial) capital, as the key enablers of economy. One segment of the research visible in eBRF relates to emergence of knowledge capital investors and 'venture knowledgists' aside of financial capital investors and venture capitalists (Harrison et al. 2004; Rasila 2004).

Put together, (i) the entirely new geopolitical situation in the world, (ii) the progress of information and communication technology, e.g., the internet, digitisation, mobility, and convergence, and (iii) the transformation, in general, from capital to knowledge enabled business reality constitute for unforeseen

challenges and opportunities – related to search for new business models and solutions – for all nations and all sectors of economy: Business, University and Government alike.

The search for new business models and solutions is no longer solely on the agenda of entrepreneurs, business development professionals, and distinct groups of dedicated academicians. From the research on the search for new business model and solutions, analysed for the present study, the following three grand themes emerge (see table 2).

Table 2. *Grand themes of research on new business models and solutions*

1. Electronisation of business

- Rather than electronic business or e-business, as a phenomenon or an emerging research domain, we should start to talk and think about electronisation of business.
- Products and services as well as production, marketing, procurement and delivery are digitized wherever possible.
- This yields changes to almost every aspect of business, every process and function, putting the classic management disciplines – accounting and finance, management and leadership, as well as marketing – to test.

2. Management of information and knowledge

- While businesses, in the electronisation process, increasingly share information and create strategic networks, profit sharing and the launch of entirely new businesses are becoming increasingly complicated.
- As business turns from capital intensive to knowledge intensive, and people increasingly find motivation from other than maximal financial income, knowledge management is an ever-growing challenge.
- Not least to the classic management disciplines referred to above.

3. Strategising in knowledge society

- Given the changing nature of economic actors and the pressure for increased cooperation between Business, University, and Government to control developments, strategy making is in turmoil.
- Who are the principals of any given activity and what are their true missions are embarrassingly relevant questions asked far too seldom.
- In the world of strategic partnerships and value networks, it is difficult to find paths to growth for fledgling ventures, even if no significant investments are needed. There is call for new insights in growth venturing.

Besides the actual changes in business reality, the changes of actors and dynamics related to business modelling constitute for great challenges. After almost a century of scientific management, and ever-deepening functional specialisation, the business research community has understandable difficulties to turn around, live up to the new expectations, and, for example, see business as an art, not a science. Initiatives such as case eBRF, enabled by the City of Tampere forward-looking economic policy, are important as case experiments when developing catalysts towards the necessary renewal of our approach to business modelling.

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Endnotes

[1] The authors wish to express their gratitude – on behalf of those 94 Tampere University of Technology and the University of Tampere based researchers who have participated in the search for new business models and solutions described in this paper – to the City of Tampere for its mobilising initiative and enabling contribution, via the eTampere programme, without which the pursuit under investigation, herein, would not have been possible.

V

Democratic Governance

Markus Laine and Lasse Peltonen

Regime Stability and Restructuration: From Industrial to Informational City

Introduction

Recent figures for the Finnish ICT sector indicate that in 2001–2004, employment increased in only one city: Tampere. Local know-how in the field is largely based on research and development functions and ICT services. In Finland, Tampere is widely recognised as a city that invests heavily in policies that support the ICT operating environment.[1] Looking at the present local ICT sector in the light of the city's industrial history, the transition from the industrial to the informational era has been dramatic indeed. It is difficult to recognise the city as the one that in the postwar years struggled to deliver Finland's war reparations to the Soviet Union. Changes in local development have been accompanied by changes in the physical appearance of the city as economic restructuration has transformed the red brick industrial buildings in the city center into facilities for media corporations, ICT businesses and multiplex cinemas.

All these changes coincide with remarkably stable patterns of local governance. Virtually ever since the Second World War, the scene of local politics in Tampere has been dominated by the so-called *Brothers-in-Arms Axis*, a coalition formed by the conservative National Coalition Party and the Social Democratic Party. This chapter examines the processes and conditions that enabled the stabilisation of this co-operation into a local regime – and that have contributed to its transformation in the informational era. We anchor our analysis in urban regime theory, focusing on the problem of coalition formation and drawing

on related notions of *governing capacity* and *preemptive power* (Stone 1986; 1988; 1989). After a discussion of regime theory and a note on methodology, we present an historical account of the emergence and establishment of the Brothers-in-Arms coalition in Tampere. Taking a cultural-historical perspective on regime formation, we then introduce the notion of habitus. The historical account contributes to an analysis of the challenges faced by the local regime as Tampere was transformed from an industrial city into an informational one. Finally, issues of regime stabilisation and change are addressed through the identification of social mechanisms of continuation in governance patterns.

Operationalising urban regime theory

The study of urban regimes has continued to grow and expand since the introduction of the concept in the 1980s (Stoker 1995; Mossberger & Stoker 2001). According to the original definition by Stone (1989, 6), an urban regime is characterised as 'the informal arrangements by which public bodies and private interests function together in order to be able to make and carry out governing decisions'. Regime analysis starts from the assumption of social complexity and fragmented sources of power, leading to the need for collaborative arrangements to enable effective governing decisions. Regimes thus provide a functional response to the challenge of governance in the context of social complexity, lack of consensus and political fragmentation, which denies any single actor the capacity to carry out governing decisions alone. Regimes structure resources and patterns of interaction, thus contributing to the stability of the mode of governance (Stone 1986; Stoker 1995).[2]

Regime theory has been criticised for its 'localist' bias, i.e. the lack of understanding regarding broader developments in the (global) economy (Davies 2002; Davies 2003). DiGaetano and

Lawless (1999) have drawn attention to its American bias, noting that unofficial interactions between public and private interests are more prominent in the United States where local governments are more dependent on resources generated by the private sector than their European counterparts. In a similar vein, Pierre (2005) notes that regime theory does not travel very well and argues that regimes should be conceived of as a culturally and historically specific model of urban governance.

Acknowledging this critique, we are interested in the original input of regime theory. In any case, the focus in regime analysis is inherently on the internal dynamics of coalition building, on 'civic cooperation' (Stone 1989, 5) or informal modes of coordination across institutional boundaries. For instance, in the context of the 'city limits' debate (Peterson 1981; Logan & Swanstrom 1990) on the relative weight of broader economic forces in the making of localities, the regime concept can be seen as a hinge between external causal variables and local policy outcomes, thus giving rise to the token slogan of regime theory: 'local politics matters'. Indeed, one of the core claims of urban regime theory is that cities and urban life are produced and reproduced not by any externally imposed logic, but by bargains and struggles between various groups (Harding 1999, 674). Still, the debate on local politics vs. global political economy is not where the notion of urban regimes has made its most significant contribution.

Mossberger and Stoker (2001) argue that the proliferation of the regime concept has broadened the scope of the notion beyond its original meaning. For them, regime theory is a model based on inductive empirical and comparative evidence rather than a fully-fledged theory with explanatory or predictive powers. They do, however, credit regime theory for its important and original contributions. First, Mossberger and Stoker argue that regime theory helped to reorient the so-called community power debate that went on from the 1950s to the 1980s between elitist

and pluralist positions over the question 'who governs?' Here, power was attributed to individuals and the goal of research was to figure out which individuals (few or many) held the power in local politics (e.g. Dunleavy 1980, 26–31; Waste 1986, 14–21). The demise of the debate and the birth of regime theory came about when regime analysts provided new insights into the way that power was conceptualised. Clarence Stone (1986) introduced notions such as intercursive power (i.e. the power to forge coalitions) and ecological power (i.e. the power to secure suitable social and institutional conditions for a coalition), which referred to the enabling dimension of power, instead of the previously emphasised dimensions of control and compliance. The notion of preemptive power clearly demonstrates the shift from 'who' to 'how'. In Stone's (1988, 83) words, preemptive power refers to the 'capacity to occupy, hold and make use of a strategic position in setting the policy agenda'. It is a cornerstone of stable governance, which has a strategic role in the complex community context. It consists of 1) the power advantage that is based on holding a strategic position and 2) a capacity to occupy a strategic position (Stone 1988, 90–91). The notion clearly departs from the model of power related to social control and compliance (i.e. power over), conceptualising power, instead, as social production (i.e. power to).

Linking these forms of power to local governance patterns, DiGaetano (1997) makes a distinction between the kinds of power that are typical of these different social settings: while competing groups seek command power, or power over each other, stable regimes exercise preemptive power, i.e. hegemonic power with agenda-setting capacities. The shift also marks a growing interest to understand power in network structures instead of hierarchical structures. Second, Mossberger and Stoker (2001) claim that the regime notion has broadened the scope of analysis of local politics beyond formal government institutions.

Asking questions about the combination of social complexity and preemptive power naturally led to studying forms of co-operation and coalition-making. Further questions were asked about the coherence of governing coalitions, the resources they control and their stability, which were all seen as affecting the way that cities are governed. According to regime theory, local policy decisions are affected by 1) the composition of the governing coalition, 2) the nature of the relationships between the coalition members and 3) the resources contributed by the members to the governing coalition. These factors, together, constitute the governing capacity of the regime, which determines its scope of action. In addition, the construction of a local regime is largely about finding a shared purpose or direction and assessing the benefits of the co-operation. In order to be successful, a coalition needs to be able to mobilise resources that support its policies. Therefore, it makes sense for an actor to join forces with others who hold important resources (Stoker 1995, 59–61).

We subscribe to Stone's (2004) view that it is important to explain how strong and stable governance can take place, even regardless of context. The question of context cannot, however, be overlooked. Wanting to emphasise this, we adopt a qualitative case-based approach, which is suited for a diachronical analysis of the logics of historical processes of regime evolution. Instead of searching for independent variables, we seek to outline socio-cultural mechanisms that account for the characteristics of the local regime. In this perspective local governance is seen as growing out of a specific historical and cultural context. This is what Meredith Ramsay (1997) has referred to as the 'embeddedness' of local governance. She emphasises the importance of distinct historical roots and traditions in shaping patterns of local political culture and development strategies. This view is also related to the credo of political geography formulated by John Agnew (1987), stating that 'place-specific social structures

and patterns of social interaction give rise to specific patterns of political behaviour'.

Following a lead by Painter (1997) – who has criticised urban regime theory for its emphasis on voluntaristic rational action models in explaining local governance – we have chosen to complement the analysis of governance in Tampere with ideas drawn from Pierre Bourdieu's (1977; 1990; 1994) cultural theory and concept of habitus. This perspective can be seen as part of a recent approach in urban studies that combines discursive elements and 'meaning-making' into the analysis of local development and policy processes (McCann 2002).

Below, we present an historical narrative on local regime formation, stabilisation and change. Stressing the cultural dimension of local governance in Tampere, we seek to answer the following question: *What social mechanisms contributed to the creation and maintenance of the Brothers-in-Arms regime and its preemptive power in Tampere?*

Our data were mainly collected for the purposes of our earlier research on the politicisation of environmental issues at the local level (Laine & Peltonen 2003). We used five environmental disputes as case studies to depict the tensions between the emergence of environmentalism and persistent traditions in local governance. The present description of the Brothers-in-Arms Axis is based on that study. It has been complemented, however, with two additional interviews (see list of interviews on page 382) and statistical material to illustrate changes in the local political economy.

The origins and stabilisation of the Brothers-in-Arms coalition

Tampere is sometimes called the 'Manchester of Finland', referring to its industrial cityscape with red brick factories and

smokestacks. The city was founded in 1779 by King of Sweden Gustav III at the Tammerkoski rapids between two lakes – Näsijärvi and Pyhäjärvi. The industrialisation of Tampere was made possible predominantly by foreign investment, which increased in the 19th century when Finland was part of Russia. The factories attracted workers from the countryside, and Tampere grew rapidly: the city became the most important industrial center in Finland, with a whole range of textile, paper, timber and metal industries. By the late 19th century over 40% of Finland's industrial workforce were employed in Tampere, and the city remained an important industrial centre throughout the 20th century.[3]

Because of the large industrial workforce, labour parties, namely the Social Democrats and the Communists (SKDL[4]), were influential in local politics during the second half of the 20th century. As we can see from Figure 1, there have been three major turning-points in the history of the local city council since 1939. The first peacetime municipal elections in Tampere in 1945 witnessed a massive change in the local political landscape. This happened for two reasons. First, there was a clear age shift as the younger generation (of men) returning from the war took over. Second, the communists were reinstated as a legal actor in Finnish politics, allowing them to take part in the elections. Consequently three political groupings of equal size emerged from these elections: the social democrats, the communists (under the SKDL coalition) and the conservatives (The National Coalition Party), all of which had a large number of new council members from the Brothers-in-Arms generation.[5]

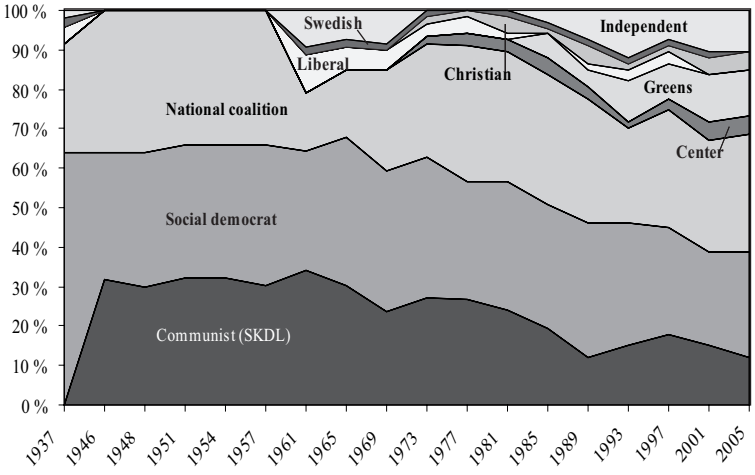

Figure 1. *Parties in the Tampere city council from 1937 to 2005. Each year marks the beginning of a new electoral term.*

None of the three parties were able to control the majority of the council on their own, and therefore two of the three parties were under pressure to acknowledge a common interest. A critical event for the emerging political co-operation between the social democrats and the conservatives was the 1948 debate on the level of municipal taxes. The two parties first tried to sabotage each other's motions, so that the meeting went on for 14 hours. This experience clearly highlighted the need for negotiation and co-operation prior to city council meetings, especially on difficult issues, so that decisions could be made in due order. The network for co-operation had been created as early as 1940, when the local association of 'Brothers in Arms' was founded. The key figures of the two parties, Erkki Napoleon Lindfors (The Social Democratic Party) and Lauri Santamäki (the conservative, National Coalition

Party) had worked together in the association, the aim of which was to give financial support to veterans of the Winter War, and to secure national independence through reconstruction.

In local politics, the Brothers-in-Arms considered the communists a threat to Finnish independence and democracy. This perception was particularly strong during the postwar years (1944–1948), which became commonly known as 'the years of danger', referring to the fear and threat of a communist coup with Soviet backing. The wartime setting was now transposed to local politics. Erkki Napoleon Lindfors, who later became Mayor of Tampere, has been quoted as saying to Lauri Santamäki: 'We Social Democrats and Conservatives, who have experienced these difficult years together [know that] our fight is not over. It has just shifted from the fields of war to those of politics'[6] (Seppälä 1983). In a sense, politics became the continuation of war through other means. For the older generation, co-operation over the left/right divide was unthinkable, but for the Brothers-in-Arms it was not all that big a step.

> We knew how to play together, and we had much the same views on local and social development. This gave us faster results as we had, how should I say, a more straightforward decision-making mechanism than your usual municipal democracy . . . in its principles. Fast results were sought and achieving them in a straightforward manner was admired. (Vilho Halme,[7] interview, 24 March 1999)

Coalition formation was thus based on shared wartime experiences. From the 1950s onwards, the influence of the Social Democratic Party and the National Coalition Party became more and more firmly established in local politics. The notion of the Brothers-in-Arms Axis can be dated to the early 1950s. The Axis coalition's regime ranged from labour unions to corporate directors, from building companies to banks, trust funds,

sports clubs and newspapers. At the same time SKDL had its own competing network, although they lacked strong business partners, who were less keen on the idea of a labour revolution. In addition, the Social Democrats and the Communists were fighting it out within trade unions to gain dominance among factory workers (Rasila 1992, 317). The Axis' connections, its regime facilitated government of the city and provided financial resources for welfare service provision and development of the city. Mayor Lindfors was thus in the position to implement his motto: 'it's not worth putting money in the bank; it should be put in steel and concrete instead'. The speech of the then Mayor-to-be Lindfors in 1951 captures the spirit of the times:

> In the near future, we will be starting work on the construction of a central office block, . . . the construction of a hospital for the chronically ill, a workers' institute, day-care centers, vocational school training workshops, 250 flats annually, a new sports center, a new bridge and sewage treatment plant, the renovation of water pipeline pumps, the construction of a new main water pipeline and the renovation of an electrical power plant, an extension to the public transport system, and the construction of a new police station. (Seppälä 1983, 126–127)

The postwar economic boom had generated enough capital for reconstruction, welfare services, and urban development projects. In addition, the metal and engineering industries in Tampere benefited from the war reparations[8] to the Soviet Union, which in turn generated increased tax revenues for the city.

Once the communists had effectively been excluded from the decision-making process, securing local growth was coupled with securing political influence. That continued steadily to grow as Axis members advanced to more important political positions. The golden age of the Axis occurred between 1957 and 1969, when Lindfors was Mayor and Santamäki headed

the conservative group in the council. A pattern of negotiations was gradually established whereby the two men maintained close contact on upcoming issues. Having discussed these issues amongst themselves, they brought their proposals to their respective political groups, where a joint position was then agreed. That position was binding upon individual council members. Consequently the proposals were accepted by the votes of the two groups, leaving the communists in the position of critical bystanders with no access to the local policy process. This exclusion also applied to various municipal committees and the nomination of municipal employees. Loyalty was thus guaranteed throughout the city bureaucracy.

The cultural constitution of the regime

The cultural and historical constitution of the local regime in Tampere can further be illuminated through Pierre Bourdieu's sociological notion of *habitus*, which he defines as a 'system of durable, transposable dispositions, structured structures predisposed to function as structuring structures' (Bourdieu 1977, 72). The notion allows for an interpretation of the Brothers-in-Arms Axis as a contingent product of past events that secures the presence of history in the present, and participates in the constant production of novel realities, actions, and classifications. It is the inertia in habitus that serves as a carrier of dispositions held by the Brothers-in-Arms, thus accounting for the transfer of these dispositions from war to peacetime politics. In this sense, it is revealing to look at the way that social democrat Vilho Halme, long-time chairman of the local council, describes the situation after the war:

> During the war we had learned to look at things regardless of party lines, so the same was naturally carried on in peacetime as well. In a way, it was a natural coalition. The communists had

> appeared from underground to take responsibility, or to pursue political power. They were considered an opponent much like the wartime enemy, and for a long time they were sort of a natural opponent. (Vilho Halme, interview, 24 March 1999)

Halme's quote suggests that the Brothers-in-Arms were simply 'doing what came naturally' in the transition from war to politics. Similarly, the preface to the book *The Deeds of Brother-in-Arms*[9] by Santamäki (1966), can be read as a document of how the Brothers-in-Arms movement perceived themselves and others.

Table 1. *Classifications constituting the Brothers-in-Arms habitus in Santamäki (1966)*

'Us'	**'Them'**
Actors	***Actors***
– Finland	– Soviet Union
– Responsible statesmen	– Communists, extreme left
– Brothers-in-Arms	– 'Defence nihilistic' new generation
Characterisations of the actors	***Characterisations of the actors***
– 'Different from Baltic countries (i.e. Estonia, Lithuania, Latvia)'	– Anti-national features
– Nationalism	– Ideological
– Realism	– Fanaticism
– Responsibility	– Short-sightedness
– Democracy	– Opposed to democracy
– Calmness and moderation	– Totalitarian

The distinction in the discourse between good guys and bad is clear. It shows how the construction of the self becomes meaningful in relation to three significant others: the wartime enemy (Soviet Union), Finnish communists and postwar peace movement activists. In generational terms, the former two are

contemporaries of the Brothers-in-Arms, while the last one clearly belongs to a younger generation. Table 1 illustrates some classifications relevant to the self-perception of the Brothers-in-Arms Axis, as found in Santamäki's preface.

One of the keys to the Brothers-in-Arms habitus was the justification for peacetime activities that derived from having been on the front in life-or-death situations. This is demonstrated in a quote from an autobiographical book by Väinö Leskinen, one of the most prominent social democratic members of the Brothers-in-Arms fraction at the national level:

> [W]e saw many negative features in other political groups – there was the threat from the left, panic on the right. In our own group we Brothers-in-Arms socialists were convinced that the attitudes of 1930s politicians could not effectively address the situation in 1944–45. . . . It was – and still is – quite natural that political organisations are rejuvenated. Rarely has that happened as quickly as after the return of the young generation of social democrats from the war. That generation brought with them their experiences from the front, and a consequent clear-cut understanding of the realities of life and death. They had fought a communist superpower, and now they were facing the communists at home. One had to keep fighting in this situation. The straightforward and coarse methods derived partly from the war. (Leskinen 1967)

The relational nature of habitus is evident here. The social democrats saw themselves as occupying a position in the middle ground of the political spectrum, in opposition to both the extreme left and right. The relevance of a generational shift is also visible in the contrast made by Leskinen between the young social democrats and the old politics of the 1930s.

This polarisation was particularly stark in Tampere – which partly explains why the Brothers-in-Arms coalition is unique to

Tampere, when compared with other Finnish cities. Tampere has always been a predominantly industrial town, ever since it was founded, and therefore the communists have traditionally enjoyed strong local support. The industrial history of Tampere accounts for the fact that, in the postwar years, almost 70% of the local population supported the left, i.e. either the communists or social democrats. According to Timo P. Nieminen, the present chairman of the city board, the same polarisation was clearly visible as late as the 1980s:

> And if I look back to the 1960s and 70s, and all the way to the 80s, there's this strange phenomenon, well maybe not very strange, but a local phenomenon that here you are either conservative or leftist – either more moderate, hence a social democrat or more radical, then you'd join the communists. . . . This began to fade in the 1990s, but in the 80s it was still very clear. (Timo P. Nieminen, interview, 31 Aug 2000)

Polarisation of the political space also partly explains why Tampere assumed quite an 'independent' image in terms of local development and rivalry with the much bigger Finnish capital, Helsinki. The left-right division in postwar Finnish politics ran through the Social Democratic Party. The right wing social democrats were the minority fraction at the national level, but they held the majority position in Tampere. Since the Brothers-in-Arms fraction held the majority of SDP seats in the council, left-wing social democrats had only limited influence in municipal politics – even though they enjoyed the trust and confidence of the national party leadership. The Brothers-in-Arms social democrats in Tampere, under Erkki Lindfors who became Mayor in 1957, were thus more loyal to their wartime network than to the national Social Democratic Party.

The decoupling of the local party organisations of both the National Coalition Party and the Social Democratic

Party (both being to the right) from their respective national organisations seems partly to account for an increased sense of local independence vis-à-vis Helsinki. It serves to note that the Brothers-in-Arms co-operation in Tampere had parallels in some other cities, but not at the national level, where the postwar political scene was dominated by centre-left governments, with the conservatives excluded from government for decades. Finnish-Soviet relations had an undeniable impact here. This decoupling of the local governing coalition from national politics was manifested in ambitious local development initiatives and projects, often flying in the face of national party leadership – and making use of national-level Brothers-in-Arms contacts in furthering local development.

In the city council, the Brothers-in-Arms Axis depended importantly on group discipline in order to remain functional and exert control. Basically, this meant that anyone voting out of line risked being sacked from the group. The practice of group discipline is traditionally the strongest in the SDP, but it is also applied in the National Coalition Party. This is demonstrated by Timo P. Nieminen's (The National Coalition Party) account of a situation where his own preferences conflicted with those of the group in the matter of demolishing an old Art Nouveau style office building in the city centre:

> I was such a conservative [by nature] that I thought, at the time [early 1970s], that we should preserve all the old buildings at that end of Hämeenkatu. . . . This may have had to do with the fact that I had travelled in Central Europe and seen long streets lined with fine old buildings. So I thought that [demolishing] was stupid. But still, I must have voted in favour myself, along with the rest of the group, because the principle of group discipline was applied in those days, that the old building should be demolished. (Timo P. Nieminen, interview, 31 Aug 2000)

The mode of governance thus worked to undermine democracy while favouring efficiency. The streamlining of decision-making allowed for rapid local development coupled with economic growth and steady inflation. At the same time (between 1950 and 1970) the population of Tampere soared from 100,000 to 160,000. The fact that the golden age of the Brothers-in-Arms Axis under Lindfors's term as Mayor coincides with unprecedented economic growth, i.e. the postwar golden decade of 1955–1965 (see Becker 1989), lent the Brothers-in-Arms coalition an heroic aura. The people of Tampere saw how their city changed as 'the old made way for the new'[10] before their very eyes. The changes in the cityscape and environment were the most visible part of the political project of the Brothers-in-Arms, who became known as the men who transformed Tampere into a modern industrial, 'efficient' city, with modern housing, new roads, welfare services such as libraries, hospitals, homes for old people and sports facilities. Through this local welfare state project, emphasising hegemonic projects of welfare creation and economic efficiency, the governing coalition bridged the interests of workers and industrialists. The growth would not have been exploited to the extent it was had it not been for the eagerness of the Brothers-in-Arms coalition.

These cultural and symbolic features are to be seen as an integral part of the governing capacity of the local regime in Tampere. The cultural and historical constitution of the coalition possesses its own relational dynamics that cannot be explained solely through (the coalition partners') rational choices or the resources brought by individual partners into the coalition, for example. Instead of 'rational choice', the governing coalition was formed on a 'cultural-historical choice', on the grounds of a common historical trajectory, based on similar ideological commitments, shared goals and mutual trust (see Painter 1997).

From industrial to informational city

Erkki Lindfors was followed as Mayor in 1969 by Pekka Paavola. Paavola was a social democrat, but more than 20 years younger than Lindfors. The young candidate had earned Lindfors's trust by succeeding in bringing a nationwide television channel (TV 2) to Tampere. The appointment of Paavola as Mayor marked a generation shift and at once a downgrading of the influence of the original Brothers-in-Arms generation. Many war veterans either retired or died during the 1970s. With this generation shift, the original ethos of the Brothers-in-Arms network grew thinner, but the institutionalised practice of co-operation between the two parties continued unchanged.

> Here [in Tampere] everything is based on the co-operation of two groups in the council. It's obviously much easier if you don't have as many groups as they do in Turku, for example. We don't need to mess around with half-a-dozen groups. When there are three groups and when I take an active role, I get things done. (Pekka Paavola, in *Aamulehti* 4 Dec 1983)

This attitude earned Paavola the nickname 'The Boss', highlighting the even more exclusive style of decision-making than in the original Axis, as well as Paavola's introduction of new management methods in city government. Unlike Lindfors, Paavola was of the 'businessman' ilk, quick in his moves and keenly focused on economic efficiency.

The early 1970s, with the oil crisis in 1973 and the economic recession that followed in 1974 and 1975, saw a clear change in the local development outlook. According to Clark (2000), this was an international phenomenon. The Arab oil boycott, together with rampant inflation, marked the end of economic growth that had continued since 1945 around most of the world. This did not, however, stop governments from growing, but there were

increasing fiscal strains as government spending continued to rise in spite of a stagnant or declining economic base.

This was also the case in Tampere, where the public sector expanded rapidly from the 1960s onwards. Much of this expansion was attributable to new welfare state policies, whereby Finnish municipalities became outlets for the distribution of state-funded welfare services.These measures did therefore not cause any acute fiscal strain in local government finances. In fact it was not until 1990 that the fiscal strain began to show as Finland slipped into a deep recession and banking crisis, partly on account of the collapse of trade with the Soviet Union.

The local role of industry began gradually to diminish from the 1970s, and by 1990 the service sector accounted for a larger proportion of employment. The numbers working in services more than doubled in the space of 30 years from 1970 to 2000 (see Figure 2). Part of these changes were planned, part of them were fortunate coincidences. It is easy now, in hindsight, to argue that the transformation from an industrial to an informational economy started around the 1970s. As an important precursor to the present ICT cluster, there were deliberate and successful attempts to establish institutions for higher education and new public services.

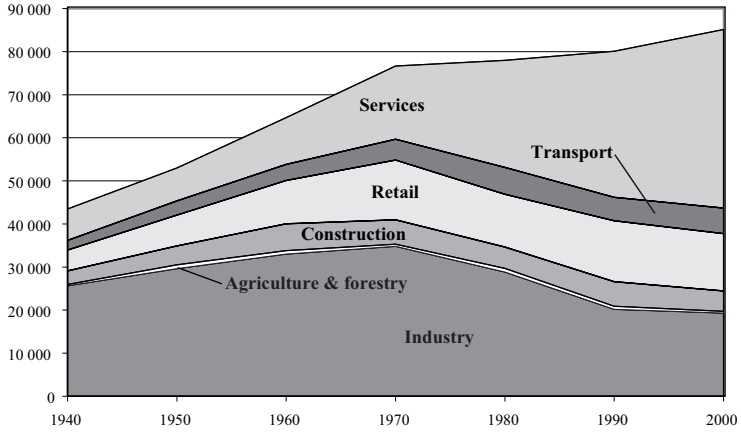

Figure 2. *Employment in different sectors in Tampere 1940–2000 (Statistical Yearbook of Tampere 2002–2003)*

The Brothers-in-Arms network was instrumental in the decision to get the School of Social Studies, the predecessor of the University of Tampere, relocated from Helsinki to Tampere.[11] Initially the school was reluctant to move, but after some political wrangling the University of Tampere was opened in 1960. Another move followed in the mid-1960s when a branch of the Helsinki University of Technology was relocated to Tampere; the unit became known as the Tampere University of Technology. A third institution that further increased employment in the knowledge-intensive service sector was the nationwide television channel TV2 operated by the Finnish Broadcasting Company YLE. Persuading YLE to relocate TV2 from Helsinki to Tampere was a mission that Mayor Lindfors entrusted to the Mayor-to-be, Pekka Paavola. His was a simple gambling strategy: Tampere poured so much money into the project that the national government simply could not back down. This same strategy had

previously been successfully used to establish a medical school and a Central University Hospital in Tampere. In addition, technical research and development received a major boost when the state-funded Technical Research Centre of Finland (*VTT*) opened a branch in Tampere in the mid-1970s.

The decisions that brought the two universities and VTT Finland to Tampere provided the foundation for the development of the ICT sector in Tampere. In the latest phase of the ICT breakthrough from the 1980s, small steps can be traced that in hindsight can be seen as the starting-points for major changes. Based in Hervanta together with the Tampere University of Technology, Technology Centre Hermia was established in 1986 to attract new technology and ICT businesses into town. Nokia started a small research team in Hermia in 1988. This was the embryo for Nokia's research and development functions in Tampere, a key player in local ICT employment.

Table 2. *Fields of expertise in the Tampere Region*[12]

	Turnover	Share of exports	Jobs	Annual growth
Mechanical engineering and automation	2.8 € billion	over 50%	25,500	3–5%
ICT	3.9 € billion	60–70%	10,000	30%
Health technology	150 € million	85%	12,000*	15%
Media services	950 € million	5%	5,500	25%

High-ranking officials and politicians in Tampere understood that ICT was a growing branch, and they established a local centre of expertise programme in the early 1990s under the umbrella of the national centres of expertise programme led by the Ministry of the Interior. According to Olli Niemi, Chief Executive of Hermia,

this was the first deliberate and serious move in Tampere towards a new business policy (Olli Niemi, personal communication 19 Jan 2005).

As a spinoff from the centre of expertise programme, the Media Tampere digital media development company provides an example of the new ICT development partnerships in Tampere between the council and new ICT businesses. Media Tampere is now situated in the historical centre of industrial Tampere, the Finlayson area, which is owned by the pension fund Varma. While the real estate company looks after the physical structure, Media Tampere focuses on the development of digital media competencies and online service systems. The company ownership structure is quite unique in Finland in that is so broadly based: four major media and ICT companies and the city of Tampere each have a share of around 20% in the company[13] (http://www.mediatampere.fi/in_english/).

As it became clear that the heavy industries, the former mainstay of employment in the city, were not about to return, Tampere issued its first-ever City Strategy entitled 'The Future of Tampere is in Knowledge'[14] in 1997. The strategy emphasises the commitment of Tampere to become the country's leading ICT centre and a major player even on the European scene.

Interestingly, the tone of the new local information society strategy reveals its origins in the straightforward hierarchical style of decision-making by the Brothers-in-Arms Axis. In a close reading of the strategy documents, Lehtimäki (1999; 2000) found that despite its explicit networking agenda, the text was written in the passive voice and in a unisonous and authoritarian tone. In the strategy's discursive imagery, the city of Tampere was set at the top of an hierarchical power structure, imposing demands upon other actors. This can be seen as a consequence of the secured strategic capacity of the regime, which had grown used to operating on its own terms. The strategy also reflects

the critical stance that the coalition had always held towards public participation, favouring instead the formal apparatus of representative democracy and its in-built mechanisms for interactions within the governing coalition.

Social and cultural transformations

The shift towards a postindustrial economy helped to offset the decline in industrial employment in Tampere. This led to social and cultural transformations through a gradual change in the population structure as a blue-collar city transformed into a white-collar one. There were several implications: first, changing class allegiances gradually changed the balance of power in local politics, undermining support for leftist parties. This trend has now continued for some time in local politics (see Figure 1 above), Particularly since the Greens won their first seats in the city council in the aftermath of local and national environmental disputes in the mid-1980s. In the 1988 elections, non-socialist seats already outnumbered the socialist section in the council. This was mainly due to the declining number of representatives of the 'League of the Left'. The dwindling support for socialists (i.e. the social democrats and communists) is depicted in Figure 3.

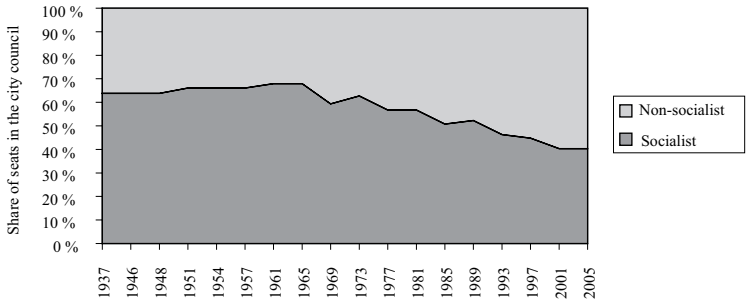

Figure 3. *The decline in socialist party support in Tampere 1937–2005*

The growing middle class and the increasing number of university students since the 1960s created a new cultural force that eventually unfolded into new social movements and threw up new challenges to the Brothers-in-Arms. Reflecting the shift towards a post-industrial era, the rise of environmental protests challenged the local regime into a public discussion.[15] The first wave of environmentalism began at the turn of the 1960s and 1970s, raising public concern over the rapid environmental changes of the growing industrial town. A second wave of environmental protests followed in the 1980s, which saw the birth of both local and national green movements.[16] Environmentalism now emerged as a prominent issue of public political debate. The early 1980s were a formative period for a new type of local green movement in Tampere. This became evident in local environmental disputes such as the occupation of the old Art Nouveau office block and the dispute over the Epilä power plant in the early 1980s, which brought together diverse groups of people who shared similar ways of thinking. The coalition that grew out of this movement had its own list of candidates in the 1984 municipal elections,

and it also contributed to the formation of the Finnish Green Party. There was a new player in local politics, and it was gaining in importance.

> The SKDL had been an opposition group in local politics for a long time. The Greens took their position as another opposition group. We were an opposition group, but not on the left. . . . you could say that ever since, there have been independent alternatives in the council. . . . At that stage the division into three [political parties] broke down. (Pauli Välimäki,[17] interview, 6 Aug 2000)

A subtle but clear transformation, which had started in the 1960s and which continued to gather pace with the Green movement in the 1980s, was the increase in the number of women in the city council. Their share of seats in the local council has steadily grown from 8.5% in 1939 to 49.3% in 2005 (see Figure 4). As women representatives now accounted regularly for almost 50% of the council, the heads of the social democratic and the conservative groups decided in the late 1980s that the term 'Brothers-in-Arms Axis' should no longer be used for other than purposes of historical reference (Timo P. Nieminen, interview 31 Aug 2000).

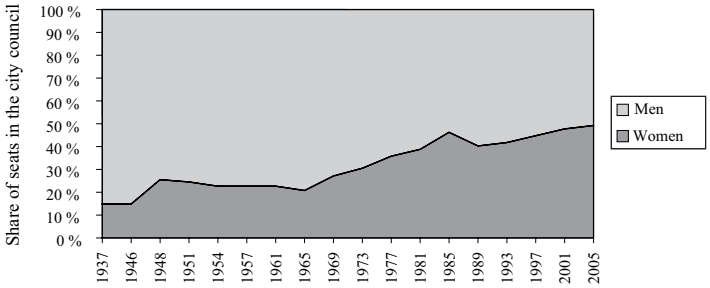

Figure 4. *Proportion of Tampere city council seats occupied by women 1937–2005*

A major source of conflict between the Axis and environmentalist views was the 'politics of construction': construction, especially for developers and many workers, meant progress, employment and welfare. It constituted a shared interest, bridging the left-right political spectrum and the Brothers-in-Arms coalition.

> We do have a strong history of construction workers. . . . Construction has brought jobs, fuelling business opportunities. It has been powerful in the SKDL and also in the Left Alliance. They have been linked to welfare like that – so it's about this very traditional structure. We have seen that construction creates jobs, gives contracts to the industry and products to be produced and so on. (Simo Isoaho[18], interview, 24 May 2004)

This politics of construction was challenged by environmentalists and the Greens. Local disputes over increasing traffic, energy production or the use of city space challenged the core idea of the Axis' political project, which maintained that economic growth and development geared by the Brothers-of-Arms coalition was beneficial for everyone. The Brothers-in-Arms conception of welfare and the new environmentalist ideas of well-being clashed in local disputes. The dominant mindset geared towards employment and economic growth, or 'simple modernity' as Ulrich Beck (1992; 1997) would have it, was challenged by environmental protests along with demands for open and democratic local decision-making. The environmental movement thus turned the attention of local people to the problematic by-products of rapid local development, such as the shrinking green spaces, the vanishing cultural heritage, traffic and pollution. The style of local governance also attracted public debate as critics complained that the Brothers-in-Arms politics was undemocratic. The close relations between city leaders and local business (e.g. construction companies) and other features of the local regime were contested. This collision is well-illustrated by a quote from

the SDP spokesperson during the so-called Tampella dispute in 1989, which frames the juxtaposition as a clash between a proud industrial history and a 'frustrated' reaction by an unthankful younger generation, spoiled by their life-style of abundance:

> I would have expected the discussion to deal not only with architectural and historical values, but to place more emphasis on the local historical tradition of solidarity, which takes the side of the ordinary citizen's work, income and future. . . . The history of work and industrial culture is not only made of matter or surface, but also of the spirit and contents of work. The longer the roots of industrial culture, the more important the continuation of the spirit of work and the workforce. The shorter the contact to this tradition, the more emphasis is put on inanimate matter. . . . The social democrats will not submit to pessimism and backward-looking stagnation, which is fed by the life-style of those that have got everything for free and are frustrated by their affluence. (SDP city council group leader Jukka Leino 22 Aug 1989)

The rise of environmentalism signalled a process of pluralisation, with the emergence of new civic groups and their political demands and new, post-industrial values. It did not, however, seriously threaten the core agenda of the Brothers-in-Arms, for it was based on a modernist horizon of increasing welfare and prosperity in Tampere as an important Finnish city. The priorities of the local governance agenda became evident in the early 1990s with the recession. By then, the environmental protest had been partly undermined by the institutionalisation of environmental protection as a national and local government function.

However, the social changes and political challenges made visible the dispositions of the Brothers-in-Arms habitus in the 1970s and increasingly so in the 1980s. The opponents of the Axis in all of these disputes were highly critical towards the non-participatory, elitist and hierarchical decision-making practices

of the Brothers-in-Arms. The critique was directed at the inertia of the Brothers-in-Arms habitus, which is displayed as political dispositions towards other actors in local politics. In some senses, the opponents' criticism of the Axis as the local mafia (Kihlström, Niskasaari & Sneck 1984) is telling and also explains the endurance of the Axis: it has been a key source of social capital and mutual trust, security and predictability that has captured a preemptive position in the local decision-making system.

Regime continuity through change

The tradition of the Brothers-in-Arms Axis, i.e. the division of power between the Social Democratic Party and the National Coalition Party, has continued virtually uninterrupted for the past 20 years. Although support has wavered from time to time, the position of the Axis parties has remained strong enough for them to persist with Axis co-operation. A key element of this continuity is the Mayor's office, designated SDP territory that has been held since 1985 by Jarmo Rantanen, who inherited the post from his predecessor Pekka Paavola. Historically, the Tampere regime coincides remarkably well with three distinct cultural phases in postwar Finnish history as identified by Alasuutari (1996): 1) the moral economy of the 1950s and 1960s, 2) the planning economy of the 1960s and 1970s and 3) the competition economy from the 1980s onwards.

These three cultural phases have been characterised by their respective discursive patterns, which can also be seen in the changes and evolution of the Brothers-in-Arms governance. The three Mayors, Lindfors (1957–69), Paavola (1969–1984) and Rantanen (1985–), for instance, have operated in very different environments. Lindfors, and the original Brothers-in-Arms, had a strong 'moral economic' agenda, which derived its strength from the wartime experiences and postwar reconstruction efforts

and close contacts with local industrialists. Paavola's approach was less dogmatic in political terms, but heavily focused on efficiency. Rantanen has had a less visible public role than his predecessors, yet he has supported the Axis coalition that has continued to function throughout a string of difficulties, such as the major recession of the early 1990s, increasing fiscal strain and cutbacks in welfare state policies. In sum, the moral and ideological commitment of the original Axis has withered away, but the operating logic, namely the close collaboration between the two major political parties, has continued all the same. The Brothers-in-Arms Axis can thus be seen as an interesting quasi-institutional innovation that has guaranteed the coalition's access to preemptive power in local politics and has carried the regime through changing times.

Two examples from the most recent municipal elections in 2000 and 2004 serve to illustrate how the Brothers-in-Arms coalition has maintained its support. In 2000, the National Coalition Party and the social democrats lost one seat each in the council. The Christian democrats, the Greens and the politically non-aligned groups all gained in popular support. Nonetheless the Axis parties held on to their majority position by striking a deal with the Christian democrats over the division of seats in the city cabinet and the municipal sectoral boards. The chair of the social democratic group in the city council had stated that the Axis parties were only interested in co-operation with 'responsible parties'. The local newspaper editorial had critical comments:

> [Very soon] after the elections on Sunday the ruling parties of the old Brothers-in-Arms Axis had divided power in the city amongst themselves. It is almost as if there had been no elections at all. . . . Could there ever be a clearer message to the people of Tampere saying that 'you voted wrong?' The head of the Social Democratic Party takes the view that at least the eight Green and six non-aligned council members are irresponsible. Luckily the

> Social Democrats and the Coalition Party both have a responsible leadership who can immediately set right the flawed results of the popular vote. (*Aamulehti* editorial 26 Oct 2000)

The Brothers-in-Arms coalition thus safeguarded its majority position in the council and its governing capacity by striking deals with third parties after the elections. Interestingly, the discourse in 2000 resonated with the early Brothers-in-Arms postwar discourse that divided 'us and them' into responsible and irresponsible actors.

In the 2004 elections, the Axis parties regained their votes after heated debate over the outsourcing of municipal services, in which the two parties were sharply opposed to each other. The pre-election debate and the election results provide an interesting example of the dissociation of ideological discourse from practical co-operation within the Axis coalition. The pre-election debate, which addressed the traditional division between left and right, favoured both of the parties on the opposite sides of the fence. The Greens and other political groups that did not have such a strong agenda on municipal service provision, received much less public attention. Pekka Paavola, the previous Mayor, who was now observinng the debate from the vantage-point of a new non-aligned and populist political group, said that the whole debate was very much tinged by election propaganda:

> The Coalition Party's advertisements for outsourcing and the Social Democrats' defense of publicly owned services is largely a matter of election propaganda. Before every municipal election it seems that the two parties have visible disagreements on some issues. However [after the elections] they will continue to co-operate just as before, if there are no major changes in electoral support. (Paavola interviewed in *Aamulehti* 10 Oct 2004)

A crucial characteristic of regimes, well visible in the case of the Brothers-in-Arms Axis, is the conscious maintenance of the regime's governing capacity. The maintenance of co-operation becomes an end-in-it-self, something that is valued over and above temporary disagreements between partners. The social 'investments' that the Axis parties had made in the process of building up their co-operation, such as fostering social networks and mutual trust, including shared wartime experiences, were considerable. It would have been extremely difficult if not impossible to develop a similar network for co-ordinated decision-making without the Brothers-in-Arms network. There is also a dynamic of increasing returns at play here. The preemptive power of governing elites means that they can acquire power 'at wholesale' (Stone 1988). Instead of spending their energies in gaining the upper hand over other actors in each controversial issue, they use their resources strategically to control the decision agenda to their own benefit. Stone (ibid., 83–84) argues that it is clearly more effective to invest in governing arrangements and in the stabilisation of shared values than to engage in a series of battles concerning individual issues (on increasing returns, see Peltonen 2004; Pierson 2000).

In a comparative study on two German cities, Scott Gissendanner (2004) has identified low party competition as one factor of governing capacity. In our case this applies to the two parties within the governing coalition, their equal strength guaranteeing the need for co-operation. However, it should be noted that their co-operation started precisely because of intense competition between the parties. Complementing Gissendanner's observation, we found an interesting addition to party competition, namely a low level of competition between individual politicians in national politics. As one of our interviewees observed, most key political figures in the Brothers-in-Arms Axis have never sought to move from local to national

politics (i.e. Parliament). For any local politician, running for Parliament would require efforts to build up a visible individual profile – which might well threaten the unity and collective trust of the local political group.

One of the key challenges for the continuation of the Brothers-in-Arms regime has been the socialisation of newcomers in politics. This has been facilitated by different institutional arrangements. Among the most important of these have been different foundations which brought old and new members of the two Brothers-in-Arms parties together to agree upon projects that it was thought were best kept outside the formal political arena. In these foundations newcomers learned how the interaction between the two parties and with the local business elite worked and how co-operation was maintained in changing social situations.

No political project can gain sufficient credibility unless it is articulated in a way that resonates with the social environment. For this purpose, the Brothers-in-Arms regime used certain characteristic forms of speech from the very outset. Later it had to modify its discourse according to changes in the social situation. This reorientation was faciliated by the regime habitus. As a generative system of dispositions that help to incorporate the old into a new, it enables political actors to form a style, allowing them to select the kind of acts and discourses that are consistent with their political identity. The Brothers-in-Arms discourse became a recontextualising principle with which one appropriates 'other discourses, bringing them into a special relation with each other for the purposes of their selective transmission and acquisition' (Bernstein 1990).[19] Some ideas are more consistent with it than others, as our examples above show. The Brothers-in-Arms discourse worked well in terms of securing continuity, until it came up against the task of incorporating the environmental challenge. This was a black spot for the discourse

as the environmental movement was calling into question the whole development project based on linear economic growth, which was at the very core of the Axis agenda.

As an integral part of the Brothers-in-Arms discourse, narratives about the origins and glorious history of the Axis achievements became discursive vehicles for the transmission of the Axis traditions to following generations. One of the most important is a book called *The Napoleon of Tampere,*[20] the biography of the first legendary Brothers-in-Arms leader, Erkki Napoleon Lindfors. A quote from an interview with leader of the National Coalition Party's city council group, Seppo Rantanen, illustrates how socialisation to Axis thinking worked. He said the first thing he was advised to do upon being elected to the city council (in 1984) was to read the biography of the legendary Mayor Lindfors:

> That brought home to me the need for the Axis. Its achievement is development. I am committed to the work of the Axis. . . . The Axis carries both joys and sorrows. It provides a backbone, continuity and predictability. (*Aviisi* 1 Feb 2003)

The Brothers-in Arms discourse had a strong growth component, which both promoted welfare and was in tune with local corporate interests. Mayor Lindfors was sometimes called 'the Mayor of industrialists' – a critical remark from the political left that reveals Lindfors's business-friendly orientation. In those days, the city granted loans to local companies and listened attentively to corporate demands on local development and city planning. It also took out loans to finance extensive infrastructure and welfare projects. Another important aspect here is the close relationship between local construction companies and the city of Tampere; witness the present Mayor Jarmo Rantanen, who used to be a local manager of a construction company before he took up his public office. In recent years there have also been other moves

from high ranking positions in construction companies to top positions in the city administration.

While the old industries were embedded in the locality and the social fabric of the city, being as old as the city itself, the mobility and volatility of present-day companies calls for new tools for such 'embedding work'. The governing coalition has gone to great lengths to safeguard its image as a trustworthy partner for businesses. Media Tampere and other similar partnerships are now used in campaigns to try and attract companies to Tampere. Initiatives and strategies such as the centre of expertise programme and the eTampere initiative on electronic governance have the function of channelling both public and private resources to foster innovation.

Conclusions

In this chapter we have presented an historical account of the emergence and stabilisation of the local regime in Tampere and described the challenges presented to that regime. We set out by asking what kinds of social mechanisms lie behind the preemptive power excercised by the Brothers-in-Arms Axis. These mechanisms might also be understood as adaptive capacities that allow for a regime to change without losing its character or identity. Our focus here has been on mechanisms through which any regime can be socially regulated in a controlled way, which in turn secures the stabilisation of shared values and social order among the coalition who are in preemptive power position. We conclude that the regime has remained effective and operational by virtue of different social mechanisms, namely institutional, interactive and discursive ones.

First, the official and unofficial institutional mechanisms in local politics have been based on securing a long-standing majority in the city council. The key to co-operation has been

that the social democratic and conservative counterparts have needed each other in order to be able to govern the city. This has included the initial shift from competition between three parties to stable co-operation between two and, eventually, agreements between the leaders of the respective groups, backed by the principle of group discipline applied to voting in the council and an institutionally strong Mayor's office. This dominance also guaranteed control over the city administration, which was divided into social democratic and conservative mandates. From the political point of view it was also important that the Axis successfully bridged the divide between the political left and right, thus bringing together the representatives of both the local business elite and the strong labour organisations. The relative autonomy of the local political setting vis-à-vis national politics also supported the status of the coalition, giving it a distinctly local character. After the Brothers-in-Arms Axis was stabilised, there was less competition within the coalition. Also, the lack of competition between individual politicians within the coalition maintained the collective, albeit exclusive style of decision-making.

Second, at the cultural plane, the preemptive power of the Axis was based on interactive social mechanisms. These regulated the relationships within the institutions mentioned above. The war was a 'critical event' in national and local politics, and it gave rise to a specific kind of habitus which embodied ideological commitments and dispositions towards social and political matters tied together by close personal relations of war-time camaraderie. The habitus of the Brothers-in-Arms, along with tightly-knit social networks, provided an important source of human and social capital, which gave the local regime its cohesion. One important interactive mechanism related to the coalitional habitus was the socialisation of newcomers into the original institutional configuration. Younger generations

of politicians learned how the Axis worked and grew to honour its traditions. Interactive social mechanisms have been also important in partnerships between governing coalition and local business elites. Co-operation was established in the 'years of danger' and kept alive by constant attunement by both parties. Close interaction between the counterparts has kept the relationship practical and effective, but this arragement has also provided terrain for non-public manouvers, which faced serious critique in environmental protests from the 1980s on.

Third, discursive social mechanisms supported the cohesion and legitimacy of the regime. A distinction can be made between two types: the 'Brothers in Arms discourse' and narratives about the origins and glorious history of the Axis achievements. They served different purposes. The 'Brothers-in-Arms discourse' emerged as a legitimising discourse which it resorted to in the face of criticism from the communists and in the environmental disputes starting from the 1970s. The discourse was grounded in the position of the local regime as a guarantor of, first, Finnish independence and, later, the continued welfare of its population. It thus became a recontextualising mechanism which helped to reinvent the purpose of the governing arrangements and to steer through changing times. The straightforward style of decision-making was justified by the remarkable results. The 'common good' was closely linked to a discourse of modernisation, promoting local development and techological progress. The 'politics of construction' was embraced by the whole political spectum – at least until the environmentalist critique entered the debate. The discursive resonance between the war-time crisis and the crises of the postwar reconstruction, the restructuring of the economy and the recession of the early 1990 also serves as an interesting case of cultural and institutional continuity and transformation. The crisis mentality sharpened the shared goals of the Axis, bringing them to focus on the very survival of Tampere

and enhancing the legitimacy of effective governance (for crisis mentality, see also Gissendanner 2004). Narratives about the origins and the glorious history of the Axis achievements, on the other hand, were not used for steering purposes, but rather for stating the fact that the Brothers-in-Arms co-operation has been and will be beneficial for everyone, even the local critics of the Axis. These narratives were told at suitable occasions: to initiate the newcomers or to strengthen the sense of collectivity, but also to legitimise the longue durée of the regime.

From a contextual perspective it is apparent that a virtuous cycle emerged in the postwar years between the outcomes of the regime policies and the legitimacy of the governing coalition. The momentum began to fade as the economic boom petered out, especially since the 1970s, but the long period of success still remained an important source of pride for the regime. The idea of a virtuous circle is linked to the mechanism of increasing returns, whereby the coalition gained power 'at wholesale' through its strategic position in local governance. This strategic position remained strong even in the wake of the socio-economic downturn. In any case, the 'golden age' of the local regime became a reference point and an example for later development efforts.

In recent post-industrial times, the traditions of governance demonstrate both continuity and transformation. As far as the critics are concerned, the strive for local dynamism has undermined local democracy, as the social production of power (power to) operating in the regime becomes a preemptive form of power which excludes some actors from agenda-setting. Contradictions surrounding the goals and values promoted in local development have also become imminent. This has been clearly demonstrated through the history of local environmental protests and demands for open decision-making. It seems, however, that the stability and trust embodied in the long-lasting

regime has become a crucial part of local governing capacity. The decision-making mechanism developed over the years and decades by the Brothers-in-Arms has allowed for effective strategic decision-making. From the point of view of legitimacy and accountability, this means that the prospects for effective implementation of local strategies remain high. Despite recent social transformations, the Brothers-in-Arms tradition has been successful in framing Tampere as a unified entity with unified interests. In sum, the history of local governance in Tampere demonstrates that, to modify the motto of regime theory, 'local politics, with its historical roots of interactions, matter'.

Manuel Castells concludes his *Informational City* (1989) by assigning a fundamental role to local governments in the new global economy. According to Castells' agenda, they are to engage local civil societies and develop trans-local networks to counter the volatility of the global economy. The Tampere model shows that the Brothers-in-Arms style of decision-making ('it has been agreed that…') presents a historically tested balance point between the efficiency and democratic legitimacy of local government. Interestingly, inter-organisational trust in network society seems to require clear control within organisations. It can be argued that the Brothers-in-Arms political culture, constructed around the use of preemptive regime power, has enabled a streamlined decision-making mechanism that is needed in consolidating trust and networking with other organisations. The historical origins of the Brothers-in-Arms style of governance have faced and continue to face the challenge of representing local civil society. Indeed, one of the future challenges is to secure political participation itself, which has been lingering close to the level of a 50% voter turnout.

Despite the pluralisation of politics and society and the increasing complexity of the network economy, it seems that the Brothers-in-Arms tradition of straightforward dynamism,

strategic leadership and effective government is well justifiable. Since the Brothers-in-Arms regime has provided the core mechanism for political decision-making for such a long time, it will be interesting to see how flexible this pattern is. Eventually, if the present trend continues, the leftist parties will lose support, which may bring the position of Social Semocrats under pressure. Tampere could then enter a phase of pluralistic competition between political groups – something the city has not seen since 1945. It is possible, however, that the major innovation of the Brothers-in-Arms, i.e. the decision-making mechanism of 'it has been agreed…', could still prevail, despite changes in local political alliances.

List of interviews

Vilho Halme (Social Democratic Party, former long-time city council chairman and long-standing editor of local social democratic newspaper), interviewed on 24 March 1999 by Markus Laine (M.L.) and Lasse Peltonen (L.P.)

Pauli Välimäki (The Greens, head of The Green city council group), interviewed on 6 Aug 2000 by M.L. and L.P.

Timo P. Nieminen (National Coalition Party, former head of the NC city council group and long-time chairman of city government), interviewed on 31 Aug 2000 by M.L. and L.P.

Simo Isoaho (Left Alliance member), interviewed on 24 May 2004 by M.L. and L.P.

Olli Niemi (Managing Director, Tampere Technology Centre Hermia Ltd.), personal communication 19 Jan 2005 with M.L.

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Endnotes

[1] Information society news portal 'Tietoyhteiskunta.fi' at http://www.tietoyhteiskunta.fi/=uutiset/163062 Accessed 8 Feb 2005.

[2] In many ways, regime theory resonates with the broader notion of governance, referring to multi-agency partnerships, power dependencies between organizations involved in collective action and the intertwining of

responsibilities between public and private sectors in meeting governance challenges (Stoker 1998).

3 Partly due to its industrial history and sizeable labour population, Tampere was one of the last postings of the reds in the 1918 Civil War. The war followed Finnish independence from Russia in 1917 and pitted 'reds' against 'whites'. The former were mostly smallholders and workers, while the latter were typically landowners, entrepreneurs and middle class professionals.

4 The Finnish People's Democratic League, *Suomen Kansan Demokraattinen Liitto* (SKDL) in Finnish. The coalition included the Communists. The SKDL was the predecessor of the present-day *Vasemmistoliitto*, 'League of the Left'.

5 As Figure 1 indicates, there was a minor change in the early 1960s when the conservative National Coalition Party lost places to other non-socialist parties such as the liberals and the Swedish People´s Party. In addition, there were small and temporary moderate conservative groups that were close to the National Coalition Party and that are included in the National Coalition numbers in Figure 1.

6 Translation from a book in Finnish by Raimo Seppälä: Tampereen Napoleon (The Napoleon of Tampere), which focuses on the political career of Erkki Napoleon Lindfors.

7 Long-time social democratic chairman of the local council and long-time editor of the local social democratic newspaper Kansan Lehti ('People's news').

8 The war reparations were entered as part of the peace treaty between Finland and the Soviet Union and they were mostly made in kind: ships, locomotives and machinery.

9 In Finnish: *Tekojen aseveljeyttä* (Tienari 1966)

10 The quotation is from a 1960s campaign film commissioned by the City of Tampere where images of demolished old wooden buildings were shown as a symbol of a better, 'concrete' future.

11 According to Seppälä (1983), mayor Lindfors had an 'academic trauma': he valued higher education and university degrees but did not have one himself. This may explain his personal motivation to make Tampere a university town in the 1960s.

12 Source: Centre of expertise programme http://www.oske.net/in_english/centres_of_expertise/tampere/ accessed 10 Feb 2005.

[13] Alma-Media (owner of the local newspaper Aamulehti), Elisa (the former local telephone co-operative, Tampereen puhelinosuuskunta), Nokia and Fujitsu-data. See also http://www.mediatampere.fi/in_english/

[14] The original Finnish title *Tampereen tulevaisuus on tiedossa*, translatable as 'The future of Tampere is in knowledge', is a play on words and also has the meaning 'The future of Tampere is known'. The second strategy was prepared in 2001 under the title *The very best Tampere* (In Finnish *Kaikem paree Tampere*, making use of the local dialect). It places greater emphasis on civic participation than the first one. Its effect is as yet unclear.

[15] We have discussed local environmentalism in greater detail elsewhere (see Laine in press; Peltonen in press; Laine and Peltonen 2003; Laine, Peltonen, and Haila 1998).

[16] The Green movement was born following a major wave of environmental mobilization after the 1979 dispute over the protection of Lake Koijärvi, an important lake for birds in Southern Finland. The repercussions of the Koijärvi dispute were seen across the country in the outbreak of local environmental disputes.

[17] A long standing environmental activist and a Green city council representative.

[18] A long-time Finnish Communist Party member.

[19] Here we follow Basil Bernstein's definition of pedagogic discourse as 'the rule which embeds a discourse of competence (skills of various kinds) into a discourse of social order in such a way that the latter always dominates the former. . . . Pedagogic discourse is a principle for appropriating other discourses and bringing them into a special relation with each other for the purposes of their selective transmission and acquisition. Pedagogic discourse, then, is a principle which removes (delocates) a discourse from its substantive practice and context, and relocates that discourse according to its own principle of selecting, relocating and focusing' (Bernstein 1990).

[20] The book was authored by a former editor-in-chief of *Aamulehti*, Raimo Seppälä (1983).

Ari-Veikko Anttiroiko, Päivi Kuusisto and Jari Seppälä

Democratising e-Governance in the City of Tampere

Introduction

The promotion of information society development and the development of citizen participation have an important role in the strategy of the City of Tampere. Even before the Internet revolution the open provision of information was expected to guarantee that citizens are aware of municipal affairs and have enough information to participate in the planning and preparation in municipal policy-making processes. Due to the introduction of the Internet by the city government since the mid-1990s all the agendas and relevant information have been made available for citizens. In addition, new electronic feedback and discussion forums and special inquiry systems were developed since 1996.

To make local information society and e-democracy work is not an easy task, though. Views and opinions gathered via the Internet are biased to some extent, if compared with the views of the whole population. This is why also more conventional ways of citizen-city administration interaction are used along with electronic means. The city government has also paid a lot of attention to training citizens to use the new electronic tools and invested on free public access points and terminals, in order to pave way for an inclusive local information society.

In this chapter these developments are discussed and assessed on the basis of the development stage model of e-government, with a special view to e-democracy and e-participation. From the point of view of citizens, it is assessed what their actual chances

to receive information and to participate in decision-making processes are and what measures have been taken to guarantee sustainability and inclusiveness.

Aspects of developing democratic e-governance

Citizen-centered e-governance

At local level the key players in e-governance are local authorities and various stakeholders, the latter falling into three basic groups: public bodies, business community, and local civil society, ranging from NGOs and local associations to active individual citizens. Citizens in different roles – as constituency, taxpayers, political activists, workforce, inhabitants, and service users – form the most important local stakeholder group in self-governing local community.

The point of departure of e-governance should be the community and, within it, individual citizens, so that whatever applications, e-services and communication tools are introduced, they should fit in with the features of local community and be based as much as possible on citizens' needs and their patterns of behavior. Deciding on resources allocated to municipal services etc. is formally vested to the representative system of government, the local council at its heart. Yet, when other forms of democracy gradually develop to revitalise democratic practices, citizens may gain more direct political control and power over policy-making issues and governance processes. Besides the genuine demand for more direct citizen control, this transformation is generally expected to strengthen citizens' commitment to their communities, their compliance with social and legal norms, and the utilisation of local potentials and know-how in community development.

Conditions for the democratisation of e-governance

Developing local democratic e-governance is a purposeful effort to democratise practices of public governance with the help of new ICTs. This is, actually, what many governments have done all over the world since the 1970s, as ably shown by Becker and Slaton (2000) (see also McLaverty 2002).

A contextual starting point for democratic local e-governance is the overall information society development and related development policies, and institutional and legal frameworks. Another important aspect is that of e-readiness, which subsumes technological readiness, behavioral e-readiness (needs, motivation, access, capacity, and skills), and socio-cultural e-readiness, which is about cultural, political and institutional openness to and reservations about e-transformation in democracy.

Another way to systematise the democratic use and development of ICTs is to apply the model of development stages of e-government, which highlights the steps and the order of actions to be taken when proceeding from the current situation towards the e-government vision. The phases that have generally observed to be sequential in e-government development are usually presented in four-fold scheme (see Macintosh et al. 2002; Grönlund 2000; UNDPEPA & ASPA 2002):

- Web presence and information provision
- Simple interaction and two-way communication
- Advanced interaction and transaction services
- e-Transformation in government (integrated and seamless service and governance systems).

In a similar way democratic e-government can be developed through such basic phases as provision of information, two-way communication (e.g. feedback), political interaction and transaction (e.g. e-consultation and e-referendum), and fully

transformed practices and systems of democratic e-governance (see Becker 2001; Macintosh et al. 2002; Gross 2002; Anttiroiko 2004a).

Evolution of e-democracy in Tampere

Establishment and early years of the website of the city

In the mid-1990s, Tampere was one of the first cities in Finland to set up a municipal website. Established in 1994 in English, Tampere's first website was primarily targeted to non-Finns looking for information about Tampere. The local authorities' own server was at first set up internally, and in the spring of 1995 the Intranet was connected to the Internet. At that time it was believed in the city administration that such an intranet constituted the most central usage of www technologies, and it was maintained for some time alongside www site of the city.

In March 1995, the city government got its first www-server under the domain name www.tac.fi, which became the home of all Tampere-related material, previously located on the server of the local telephone company TPO. In May the municipal IT department applied for the tampere.fi domain and adopted it to complement the old tac.fi. The first content for the address www.tampere.fi was generated at this point and the tac.fi was allocated for the Intranet system only (Anttiroiko 2004b).

As the provision of content to the web site of the city government was in the early years largely in the responsibility of communication professionals of the city government, the very first material to be put on line comprised press releases, descriptions of the local administrative sectors and promotional materials produced by the business services section. Photographs of the City Council and the City Board were made available in October 1995, but no-one thought of complementing them with the e-mail addresses of the councilors and board members, which

goes to show how unfamiliar this new means of communication still was.

The first attempts to bring the agenda of the various municipal bodies on line were made in late 1995, but it was the automatic release system adopted in early April 1996 that made them regularly available. Since then, the agenda for the meetings of the municipal bodies, City Council and City Board included, have been available on the Internet as soon as the preparing official forwards them for duplication. After the meetings, the agenda are updated to become records.

Increased web-based communication since 1996

In addition to the informative content, *interactive* usage has always been an important objective of the municipal website. At the very simplest this means providing the citizens with the e-mail addresses of the elected officials and public employees, which soon proved to be an efficient way to encourage feedback. Back in 1996, more systematic participation channels were few. Early examples include an petition from the spring of 1996 organised by steamship enthusiasts appealing for the restoration of SS Pohjola. E-mailed to the mayor, the petition was received with due procedure and submitted to the preparing authorities just like any other written initiative made by the citizens (Anttiroiko 2004b).

The spring of 1996 saw the opening of a *discussion forum,* where citizens could participate using either their own names or aliases. Appropriate messages were put on line after being passed by a moderator. The local authorities wanted to collect opinions on significant projects in their preparation phase, and the first subject was the refurbishment of the Central Square. The 100 contributions received at the forum during the viewing period of the general plan for the square were included in the revisions

of the plan. Other topics to attract 'unofficial points of view' via on-line debate were the future of Tampere and the municipal emblems.

The local election in the autumn of 1996 was the first occasion to test the Internet as an *electoral information and communication forum*. This was done by providing the voters and the candidates with a place to meet and discuss. Furthermore, the website contributed by providing basic election information, including the lists of candidates, poll stations, polling times and the results of the previous election. On the election day, the results were put on line directly from the vote-counting system. These basic contents were part of the website of the following local election as well. On each occasion, though, the authorities have wanted to provide the website with something new, to attract the citizens' attention and get them to vote.

Adopting new tools to understand citizens' preferences since 1997

In order to improve the knowledge-base of the development of e-government, more information on citizens' interests and preferences was needed. As long as the Internet remained a mere curiosity, there was no need to take it seriously within administration. Very quickly, however, the Internet became too significant a phenomenon to be developed only on the basis of a rule of thumb. This led the city administration to design new model by which to systematically keep track of the wishes and preferences of active web users.

The first Internet user survey was carried out in 1997. According to its results, two thirds of the visitors to Tampere's website are from Tampere. In addition to numbers, local residents are the principal users of the site also in terms of frequency: locals visit the site more often than people living elsewhere. Some 50%

of Tampere-based respondents reported visiting the municipal site at least once a week. At first, the most important reason for visiting Tampere's website was to obtain events information. Since 1997, user surveys have been arranged on a yearly basis. The primary purposes of visiting the website have shifted towards official dealings with the authorities and accessing services, whereas political participation is still for the few.

In the spring of 1999, the first 'Talousfoorumi' (Municipal Finance Forum) was arranged. It is an open inquiry gathering citizens' opinions with regard to issues to be addressed in the preparation of the next year's budget. Since then, the Municipal Finance Forum has been carried out every year, with slightly changing content and priorities. Together with city council's priorities, the results of the Forum in question have been a basis for the preparation of the budget. Yet, as the system if based on representative democracy, the city council has the final say in all aspects of the budgetary decision making.

Table 1. *The development of the number of the survey respondents*

	1996	1997	1998	1999	2000	2001	2002	2003	2004
Discussion forum	250	159	263	468	519	394	449	664	781
Citizens' Q and A booth				180	229	218	208	247	271
Internet user survey		1 000	280	665	1 188	1 274	1 358	1 271	1 109
Municipal Finance Forum				678	654	314	739	1447	657
Internet				558	430	160	652	1295	545
paper form				120	224	154	87	152	112
Finance and traffic consultation (authentication)							260		
Digital ID card							22		
"Netposti" user ID							238		
SMS consultation (finance)							93		
Strategy consultation					104				
newspaper					70				
Internet					34				
Election initiatives					107				
free distribution paper					61				
Internet					46				
Initiative vote (Internet)					484				
Town planning games				284	350				
Winter maintenance of streets						200	355	294	119
Housing strategy							325		
Environmental strategy						27	6		
Internet survey of Parks Department					170				
Component master plan for traffic; Internet							414	375	
questionnaire on paper								69	
written opinions								25	
Participation survey							178		
Senior citizens' info service namning competition									
free distribution paper								94	
Internet								150	
SMS service							250		
responses							120		
Curriculum							17		
Valma preparation forum								340	349
Survey for course ideas at Adult Education Centre									162

In the autumn of 1999 the '*Kansalaiskioski*' (Citizen Booth or Citizen Kiosk) was opened. It is an electronic questions and answers booth on municipal issues for citizens with a volume of more than 200 questions/answers per year. This and some other applications of e-government have raised a question of how to categorise e-mail as a means of communication: is it a parallel to telephone or a written document? Namely, many officials take the communication via e-mails more seriously than the use of telephone, which creates slightly higher threshold to the use of e-mail. It is a written document that can be stored and may be used later should it be needed at a later stage of a certain process. From the point of view of citizens the picture is almost the opposite, for e-mail has become a popular means of citizen-to-government communication. It has for some time been more popular than a telephone. The amount of official mail to the city government has remained more or less the same despite the increased use of e-mails in making inquiries and asking for information.

The first town planning game providing the opportunity to digitally play around with various zoning alternatives was launched in the summer of 1999. The game illustrated vacant building land in various parts of the city and offered various ways of filling them up with new residents. The game illustrated several alternative scenarios by modelling different construction solutions with images. Participants could send their viewpoints straight to the planner. A second town planning game was launched in 2000, and since October 2001 all pending town plans are available via the Internet and complemented with a commenting channel. Plans are illustrated in an on-line map with a participation form that can be sent to the planner. Actually, the Internet has proved to be very useful tool in town planning, as the plans can be presented in an illustrative manner and with simple visualisation, added with an opportunity to gather feedback and opinions conveniently during the planning process.

Representative e-democracy in the early 2000s

Since the beginning of 2002, citizens have been able to make official initiatives on the Internet and monitor their progress on line. At first participants were authenticated with the help of a digital ID card, but since November 2003, authentication for submitting initiatives has been carried out by user ID and password.

As the Finnish local democracy is based on representative system, a large part of citizen involvement must somehow be connected to the functioning of this system. First steps were taken already in the latter half of the 1990s by increasing information on formal decision-making process, such as securing the availability of minutes and agendas. A new turn took place since the spring of 2002 when it became possible to monitor council initiatives and their processing via the Internet. Since late 2002 voting results of the council have been available on line immediately after council meetings. Before the Internet, those interested had to wait until the minutes of the meeting were published. The voting behavior of each councilor can be tracked through an online seat map.

Another extension of representative e-democracy is the Valma preparation forum launched in April 2003. It makes it possible for citizens to bring forward their opinions concerning issues on the agendas of the committees and participate in discussion. Opinions are e-mailed directly to the elected officials and municipal employees concerned and collected into a summary enclosed in the minutes of the committee. Valma brings democratic e-governance to a new level, as it involves people to the daily preparatory work of city administrations and committees. It seems, though, that the extent to which this attracts the attention of ordinary people, however, depends largely on the matter under discussion rather than the tool used. This implies that Valma as such may not increase participation to

a new heights, but rather provides another tool which is available for those interested in participating in decision making at the preparatory phase of the process.

As mentioned, the first discussion forum was set up in 1996. Since then the number of topics presented to the public have increased so that in 2003 they numbered 19. Currently the most popular topics include traffic and communications, public finances and services, and issues raised in the Valma preparation forum. Contributions amount to more than 600 a year. The number is not huge but not negligible, either. Before the Internet, the only places to discuss local affairs in public were the letters to the editor in local newspapers and some occasional public discussion events. The discussion forum can actually be considered the first interactive section of the web site of the city government. The city administration works as a mediator which tries to engage officials and political representatives to participate in the discussions and comment the viewpoints presented by discussants. Yet, the reality is that these forums are mainly a sphere of the discussions of ordinary citizens.

Before the local election of 2000 a call was sent out for so-called election initiatives with the result of 150 suggestions brought forward. A vote was arranged and five winning initiatives were submitted to the new city council. The most popular initiative, attracting the majority of all votes, suggested the building of a dance pavilion. Before the 2004 election, the municipality set up its own candidate selection application to help voters find the candidate whose values and opinions on current issues match best with those of the citizens. As many as 390 candidates (70% of the total in Tampere) submitted their responses to the application, and more than 13,000 voters used the application, which is fairly high rate (roughly 8% of 157,000 eligible voters).

Voting via the Internet has also been experimented with in Tampere. In the autumn of 2003, the students of the Tampere Polytechnic voted on line at the students' union election, using the electronic eTampere card as a means of authentication. The system is technically feasible, but the privacy of the very act of voting remains a problem that hinders a wider adoption of e-voting method in local elections.

Summary: Evolution of the web-based activities from 1995 to 2005

The principal content of the website of the City of Tampere comprises informative material, complemented by increasing number of interactive channels between the residents of the city and elected officials and municipal employees. The feedback channels are an essential part of the site, and in addition to the Internet, questions and comments can be sent by SMS. The contact information of elected officials is also widely available. The discussion forum is now an established channel of participation. Several polls and surveys are arranged every year and a wide range of interesting issues are raised at the Q & A booth.

The local authorities are still working hard to improve the opportunities of on-line participation. One good example is the Valma preparation forum, enabling the citizens to have their say concerning issues processed in committees and forward their comments straight to their representatives. Nevertheless, all this is still a very narrow slice of all that is possible to encourage on-line participation. True challenges are still the political will and institutional arrangements that really open up decision sphere to the public, not the technical tools used in democratic governance processes.

Assessing the democratisation of e-governance

Access to information as a precondition of democratic e-governance

Access to information is a basic condition to democratic governance and policy-making. In Finland, it has been possible to develop e-democracy on the basis of a traditionally transparent public administration. A major turn took place in 1977 due to the enforcement of then new Local Government Act which stated that municipalities must openly release information concerning the preparation of municipal issues (the present law on local government is Local Government Act.365/1995 which has a similar emphasis on openness and transparency).

Ensuring the constant availability of information is, of course, an ongoing project. According to various surveys, between 57–73% of the residents of Tampere think that their access to municipal information is sufficient. As much as 40% of the residents report getting a lot of information via the Internet.

From the beginning, Tampere has worked hard to combat the threatening urban digital divide. To build up its web-based communications and services, the municipality has arranged ICT training for citizens and established free Internet access points open to all. According to a survey carried out late in 2004, 80% of the residents of Tampere reported having access to the Internet. In the same survey 38% of respondents expressed that they feel a need for further training in the use of the Internet (Taloustutkimus 2004).

One of the most innovative attempts to bridge the digital divide is the bus called 'Netti-Nysse' in Finnish. It provides free Internet access and training on wheels, a 'netmobile' going to where the people are in suburbs and meeting places. Another specialty is 'Mukanetti', a training program for the elderly in computers and the Internet launched by the church and carried

out by peer teachers that even the shyest newbies feel comfortable approaching. A third important development is 'Mansetori', the neighborhood venue that trains people to generate their own content and maintain websites for their own neighborhood or group (Seppälä 2001).

Citizen influence and its limits

Focussing on the citizen is the guiding principle of Tampere's municipal e-services and e-democracy. The first website of the City of Tampere was little more than a tourist information package, but very soon the focus shifted from visitors to the local residents. User surveys and topics suggested by the citizens have been used to set up a user-oriented website and a real channel of feedback available 24 hours a day to every resident of Tampere. Questions are answered promptly and opinions are forwarded to the staff processing the issue in question.

The municipal budget has been one of the best venues for e-democracy. The residents' viewpoints have been heard before the council has set its own priorities. The results have been available at the final decision-making phase.

In town planning, the official commenting periods have been enhanced by the Internet and its potential of visualising the plans and enabling people to study various solutions comfortably at home. Comments are received by e-mail and recorded with due procedure. Even the dance pavilion that was voted the best suggestion of the initiatives collected via the Internet before the local election of 2000, as well as the results of the town planning game carried out in two neighborhoods, were included in the final consideration of the planning alternatives.

All participation and civic influence have their limits, though. In the end, the dance pavilion was not built, and many good ideas that the residents have come up with have never been implemented. In the representative democracy elected politicians

are responsible for the municipal affairs, for designing public policies, and for allocation of resources, and it is not possible to make every wish come true – not even in respect of the winning or the popular initiatives. As a matter of fact, the same applies sometimes even to the most influential politicians: they cannot dictate the municipal policies and decisions, but need to negotiate with other politicians and relevant stakeholders in order to find a kind of negotiated solution. This is due to the pluralist nature of local decision making in Finland. On the other hand, we should be able to challenge some of the premises of representative system of government. In this regard one of the most important issues is, should there be some arrangements to allow direct citizen involvement in decision-making as in the case of binding referendum (see Becker & Slaton 2000).

Does e-democracy make a difference?

e-Democracy is often criticised for being too 'easy' and promising more than it can keep. From the point of view of local government e-democracy is but one dimension of the functions and tasks of self-governing local community, subject to many other influences and demands with varying weight. On the other hand, democracy is an important building block of the legitimate system of local government, which affects the functioning of the system and the local condition much more than the apparent democratic processes themselves may make us believe. This is why we should continuously work for more democratic e-governance, as it is the way to match the requirements of transformational politics and policy to the emerging information society.

In its present form the representative e-democracy should be understood as a convenient tool to conduct polls and citizen consultation in the cases in which such an information on citizens preferences are needed. Within present system this is, however, only consultative, due to existing legislation. Yet, the

true potential of democratic e-governance is used when local democratic processes are taken to a higher level with organised deliberative and participatory processes and at some point of history, with more radical applications of direct democracy (On the rating of the level of e-democracy, see Becker 2001). This development has its preconditions. At the moment societal and local tendencies provide a mixed view of what will be the future direction in this respect. For example, there are demands of increasing direct democracy, such as binding referendums, but at the same time there is increased individualism and alienation, which seem to undermine the very idea of democratic governance.

According to a survey carried out in 2002, 36% of the residents of Tampere were interested in the participation opportunities provided by the municipal Internet services. Why is it then that the record rate of actual usage of these opportunities is around 1%? In addition to organised opportunity, access and sufficient skills, people need a motive to participate. As a source of motivation, technical novelties and gadgetry related to the Internet revolution have more or less been exhausted. People are more interested in – the method of participation notwithstanding – issues that are concrete and topical rather than those that are more abstract in nature and thus difficult to understand. Publicity in media outside the web site of the city government clearly increases participation. The possibly even more important factor of motivation, however, is the result of participation experienced in the past and its impact on the expectations attached to current or future policy and governance processes: if civic participation has made a difference at one point in time, it is easier to make people interested in participation at some later stage. Creation of such positive collective experiences seems to have had too modest a role in the development of e-democracy.

Even though the means and the methods are still developing, the Internet was no longer a novelty in the mid-2000s. Mobile phones could also be developed as a real voting instrument. At some point, digital television is going to open up new interactive channels. Anyhow, it has become clear by now that democracy is not and will never be about technology as such, but about rule by the people. From a practical e-government perspective this refers to e-enabled arrangements that make the democracy function better by providing sufficient information, organising consultative and deliberative processes, and connecting these to the actual decision-making processes in which the citizens have a say in the mix of direct, participatory, and representative models of democracy.

Conclusion

Tampere has shown a capacity for social innovation in the area of democratic e-governance. Since the mid-1990s it has systematically increased various forms and applications of e-democracy. The City of Tampere has been ranked high both in Finland and in Europe, for it scored the highest on Internet services among 34 Finnish cities in the Municipal Services 2001 Survey and number 13 in the European eCity Competition in 2002. It has been awarded for its innovative city planning game by the Finnish National Idea Award in 2001 and for its Internet Bus (Netti-Nysse) by the European Commission eGovernment Best Practice Award in the same year. The eCitizenship for All Award by Telecities was granted to the City of Tampere in 2003 for Participation Palette. Some evidence of the local stakeholders' perspectives is provided by surveys in which the overall ranking given by Internet users to the e-government services of the city has constantly been slightly over 8 on a scale 4–10, which is a fairly good result (Kuusisto 2002; Anttiroiko 2004b).

Even if Tampere has succeeded in increasing democratic aspects of e-governance, the overall transformation has been modest. The change has taken place especially in the interaction between the administrative machinery and active Internet users, be it that it is only initial step in the long process of democratising e-governance. It is fair to say that the Finnish system of local governance contains many conservative aspects due to its strong rooting in representative democracy. What remains a challenge in this respect is a tighter integration of e-enabled democratic practices to the decision making sphere of the city government. It is equally fair to say that the problem of democracy deficit in real life is not that big, due to the societal conditions of Finnish welfare society, which is based on the idea of transparency, universal welfare provision, and high-performing public administration.

Today, e-democracy is increasingly an inherent element of the structures and processes of municipal system. What is of utmost importance is that in the mid-2000s the entire approach to e-democracy and e-services has changed from what it was in the latter half of the 1990s. The enthusiasm of early experiments has made room for more cautious approaches which pay attention to critical mass (sufficient number of users for e-services and applications) and cost-efficiency. As a result, it is possible that the latter half of 2000s becomes a period of stagnation or at least slow development rather than acceleration in the development of democratic e-governance.

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Tapio Häyhtiö and Auli Keskinen

Preconditions of Democratic e-Governance: A Critical Approach

Introduction

New opportunities for civic political action have emerged in the contemporary societal transformation process that is often seen to lead towards a post-modern *information society* (Keskinen 1999). The rapid development and diffusion of new information and communications technologies (ICT) provides various political agencies with new tools, channels and methods which can be utilised both in order to transform closed representative democracy systems into more open and communicative ones and to facilitate new forms of authentic civic political action (Malina 2003; Tsagaraousianou 1999; Hoff et al. 2000a). Therefore computer-mediated technology is defined as having had an important role in the process of the reformulation and redefinition of the modern liberal democracies (Hoff et al. 2000b, 1; Bellamy 2000, 33; Bellamy & Taylor 1998 1–32; Mathews 1997, 51–52, 66).

From the point of view of communicative governance systems, the potential of ICT means that whole new sets of concepts and practical solutions can be articulated when different types of e-participation are manifested in modernised societies (Coleman & Gøtze 2001). The common notion for inclusive political governance is that citizens must be connected in one way or another in the political regime (OECD 2001). Discussion about democratic e-governance has its roots in early theories about participatory democracy and e-democracy that expanded gradually from actions of small groups of academics

and activists towards a high-level policy issue fuelled by the Internet revolution. Simultaneously the development of new forms of governance and globalisation has made 'democracy as usual' look obsolete, leading to a situation that is often referred to as 'democracy deficit'. In a broader policy perspective we can see a convergence of two trends: a well-established instrumental 'informatisation' policy on the one hand, and a more contingent 'communicative e-governance' policy on the other.

This article analyses institutional electronic democracy projects as manifestations of democratic thought or as communicative e-governance constructions that are based upon societal civic participation. Most experimental e-democracy projects utilise fairly similar infrastructures of computer-mediated communication, notably various Internet applications. In general, the electronic democracy discourse is marked by two grand promises: the citizen's free access to public information and open discursive deliberation on the electronic Net (Tsagarousianou 1999). The website[1] of the City of Tampere can be analysed as a comprehensive case of institutionally organised e-democracy which has put a lot of effort into the enhancement of civic participation. The site's applications on the *Participation Portal* (*Osallistuminen* in Finnish)[2] are connected to a dominant representative system, in other words, people are encouraged to influence political decision-making. Various types of civic participation services have been made available, but the most innovative two-way applications strive to create online forums that take advantage of the Net's interactive properties (Ridell 2004, 92–93; Mäntymäki 2003; Seppälä 2002). The web-site participation services disseminate information about political issues in order to help citizens produce and express reasonable and logical arguments within the online-forums.

In this article the framework of citizen participation is discussed by focusing upon the relationship between knowledge

and political action. We examine the influence of easily accessible information on citizens' political deliberations. This point of view is based on a discussion about the Internet, which supposes that the Internet enables relatively unrestricted and easy access for the citizens to administrative and political information and knowledge. The citizens' awareness of societal affairs is understood as a precondition for meaningful citizen participation, deliberation and ballots to be arranged on the Internet. This is also understood as a solution to the problem of citizen participation in liberal democracies (Becker & Slaton 2000; Bryan et al. 1998). In this context, the retrieval and utilisation of information and knowledge becomes an important factor that defines the theoretical realm of citizen participation and political deliberation. Therefore the relationship between knowledge and political action has to be reflected. The article clarifies the preconditions for e-governance tied to the present administrative participation discourse, which aims to construct and rationalise the practicies of participation from above. The institutionally organised participation introduced in the City of Tampere website is a model of new steering imperative, inclusive political communication, which invites lay people to exercise civic influence in new access points and to partake in a systemic decision-making process (Bang 2003a). In the article we bring out how the practices of inclusive governance are based on the ideas given by the tradition of the participatory democracy theory.

Methodologically the article assesses the City of Tampere website's interactive electronic democracy practices. First of all, democratic theory that contains views about political participation and political deliberations of citizens is combined with the research materials acquired from the City of Tampere *Participation Portal* (*Osallistuminen* in Finnish)[3] and the city officials. Using this theoretical-empirical approach the consequences of the Internet in relation to democratic theory

are studied. Our key theoretical concepts are participatory democracy, deliberative democracy and e-democracy, which are placed in the e-governance framework. Secondly, a rhetorical analysis of the citizens' political deliberations carried out on the City's *Preparation Forum (Valma)*[4] during Jan 2004 to Oct 2004 is briefly conducted and presented. Thirdly, we propose political judgement to be adapted to the study of Net participation. Political judgement as a concept can be theoretically used to describe the field of electronic civic political action, which the administrative discourse of democratic participation describes unsuccessfully.

The framework of e-governance: A demand of rational politics?

e-Governance is a novel term and it has acquired various meanings remaining, however, rather undefined so far (Anttiroiko 2004a). In this article, e-governance is approached as an integrative and rhetorical concept for several e-oriented methods for communicative governing. Among the main foundations of e-governance is, for instance, the ensuring of universal access to data, information and knowledge for citizens (Coleman & Gøtze 2001). The governance approach argues for new models and practicies that are expected to complement, evolve and reform the current representative democracy to better suit the modern needs of rapidly moving and changing societies (Coleman & Gøtze 2001; OECD 2001; Keskinen 1997).

A concrete example of the governance rhetoric is found in the civic e-participation practices constructed by the City of Tampere:

> The City of Tampere has made a conscious effort to develop online civic participation. The strategy of the city stressess transparent

> decision-making, active communication and the utilisation of new technology. . . .
>
> The civic *participation portal* set up by the City of Tampere (www.tampere.fi/osallistu) comprises the following parts:
>
> 1. information about municipal government and participation opportunities as well as the contact information
> 2. permanent channels of e-participation: feedback facilities, discussion sites and a Questions & Answers service
> 3. topical consultations: Internet-user surveys since 1997, budget polls since 1999 and various consultations on issues such as traffic, zoning and services
> 4. opportunity to initiate official motions and monitor their progress,
> 5. links to other discussion and participation arenas, such as children's and young people's forums
>
> (Seppälä 2003, 1)

The governance model presented in the City of Tampere *Participation Portal* website, as well as various other fairly similar administrative e-democracy projects, attempts to respond to glocalised modernisation pressures by engaging the citizens in the communicative processes of political regime. The public organisations strive towards dialogic relationships with various stakeholders because political environments have become highly complex and fragmented. Political government can no longer be carried out by non-communicative hierarchical steering (Bang 2003b 243–244). The *Participation Portal* of the City of Tampere is an excellent example of how a representation system tries to connect to the political community's stakeholders. The political managers and administrators have to demonstrate nowadays that they want to be in cooperative relationships with civil society and citizens so that they can generate the legitimacy of political steering (Bang 2003b, 252):

> In the planning, decision-making and realisation of the future of the city all of us are needed. The citizen has a right to participate in taking care of common matters.
>
> The City of Tampere develops the possibilities of the inhabitants' participation. Our purpose is to hear and to listen to more inhabitants than before in all matters concerning the city. (An introduction to the *Participation Portal* <http://www.tampere.fi/osallistuminen/index.html>, translation: Häyhtiö)

During recent decades, ideas and practices of political participation, mobilisation and the various modes of political activity have been in a state of turmoil. Hence, political governance rhetoric also has to be understood as a response to the constantly and steadily declining turnouts in various general elections, the citizen's widespread alienation from partisan politics and their decreasing participation in the activities of institutional parties. Governance thinking shows that democracy is not a stable phenomenon; rather it is a dynamic process. Administrative e-governance practices can be defined as a part of a new communications oriented approach, sometimes called *porous government* or *culture governance* (Slaton 1992; Keskinen 1999; Bang 2003a; Bang 2003b; Bang & Dyrberg 2003). This shift in the democracy paradigm, i.e. taking people 'in' and the generation of new modes of governance, emphasises more lateral, equal and interactive relationships like *mediation, recognition of interdependencies, and networking* in democratic governance and practices. e-Governance modes deal with the impact of newly formed computer-mediated communication devices in respect of democracy and democratic governance. From this perspective ICT introduces communicative tools for the rearrangement of the party and administration dominated civic participation (Macintosh et al. 2002).

The culture governance adopted by public organisations addresses several rhetorical promises relating to citizens' empowerment, customer orientation, opening up participation channels and the creation of multiple partnership relations etc. (Bang 2003b, 243). A report by the City of Tampere, *Working Group for Improving Citizens' Opportunities for Participation*, states that the residents, civil servants and the elected representatives have to be in closer interaction than before so that representative democracy can be strengthened by direct participation (City of Tampere 2003). Furthermore, it is proposed that the whole organisational culture of the city needs to be changed so that civic participation can become *an inherent aspect of political and administrative culture* (Anttiroiko 2004b, 380). The city wants to generate a responsive participation culture so that the citizens would be activated in participating in the preparation and taking care of matters related to their own living environment. The report also underlines that active participation in the city affairs would have integrative effects for the local community and public policy activities (City of Tampere 2003).

It is not clear how the public organisations follow the self-regulated ideals of communicative governance in their concrete actions, because it is obviously contingent on other factors. According to Henrik Bang, culture governance strives to construct feasible citizen empowerment, which means inviting people to exercise civic influence at new access points and to participate in systemic decision-making. In post-modern society, public authorities want to create an administration related participative culture, which is effective for the legitimacy, coherence and the decision-making of the organisation. Thus, communicative governance refers to the social practices of a modernised political community, in which *the rulers attempt to socialise and regulate people's conduct in an indirect manner by working on their identities and thereby their values, feelings, attitudes and beliefs via a variety*

of new interactive modes of dialogue and co-operation (Bang 2003b, 246–247; Bang commented also in Rättilä 2004).

In practice, governance in political systems has to be based on complex communicative and interactive practices. The e-governance model of the City of Tampere gives an overview of the features of electronic civic participation organised by public authorities. It seems to share a general belief that the citizens' awareness of societal affairs is a precondition for meaningful citizen participation and making them interested in systemic governance issues. The website of the city has made available a wide variety of information about the city's plans, reports, policy alternatives and proposals. For instance, all the agendas and the minutes of the municipal bodies are published on the website at the same time as they are sent to the decision-makers. The *Participation Portal,* especially, extensively disseminates information on opportunities of participation, procedures, local current affairs, formal instructions and regulations. Accordingly, the City of Tampere wants to provide residents with background information in order to help them produce and express reasonable comments to the authorities and political representatives on local issues (Seppälä 2002; Seppälä 2003; City of Tampere 2003, 13, 21–23.).

In modern liberal democratic thinking and institutions the ideal of rational political action is almost taken for granted. Appropriate politics is considered to be a process that focuses on a society's public discussion, dealing with perceived problems, and issues in a deliberate, dispassionate and knowledgeable way. The ideal of rational politics sees information and knowledge as part of politics, which is displayed in political thinking and deliberation in two different, but not separate, manners. Firstly, it indicates the importance of scientific factual knowledge and articulates this knowledge as applicable to the resolution of political conflicts and problems. Secondly, this rational ideal comprises an approach that

holds that political thinking and deliberation should be logical, reasoned and the facts understandable (Rättilä 1999, 49, 52).

According to Bernard Crick, the idea that scientific knowledge is applicable to the resolution of political problems is derived from a strand of thought that sees technology as a tool with which all human problems can be resolved. While generating economic development in societies, industrial and technological development has also created a doctrine of rational manipulation. The problems of human civilisation are considered technical and, in accordance with the technical mode of thinking, these problems can be resolved with knowledge that already exists or can be easily developed if only the resources of knowledge are at hand. In political conflicts, the various discourses acquire a scientific and technical form, and solutions are believed to be found in the knowledge that has evolved from the observation of social and historical development (Crick 1982, 92–93, 95). The discourses of political language are transformed into specialised discourses within the fields of economy, law, medicine and others, and the political actors can ground their decision-making upon these expert fields (Ball 1988, 12). The application of neutral scientific knowledge to politics is supposed to lead to the best possible solutions in all problem areas, also overcoming traditional political conflicts.

The application of scientism to politics, i.e. the reduction of political language into the politics of knowledge, transforms modern societies into epistemocracies in which a particular social class, faction or individual rises into a dominant position because he/she/it is in possession of some functional professional or special knowledge. Political power is conceptually assimilated into technical and expertise power, and the people who possess political and administrational power have become experts in their own field. Thus it can be stated that the governing elite in modern bureaucratic societies is in a position in which it can legitimise its

leading role by claiming that it possesses special knowledge and expertise (Ball 1988, 115–116).

The so-called Platonic model of thinking indicates that experts or scientists should be leading states because prudent action is based upon verified knowledge. In a certain way one has to acknowledge the extensive importance of expertise and knowledge because without them society would be functioning blindly. However, it can be stated that in political action and decision-making there are prerequisites and divergences of objectives, which cannot be defined at all in the sphere of science and knowledge. These prerequisites and divergences are excluded from the scientific sphere because political judgements and decisions have to be made subjectively (Ross 1951, 210). In political action, the subjective approach becomes indispensable, because political conflicts are typically complex and ambiguous. In political situations instrumental knowledge can find solutions only when the problems under consideration are sufficiently simple and unambiguous.

Political scientists have not reached a consensus about whether the increasing supply of information in modern societies activates or passivates the citizen's willingness to engage in politics. We do not agree with a view according to which information or knowledge would be a prime factor or key motivator for citizens' participation into politics. Alf Ross states that people's political activity originates more or less in the conscious will or aspiration towards a certain objective. This kind of activity is not based on any kind of firm knowledge; neither is there any such unalterable knowledge that would guide us towards the objectives we should strive for. People can utilise knowledge to achieve their objectives (Ross 1951, 208). Thus if a person wants to participate in the City of Tampere online political forums, he/she can take advantage of the information documents that are attached to the fora if he regards it useful. If a participant is willing to express

himself without using any additional information, it can be supposed that this person does not consider these information sources to be relevant for this particular choice situation.

The forums of institutionally organised electronic democracy projects strive to initiate so-called *civic* deliberation by disseminating information. However, in so doing they often also formulate the goals of civic deliberation without leaving the participants and deliberators enough space to formulate their own floors and arguments. This demand for rational politics undermines or restricts the citizens' self-understanding in relation to politics by defining those characteristics which the political actors should possess (Ball 1988, 123). Together with the demand for rationality, politics is transformed into a privileged area for those who master competent reasoning and argumentation with facts. Politics is characterised by practical action and it is based upon the arts of collective deliberation, dialogue and judgement in which reciprocal relations, different political judgements and opinions emerge and become public. Every citizen possesses the required expertise to participate in this kind of political deliberation: the arts of listening, learning and being heard (ibid, 119). The aim of electronic online forums to cultivate political discussion and deliberation via an effective spread of information is, to say the least, dubious, because political action and decision-making should be emanating from the subject. Personal choices depend upon a person's own situational judgements, and these are made subjectively.

Participatory democracy theory and the civil citizen

Participatory democracy can be defined abstractly as a regime in which adult citizens assemble to deliberate and to vote about the most important political matters. A ballot decides the policy that is to be chosen (see e.g. Budge 1996, 35). According to

this definition of modern participatory democracy, the City of Tampere web-based *Participation Portal* can be seen as having a twofold standing. On the one hand, the portal's interactive Net spaces are modern society's structural solutions to participatory democracy. The citizens are offered an opportunity to access the online forums and to debate political issues, but they do not have the possibility of voting on these issues. But the developers of these electronic democracy practices seem to have a view that citizens in modern societies wish to exert at least some kind of influence upon political decision-making.

Benjamin Barber states optimistically that participatory democracy becomes possible through policy-making institutions and a high level of education, which binds citizens to pursue common good (Barber 1984, 117). A general belief in people's high educational level[5] also underlies the development of the City of Tampere website. Education is considered a factor that creates a need for citizens to employ political methods of influence that go beyond conventional voting. The communication manager of the City affirmatively describes civic digital education:

> Participation in these implementations of e-democracy has been underpinned in all education pertaining to the information society. Every year, the municipal school administration provides some 30,000 citizens with basic computer and Internet skills and some 3,000 are trained every year on separate courses for adult beginners, senior citizens, the unemployed, the socially excluded and immigrants. During 2002, the Internet bus was used by approximately 9,000 people. (Seppälä 2003, 3)

Barber specifies that strong participatory democracy will not develop through civil education and knowledge. Strong democracy will arise when people are given political power and channels of influence. Having attained these, they will perceive that it is necessary to acquire knowledge in order to be able to

make political decisions (Barber 1984, 234). The website in question provides the citizens of Tampere with both channels of political influence and information about political matters. The latter means that the people who participate in the forums can educate themselves and formulate reasonable political arguments.

The theory of participatory democracy holds that civil education for political action is one of the main functions of political participation. Schooling means both the development of psychological attributes and the acquisition of the practical skills and procedures required in political action (Pateman 1970, 42). Equal civic development can be achieved only in a participatory society, which emphasises the significance of collective problem-solving methods. Citizens are schooled to be educated community members who are capable of political participation and who have an interest in participating in the political decision-making process (Held 1987, 262). According to Carole Pateman, people's participation in the community's decision-making stabilises the community. A decision-making process that allows public participation develops from the very start as a process that perpetuates itself due to the effects of political participation. Participatory political processes have an impact upon the development of the social and political capacities of citizens, and this positively influences the next act of participation. Participation has an integrative effect especially upon those citizens who take part in political activity, and it makes the acceptance of collective decisions easier (Pateman 1970, 42–43).

One problematic feature of modern liberal democratic systems is considered to be that citizens are often quite ignorant of public political affairs, and thus unable and unwilling to participate politically. According to Ian Budge, political ignorance cannot be seen as a static feature of the members of a community. Forging an interest in political participation requires that people

have an opportunity to participate in decision-making that is directly relevant to their own wellbeing. This can set off a learning process, which leads to the emergence of competent political actors (Budge 1993, 147). According to Pateman, the goal of schooling oneself politically is to develop one's capacity to make intelligent political judgements. Such education presupposes the existence of social circumstances and political organisations, which allow citizens to perceive themselves as political actors. Associated with the idea of how political participation becomes possible is a concept of the development of practical reason. It emerges via political knowledge and experience acquired from participation (Pateman 1985, 187–188; Almond & Verba 1963, 206–207). An individual's linguistic capacity combined with other intellectual capacities is an essential part of his/her capability to perform politically and to understand the other actors' speech acts (Pateman 1985, 178).

According to the modern theory of participatory democracy people's political participation and deliberation are characterised by an aim to acquire information and knowledge about political matters so that political opinions or decisions can be argued proficiently. Knowledge is not, however, usually the starting point when opinions or decisions are formulated; information about political issues is by nature contingent on the situation. The citizens who participate in political deliberations are assumed to possess an ability to select relevant information they can use to support their arguments. Among the most basic principles of participatory democracy is the idea that people learn through the opportunity to participate and by utilising and judging the relevance of different types of information. The City of Tampere website and especially the *Participation Portal* have mobilised electronic technology and provided information produced by administrations as an ingredient of political deliberation. Political information and knowledge are therefore given a certain utility

value in political argumentation. Administrative information and knowledge of societal matters are presented as having significant descriptive power regarding circumstances.

Deliberative democracy theory and reasonable political deliberation

The theory of deliberative democracy doesn't actually differ very much from the ideas of participatory democracy. Deliberative theory can generally be defined as an approach, which aims to construct ideal standards for political deliberation. The concept of deliberative democracy is relatively novel and it has been in play since the 1980s. The theoretical approach consists of the critique of liberal democracy, beginning in the 1970s, and the theoretical discourse of consensual politics evinced by participatory democracy theory (Bohman & Rehg 1997, xii). The theory explicates a markedly normative approach to the political process, which should occur as reformed institutionalised organisations, and be based on public civil deliberation

According to the deliberative ideal, a democratic community's political resolutions are produced in a process of public argumentation and reasoning in which citizens participate as equals. When citizens take part in this process they commit themselves to the solving of different kinds of problems and to collective decision-making. The citizens regard as legitimate only those institutions in which the decision-making is conducted via free and public deliberation (Cohen 1989, 21). In a deliberatively democratic community people assemble voluntarily in order to argue and to find solutions to political conflicts (Knight & Johnson 1994, 285). When political conflicts occur, a deliberative community aims to reach a rationally motivated consensus. This means that common political decisions are rationalised by arguments which become acceptable to all those who have

taken part in the deliberation. However, it can be assumed that political conflicts are by nature such that the requirement for consensus is too demanding. This is the case even when political deliberations are made in ideal circumstances and decisions are arrived at via majority rule (Cohen 1989, 23). A key prerequisite for the legitimacy of decisions is that every citizen is entitled to engage in public deliberations so that the decisions are produced as an outcome of collective political debate and judgement. The legitimacy emerges from the process of deliberation in which everybody's will is taken into account. This procedure grants the output of the process its legitimacy (Manin 1987, 352). The deliberative procedure serves as the source of a community's legitimacy, and the arguments put forward in the deliberation process exert an impact upon the content of decisions made in the collective process (Cohen 1989, 21).

The Participation Portal on the website of the City of Tampere can be connected in an interesting manner to the ideas of the political community presented by the theorists of deliberative democracy. In our opinion, face-to-face interaction cannot be the only standard for political deliberation. The chosen starting point would be the premise that the deliberation can also take place in an electronic network. Moreover, the deliberative forum is considered to be defined by any setting in which citizens assemble regularly to make collective decisions about public matters (Gutmann & Thompson 1997, 12; Cohen 1989, 21). The political deliberations carried out in the online forums, however, are not orderly meetings in which common decisions are made after profound political debates. Rather, they are temporary and informal deliberations in which participants are making conscious efforts to contribute to policymaking. For example, on the City's website *Preparation Forum (Valma)*, the summaries and rejoinders prepared by the forum administrators could be regarded as some kind of political resolutions. On the

other hand, in the City's general discussion space *(Tampereen kaupungin keskustelupalsta)*, such documents are not regularly composed, and any political influence that the citizens might have is filtered through politicians or officials who engage in deliberations or read them. The city officials describe these two electronic mechanisms as two separate civic forums partaking in local decision-making:

> The City of Tampere employs a workflow management system in case preparation, enabling digital discussion of issues within municipal administration. The agenda of elected bodies are published on the website of the city at the same time as they are forwarded to the elected officials. From the point of view of civic participation in case preparation, this is often too late.
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> [In the Preparation Forum Project] residents of the munipality will be secured a means of delivering feedback and participating in case preparation from beginning to end. As soon as the decision is made to open a case for preparation (when the case is for instance, entered into working plans) the secretary or spokeperson of the committee places a notice about this on the website of the municipality. The notice will be accompanied by a feedback form returnable to the preparing official, committee secretary or elected officials. The network debate concerning the case is recorded on a discussion forum. When the preparation proper begins, preparation documents in digital form will be available to the residents via the Internet. (Uurtamo 2003; Seppälä 2003)

It must be acknowledged that several theoretical aspects of deliberative democracy theory materialise in the City's Internet forums. People participate in the deliberations as equal citizens: the participants could be considered equal speakers and performers in relation to one another. Electronic deliberations – with the background information provided – could be considered

as processes of political reasoning and argumentation, and the deliberations are free and public. Presentations are not generally hindered or restricted by any authority and they are all public. Although, it has to be acknowledged that the city's discussion services are premoderated (Seppälä 2002; 2003). Participation is voluntary and its aim is to influence local politics – although people do not actually have a direct opportunity to contribute to policymaking. However, the explicit aim of the City's website foruma is to promote democracy and the citizens' opportunities to participate in politics. The forums therefore seem to seek a kind of consensual politics by means of argumentative deliberation. The aim of public deliberation is to legitimate future policies. In the forums, participation is reciprocal. Also, background information on the issues under deliberation is provided. This gives the participants an opportunity to justify their arguments and to assess the arguments delivered by others.

The theory of deliberative democracy illustrates and conceptualises the existence of systemic legitimacy that is essential for a community. Normatively, democratic legitimacy can be founded only on public deliberation. The advocates of deliberative democracy, however, are not in agreement about those procedures and processes which would be required if deliberative politics were to be widely applied to a society's politics. Deliberative theorists are generally divided into the proponents of *fair proceduralism* (see e.g. Manin 1987; Gutmann & Thompson 1997; Christiano 1997; Bohman 1997; Knight & Johnson 1994 & 1997; Benhabib 1996) and to those favouring the *epistemic standard* (see e.g. Dryzek 1990; Cohen 1989; Rawls 1997). The former group emphasises the need to carry out political deliberation in just and equal circumstances. The latter group presumes that the outcome of deliberation is qualitatively legitimate when an independent standard is met (Estlund 1997, 177–181.) This independent standard can broadly be defined

as legitimacy. This requires that each political decision relies on arguments that cannot be opposed by any reasonable citizen (ibid, 175). The standard is conceived of as an argument that is founded on knowledge, which cannot be refuted.

Although fair proceduralism excludes strict epistemic standards from the political process, it does not completely discard epistemic definitions. Political deliberations are considered in almost every theoretical case to be serious deliberations about the common good and justice – a fact that assumes the articulation of normative suggestions. This brings to the fore an assumption that deliberation proceeds as a selection between correct and incorrect[6] opinions, guided by objectivity (Richardson 1997, 349). The theory of deliberative democracy appears to be committed to the cognitive nature of processes it is describing although the degree of cognition varies according to the point of view. In theoretical discussions, the furtherance of the common good and fair justice in the democratic process means that objectivity and cognition are emphasised properly. In a political perspective one expects to find conclusions that lead to certainty and knowledge.

e-Democracy and the networked e-citizen

e-Democracy can be defined as an interactive process enabled by new technology where political communications become networked and diverse. Through information networks citizens can make initiatives, take part in political planning and discuss the effects of decision-making (Keskinen 1995a, 10; Keskinen 1995b, 22; Savolainen & Anttiroiko 1999, 11). e-Democracy is easily associated with technical systems (such as the City of Tampere's website) that are enabled by new information and communications technology, especially the Internet. However, rather extensive e-democratic (then: teledemocratic) experiments examining the implications of direct participatory democracy

were carried out already during the 1970s (Becker & Slaton 2000; Becker 1995, 43). e-Democracy has taken different forms, as exemplified for instance during the 1980s and 1990s by *TELEVOTE (*Scientific Deliberative Poll) (Slaton 1992; Becker & Slaton 2000), *ETM* (Electronic Town Meeting) (Becker & Scarce 1987, 272–279; Becker 1995, 43-49), and *Citizens' Jury* (Carson & Martin 1999; Carson & al. 2002). Early experiments mainly utilised telephone and television as teledemocratic instruments (Becker & Scarce 1987, 274–279). Later on computers and Internet were introduced.

The development of information and communications technology (ICT), especially the Internet, has led to a revision of the theoretical definition of e-democracy so that it includes the fulfilment of a new kind of electronic democracy more extensively. The e-democratic process can be thought of as a combination of participatory and deliberative democracy in which the existence of information networks gives the citizens a possibility to maintain an equal level of information and knowledge about societal affairs. In this environment, the concept of electronic democracy comes to form a whole consisting of networks and people – and one in which the political decision-making processes are guided by a deliberative process (Keskinen 1999). The Internet – understood theoretically in the context of electronic democracy – can be an instrument that fulfils the democratic ideal of the citizen who is active and aware of societal issues. The Internet forums combined with the dissemination of information are serving as a potential environment for reasoned public deliberation (see Hill & Hughes 1998, 1–3, 22; Alexander & Pal 1998, 7; Miller 1996, 217; Slevin 2000, 185–186).

According to Savolainen & Anttiroiko, participation in public debates within the framework of deliberative electronic democracy presupposes that the citizens have sufficient capabilities to express themselves as well as to search for and

to make use of the background information that is needed to support arguments (Savolainen & Anttiroiko 1999, 35). In an interactive information society, then, citizenship refers to a proactive actor who participates in the production of new information at the same time as he/she participates in reciprocal communications (Keskinen 1999, 20, 23). According to this definition, public argumentation, individual opinions and the background information they include develop into a kind of *process of spiral feedback*, which builds a positive and supportive ambiance in the political community. According to Kenneth Hacker, interactivity of this kind aspires not only to attenuate societal uncertainty, but also to construct political definitions and policies by way of close co-operation. In electronic deliberation it is not important that all messages are answered promptly. More essential are the quality and information content of a response (Hacker 1996, 228). According to Scott London, rational dialogue and political deliberation are possible in a network environment whose operation is founded on horizontal networks of co-operation and mutual trust between citizens (London 1997, 8). According to this interpretation, electronic political activity should manifest itself as reasonable political deliberation that increases social capital. In political deliberation of this kind, reasoned and confidence-inspiring dialogue are meant to balance and to solve political conflicts.

According to Lewis Friedland, theories that emphasise discourse cannot explain the citizens' motives for civic participation in an electronic operating environment. Discursive democratic dialogue does not arise in virtual online-domain spheres unless the community has the infrastructure formed by social capital, or in other words, the norms of reciprocity that inspire confidence and the social networks developed among citizens (Friedland 1996, 189). In our opinion, however, theories

of participatory democracy, deliberative democracy, and e-democracy are not just contextual definitions about discursive political talk, but also models of thinking about the infrastructure of social capital. These models, like the theory of social capital, aspire to political deliberation, in which people are communally motivated to deliberate in a civil and reasonable manner.

These approaches emphasise the distribution of information and knowledge as a material used by the public in order to form arguments or to support their political opinions so that confidence among citizens increases. These confidence-inspiring relationships aim to create functional models in democratic communities. The models in which solidarity and intellectual deliberation are respected are based on effective cooperation. A political community is therefore to be founded on moral commitment and admission of legitimacy to reasonable, logical and knowledgeable arguments that are approved by a majority. The aim of the requirement and search for such arguments is to reduce societal uncertainty; it is assumed that the rationality of political deliberation produces clear and correct political solutions.

The main aim of reasonable political deliberation is to create an operational model of communality. Collaboration is politically easier when communal values are popularly accepted and individual interests are relegated to the background. Under the prevalence of democratic communality and unanimity legitimation for political decisions is sought in informative and knowledge-based arguments. It is easier to concentrate upon these when political deliberation is not disturbed by individual interests. The theoretical definitions of participatory democracy, deliberative democracy and e-democracy generally try to promote such communal politics and, in so doing, they present a desirable functional model for the accumulation of social capital in democratic communities.

The modern tradition of participatory democracy which deliberative democracy and e-democracy also belong to stresses the importance of citizen participation in public political deliberation and decision-making. The tradition opposes the idea that the administration of political affairs is best centralised and left to professional politicians whose position and dignity within a community are based upon their ability to argue in a manner that appears rational and upon their ability to defend their arguments with factual information. But simultaneously the tradition of participatory democracy commits itself to rational politics and wants to set an epistemic standard for civic deliberation. Citizens ought to possess intellectual capacities, as well as be educated, so that they can construct a convincing and reliable argument. Civic education is considered to be a factor that familiarises citizens with rational political deliberation. Civic education also helps people to understand that they are recognised as politically valid actors only if they master a convincing method of argumentation.

The City of Tampere website and its *Participation Portal* are modern, virtual spaces for political action facilitated by new ICT. Theoretically, they are ideal examples of deliberative, participative e-democracy. The key preconditions of this theoretical viewpoint materialise quite extensively in the online forums. Information resources are distributed, the participants are considered equal and everybody has a say. Moreover, the deliberators are mostly well educated and they have at least to some degree a chance to influence decision-making. Thus, it is quite obvious how the tradition of participatory democracy thinking has given organic civic participation ideas to the e-governance practices, which aims to construct and rationalise the practicies of participation from above. Both approaches are in favour of construction of a political discussion environment, which adheres to an assumption of civil sociability. The concept of *civil* signifies, in this context, a kind

of erudition and a level of competency in deliberation, on the basis of which people feel capable of co-operation and of trusting each other. Co-operation and trust engender predictability and certainty about the action and its effects. Politics therefore becomes sociable politics, in which conflicts emerge on the political agenda but in which they are resolved in the harmony created by civic deliberation (Lappalainen 1999, 56).

Civil sociability also requires, in addition to communality, civil self-understanding. Habermas develops, in his theory of communicative action, a cognitive-instrumental rationality, which has contributed to people's self-understanding in modern society. The concept denotes successful self-presentation, which provides intellectual readjustment to the terms of the contingent environment and the utilisation of those terms (Habermas 1987, 95–96). Inversely construed, modernised society appears to require, in certain situations, civil argumentation from its citizens. The City of Tampere's website and its *Participation Portal* has drawn attention to the condition of successful self-presentation. This condition, more precisely, presupposed that the information relevant to the administratively organised topics ought to be used in argumentation. The political environment of citizen engagement constructed and theorised by the tradition of partipatory democracy theory assumes that people should be civilised in order for them to adequately take part in politics. As citizens take part in public political deliberation, this civilisation should manifest itself as reasonable, logical and knowledgeable argumentation.

Political judgement as a precondition for participation

Since the last decade modern representative democracies have actively tried to increase civic participation in public affairs (Rättilä 2004). This governance approach represents

administrative participation discourse, which aims to construct inside the governing system the efficient communication channels of participation. It is expected to strengthen the credibility and legitimacy of the decision-making of the representative system at minor costs. In networked governance practices it is distinctive that lay people are given voice, consulted or involded in matters, which are suitable for the interests of the representative system, or simply, it is desirable to open up civic discussion to the public. Today, the complexity of the political environment and need to find out the citizens' opinions are evident for the political management because in the postmodern society political judgement is dangerous to found only on the hierarchial views (Luomala 2004).

In the City of Tampere the utilisation of new ICT networks, especially the Internet, in the citizen-oriented governance practicies illustrates the features of administrative civic participation discourse. Obviously, this invitation to participate in municipal affairs has not been a great success (see Anttiroiko et al. in this publication). Some of the citizens actively consume public e-services but big crowds have not turned their activity to the city's political electronic discussion forums on the *Participation Portal*. Instead, it can be observed that only a few civil servants fairly diligently answer the questions and floors presented by individual citizens on these electronic sites, where the elected city representatives do not figure (Ridell 2004, 95).

However, we do not wish to propose that political civic activity on the Internet is somewhat impossible to perform. Our criticism take a stance that citizens' political judgements and actions are highly present on the Internet (Meikle 2002, McCaughey & Ayers 2003, van de Donk et al. 2004) but citizens cannot 'properly', or in intensive political conflicts don't want to, harmonise their subjective or do-it-yourself styles of action to the demanding practices constructed by the party-administration

form of political governance. To demonstrate this argument we have conducted a brief rhetorical analysis of the citizen discussions of the *Preparation Forum (Valma)*[7] located on the website of the City of Tampere. In addition we have connected the concept of political judgement to our research subject to take a hold of the field of electronic civic political action. During January-October 2004, 30 administratively launched discussion topics were published on the *Preparation Forum* discussion site and 254 floors took place on the forum (up to 19 Oct 2004). Most of the addresses (or floors) have been characterised by a strong normative attitude, in other words, the participants have wanted to express their opinions about how things should be and how they ought to be understood. In any case, a majority of the addresses tended to argue for their opinions at least in some way, even though they could not always be considered as being valid or persuasive.

Our study reveals not only big differences concerning the argumentation techniques and the types of knowledge used in the discussions. We could also see that certain argumentation techniques and types of knowledge were dominant in the samples. Most of the floors contained an argumentation technique that emphasises informed argument. Singular and perceptive knowledge was used extensively, and it was often related to the people's own observations and lives. When using this type of knowledge people rarely try to evince, or even can evince, a complex construction of the present. Instrumental and modal knowledge were also used to some extent. However, in political deliberation they are used mainly in order to choose desirable forms of action, because instrumental action cannot offer any universal functional solution to a political problem. In civic deliberations, the floors offering solutions by utilising instrumental knowledge have often seemed to consist of the speaker's own empirical observations of their environment. In the

online deliberations, the citizens seldom justified their views by evoking other kinds of facts, regularities, causal connections or explanations about why or to what end certain states of affairs are to prevail or come into being. Systematic evaluations about ways in which certain issues and functions might perhaps be connected to a wider context were rarely pursued.

The City of Tampere's *Participation Portal* and online forums have not developed, as the tradition of participatory democracy theory envisages, into a cradle of new communal politics in which the citizens would aim to handle common societal issues by applying civil and deliberative means. The motives hypothesised by participatory, deliberative theory do not govern the actual processes of party-administration machinery organised civic deliberation, and political participation does not transform into the envisaged cognitive learning event. Neither have the deliberations obliged participants to present their arguments in an informatively and reasoned fashion. The arguments and their contents have been dominated by the participants' own subjective and normative opinions about issues on the agenda.

The political deliberations we have analysed can be described as the speakers' subjective performances, directed at an audience. The addresses delivered in the Internet-forums do not conform to a reasonable and knowledgeable style of deliberation that is supposed to be facilitated by the forums. The addresses are mainly subjective, situational judgements about the style and ways according to which the actor has formulated his/her performance. Hannah Arendt defines situational and temporal political action, politicking, as a performing art, by which she refers to politicking as action; action that has its own independent existence as a product of acting. The principles that guide political action are formed in an actual political performance (Arendt 1987 [1961], 152–153). Political action must thus always be understood, at least partly, as a situational and temporal performance, in which

political judgements or self-assessments become concrete in the present situation.

In this performative view, political judgement is defined as action in which a political actor judges some situation. According to Kari Palonen, in theorising the concept of political judgement, it has to be noted that political action in itself is based upon criteria that apply to action in contingent situations. He divides politics, on a temporal basis, into verbal forms of politicisation and politicking. When politics is viewed as an action, politicisation and politicking are displayed as primary performative operations (Palonen 1998, 5–6). In political judgement the focus is on the making of politicisations, which refers to opening new contingent dimensions for politicking. Politicking the present is an inseparable part of the politicised horizon of opportunity. The political sphere, strengthened by the polity, excludes and includes some possible forms of politicisation and bars some politicisations from becoming generally accepted policies. As a concept political judgement crosses the border between the conformed and non-conformed spheres of the polity, and the politicisations are combined with the aspects of the past and the future. Political judgements connected to the non-conformed sphere are difficult for performative actors due to the fact that the constraints formed by the generally accepted sphere are also regarded as general restrictions of politicking (Palonen 1998, 8–9).

However, according to Palonen, politicking includes an attribute of transcendence. This is because politicking takes place in the extended moment of the present in which the predetermined formalities do not apply. The momentary separation of politicking creates an opportunity to construct alternative modes of action (Palonen 1998, 10). Political judgement can attain a reflective form, which critically examines the prevailing hegemony and constructs alternative discourses

(Forti 1998, 27–28). Political judgement, then, is not merely judgment from the viewpoint of a spectator; there is always an aspect of self-judgement attached to the action. This means that an actor judges his/her own position in relation to the political mode of action and to the politicking of the active politicians (Palonen 1998, 10). The performance of political action means that through the Internet, offering communicative civic space, citizens have an improved opportunity to make public political judgments and self-assessments of their own. On the Internet these judgements do not need to be policy-conforming; they can gain attention and take place on the political playground through their alternative performances. The Internet, then, provides citizens with a channel through which they can try to take a position on a local, national or transnational public political debate.

Political judgment presupposes a *sensus communis,* or an agreement of minds, which does not, however, refer to the social capability that arises when people are pursuing a good political community. *Sensus communis* refers to a kind of preliminary stage in the process of political judgment. It manifests itself as two simultaneously occurring conditions: as the opportunity to communicate (language) and as a general opportunity to share (Forti 1998, 21). On the basis of this assumption, political judgment manifests itself as a practical rationality and as a form of communicative action and understanding. This allows room for subjective meaning-making of occurrences without having to give them a definitive meaning (Forti 1998, 29).

Practical rationality cannot be understood as a function of reason that uses knowledge as an instrument. It must be understood as a thinking process that formulates meanings and stories upon which the operations of the mind, will and judgment depend. These operations are significant elements in trying to understand political action (Kotkavirta 1998, 117). The human

reason that uses knowledge as an instrument always tries to reach some objective and to attain truth. Therefore, the process of reason creates knowledge that political judgment cannot pursue. Thinking, for its part, is not characteristically instrumental or orientated towards any particular objective. It is not governed by given methods or regulations: thinking consists of ideas, which give birth to new ideas. Political thinking and judgment cannot be conducted individually in the same way as cognitive reasoning. Political judgments aspire to meaningful claims and assertions, and the tenability of these judgments assumes quite a special and specific nature. In other words, they are not held to be universal. Understanding and interpreting situations are objectives of judgments, not universal truths. Thus understood politics creates shared understandings about interpretations, meanings, values, norms, good and bad, right and wrong, on the basis of which popular deliberation and action become possible. In this view, the political environment must be understood as an unpredictable and plural field, whose preliminary condition as well as outcome is a kind of *sensus communis* of the manifestation of the world (Kotkavirta 1998, 117–119).

Acting and judging politically are not the same thing, even though they cannot be separated in politics. In other words, political action calls for political judgment and vice versa. Acting and judging politically cannot always occur simultaneously because of the retrospective character of political judgment and because of the *ad hoc* factors that influence action. On the other hand, without retrospective judgments individual political activities would be meaningless. The inseparability of judging and acting comes to the fore when judgments are made about future occurrences. The actors have to anticipate their potential contingencies without having an opportunity to perceive the whole in the same way as can be done in relation to retrospective events. Reflective evaluation of the past, however,

provides political actors with a capacity to judge the future and to understand its unpredictability (Parvikko 1998, 49–50). Thinking is the only means by which the political actor can direct his/her action to events that might take place in the future.

The concept of political judgment, in the Arendtian temporal point of view, puts forward the contingent and unpredictable character of political action. The political environment of action described by this concept does not allow the use of knowledge in politics in an instrumental or goal-oriented manner; the utilisation of knowledge cannot have the same kind of role that it has, for example, in rational natural sciences. According to the political judgement approach; information documents attached to the City of Tampere website belong to the realm of practical rationality. That is, they have to be seen as objects of meaningful subjective thinking and judging. The citizens' political activities in the City electronic forums are guided by subjective and situational judgements about those performative actions according to which they decide to act.

Conclusions

The theoretical approaches of participatory democracy, deliberative democracy and e-democracy have misinterpreted and constructed in an incorrect manner the nature of institutionalised electronic political deliberation. According to these theories, deliberations should be reasonable and disagreements resolvable by dialogue (Schalken 2000, 168; Meikle 2002, 34–37, 55–58). However, it is characteristic to politics that opinions about political issues differ from each other. Reasonable and knowledgeable argumentation cannot therefore be treated as a method that would be able to remove the basic element of politics, i.e. conflict (Rättilä 1999, 54–57).

In principal, the e-governance practices constructed by the City of Tampere have to be comprehended as supportable governing activities. Normatively, it cannot be erroneous behaviour for political governors in democratic polity to strive *to hear and to listen to more inhabitants than before in all the matters of the city*. The governance model presented in the City of Tampere *Participation Portal* website attempts to answer glocalised modernisation pressures by engaging the citizens in the communicative processes of political regime. The public organisations strive towards dialogic relationships with various stakeholders because political environments have become highly complex and fragmented. However, the organic preconditions set by the administrative participation discourse have a very limited capability of responding to the challenge of authentic *citizen politics* (Donk et al. 2004), which means making meaningful political judgements and acting politically in your own terms. This is the main reason for low participation figures on *the Partipation Portal*.

Although we can easily conclude that the City of Tampere e-democracy experiments have only gained modest results in activating citizens and inserting e-democracy practices into the dynamics of the representative system (this has also been a reality for other top-down e-democracy pilots) (Dahlgren 2004, xiii), we are also able to note the substantial intensity in local civic netactivism bringing alternative meanings and practices from below (Ridell 2004). Extra-institutional politics is particularly keen to adopt the new ICT offering publicness and public spaces as a tool and a channel to compete in complex democratic games (Donk et al. 2004). In the society of interactive media the do-it-yourself civic activity is much easier than before. The logic of computer-mediated communication enables nearly unlimited freedom to produce digital contents on the electronic network.

Political judgement at the level of free debate easily detaches the debate from conformistic policies. It can also stimulate citizens to take up performative means of action in the political arena. Thus the citizens can have an opportunity to create and open new avenues of politicisation. Generally, it seems that performative politics defines citizens' political action. On the Internet space citizens are politicking in the context of the near past, present and near future. In modernised information societies this means a substantial potential for citizen politics facilitating new styles of political action and accelerating the fractures of political environment in local, national and transnational levels.

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Endnotes

1 http://www.tampere.fi/

2 http://www.tampere.fi/osallistuminen/index.html

3 http://www.tampere.fi/osallistuminen/index.html

4 http://www.tampere.fi/osallistu/valma/index.htm

5 General confidence to high-level education also presupposes citizens' computer literacy.

6 Incorrect is taken here to refer to a political opinion, which cannot be reasoned in a generally acceptable manner.

7 http://www.tampere.fi/osallistu/valma/

Sirkku Kotilainen

Learning Together: Developing Civic Webs as an Innovation Experiment

Towards citizen-oriented communication

The development of an information society with interactive digital technologies and networks has not produced any revolutionary change in civil society so far. It is not clear, for example, how old policies can be transformed with technology as a promoter. Internet and other digital media have not narrowed social and informational gaps, on the contrary, the gaps have been widening. Although new technologies have always had an innovative potential, audiences or users' applications have not had priority over 'commerce, industry, military and bureaucracy' (McQuail 2000; Winston 1998).

There is nonetheless promise of transformation in terms of the perspective of communication. For example, the Internet differs from the traditional media at least in the degree of interactivity and social presence experienced by the user, and in the user's autonomy to produce and control content. There is also more shared public space than ever before. Interactive technologies have restored audiences up to the agenda of media studies: there has been a change in perspective from a sender-oriented to an active audience or social action theory approach. From this point of view the broader possibilities of audience activity call for more participatory media models for 'sharing and exchanging information, ideas, experience and developing active (computer-mediated) relationships' (McQuail 2000, 120; Servaes 2001).

The active audience approach constitutes a cultural sharing model of communication instead of the transmission of messages. The concepts of communication space and local public sphere also belong to this framework. According to Jürgen Habermas, the ground for an active, democratic society can be established with civic, rational thinking and communicative actions (Carey 1989; Habermas 1996, 364, 371). However, the notion of an 'active' audience needs to be seen more in terms of different receptions and actions of the audience as media consumers and agents or activists. Audience activity is not one single mode of participation, and there are many people who do not have the energy or motivation to engage for example in participatory processes on local public media (e.g. McQuail 2000). Studying young people participating on the Net in the UK, Sonia Livingstone (2005) distinguishes three types of participatory users: the interactors, the civic-minded and the disengaged. The civic-minded are concerned with political participation, while the interactors use the Net for more cultural and creative purposes. The disengaged were mainly those who had no net access at home.

Nicholas Jankowski, Martine van Selm and Ed Hollander (2000) argue that local digital networks are studied to a great extent without connection to history, even though theoretical and empirical research on active audience -oriented community media has a tradition. Small-scale media developments and community media research has been undertaken since at least the 1970s in community media studies. These action-oriented field studies, for example on community television, have been concerned to identify transformations in media use whereby residents could become producers of media messages and a sense of community among residents might develop.

One important objective in the Evolution of Electronic Communities (EEC) research project on Manse Square (http://

mansetori.uta.fi) has been to seek development towards active citizenship and communities who are not only critical media-consumers, easily adapting to the emergence of the information society, but who also are prepared to act in their own alternative terms in order to bring about reforms. In other words, the user does not merely survive and adapt to information society, but also seeks to influence its evolution (Freire 1973; 2001). This project was established as an opposite to a top-down development model, where people are expected to adopt new technologies as soon as possible (cf. Uotinen 2003; cf. van Lieshout 2001). The Manse Square network and portal in the EEC research project were established on the basis of the Freirean understanding of communication as a civic right, a social practice and a tool for increasing participation and local communality. This conception belongs equally to the background of participatory action research framework (Einsiedel 2001, 104–105; Dubell, Erasmie & de Vries 1980).

Civic webs have been implemented in Finland mainly as local, national and European short-time development projects. Many of them have been launched as parts of wider information society programs at least since 1995: one example is the project realised in eastern Finland, Carelia (Uotinen 2003). At approximately the same time several civic web projects were initiated abroad, for example the Digital City of Amsterdam (see e.g. van Lieshout 2001; Jankowski et. al. 2000).

The Finnish civic web projects differ from each other for instance in respect of their planned objectives, the web applications used and the research activities connected to them. Esa Sirkkunen (2004) names three typical objectives in such projects: (1) advancing the rights of and services for citizens, (2) facilitating progress in local communities and areas and (3) enhancing civic participation and communication via the net.

Improving local participation among special groups threatened by the digital divide is a common feature of many such projects in Finland.

Research activities in the Evolution of Electronic Communities (EEC) project on Manse Square fit the objectives presented above, and especially the third, also improving local participation among special groups threatened by the digital divide, this meaning for example gypsies and foreigners in Tampere. The various sub-studies of the project can be divided into sections according to the activities they involve: creation and maintenance of a public space and development of other possibilities for civic participation; development of civic innovations and digital applications to support civic groups; and scientific analyses of the dynamics of web-mediated publicity. There has been at least one academic dissertation and several master's theses in addition to research reports and articles published so far (see e.g. Heinonen et al 2001; Ridell 2002).

The media environment in the City of Tampere, with over 200,000 inhabitants, includes one regional newspaper, several local and neighbourhood newspapers (free of charge), a local TV-station and three local radio stations: a commercial, a public and a university campus radio. Further, the website Manse Square is coordinated by the university and situated at the server in the university. The Journalism Research and Development Centre was in charge of the project, with collaborative stakeholders from the local media, Finnish research funding institutions and the Massachusetts Institute of Technology (MIT) Media Lab Europe. The residents of the city of Tampere have been publishing on Manse Square since 1998.

Manse Square runs activities in three sections on the web (http://mansetori.uta.fi):

(1) Manse Communities is a website for local neighbourhoods and cultural communities, for example gypsies and

foreigners living in Tampere. Each of these communities provide a forum where people can exchange views and information on issues concerning their own living environment.

(2) Manse Forum is a web forum for public discussion and debate on locally important issues. The aim is to create more open interaction between city officials, politicians, economic actors and residents, and in this way to promote the development of a more viable local democracy.

(3) Manse Media is a journalistic section of Manse Square offering news from the Tampere region and contextualising information for discussions taking place on other sites. In addition, local residents working as neighbourhood reporters publish articles and pictures on Manse Media.

These kinds of websites may be designated civic web, although the term community web might be equally suitable. While the endeavour is to bring an alternative civic perspective to local publicity primarily by voluntary means, the activity as a whole is in many ways comparable to the early period of the introduction of electronic community media in the 1970s and 1980s, for example community radio or television: the intentions and expectations that community networks can contribute to development and bring improvement to localities. This community communication approach focuses attention both on the individual level, involving for example personal actions, motives and expectations, and at community level as a specific social context. Together, these publishing communities of Manse Square form a network both on the Net and in physical meetings (cf. Jankowski, van Selm & Hollander 2000).

The ideological roots of the Manse Square civic web activity lie also in public journalism by merit of the residents' central

role in local publicity in the sub-studies. However, the research and development projects in public journalism are implemented mainly from the viewpoint of professional journalism. For example Brian Massey and Tanni Haas (2002) note in their study of the U.S. that public journalism research concerns mainly journalists' attitudes and beliefs about public journalism, their public news work behaviours and public journalism's effects on news audiences.

By the same token Ari Martikainen (2004) makes a distinction between neighbourhood reporting and public journalism in which professional journalists ultimately work as providers and guardians of access to publicity. He considers the activities of Manse Media as representative of people's journalism or as a citizens' media in which small stories produced by individuals' are prioritised over larger common issues. This Manse Media section also provides citizens with a possibility to function as both providers and gatekeepers to publicity (cf. Rodriguez 2001). Manse Media's neighbourhood reporters come from different neighbourhoods of the city and form a cultural community, all of them interested in expressing themselves and reporting on local issues in the web-mediated public arena.

Particularly the establishment of publishing communities and the evolution of participants into publishing citizens have been encouraged in the sub-studies of the EEC research project. The Net Teams of Manse Communities and the group of neighbourhood reporters constitute such publishing communities, i.e. voluntary editorial boards who represent their basic neighbourhood communities. Residents participating in the work of Net Teams are ICT activists or are interested in exerting an influence on local issues. Communal activities in the Net Teams and their basic communities have been physically and geographically confined to particular residential areas of Tampere. These community members thus live very locally in their own

districts, and the online and real life networks overlap with each other (cf. Jones 1998, 5).

Previous investigations into community radio and television suggest that the potential contribution of the media to the community development process is limited. Community networks may reinforce the social capital of an area when components of it are already present, but contribute little to improving the actual situation faced by localities. It is nonetheless important that these earlier media investigations and results should induce researchers to become engaged in the creation of community networks through critical and constructive study and consultation (Jankowski, van Selm & Hollander 2000; cf. Massey & Haas 2002).

Within this perspective, the fundamental condition for understanding this activity as collaborative learning is highlighted in the evolution of the civic web. A community is seen as a set of interindividual relationships which carry the participants' common understanding of the community's function and objectives. The compatibility of each actor's personal objectives and the community's common goals, as well as the dialogue between individuals striving towards understanding and consideration, are also crucial (see Kurki 2002, 50–51). Learning can be defined as a change in an individual's level of knowledge, skills, attitudes or behaviour, and it can occur sporadically in various kinds of situations. The assumption is that in communal activity the individual and the community go through a parallel learning process. In this Manse Square project, systematic training and support have been taking turns and represent a part of the communal activity.

Carmen Sirianni and Lewis Friedland (2001) connect this kind of social and dialogical learning to the process of civic innovation. By this they refer to the development work of people and their organisations or movements. The communal process

can help to solve local problems, enhance local democracy and empower civic agency. The civic innovation process is usually realised on the initiative of a local administration or is somehow connected to it.

According to Maryann Feldman (2001, 48–51), innovation is about problem-solving and the development of products, processes or methods which create novelty. The creation of something new thus becomes an important result. As a process, innovation is cognitive and social: individuals from different disciplines, competencies, vocabularies and motives together make knowledge creation and deployment; 'negotiations, clarifications and re-conceptualisations as an idea moves to become an innovation.' Civic innovation can be conceptualised as a process in its own right by reason of the public participation of citizens which often takes place in collaboration with professional actors and authorities (Sirianni & Friedland 2001). In several sub-projects of Manse Square, innovative actions have been proceeding and civic innovations have been created.

In traditional design and development processes in information technology, there can be seen a manifest practice to configure the user to meet the device and particular computer. This typical match-up is a systems view and neglects the experimental opportunities of the real user. M. J. van Lieshout argues (2001) that configuration and appropriation strategies should be understood more from the user's point of view with an experimental attitude and as a mode of social learning. Innovation, development and experimentation with tools and methods together with user groups (i.e. residential and cultural communities) form essential parts of the research project in Manse Square.

M.J. van Lieshout (2001, 147–150) describes social learning in the digital city of Amsterdam (DDS) during an open project which emphasised flexibility in design, adaptability of both

users and uses and explorative settings which lasted throughout the whole life cycle of the project. Opposite to this mode the author describes the mode of control, which has elements of central regulation, a clear separation between designers and users, values developed by the project organisers, a strict deadline for the project and an evaluation appended to it. The Manse Square project lies somewhere in between these modes, but has been implemented more according to the experimental mode. Although there has been some 'controlled' support, several results can be reported regarding residential and cultural communities, individuals and network media (cf. Sirkkunen 2004, 19).

The Net – A publishing channel and a tool to influence

Manse Square has established its position as a civic web medium in local publicity in Tampere and as a new form of communication for its citizens. A characteristic feature is that the number of citizens' home pages grows regularly by itself. Also, the City of Tampere has located the project as a part of eTampere project and supports coordination of the various communities. In 2005 there were altogether 23 online Manse Communities and 5 neighbourhoods lining up for a site on Manse Square, whereas the total number of real life districts in Tampere amounted to 80.

Compared for example to Digital City of Amsterdam, Manse Square attracts more female users (68%, N=236), while DDS users have been mostly men. According to the national civic web user survey (*Seutuverkkojen käyttäjätutkimus* 2004), the users of Manse Square are aged 25–49 and are employed fulltime or have the status of students. They have fairly high education, most of them holding a high school diploma and nearly half of them a degree in vocational high school or higher (44%) (cf. van Lieshout 2001). Nearly all of the respondents have a PC at home, and about half of them have a broadband connection. They can

be called active ICT users: 83% of them use PC, Internet, e-mail and mobile phone several times a day. The respondents do not necessarily act as content producers in the Net neighbourhood teams, but they are active website users in Tampere and elsewhere in Finland.

Pauliina Lehtonen's survey and thematic interviews (2004a) among active Net team members shows that these users consider the activities of Manse Square important, even if they do not visit the site very often, only once a week or more seldom. Among their favourites are the neighbourhood home pages and articles about their own residential areas in the Manse Communities section. This section offers possibilities to follow up current issues in a given district, read about history and visit online flea market or discussion board. The use of the journalistic Manse Media section with local stories is almost as common as the use of Manse Communities, whereas the section of Manse Forum is not so popular among residents in that it is concerned with issues in the whole area of the city and with political participation. Especially the designed participatory tools and services in Manse Forum have not met the needs of citizens or city officials as widely as was expected at the beginning of the EEC project. Such tools are, for example, the civic participants' handbook, an initiative filing system and an electoral machine for sustainable development. Respondents nevertheless consider these participatory possibilities very important.

As positive results of this EEC research project, some changes among residents and their neighbourhood communities can be reported (Kotilainen 2004; Lehtonen 2004a):

- A publishing channel for web publicity for communities
- Alternative genres and other new participatory forms on the web

- Citizens' influence on local issues and digital competencies
- Networking of residents and communities

The web has become a publishing channel and a tool of influence as a result of the activities of the neighbourhood home pages and cultural interest groups on Manse Square. The total duration of the research projects realised during the six years has helped to consolidate web activities. Genres alternative to the mainstream local media and other new participatory forms have been tested and built up during the project. Software and narrative forms have been created to support citizens' public interaction with local authorities. Thus the whole Manse Square project has constituted a civic innovation and experiment in itself (cf. van Lieshout 2001; Jankowski et al. 2000; Sirianni & Friedland 2001).

It emerged in all sub-studies that the civic web projects have not only promoted participants' own local issues and influence on local democracy, but have also contributed positively to the development of individuals' and communities' external contacts. This has taken place through networking at research project gatherings with other e-publishing communities and persons. In addition, networking has proceeded in many projects with local schools or certain administrative officials. Networking has obviously supported this kind of citizens' web activity, and has encouraged citizens to publish and participate on the web. Skills have been learned in all the abovementioned areas. In addition to digital skills, influencing skills and networking skills have also accumulated (Lehtonen 2004a; Kotilainen 2004). This development may have taken place in communities which already have some social capital as a civic or individual resource, for example in the Net teams (cf. e.g. Jankowski, van Selm & Hollander 2000).

Pauliina Lehtonen (2004a; 2004b) describes the evolution and the results of Manse Square within the framework of social

capital: residents' networking has increased trust, reciprocity and sense of community in neighbourhoods. As an example, Lehtonen (2004b) gives an account of the development of a so-called citizen jury. For about one and a half years the citizen jury in the Tesoma district attempted to act politically and to participate in the development of their own neighbourhood. As a part of their deliberation jury members in Tesoma contemplated how new information and communication technologies should be developed into a meaningful instrument for local participation. During the project one of the jury's proposals was introduced to the city representatives, who considered it useful. The proposal concerned the website of the city, how the web designers and officers of the city could improve the structure and presentation of issues to render the service more friendly to civic users.

During the process people on the jury became more self-confident when expressing their opinions. They started to listen to different views and arguments and began to evaluate their own opinions more reflexively. After the research project citizen activism in Tesoma did not fade away, since the members of the jury were involved in founding a neighbourhood association in the area. This body has grown from a few to some two hundred members and has among other things organised various happenings in the area. This represents a new mode of acting in web publicity, but the citizen jury can also be classified as a civic innovation (Lehtonen 2004b; cf. Sirianni & Friedland 2001). This local jury is also a good example of the active audience approach as experimental, critical and constructive study and consultation (Jankowski, van Selm & Hollander 2000; van Lieshout 2001).

Information technology as the restrictive factor

Activities in the Manse Square project have been restricted by a variety of practical problems, a low level of technical competence, unfamiliarity and the high costs of the technology.

The functionality of web technology cannot be trusted on an everyday basis, and interaction between web experts and users does not always run smoothly. Unfamiliarity with web activity and a low level of skills have also been mentioned as problems among residents and local authorities. In Manse communities, however, almost half of the residents with basic web publishing skills have reported having instructed others in devising neighbourhood home pages. In addition, the communities have experienced problems with voluntary work: there have not been enough volunteers to update the web pages or to lead discussions. The prime reason, especially for families, has been found to be the lack of time to take up new hobbies. This observation also reveals who has the time and the interest for such a demanding citizenship: those with no job or family (Kotilainen 2004). It must also be noted that active citizenship as an active audience assumes different modes in human activities which do not all take the physical form of participating in community or movement actions (cf. McQuail 2000; cf. Livingstone 2005).

The traditional local media in Tampere have reported on Manse Media and other Manse Square events, but the sub-projects have not reached any wider publicity. Reporters have searched for ideas from the website and this is how the Manse Square has influenced a broader local arena: its impacts can be seen for instance in the construction of themes and in reporters' choice of viewpoints. Local authorities have used Manse Square as a source of information for civic issues and opinion. So far, however, they do not consider the website a significant means of communication between residents and authorities, and they have not been eager to take part in civic discussions on the web. Also, the active audience approach in the form of civic innovation experiments has remained strange to the local media, and these experiments have not extended to the mainstream media (Lehtonen 2004a; cf. Jankowski et al. 2000).

The research project as a sociocultural animator

One essential factor in the development of Manse Square has been the role of the research project itself as a promoter of development and learning in the frameworks of action and design or development research (see e.g. Kemmis & Wilkinson 1998; Bereiter 2002). Both of these research frameworks have the objective of reforming, developing and changing actions or models. The action research framework implies research 'for the people and by the people'. Changes can be implemented by several research methods and the focus is on problemsolving together with other involved partners: planning, acting, evaluating and reformulating processes. Participatory action research has its roots in the social sciences and education, while design and development research also draws upon media, arts and technology studies (Dubell, Erasmie & de Vries 1980). Regarding Manse Square, the research project has been a public development institution which has implemented the progressive cycle of needs and conducted mediapedagogic interventions in publishing communities in a digital media context on the worldwide web and in real life.

Media Pedagogics means teaching about media, and with media. In this project, residential communities have been developed by imparting skills to residents to create for example home pages by practical hands-on methods. The researchers have also been helping residents to participate in current local issues in many ways: for example by organising seminars and other possibilities of public discussion together with residents (e.g. Buckingham 2003; cf. Giroux & McLaren 2001).

From the point of view of development work, the process can also be compared to sociocultural animation. It is a movement evolving in the sphere of Social Pedagogics, particularly in Latin America, in development and research projects. The objective is

to prevent marginalisation and to support the development of individuals and communities towards conscious construction of life and citizenship. According to the main underlying theory, Paulo Freire's pedagogy of liberation, an individual does not really require teaching, but learns in the process of communal participation. Essential in this process are the animators of various kinds and the community itself. Authorities, associations or other organisations are usually involved with sociocultural animation in some way or other, functioning as public enablers (Gillet 2004; Kurki 2000, 42–43; Freire 1973; 2001). The Manse Square project may be envisaged as such an enabler, the sub-studies as actions of animation and the researchers and other actors in the project as animators who are supporting dialogical learning.

Community Net activists, researchers and web designers have had a significant role as animators. The awakening of individuals and communities to understanding web publicity and specify their personal needs, has built on motivational acts of sub-project researchers during the planning stage. This process has continued throughout the actual web activity, as the actors have gained better technical skills and understanding of web publicity. Also, peer critique and reflection with researchers after various undertakings, have been crucial in some of the sub-projects. The reflection of learned skills and experiences generates new viewpoints. Thus, the needs and practices of a community, or the web-democracy of a city, can be seen in a new light. According to Paulo Freire, action which leads to the evolution of a community should be realised through a triad of awareness, action and theory (reflection), which is the process of dialogical learning (cf. Kurki 2000, 134–137; 2002, 57; Freire 1973, 84–87, 123–126).

For example within a sub-project dealing with neighbourhood reporters, emphasis has been laid on reporters' strong commitment to their own webmagazine. Ari Martikainen (2004) depicts neighbourhood reporting as inter-reflection between

peer learners. An example of inter-reflection is the art of making commentaries on stories, where the researcher's task has been mainly simply to summarise. Some dozen residents, aged 8–72, in different districts in the city of Tampere have been acting as voluntary neighbourhood reporters. They have been publishing stories with pictures from their own suburb in the webmagazine Manse Media via the publishing platform on the Net. The reporters are interacting closely with their interviewees in the various neighbourhoods, and reflection has also taken place with reporters and interviewees. This sub-project in the Manse Media section is a clear example of citizen and community media activities in digital networks (Rodriguez 2001; cf. Jankowski et al. 2000).

However, not all the sub-projects have applied this dialogical model of learning with reflection; in some cases the publishing process in the community has begun more as a top-down activity emanating from the researcher to the residents instead of via communicational needs arising from the community itself. In these cases, publishing on the web has remained no more than an experiment and net activists have not been committed to continuing their publishing activities after the research project closed in spring 2004. According to Paulo Freire a number of pedagogical situations have failed when they have been carried out without taking into account the views of the participants in the communal program (Freire 1973, 83). The activities and discussions on the Manse Forum section have been led mostly by the researchers. After a lively beginning they have sought to keep activities alive and get local political movements and groups interested in web-mediated publicity. They have moreover organised discussion series trying to unify physical and net discussions between residents and local administrators, with the result that mainly the net has not induced participants to become

involved. In 2005, there were hardly any civic actors. In this section the focus of issues may also be too broad considering the local politics of the whole city (cf. van Lieshout 2001).

Maarit Mäkinen (2004) reports on the sub-study among gypsies in Tampere, where the main purpose was digital empowerment, meaning learning which may have resulted in significant development in the community's and individuals' interaction with the surrounding society. The purpose was achieved with the gypsies especially on the individual level, but within the gypsy community as a whole the process of empowerment has remained in progress. The community's needs for web media and the development of web communication skills turned out to be essential factors in the launch and progress of the empowerment process. The gypsies interviewed felt that there had been changes concerning the essential points. They also experienced an increase of confidence in their own capabilities and growth of their personal networks. This case shows, for example, that the important factors in individual and community development are individual and communal motivation and experienced needs, together with probably already existing social capital (see also Lehtonen 2004a; cf. Jankowski et al. 2000).

Researchers as participatory agents

The researchers participating in the project have together with residents created and supported public web space and other requirements for civic participation. Researchers and web designers have worked as teachers and consultants over and above the execution of their basic tasks, that is, research and development of web tools. In the interviews they name their own roles as follows: *technical resource, producer, consultant, trainer, preacher* or *inspirer.* It is essential that the researchers should feel that they were also mostly learners with other actors in the

development process (cf. Kemmis & Wilkinson 1998; Dubell, Erasmie & de Vries 1980).

Communities go through different stages in their development, which was noted during the research project also in Net team evolution. Usually there has been marked activeness at the outset, which has decreased as the number of volunteers has started to decline and residents have become better aware of the limitations of their digital competencies. In communities which have already been involved for several years there has been considerable variation in the levels of activity, for example in terms of net activists' interests and the amount of time they have devoted to the project.

In the initial stages of the sub-projects researchers designed and produced the communities' first websites in collaboration with citizens participating in Net teams. Subsequently the role of the researchers in the maintenance and further development of websites gradually diminished. Since completion of the research project there has been a half-week coordinator with the funding of the City of Tampere: the project offers server space, lends technical equipment, provides helpdesk services and gives training in web publishing for community Net teams. The coordinator also organises monthly network meetings for all actors on Manse Square.

The aim of sociocultural animation is to induce communities to grow independent and build their own norms of activity. For example, the activity of the citizen's jury in Tesoma has during the process developed into official resident association activity. Also the work of neighbourhood reporters is so far continuing. These two sub-projects are good examples of civic innovations which have re-constructed web-mediated local publicity and empowered the online communities. As M. J. van Lieshout (2001) has surmised, such concrete issues and actions on a local scale can lead to empowerment. In these cases development has taken

place not only in an experimental natural mode and with control, but with dialogue and reflection as sociocultural animation. As noted by Jankowski, van Selm and Hollander (2000), also here the community development process has been limited and has concerned mainly the actives and Net teams participating in the development processes themselves.

Innovative development: Studying together

The worldwide web has served in this research project as an information network, a subject of study and a tool, and as a public environment for community development and research. The evolution of the civic web as a participatory means of communication has been studied in the perspectives of active audiences, innovative development, sociocultural animation and learning. During the evolution of the Manse Square website and its online communities, researchers could identify and increase knowledge of the process involved in civic web construction and the support of individual and communal growth in digital participatory environment. The research project has touched on residential geographic communities, communities of interest and also cultural communities, developing local participatory web-mediated publicity with them.

The knowledge we have acquired reflects the local characteristics it stems from, and it is difficult to generalise from the evolution process, for example with regard to factors which prevent the spread of good practices. Some concluding remarks may nonetheless be offered regarding the identified commonalities of civic web construction and development work.

The need for and the role of different ways of supporting development activities have not been discussed enough nor made visible enough. One of our key observations has been that the web media alone do not lead to any significant changes; this applies to

both open natural experiments and the control mode. I would argue that in this kind of innovative development, manifold support is needed in order to bring about civic and community digital empowerment and promote participation in web publicity, as this research project has sought to do over a number of years. The project's main aim has been to function as a sociocultural animator in various ways in a process which has been new and open to citizens and communities. Intervention has been part of the process generating needs and empowerment in the various communities. The civic innovation process takes time, it is interventionist and attains value in individuals and communities aware of the potentialities of web-mediated publicity (cf. Bereiter 2002). Another observation has been empowerment; when it has evolved, it has been in the service of individuals as their personal growth and in the service of community need and growth. The development has also partly reached some communities near the digital divide.

Where there is a desire to provide independent web media one needs to provide the actors not only with Net access but also with different accessible and easily operated web tools, software and alternative genres for civic expression, as well as with information about them. Awareness of communicative needs in residential and cultural communities regarding the Net has been one crucial point in the development. When needs and ideas spring from the community, then a commitment may emerge among residents to continue publishing on the web. In this project the Net teams and other web actives, the training and guidance organised by the project as well as the consulting attitude of the researchers have served as media pedagogic support resources in the development process. In the case of other development situations, the structures of the civic web procedure should come from municipal actors, cooperation added with other partners interested in local communication via the Net.

If the aim is to enhance empowerment, civic innovation and participatory action, development activities should strive to create such publicity and support which provides participatory residents with insightful questions, the ability to see new connections and a readiness to communicate via the Net and a better understanding of the possibilities of democratic participation. In the case of Manse Square, the foci of civic participation have shifted since the outset from efforts to influence local political issues on the Manse Forum towards more narrative forms of self-expression in the Manse Communities and Manse Media sections. Residents wish to make public in these local alternative media such everyday neighbourhood issues which are not regarded as news in the mainstream local media. Thus the residents' relationship to web publicity is focused more upon the subjective and community levels in the city's districts than upon the whole city and active political participation. For example, the amount of participatory discussion on the Net has remained very limited.

The residential Manse Communities and neighbourhood reporters' community publishing on Manse Media have been stabilised online communities on Manse Square. These digital and social networks do not necessarily demand committed political participation from either residents or local administrators, but instead offer digital possibilities for civic self-expression and local neighbourhood micropolitics with a cultural dimension. These audiences are 'communicating back' and they use various levels of active audiences as activists experimenting and producing on web-mediated publicity, consuming online services and also taking the position of non-participation (cf. McQuail 2000; Livingstone 2005).

According to this research project's experiences the key building blocks in the development and management of digital network projects and especially in the construction of civic websites can be summarised in three points:

- Understanding of the innovation and learning processes
- Dialogue with different participants as a basis for development
- Openness to experiment and visionary participants

In order to enhance commitment in civic web activities, project workers need to understand the dynamics of innovation and dialogical learning processes. In the beginning they must direct their energies towards awakening subjects and communities to see the possibilities of communicating in the Net. This leads on to the concrete work, and then follows the most important part: a collaborative reflection on what has been done, why it was done and how one could perhaps have acted otherwise. A reflective touch is the key element in the whole development work, and it must be reached through a dialogue connecting different partners of the project: the civic, municipal, academic and business actors. The whole design and development process is at its best a process of studying collaboratively together. Because of the continuous development of information technology tools developers and users can learn from each other. The greatest difficulties in such collaboration have arisen from the different competencies in skills and understandings of ICT technology within the Manse Square project. These have shown up as questions of language and power, for example when civic participants have attempted to develop web tools with the designers.

The EEC research and development project was realised within six years and still many questions remain open. Cultural habits and ways to communicate openly in terms of politics among residents and local administrators have not changed much so far, as has been noted by previous media researchers. This research also supports the notion that the innovative process needs time, continuing openness to experiment and the input

of visionary participants. The Manse Square project has focused on the Internet, but there is equally an opportunity in taking advantage for example of cell phones or other technologies. Also, there is a possibility of expansion in innovative experiments as a more integrated process in people's lives.

From the city's viewpoint, it would be important to enhance civic participation via the Net when the local government is trying to develop its own services. From the university and research perspective it would be important to continue these kinds of experiments to give the next generations of students and researche's an opportunity to observe and further the evolution of a civil information society. There are also many potentials for civic innovative development which should be taken seriously in the mainstream media. Active audiences are here to stay online.

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VI

Services and the Well-Being of Citizens

Tuuli Kurkipää

e-Learning in the City of Tampere

Introduction

This article analyses the development of e-learning in the city of Tampere from the perspective of networks and local cooperation. Like other social, economic and technological dimensions of the information society development realised within the framework of the eTampere programme, active networking has proven to be an effective approach to promote digital literacy and e-learning. Tampere has invested a great deal in these two increasingly important elements of the information society. In local, national as well as European level strategies aiming at an equal but competitive information society, digital literacy, lifelong learning and e-learning are acknowledged as priorities that need active promotion.

Digital literacy is here understood as the competence to operate in the information society. In practice this means the basic skills to communicate and to locate, understand, evaluate, use and create information and knowledge by using computers and the Internet. e-Learning on the other hand consists of a multitude of mutually complementary concepts and practices that refer to ICT assisted learning, teaching and training, and the associated administration. The eLearning Action Plan (2001) adopted by the European Commission defines e-learning as the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration. Digital literacy and e-learning are also seen as means to advance social inclusion, active citizenship and lifelong personal development.

The article will discuss initiatives and policies related to digital literacy and e-learning and demonstrate a range of research and development projects and networks that have been adopted to realise the objectives of these policies. The article will concentrate on the effort, challenges and achievements in promoting digital literacy and in making use of and integrating e-learning in its many forms into everyday learning, teaching and administrative practices. As an example of an e-learning network, the article presents the Tampere eLearning Cluster, a collective, as opposed to an institutional, approach to e-learning development.

Expectations and motivation

e-Learning has been actively developed in Tampere in the context of European and national policies. The European Council has placed general education, vocational education, and professional training firmly at the cutting edge of the EU's political agenda, urging the Member States to adapt their education systems to the requirements of the knowledge society. In particular, the Council requires efficient integration of ICT into the European education and training systems as well as the development of information society skills for all citizens to adapt to rapidly changing working and living environments. The European Commission has been active in supporting and complementing the efforts of EU Member States in this field. Through the eLearning Initiative (2000), the eLearning Action Plan (2001–2004) and the eLearning Programme (2004–2006) it has encouraged co-operation, networking and exchange of good practices at the European level (see the *Lisbon Strategy* 2000, Commission's communication *Making a European Area of Lifelong Learning a Reality* 2001 and the *eEurope 2002* and *eEurope 2005 Action Plans*).

The Finnish National Information Strategy (2000) set important objectives for education and training. The first was to create an information strategy for each educational institution. The aim was that all teacher education units and educational establishments should devise strategies for the educational use of ICT by 2002. In Tampere all institutions from primary and secondary education to vocational, higher and adult education have also produced such strategies. The strategies deal with the current status and future development of infrastructure, appropriate use of ICT in teaching and administration, support, development and research activities, teacher training and networks. For example, the strategy of the Adult Education Centre of the City of Tampere aims at developing the teaching staff's ICT skills and quality of teaching. The long-term goal of the strategy is to develop the working culture of the whole organisation and bring it closer to the challenges of the Information Society.

It is generally recognised that a solid education, good general knowledge and ICT skills acquired throughout life create the basis for acting as an empowered citizen and using information society services in everyday life. Educational institutions provide pupils and students with ICT skills and this requires good overall and pedagogical ICT skills in the teaching profession. The teaching staff is thus the main target group for promoting digital literacy and consequently e-learning. The implementation plan for the national Information Strategy for Education and Research 2000–2004 states that the educational institutions and education providers must have access to competent educators and guidance personnel to promote the use of ICT in teaching and learning. The distinction between the learning environments at home, school and workplace is disappearing. This requires increasing attention to web based and more varied methods in the planning, implementation and evaluation of teaching. More and more

tracks are also available in lifelong learning, and in the long run the programmes targeting ICT in education concerns all citizens as users or producers of information society services.

These strategies and programmes have brought about numerous e-learning projects, training and content production projects as well as research and development projects in the education organisations and also between them. The national policy emphasises networking, and the schools, vocational colleges, adult education centres, polytechnics and universities in Tampere have participated very actively in the national networks of the Virtual School, the Finnish Virtual Polytechnic and the Finnish Virtual University. Various private and public sector organisations and e-learning companies in Tampere have also been active in developing e-learning for their own needs or for their customers, often with public funding or other incentives.

e-Learning has been developed in Tampere according to European and national policies, but also in the context of the e-learning market development. As it has turned out, the expectations regarding the fast application and expansion of e-learning have been considerably more positive than its actual growth rate both in Finland and internationally. It did not become the 'next killer application', the explosively expanding global market that the e-learning industry had hoped for. The share of e-learning in the education and training activities of public and private sector organisations as well as in educational institutions has remained rather constant during the last seven years, and there is no reason to assume any radical change in this in the near future (Study of the eLearning Suppliers' 'Market' in Europe 2004; Markkula 2004).

We could say with hindsight that some of the public and private investments in e-learning were based on unrealistic expectations, and that the focus was too much on technological solutions instead of on people's skills and motivation to use e-

learning. Lessons now learned, the e-learning objectives in education and training concentrate more on enhancing the quality of teaching and learning and on the appropriate and sustainable integration of ICT in teaching and administration. In corporate training in both the public and private sectors, e-learning is also gradually becoming part of the mainstream activities.

e-Learning in the schools of Tampere

Markkula (2004) divides the municipalities in Finland into three groups according to their stages of e-learning development; First we have the municipalities with a long-term history in ICT exploitation development, with complete, high-quality solutions at their disposal, and with the activity's focal point already shifted onto teacher training and the development of pedagogical implementations. Second there are municipalities with their own ongoing ICT implementation and activation projects; however, with the projects' educational objectives partly or entirely undefined. There is also little support from the municipal management or the educational system management for the ongoing activities. The third group consists of municipalities with entirely dispersed activities, including the development targets. They have no strategy for implementing e-learning in practice and the use of ICT equipment and software is not systematic.

Tampere undoubtedly belongs to the first group of active developers with clear objectives and plans for their realisation. The e-learning vision of the City of Tampere is a worldwide classroom for all pupils and students. The aim is to evolve pilot projects for sustainable e-learning. The new national curricula for primary and secondary schools also require that ICT should be used in the regular teaching of all subjects. At the moment, however, it is not possible to generalise that the state of e-learning

in the schools of Tampere would be either this or that. As in any city, schools and classes range from progressive pioneers to those who lag behind regarding both equipment and inspiration (see Murto 2004).

The department of education of the City of Tampere has developed e-learning both on strategic and practical levels since 1999. The comprehensive improvement of e-learning is based on equal emphasis on supporting teaching staff in methods, content production as well as technical skills, and on determining issues on the organisational and strategic level. Representatives of administration, schools and institutes form a steering group that coordinates distance and e-learning activities. An e-learning support unit, eBase, offers practical support and training for the teaching staff from project management and pedagogy to various technologies and web design. The City of Tampere has active research and development cooperation with universities and polytechnics. Yet it is important to keep in mind that it is the teachers who develop the best e-learning concepts and practices (Murto 2004).

There are different approaches to ensure an up-to-date learning environment for all students. In the City of Tampere the department of education engages in long-term cooperation with application developers, e.g. Microsoft, publisher eWSOY and the IT solution provider TietoEnator. An entirely different approach has been adopted by four municipalities surrounding the City of Tampere, Ylöjärvi, Lempäälä, Nokia and Kangasala: they have together established the VALO Open Source Resource Centre that promotes and supports sustainable open source software development in schools. For example, Linux and other open source based applications enable the utilisation of otherwise old and useless equipment and software can be adapted and developed according to the users' needs.

e-Learning has also widened the learning opportunities especially in upper secondary and vocational education since the secondary schools and vocational colleges in the Tampere Region have started to coordinate and share e-learning courses that can be taken by any student in any institution. Regional cooperation as well as cooperation with polytechnics and universities give students new opportunities for future studies. It has also been recognised that in the development of e-learning in schools, cooperation with various cultural services, museums and libraries is especially important (Murto 2004). In this context, the research and development of informal learning is a significant area of interest, together with the promotion of digital literacy and media literacy.

e-Learning drives the transformation of administrative practices

Teachers need to improve their skills in the acquisition and management of information and in communication. In terms of positive information society development, this necessitates not only intensified use of information and communications technologies, but also the development of operational culture in educational institutions. The Information Strategy for Education and Research 2000–2004 suggests that training means not only upgrading an individual teacher's professional skills, but must serve the whole work community. A related question of interest is the cost effectiveness of e-learning. The research cooperation between the City of Tampere and the universities concentrates on gaining knowledge for administrative decision-making: what are the risks and advantages of e-learning and what kind of investments are profitable? A central focus for development projects is the competencies of the entire city personnel and their

work practices as well as the facilitation of change in working cultures.

On the whole, the everyday use of ICT in classrooms is still in its infancy, both due to lack of equipment in schools and because all teachers are not familiar with e-learning methods and tools. Although all the teachers in Tampere have participated on average in two basic courses of e-learning methods during the last five years, exploitation of ICT in teaching does not occur apace. According to a study conducted in 2004 most teachers use only e-mail, Internet and word processing tools. Few teachers use multimedia or the Internet for interactive communication, collaboration or publishing and equally few are familiar with e-learning platforms, chat and other such tools for example. The use of e-learning is very much tied to the teacher's personal ICT skills and interest. Therefore the use of ICT in teaching will remain limited as long as the teachers' personal use of ICT is one-sided. To make the educational use of ICT more versatile the schools and teachers need concrete course plans, so-called learning objects, collegial exchange of experiences and more time to develop e-learning methods together (Franssila & Pehkonen 2004).

The opening of the new Sampo Upper Secondary School in Tampere in autumn 2005 has made it possible to study and develop the use of ICT in the school processes. The City of Tampere, the Hypermedia Laboratory of the University of Tampere and Microsoft collaborated in a action research project that aims to generate more developed and comprehensive ICT architecture, capabilities and ICT-supported organisational practices in Sampo School. The researchers will analyse, document and package the processes into a general model that can also be used in designing e-learning practices for other schools. The innovation of this action research project relates to the new co-design methods applied in the design processes of user-friendly

information systems and their usage practices and usage culture. This tight, hands-on interaction between school staff and students, technology provider and researchers as intermediaries is a unique approach in building more developed ICT-supported service processes in schools. From the technological point of view, the focus will be more on the integration and sound use of old tools, although some new collaboration technologies will also be introduced.

The starting point of this approach is that updating the technology alone will not bring about a transformation in teaching practices. The work processes also have to be redesigned, otherwise the use of the new tools will be slow, fragmentary and will lack critical mass. As a survey of the expectations of the future of e-learning services in Tampere showed, teachers are a very critical target group who should not be offered incomplete solutions or practices to implement (Murto 2004). The same requirements apply to other sectors of information society development as well. In general, we can conclude that most of the potential is still unused, because the Finnish information society is, according to statistics, very device oriented. We can even say there is a paradox in the use of ICT: the number of devices (mobile phones, computers, etc.) per person is high but their usage is low. As Inkinen states in his article 'Social Uses of Information and Communication Technologies' in this book, the introduction of new applications is a socio-cultural process, and the change in everyday practices requires a long time (see also Inkinen & Kuru 2005).

e-Skills come before e-learning

The development of digital literacy is in line with the general rise in educational levels. The better the information technology related training is integrated into comprehensive education, the

more the skills and knowledge levels of the general population will rise. Learning to use ICT as a child will advance the capacity to learn new skills later in life. Improving and broadening the general level of education are essential elements of the development of the information society. In the end, the most essential question remains how to apply information in practice. This is important, especially if we are to shape the information society into a knowledge society (Inkinen & Kuru 2005).

Applying the idea of self-motivated learning, there needs to be the largest possible range of educational provision, learning programmes and learning environments for all citizens, with a special effort to reach all population groups. Educational institutions provide pupils and students with the necessary skills, and in Tampere the use of computers and the Internet have even been included in the day care curriculum. The personnel are trained in basic computer skills and the day care centres are provided with equipment and software suitable for children. Activities are developed together with parents and special attention is paid to the positive but safe use of the Internet.

Particular attention also needs to be focused on the needs of groups outside the education system and staff development and training. Lehtonen and Soronen give examples of some successful initiatives and projects in their article 'Challenges to e-inclusion in a High-Tech City' in this book. The aim of these efforts in Tampere is to prevent the marginalisation especially of middle-aged and older people, adults not actively employed and special-needs groups. The objective is to enable all residents to become computer literate and to use online services that improve their employment prospects and quality of life.

Libraries have always provided the basis for literacy and now they are also important places for spreading digital literacy. Libraries are in a key position to reach people and teach new information literacy skills, especially to middle-aged and elderly

people as well as immigrants. People who use library Internet services are from every population and age group. In point of fact most people have first used the Internet in a municipal library.

The libraries offer free access to computers and the Internet, but more importantly, they also offer professional guidance and training in basic computer skills and information retrieval and evaluation skills. The Net Squares of the Tampere City Library spread digital literacy in several ways: they offer individual support, computer courses for adults and training in information retrieval for school children. The Net Square teaching premises and computers are also available for any groups of citizens, clubs and societies. The Internet tutors provide customers with individual support. They are not teachers by profession but experienced customer service professionals. They are easy to approach, they have an encouraging attitude and they also speak in plain language where difficult ICT terms are translated into everyday language. The computer courses are for adults with little or no experience of computers. The courses are open to anybody and free of charge. The average course participant is a woman, aged 55 to 65. The two most popular reasons why she has participated in the course are firstly that she wants to learn how to pay bills over the Internet, and secondly that she wants to have her own e-mail account and learn how to use e-mail to keep contact with her children or grandchildren. Information retrieval classes for schoolchildren introduce different web search engines, but emphasise the importance of critical evaluation and the fact that many times, other traditional sources are better for finding relevant and reliable information.

Mirror of learning

As described above, e-learning is seen as a way to promote positive change in teaching practices and also in the organisational

cultures. From the students' and teachers' perspectives, what is interesting about e-learning is how it raises issues that should also be discussed regarding other, more traditional teaching methods. The pedagogical usefulness of a web-based course is easily questioned, but in universities the age old exams on set books are still held, even though we know quite well that students forget what they have read as soon as they close the door of the examination room behind them. At the same time, the lecturer cannot really tell who is asleep and who is paying attention in his or her class. The greatest promise of e-learning is indeed the increased interaction and collaboration of pupils and students, tutors and teachers, especially when they are physically remote. e-Learning may also offer new inspiration, especially for experienced teachers, and an opportunity to reflect on their own work.

Flexibility is perceived as the main added value of web-based learning. For students in polytechnics and universities it offers flexibility in time and place, which is especially important for students who are working or otherwise unable to attend class. Many students also like the fact that they have to take the responsibility for their own learning and for making their own schedules. On the other hand, because e-learning does require taking responsibility, it is not suitable for everybody, at least not without very good guidance. This means that e-learning requires above all good pedagogical skills from the teacher. To keep a group of students motivated and active online requires a profound understanding and experience of how to teach a class face to face.

Students' and teachers' expectations of e-learning are also affected by an active discussion on quality issues. National as well as international strategies and programmes promote, even demand quality e-learning, and universities, polytechnics and schools create guidelines and systems to evaluate quality.

Quantitatively evaluated, the state of e-learning corresponds to the strategies: universities and polytechnics offer more and more e-learning and the infrastructure supports flexible study on-line. The actual quality of e-learning is another question to which, for example, the Virtual University Project of the Tampere University of Technology wanted to get an answer on a long-term action research project. The aim was to find out whether students at the University of Technology feel that web-based learning is efficient, appropriate and of good quality. The main result of the study was that the perception of quality depends very much on the students' learning and technical skills and motivation in general. It is therefore essential to develop and support teachers in implementing e-learning to correspond better to the diverse learning needs of different student groups (Silius et al. 2004).

Process innovation enables learning

Efficient and useful e-learning requires quality content, tools and networking – as well as skills and enthusiasm from the teachers. However, efficient introduction and integration of e-learning on all levels also demands process innovation that makes the various systems interoperate and makes the use of various technologies smooth and beneficial instead of disturbing and obstructing learning, teaching and administrative processes.

For example, the University of Tampere has developed a watertight process for student enrolment and administration based on interoperability and integration of information systems. This development work follows the University strategy that aims at developing services and processes that are beneficial both for the provider and the user. In this case a faster and more efficient process is also qualitatively better: from day one the students can concentrate on academic studies instead of waiting in several lines for enrolment, access codes, student cards, etc.

The system supports the students' integration into the academic community and culture, which is critical for making a good start on studies. The process also involves unconventional crossing of organisational boundaries as the Student Union of the University has also been assigned administrative responsibilities in the process.

Another example of efficient integration of various information systems is the Finnish Virtual Polytechnic, a national network in which the two polytechnics in Tampere – Tampere Polytechnic and Pirkanmaa Polytechnic – actively participate. Tampere Polytechnic also hosts the central development unit of the Virtual Polytechnic. It coordinates the production of courses in the polytechnics that can specialise in certain areas or cooperate in so-called production rings. The e-learning courses are offered to all Finnish polytechnic students through the Virtual Polytechnic Portal. The option to participate in another institution's courses poses many administrative challenges. To overcome them, the Virtual Polytechnic has developed services such as the e-student office, which enables smooth enrolment and accreditation of courses. Another challenge is the consistency of course contents and their description. A solution is to develop common metadata and quality systems. In the era of lifelong learning this problem of course goes beyond the polytechnic network. It is vital to integrate the information systems of all institutions and administrators, also internationally (Paakkanen 2004).

Innovative methods to support learning

e-Learning experts agree that ICT in education needs to be integrated into the various learning practices, instead of developing e-learning in isolation. However, it is equally important to stress that ICT tools should not just be implemented as part of the traditional teaching methods or vice versa. Teachers

should, together with colleagues and experts, discuss how ICT can in fact change pedagogical practices. e-Learning did not bring about a revolution, but the revolutionary inspiration should be kept in mind, so that we do not just use new tools in old ways (Murto 2004).

One way in which e-learning is changing and facilitating teaching and learning practices is the options for simulation, visualisation and modelling of complex phenomena. In Tampere, these methods have been used e.g. in mathematics and medicine with good outcomes and they also offer great potential in vocational training. The Hypermedia Laboratory of the Tampere University of Technology has participated in an interesting research project on simulator-based training in the forest industry. The study was based on interviews and applying mathematical methods on simulator data, such as self-organising maps and data mining, and it focused on making explicit the tacit knowledge of experienced harvester operators. This tacit knowledge is part of their expertise and skills and is connected to the ability to observe, plan, anticipate and evaluate situations as they arise during the various phases of the harvesting process. Simulators offer a training method when it is not possible to utilise an authentic training environment or it is, for example, too expensive or unsafe. The Hypermedia Laboratory's research also suggests that by analysing the rich process data available from the simulators, numerous opportunities can be gained to evaluate and support studying and learning on the more abstract level of decision-making thereby supporting curricular development (Ranta et al. 2004).

The possibilities of game-based learning are also attracting much interest among teachers and students in schools, vocational institutions and universities as well as among e-learning researchers. The game-based learning process is by nature social, motivating and engaging. Games and play are a natural way to

learn with game-based simulations and scenarios being common in all levels of education as well as in business. Learning games build upon motivation dynamics inspired by games and game communities. For the younger generations games form a natural part of every-day activities and they will most likely prefer products, services and education that include game elements (see Mäyrä 2004).

Innovation in collaboration

In addition to providing an opportunity to reflect on teaching, learning and content, the little 'e' challenges the developers to cooperate. The development costs of e-learning are high and therefore it is unwise to develop the same courses, repeat the same mistakes or try to solve the same problems in every school and research laboratory. In Tampere, people involved in e-learning have made an effort to increase regional cooperation and interaction between research and practice. This is seen in the commitment to common projects and initiatives, in sharing information, practical division of labour and exchange of experience. e-Learning has in fact been a catalyst in the generation of new kind of collaboration culture.

An example of promoting cooperation in e-learning research and development in Tampere is the eLearning Cluster, a local network of educational and research institutions, the local and regional policymakers and the private sector. e-Learning is thus developed not only institutionally but also by promoting a collective approach. It is also not only a horizontal network among e.g. higher education institutions but also promotes vertical cooperation in all education levels. The partnership was established in 2001 as part of the eTampere information society programme. Currently the members are Tampere University of Technology, the University of Tampere,

the department of education of the City of Tampere, Tampere Polytechnic, Pirkanmaa Polytechnic, the AKONET Vocational Adult Education Network and Hermia Technology Center. Other institutions and companies also participate in the Cluster activities, and the Cluster cooperates closely with other networks and projects within the eTampere programme.

To advance networking and collaboration, the Cluster disseminates information on events and developments in the field, and organises meetings, seminars, training and other events. The coordinator finds partners for research and development projects, and coordinates and assists in the preparation of project proposals. The Cluster also participates actively in various national and international networks. The Cluster aims at making the latest research results rapidly available for the development of quality teaching and training projects, and, in return, to receive feedback from the field to initiate new research. At the same time, co-operation is promoted between the various levels and fields of education and training. The main aim of the network is to promote interaction and share information and experience amongst the members. Between them, members of the Cluster host approximately 10 e-learning research units, and the same number of e-learning development and staff support units. Active e-learning development is also conducted in various university and polytechnic departments, individual schools, continuing education centres, etc. The Cluster promotes and co-ordinates their collaboration in multidisciplinary research in a wide range of areas. As a result of the Cluster's existence, there have been several local, national and European research and development projects involving new kinds of local partnerships.

An example of this kind of collaboration is the Cibernarium project, where Tampere participates together with eight other cities in Europe and Latin America. The aim of this EU-funded (@lis Alliance for Information Society) project is to develop

pedagogical frameworks for digital literacy. The experiences of the four European cities, Tampere, Barcelona, San Sebastian and Brussels, are the basis for the exchange of good practices and development of citizen's e-skills and chances for participation. The project activities include setting up 'Ciberespacios' in each city for free Internet access and guidance, training for trainers and production of e-learning courses and short videos as well as a TV series about various subjects related to the information society. The project complements the local strategies well, and in Tampere it has brought together an extensive group of digital literacy and e-learning experts and decision makers from the eLearning Cluster, the information office of the City of Tampere, the city library and local e-learning companies.

Evaluation of network cooperation

A network does not work itself; some kind of coordination is essential. Tampere has been noted as the pioneer in Finland in organising coordination for a local e-learning network (Markkula 2004). The eLearning Cluster is a well-known example of a straightforward, grass-roots initiative by the stakeholders to build a partnership in order to bring together an extensive but fragmented mass of projects and experts, to coordinate research and development activity and to exploit the potential for innovation.

A precondition for functioning of the eLearning Cluster is that organisations are committed to the activities that are being pursued. However, these are not all planned and implemented by an overarching steering group – rather, they are agreed and coordinated based upon each institution's interests, activities and specialties. Each participant has had different and various grounds and interests for joining, such as research collaboration, further training and postgraduate studies, international development

projects, or a general need for knowledge acquisition and keeping up-to-date with developments. The Cluster is also a practical network for individual learners, teachers, researchers and other staff in the organisations. One of the main reasons for individual teachers' interest in the Cluster is that they 'want to know what is going on in e-learning'. The Cluster filters relevant information on events, research, funding opportunities, etc. for them (Kurkipää 2004).

To find out how successful the cooperation actually is, the Cluster carried out a small, external evaluation research project on the commitment of the members to the network. All the respondents agreed that the coordinator's work, likeminded people, good communication and thin bureaucracy makes collaboration easy. The various advantages the members reported getting from the network included training and other events for their staff, information and contacts, expert knowledge and partners for projects. However, they all pointed out that the usefulness of the membership depended mainly on their own activity. Many things were easy to do through the network with others, but no organisation or unit is in any way dependent on the Cluster. It is not a critical part of the organisations' activities. The main problem is lack of time to take a more active part in the Cluster activities. Therefore commitment does not always show in concrete ways.

Instead of defining e-learning and attempting to focus on any aspect of it, the network has evolved freely in various directions resulting many times in unexpected but in any case fruitful initiatives. Then again, the flexible structure and varied aims of the network can also be seen as a negative aspect. The organisations tend to forget why they joined the network, because they do not see it as serving their specific needs. Also, if there are any conflicts, it is easier to withdraw than to discuss and decide on the roles of the members. Nevertheless, the evaluation

process itself generated much discussion about the function of the eLearning Cluster and its member organisations, and this has created a good basis for developing the partnership further (Mustala 2005).

Conclusions

From the e-learning developer's perspective, schools are an important field for basic and applied e-learning research, because the school has to imbue the pupils with the motivation and skills to utilise e-learning in their future studies and work. At the same time development on the lower levels of education creates challenges for colleges and higher education institutions. They have to be ready for new students who will demand innovative new learning methods. This is an interesting situation that requires close cooperation among all levels of education, administration and research. The Tampere eLearning Cluster has been successful in networking the stakeholders, and the unique cooperation of different education organisations with local, horizontal as well as vertical dimensions has proved to be an important dynamic in developing e-learning in Tampere.

In everyday teaching and learning in schools, universities and other institutions in Tampere, e-learning is not primarily a technological solution to improve learning but a concept that enables social innovation. The e-learning development has been a combination of small but steady steps towards sustainable e-learning on the one hand, and of bold leaps to develop and adopt new technologies on the other hand. In any case, the focus is on everyday practices and the reasonable utilisation of technology for enhancing teaching and learning. There is still much to do in terms of e-learning truly penetrating the education system. There is resistance on both the supply and demand sides to this. Within institutions and organisations there tend to be a few active

users of new methods whilst the rest stick to more traditional techniques. Earlier the balance of funding was also in favour of the development of materials and courses, but as e-learning has been seen more and more as business as usual, there has been more emphasis on supporting its implementation.

Although the revolution never came, e-learning is gradually becoming a mainstream part of teaching. The strategy processes for ICT in education in schools have gradually been merged into curricula, the aim being appropriate and sustainable integration of ICT into teaching, learning and administration. However, as the Study of the eLearning Suppliers' 'Market' in Europe (2004) recommends, decision-makers and practitioners should 'keep the "e" in e-learning!' Although this is about learning, the 'e' dimension is distinctive and we are only at the very early stages of building our understanding of how these technologies will be integrated into education and training systems, and how they may influence changes in those systems.

Teachers' and learners' skills and motivation to use e-learning are the key issue here. In general, people's ability to use ICT applications needs to be promoted by education and training from day care and primary schools to universities and adult education. In strategies the information society is seen as fostering equality, and e-learning can also be a means to promote lifelong learning and social inclusion in all population and age groups. However, digital exclusion needs to be prevented determinedly, both locally and worldwide. If the speed of e-learning development is too fast, developer-centred and limited to technological solutions, we will not be able to bridge the widening digital gap. In this sense e-learning is both a threat and a solution to a problem. The way it takes depends very much on the ability to understand the needs of the users, the teachers and the learners.

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Hannu Eskola

Visions of e-Health in Tampere

Introduction

The terminology of modern health care and wellness contains several e-words, each of which is used with various different meanings. In the context of eEurope, the concept of e-health is employed to describe the application of information and communications technologies across the whole range of functions which, in one way or another, affect the health of citizens and patients (eEurope 2005). e-Wellbeing is often used in similar contexts as e-health. However, wellbeing basically includes everything that is good for a person, not only health. e-Wellness and e-welfare are related to e-wellbeing, the former having most in common with e-health. e-Wellness contains many electronic health services and technologies which are used outside hospital institutions.

Health services are widely provided by the society in Finland. The challenge facing the welfare society is to maintain or even improve the level of services in a population that is aging. The opportunity is the system of quite homogeneous services, which may result in low development costs of novel methods.

In a recent Technology Barometer (Naumanen 2004), Finland was compared to Japan, USA, and five European countries. Most indicators gave high scores to Finland, although quality of life was lowest in the comparison. This was due to low scores in the areas of health and employment. According to the report by Eurostat (EHEMU 2005), the life expectancy is comparable but the health life expectancy is several years shorter than the European average. At 65 years of age, the expected time

free of disability is about seven years in Finland, four years less than in the other European Union countries. This challenge cannot be met only by developing diagnostics and treatment methods. Progress and utilisation of e-wellness is also necessary.

A lot of expectation has been put on information technology as a tool for improving the efficiency and quality of health care. Fast information processing, data networks, mobile devices, web technology, email, online chatting and short messages all have the potential for providing wellness services.

The Tampere Region has world-class knowledge in the field of e-wellness. The two universities and Pirkanmaa Polytechnics are specialised in the education and research of information technology, health science and social sciences. A large portion of citizens are also working in product development and services that provide information technology and health care.

This chapter gives an overview of e-health development in the Tampere Region. It will cover the effects of the local development programs eTampere and BioNext. The role of e-wellness development in facing the future challenges of health care is emphasised in this analysis.

Current activities in the Tampere Region

There are more than fifty thousand people working in the area of wellness in the Tampere Region. Most of them provide health care and education services. Each year around one thousand health care professionals graduate from the two universities and polytechnics, and around two thousand in fields related to health care topics. Recently, special attention has been paid to e-health in the region. Since 2000, several programs and operations have been started in the region. These programs and projects are presented next in chronological order.

The National Centre of Expertise program has resulted in several regional programs that have special competence in local institutes and companies. In 1999, three centres of expertise were founded for an eight year period in the Tampere Region, one of which was named Health Technology (Centre of Expertise Programme 2005). This supports research and development in a wide range of fields, covering cancer research as well as home health care. The main goal of the centre of expertise is to create an innovation system for wellness technology.

The eTampere information society programme, which provides the background of this book, was established by the City of Tampere in 2001. Of its six subprograms, Technology Engine Programmes, Information Society Institute and InfoCity have been most involved with e-wellness and e-health research. For instance, the Special Groups and Information Technology process has resulted in several research projects that develop living and working conditions for disabled people. The idea is that invalid people of the traditional society have become valid citizens of the new information society. In another project named Health Care TV, the use of digital TV was piloted to support self-care and follow-up of certain chronic diseases. In all, there are around twenty projects in eTampere connected to e-health and e-wellness topics. The effect of eTampere on other programs mentioned in this section, as well as to several individual projects, is discussed later.

The PIRKE Development program was also established during 2001–2006 to implement a system of regional information management. It was set up as a co-operation project between the core municipalities of the hospital district, the primary health care of the region and the Pirkanmaa hospital district, which is located around Tampere (Kivisaari, Saranummi & Väyrynen 2004). During the period 2004–2006, the regional information management solutions achieved and implemented

will be extended throughout the area of the hospital district. The development and implementation of a regional information management strategy is based on a mutual agreement entered into by the municipalities and the hospital district. In the provision of medications and imaging, a regional service system is to be set up for the entire population of the hospital district. The pharmacy operations of the hospital district began in 2003, and the regional visualisation system began in stages in 2004. The aim in health care support services is that the regional service systems should cover the entire area of operation within three to four years. Likewise, a regional service system is also being built up in support services, such as financial and personnel management and technical maintenance.

The eHealth Conference series was initialised in 2001 as part of the MindTrek media week. Since then it has been organised every November as a monitor of e-health development, both nationally and internationally. In addition to research experts, the government of Finland and the most remarkable national financers in the field are represented there.

The universities and polytechnics formulated a common regional strategy from 2003 to 2006, which was strongly focussed on wellness technology. The network Hyvite was established to accomplish this. The goal of this network is to carry out research and development in wellness technology for advancing the functionality and health of the population by utilising design for all principles. The institutes have special roles in the network. The University of Tampere is mainly responsible for research methods, while Tampere University of Technology specialises in technology and operation environments. Tampere Polytechnic has a special role in product development and Pirkanmaa Polytechnic is responsible for health care models, practices and contacts to local health care professionals.

Although research and development are the main areas of Hyvite, the integration of new e-health topics to education is also important to train professionals for future needs. The Hyvite network has established a common course taught to students in all member institutions by teachers of all four. Also, a series of doctoral seminars of eWellness was started.

BioneXt Tampere development and investment programme is also funded by the city of Tampere (BionXt Tampere, website). It started in 2003 and will last for seven years. BioneXt focuses on top-level research, product development, clinical application and the international commercialisation of biotechnology for promoting health and well-being. The programme unites the strong technological expertise in the Tampere Urban Region to initiate new research in biology. It also underlines co-operation between producers of health care services, businesses and underwriters. At the same time, the programme lays a new foundation of expertise that enables the strengthening of knowledge-intensive business activity in the Tampere Urban Region.

The health care services strategy of the City of Tampere contains various e-health topics such as the development of personal health records, home health-care and electronic health care services. In 2005, the city launched a new organisational model, in which the organisation contains both service buyers and service suppliers. In this model, the wellness services will be produced by more independent organisations. This means, for instance, that the special health-care and home health-care activities of the city may be organised as business units in the near future. Some of the services will be bought from private companies.

It may be concluded that e-health research and development is active in the Tampere Region. Good examples of local e-health research institutes are Ragnar Granit Institute, Digital Media

Institute and The Biomaterials Research Group in Tampere University of Technology, Institute of Medical Technology, Regea Institute for Regenerative Medicine and Tampere Unit for Computer-Human Interaction in University of Tampere and the Wellness Clinic in Pirkanmaa Polytechnic.

The number of companies and employees in health technology in the Tampere Region is not very high in relation to the activity in research, development and education in this field. However, there are some positive examples. Inion is a company established in 1999, specialising in the development of biodegradable medical implants, which is a fast-growing segment of the global orthopaedics market. This growth is being driven by an ongoing shift from metal implants to biodegradable materials based on a range of benefits they provide to both the patient and the surgeon. The COXA Hospital for Joint Replacement was established in 2002 mainly by Pirkanmaa Hospital District, but it has shown potential to become a prominent national specialist hospital. Completely new private hospitals have also started recently in the Tampere Region. About one hundred smaller companies deal with e-health in the Tampere Region, but the total number of personnel is probably less than one thousand.

Future trends

The development of e-health in Finland is connected to social trends in various fields. Three phenomena characteristic to our society are listed here:

1. The proportion of unhealthy people is high and will probably rise. As mentioned in the introduction, the number of unhealthy years is high with the Finns compared to the reference countries in Europe. Since the relative population of elderly people will rise, it will be

difficult to decrease the number of unhealthy people in the near future.

2. The Finnish health care system is basically free and serves all citizens. This offers the opportunity to utilise new e-health concepts at national level, and therefore affect the national health level. However, local and municipal health care systems are financially quite independent.
3. Research and development in information technology is intensive in Finland. This gives a strong technological background for development of innovative e-health technology.

These three facts also describe the development in the Tampere Region. However, the number of elderly people is relatively low in relation to most other regions in Finland. The health care is more centralised in large institutions such as University Central Hospital and the City Hospital. In information technology the region is specialised in research and development. In summary, the Tampere Region seems to have an almost optimal structure for innovative e-health development. Additionally, other effects of eTampere program in this context have been the networking of institutions and a more positive attitude of citizens to electronic services.

The ability of Finnish society to utilise the information society has been discussed widely. There are positive and negative examples of this. While more than half of the population pay bills using the Internet, few have even considered the use of an electronic signature which is important in many e-health procedures. However, if a system is recognised as useful and easy to use in this society, it will quite soon be utilised by the majority of the citizens.

To overcome the problems arising from the aging of the population, the concept of home health care must be reformed. The homes of elderly people should virtually contain the facilities of municipal health centres today. This would be possible by innovative user interfaces, modern biosensors, fast computer networks, intelligent agents and efficient use of medical professionals. The new generation of home patients will feel safer and still enjoy a natural way of living. The Hyvite network has started an interesting project in home health care by analysing the homes and needs of elderly people and home patients in sparsely populated regions around Tampere.

In the near future, the electronic patient record should be immediately available whenever and wherever it is needed by medical professionals, or by the patient. As a consequence of a systematic national programme, it is already possible in the Tampere Region to view the electronic patient record containing both the text and image data within the network of the hospital district. However, linking between the districts, exchange of data between private and public health care, or availability of the record at home for the patient are challenging goals. Moreover, patients' unlimited access to their own patient record has also been criticised because of safety problems and potential misunderstandings.

Discussion

A lot of expectations have been set for information technology and information society to meet the future challenges of health care. The Tampere Region has the potential to become a pioneer both in the development and application of new e-health solutions. A sufficient knowledge basis is needed in health care, engineering and social sciences. There are few cities where all of these are well represented both in education and research.

In engineering sciences, information technology is not the only important field, but there should also be other technologies to be applied in health care. In the Tampere Region, at least two such fields of engineering have both reached a high scientific level and given birth to high-tech companies. Biomaterials research has direct applications in biodegradable materials and development of monitoring and therapeutic artificial tissues. Optoelectronics is another field of potential, which can be applied both in diagnostics and therapy.

Two effects of the eTampere programme are of major importance when considering the potential of the region in e-health development; namely grass rooting of e-governance and networking. By being identified as an informational city, it obviously increases the readiness of the citizens to use information technology. An obvious effect of eTampere has been the networking of various institutions, which otherwise would not have a natural interactive environment.

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Tommi Inkinen

Social Uses of Information and Communication Technologies

Conceptual introduction

This paper explores the social use of information and communication technologies (ICTs) in the Tampere Region, Finland. It thus focuses on two essential elements: the city as a location and citizens as members of this local information society. Cities and their current state of 'informational development' are commonly assessed through the activities of the ICT industry in the area. Komninos (2003), for example, analyses 'intelligent cities' as locations of innovative production: they are thus measurable through the volume of research and development investments and other 'technopole' metrics. Similarly, if the information society is measured through citizens, the statistics used generally concern households' levels of technology ownership or quantitative data on Internet use.

First, it is necessary to make some conceptual remarks regarding the information society and its citizenship. In this paper, information society refers to the use of technology through three dimensions. First, there is the ICT usage competence level of individuals. In the analysis of citizens' ICT usage, it is always necessary to consider digital divides as an undeniable element of the information society. There will always be groups that are incapable or unwilling to use or adopt contemporary technologies. In this regard, it is as important to recognise the needs of the disadvantaged groups within society, and that the inclusion of these groups is an essential dimension of the inclusive development of the information society.

Second, if we talk about the information society we must understand the social importance of ICT usage. We know from prior studies that the common conceptualisation of the information society among ordinary citizens (for the Finnish case, see Inkinen 2003) is rather pragmatic. For the majority of people, the information society equals the actual use of technology. For this reason, this paper also examines the building of social networks via the Internet. My aim is to evaluate the magnitude and importance of the Internet in the creation of social relations. This analysis gives indications and shows new aspects of the changing nature of social communication. For example, the popular media commonly offer an exaggerated picture of the impact of the Internet on the creation of social contacts.

Third, we must understand the impact of ICTs in people's daily lives. The essential questions are how these devices relate to people's experiences of well-being, stress, family life and happiness. For example, in studies addressing working life and ICTs, it is commonly acknowledged that technology enhances the production process and thus becomes visible in the statistics describing the economic attributes of the information society.

This book is about the local information society in the City of Tampere. From the citizen's perspective, it is important to highlight the social cohesion of the Finnish society. On the nation-state level, the income differences between households are spatially relatively small (SVT 2004). What, then, makes Tampere special in comparison to other Finnish cities? A central aspect is that Tampere has actively integrated the 'social and cultural' side of information society development into its strategy. The City of Tampere has conducted surveys on ICT penetration among its population since 2000. The results indicate that usage and ownership levels are slightly higher than the Finnish average (see Nurmela et al. 2004). However, this is typical of urban areas

in general. Other contributors in this book have discussed the particulars of the Tampere case from various perspectives.

One conceptual clarification is necessary to further specify the focus here: in this chapter, the term information society is used mainly to refer to individuals' use of ICTs (computer, Internet and mobile phone). The selection criteria are based on earlier studies conducted on citizens' understanding of the term information society. In the societal setting, the concept of knowledge society would perhaps be more appropriate. However, as the term knowledge society is often used to describe the common level of understanding, intelligence or creativeness within society, its scope in this context becomes too broad and problematic for our purposes. Thus, when referring to citizens' usage of ICTs, the term information society provides a sufficiently limited conceptual focus for a survey study.

Framing the social use of ICTs

Digital divide, socio-economy and skill

The framework used in this study includes three core issues, of which the question of the local digital divide is the first. The causes of digital divides can be categorised into two groups: gaps caused by the costs and financial attributes and gaps resulting from inadequate competence. In the existing literature, digital divides are commonly associated with development studies and global perspectives (e.g. Norris 2001). The existence of digital divides between the North and the South, as the divisions are often presented nowadays, can quite easily be explained using the gross national product (GNP) or other national level economic indicators, such as average household income per month (see e.g. Compaine 2001).

Digital divides exist on all levels of spatial categories. The focus of this paper is on the regional level within an industrialised

Nordic welfare state, Finland. Regionality is an essential element of policy guidance both in Finland and in the whole of the EU-25. Through regions, we are able to conceive of a local context for the activities observed. This is not, however, to say that location would be a 'container', as philosophised by Foucault regarding 'fix settings for social actions'. Tampere is one of the leading European cities in local information society development initiatives: the local authorities have themselves started to promote the citizen-oriented development of the information society by providing a better platform for other organisations and actors to conduct ICT inclusion projects. As an administrative entity, the city itself modifies the development of the local information society according to its specific needs and preferences.

It is important to recall that digital divides do not only affect individuals. Actually, divides between organisations, both state agencies and private companies, are more easily detected than discrepancies between individuals. This is a question of measurement. On the organisational level, many attributes and causes can be measured through numerical or categorical metrics. I argue that the existence of digital divides in society is, at least, as much a question of conceptualisation and measurement as it is the way in which it is experienced in the everyday life of the citizens. People who are seen as excluded from the information society may not perceive their situation as problematic in any way. The macro-scale social (and economic) indicators easily show differences between regions and actors (individuals and organisations) in ICT usage. However, the most problematic question becomes, how do these experiences transform into experienced and signified reality? An essential characteristic of this paper is to evaluate the 'human-centred' signification of digital divides: What does the usage or non-usage of ICTs mean or represent to citizens living in a certain spatial location with a certain cultural orientation?

Based on the above discussion, the following main problems of digital divides can be formulated. First, how is the social picture of ICT usage problems constructed? Or, what are the essential socio-economic characteristics behind the existing divides, and how vast are the differences? Second, what possibilities do public authorities have to narrow the existing divides? This can be assessed through respondent evaluations of the significance of the divides and their presence in everyday life.

The digital divide theme must therefore be considered as the starting level of the socio-economic framework of the information society. It seems evident that basic economic requirements must be met before a person has access to the information society. In the industrialised countries, economic reasons are often outranked by factors related to competence and know-how as causes of the digital divide (van Dijk & Hacker 2003, 317). The empirical section of this paper considers both domains as regards the working age population. In my approach, the digital divide theme can be viewed as the 'infrastructure' in the analysis of social usage of ICT. From infrastructure we will move to discuss 'content', including the practices of social networking and experiences of the 'speeding up' of society.

ICTs as a medium of social life

The second part of the framework considers the role and significance of ICTs in personal social networking. I am interested in examining certain persistent notions concerning 'location-free' communication. An essential question is the signification of Internet communication: on what scale does the Internet provide a new and in some cases addictive communicative environment to working age citizens? Technology has provided an easier and, in some respects, time- and location-free mode of communication. However, studies on the signified importance of these communications among the larger population remain rare.

The paper also discusses spatial scales. An important aspect in the 'importance' evaluation is the respondents' practices in creating and establishing new social relations via the Internet. A central question in this respect is: 'Is it more common to use the Internet to establish relations with inhabitants of the same country than with foreigners or those in other countries?'

Far too often the societal impacts of technology are discussed from a technology-driven viewpoint. A concept of technological determinism is commonly used to point out the assumption that technology will inevitably lead society to some predetermined destination. In deterministic discourse it is also claimed, usually with no empirical evidence to support the claim, that ICTs might provide important life content through the various communication channels and information sources that it enables. It is necessary to evaluate some of these claims in detail. Fifteen years ago Eyles (1989, 103) wrote a commentary that is still accurate today about the routines and the geographies of daily life:

> Everyday life is . . . a taken for granted reality which provides the unquestioned background of meaning for the individual. It is a social construction which becomes a 'structure' itself. Thus, through our actions in everyday life we build, maintain and reconstruct the very definitions, roles and motivations that shape our actions.

It seems clear that the quote continues to have relevance in the current 'mobile information society'.

When discussing ICTs as a social medium, it is necessary to consider the concept of interactivity. The question of interactivity was central for social scientists who studied the significance of the Internet and other media technologies in the mid 1990s. This was also the period that saw the origins of the triumph of the 'information super highway'. We might say that

interactivity and contextual behaviour are essential nominators for the social information society. Technological development has provided the tools and opportunities for enhanced interactive communication and the transmission of electronic material. However, the exploitation of information is always bound to subjectivity (individual decision making) and subordinated to the social structures and cultural values of the location in question. In addition, we must also understand the importance of spatiality, which is pronounced when analysing mobilities: When the surrounding environments change, interactivity and social behaviour on the Internet change with it. This concerns the impact of the spatial context. Thus, we have to include the significance of mobility and spatiality of usage (the context of an environment) into the analysis of social change.

The question of 'selection' refers to the growing number of issues that citizens must be aware of in a societal setting. Selection refers, on the one hand, to a growing number of services that have emerged on various forums. For example, Internet services complementing (and also substituting for) services taking place in 'real locations' clearly provide us with an increased range of choice. On the other hand, the process also works *vice versa*. The idea of free selection can be seen as a construction serving the goal of efficiency. In time, this will lead to a further shift towards a 'do it yourself' ideology. However, product and service provision is only the practical side of the selection culture. It is possible to observe the phenomenon more deeply and think about the essential causes behind the actions: How are these decisions reached and what are the implications of these decisions in relation to aspects such as privacy and information security?

It is clear that the availability of information has increased after the expansion of Internet usage. We might think that the information society is transformed into a knowledge society at a point at which the general level of 'citizens' knowledge' increases

with societal development. Some theorists argued in the late 1990s that ICTs will lead us to a social revolution comparable to other major innovations in history. I am sceptical regarding the significance of these changes, particularly in relation to a 'social revolution'. May (2002) discusses this issue from a critical perspective:

> There are a number of problems with these overarching claims for revolution. . . . Obviously they involve a view of society that assumes a major determining role for technology. Indeed, technology is perceived as imposing its character on the rest of society. However, technologies are developed in specific social circumstances and deployed reflecting contemporary social relations. . . . The relationship between technology, its 'character' and society is much more complex than unidirectional determinism allows. (May 2002, 13–14)

Indeed, societal change and the role of technology are intriguing phenomena, although they can, in many contexts, also be seen as boringly practical. An important aspect here is the distinction between the 'micro' and 'macro'. All of the above discussion focussed on the macro-sociological perspectives. Yet, even macro-level indicators and discourses are based on individual actions and choices (whether or not structurally guided). The 'change' becomes less dramatic when we stop to consider people's individual social behaviour. This behaviour also has reflections on the experience of the information society.

To conclude the social change perspective, I present the essential questions relevant for this chapter. First, it is necessary to evaluate the extent to which new social relationships are created through the Internet. Second, it is as important to evaluate the significance and depth of these online relations. In other words, is the Internet only an additional communication device, and to what extent are ordinary citizens expanding their social sphere

through the Internet? Third, and perhaps most importantly, this paper looks at the fundamental question of respondents' evaluation of the subjective impact of the Internet on the quality of life.

Stress and fragmentation as two imperatives for 'informational citizenship'

Are we feeling more stressed than before? Are social inequalities increasing? Is the border between home life and work life disappearing? All these questions are nominators for aspects related to the social understanding of the information society. This focus has a clear working-life orientation. The content of the work and the societal structure of sources of livelihood are determinants underlying the occurring visible developments. One of the best-known writers on the 'speeding up' of society is Jeremy Rifkin, who discussed the 'nanosecond culture' as early as 1987. Computer technologies are most often designed to 'speed things up'. How this 'speeding up' relates to the social reality of ordinary citizens is a research area that still needs focusing on.

The social aspects of ICTs have appeared in public debate recently due to the transformation towards increasingly knowledge-based working cultures. Pekka Himanen (2001) writes about 'hacker ethics', according to which young computer hackers (mostly boys/men) are so ambitious about their work that, for them, a lasting supply of soft drinks and a computer are sufficient requirements for a satisfying life. The hacker work ethic is thus based on individual enthusiasm, and Himanen argues that it is replacing the old protestant ethic characteristic of the working culture of information societies. At this moment, however, it seems that hacker ethics are adhered to by only a small group of people. From my point of view, 'high-end' professionals and computer-wise youngsters represent only a fraction of the 'working culture' of the information society. Richard Florida

(2002) discusses the 'creative class' as the primus motor for the information society. Societal change signifies an increased proportion of creative workers in relation to operative workers. Additionally, it can easily be argued that successful societies in global competition can produce industries capable of making the most of creativity.

In Finland, the number of people receiving the 'highest' level of education (including universities and polytechnics) make up approximately 60 per cent of the relevant age cohorts. The competition for employment between the highly educated is intense and continues to intensify. The availability of work, short-term contracts and increasing organisational efficiency are key features of the contemporary labour market for highly-educated people. What perhaps best describes the situation is the experience of lacking time for anything except work.

Blom et al. (2001) have studied 'informational' workers in Finland. Their study clearly indicated the dilemma of knowledge or creative work. On the one hand, knowledge workers get more satisfaction out of their work and are more often content with their work, compared to workers carrying out operative and practical tasks. On the other hand, knowledge workers are more stressed and feel the limitations of time more strongly than other workers. A central empirical question thus becomes, on what scale do ICTs impact the respondents' views of the information society, its individualism and its consequences for the different dimensions of society?

Another important theme in the 'fragmentation of everyday life' is the frequently heard promise of the information society: the emergence of distance work or e-work. The question relates the two essential life spheres of work and home and their emerging fusion and interdependency. This paper approaches the question of 'location-free' employment through respondents' evaluation of their possibilities to decentralise their work. The theme relates

strongly to the notions presented by Florida (2002) regarding the general level of innovative (or creative) work tasks. The level of distance work in a nation-state (or region) can thus be seen as an indicator of the existence of a creative class within the society.

Final commentary on the essential research questions

All of the three domains presented above constitute topical issues than can easily be found in information society related social scientific literature. These domains are interlinked. First, the digital divide thematic provides a practical foundation for experiencing the information society. The existence of a digital divide can, in the majority of cases, be explained through financial and educational aspects. The general level of ICT usage can, therefore, derive from the socio-economic situation. After the definition of different user-level groups, we can focus on the social implications of ICTs. These issues cannot be as easily explained through socio-economy. Rather, they are individually determined reflections of subjectivities and personal histories. In the following, I will evaluate the proposed Contents domain in the light of an extensive survey from the Tampere Region.

Empirical overview

Discussion of the data and methods

The empirical data was collected through a mail survey in May and June 2004 from the Tampere Region (Pirkanmaa). The sample size was 2,000, out of which 1,061 questionnaires were returned (52.6%). The sample derived from two-stage random sampling targeted to three pre-defined regional types (the regional capital Tampere, small towns and rural areas) and households. The sample population consists of working-age people from 18 to 61 years of age. Table 1 presents the essential respondent

information and comparison to official regional statistics (Statistics Finland 2003). The data is representative in the light of background variables.

Table 1. *The data set and comparison to official regional statistics*

	This data	**Statistics Finland**
Average age	41.2	39.4
% of females	55.9	52.3
% with university or polytechnic education	25.0	23.7
% of 30–49 year olds	45.4	44.1
Unemployment rate (%)	7.8	12.3
Average household size	2	2

The data provides information in three layers. The first layer consists of device-related questions that refer to levels of ICTs and home entertainment technology ownership. The 'device' questions are mainly used as explanative (independent) variables in the analyses. The second layer is related to 'practice'. This refers to the contents and frequencies of ICT usage. The practice questions are aimed at finding out what the respondents actually have or have not done on the Internet. The practice questions therefore also play an important role in the evaluation of experience. User experience can be evaluated on the individual level only if the respondent actually has experience of the activities in question. For this reason, the practice-oriented questions also include an evaluation of personal user experience. The third and final layer is concerned with questions related to 'belief'. These questions refer to respondents' beliefs in relation to ICTs, thus recounting common ideas related to concepts of information society, technology and ICTs. However, the respondents' ability to provide fruitful information regarding macro-scale societal issues is rather limited. The 'belief' questions thus mainly provide

insight into common conceptions and thoughts regarding the information society, with no verifiable grounds in direct experience or real knowledge.

The methods applied consist of standard statistical tests commonly used in social research. Most of the questions are statements with five response categories (Likert). There are a total of 99 variables in the data. Ordinal variables are aggregated to form sum-variables. The larger value scale, provided by the sum-variables, enables a more efficient use of numerical testing such as regression analysis and GLM (general linear model). The main methods, however, comprise simple cross-tabulations and χ^2 tests.

All the central themes presented in the theory section are qualitative in essence. It might, thus, be asked whether or not an extensive mail survey can be used to efficiently assess some of the issues presented in the framework. It must be remembered here that the subjective experience can be reached (if at all) only through in-depth interviews. The choice of method is always a trade-off between generality and depth of information (or knowledge). However, the questionnaire used was designed to reach some elements regarding the 'soft' experiencing of the information society. Also, if we want to consider even some very general aspects of citizens' ICT usage experiences, the survey method is the fundamental starting point. After these methodological considerations, I will now apply the three domains identified earlier as a framework to analyse the empirical material. I shall start with a consideration of digital divides.

Digital divides

First, it may be useful to recall some practical facts of computer, Internet and mobile phone usage: in the Tampere Region, 85.9 per cent of the population are using the Internet, 95.1 per cent mobile phones. Over 46.7 per cent of respondents are using the computer for more than an hour per day. On the other hand, a

14.1 per cent share of respondents do not use computers at all (the corresponding figure for mobile phones is 4.9 per cent). The general guideline is thus that if technology is used, it is for the most part used frequently. It is evident that the people not using technologies are also those most affected by digital divides (see also Kling 2000).

The theme of digital divides has two essential strands of argument: cost and competence-related divides. First we look at respondents' evaluations concerning the costs of ICTs. Based on the results, cost is not the most important source of the digital divides. A sum-variable including the following statements was constructed to offer a more general picture of the existence of cost-related digital divides. The statements used were: 'How do you consider your possibilities to purchase ICTs if you wish?' (Scale: excellent–very poor); 'With a view to the cost, how do you consider your possibilities to use ICTs?' (Scale: excellent–very poor); 'Internet usage costs are too high for me' (Scale: fully disagrees–fully agrees). The sum-variable was categorised into four groups according to the aggregate value distribution. The group of respondents who identified their possibilities as the best (costs play no role) is approximately one third (35.1%). On the other hand, the most disadvantaged group covered some 10 per cent of the sample population.

The above questions can be analysed through standard statistical tests on individual and sum variables. Statistical testing clearly brought up that education and current employment status are the most important explanative variables behind the cost-based digital divide. The explanative variables are similar if the second part of the digital divide is observed: the respondents' evaluation of their possibilities to use and interact with ICTs. However, the role of age becomes more prominent in the issues of competence. An interesting viewpoint on the 'Cost and competence' section can be arrived at by analysing the

respondents' evaluations regarding Internet contents: 63.9 per cent of respondents evaluated the general level of Internet content as 'very interesting', whereas less than 9 per cent stated that Internet contents are 'not interesting'. The results clearly indicate that the respondents are able to find contents that interest them on the Internet.

Digital divides are commonly related to regional divisions. If the City of Tampere is compared to other regional categories (smaller cities and rural areas), it becomes clear that digital divides are also a question of urban-rural dichotomy. However, the regional divide is more strongly related to competence level rather than to costs. The regional divide is evident particularly in the amounts of technology use. The usage frequencies of computers and the Internet are the best explanative variables in all segments related to the respondents' experience of ICTs, digital divides included. These results are also supported by other studies (e.g. van Dijk and Hacker 2003).

Perhaps the most important finding based on a single statement concerned the respondents' evaluation of their own need for low cost ICT training. A little less than a fifth (17.4%) fully agreed with the claim. The result indicates that the need for low cost or preferably free training in the use of the Internet is an important instrument in narrowing the digital divide. The age dimension is also clear. There are no considerable differences between age groups until the age of 50. People above the age of 50 report the most difficulties. This phenomenon is most evident in the case of mobile phone use: 3.8 per cent of the respondents agreed fully or somewhat with the statement that they do not possess adequate skills to use the mobile phone. Over 75 per cent of the people experiencing difficulties in the use of mobile phones are over 50 years of age.

The existence of digital divides is, in our framework, largely an age-related question. We might therefore argue that

the magnitude of the divides will decrease in the future. In one sense, we can raise the old idea of computer literacy as a central component. Education, training and ICT integration play key roles in this process. At best, ICTs constitute an efficient educational tool, while in the worst case the technology becomes an end in itself.

Social interactions

The Internet and other communicative technologies are said to make distance meaningless (e.g. Cairncross 1997). If this is the case, the concept of distance probably merits some consideration in this respect. Distance is commonly understood as a practical geographical metric. In some cases, distance is understood as communication. We might think of communication as content distributed through the ICT infrastructure. An essential part of the content is social networking. In the following, some central statements describing the problem of distance and social relations are analysed. Distance is understood here as a spatial concept that includes not only metrics but also, and more importantly, social processes and the signification of spatial context.

In the survey, the network generation potential of the Internet was examined with a number of quite practical questions. The questions included the following claims. All statements are answered through 5-point Likert-scale variables (fully agrees–fully disagrees). 'I have established new social relations via the World Wide Web'; 'I have become acquainted with new Finnish people on the Internet' and 'I have become acquainted with new foreign people on the Internet'. The social networking is thus divided into national and international spheres. A sum variable was constructed on the responses to these claims: 18.9 per cent of Internet users in the sample have used the WWW for social network creation to some extent. On the other hand, 49.1 per cent have not.

Based on the results, it seems that the WWW itself is an efficient medium for social relations creation only for a relatively small group of Internet users. In fact, the share of the 'fully agreed' segment is less than 10 per cent (8.0%) for the statement regarding new contacts to people of the same nationality and less than 4 per cent (3.1%) for foreigners. Distance still seems to make a difference, particularly from the viewpoint of national and international contacts.

I wanted to make a distinction between Internet (WWW) and email communication. The obtained distributions highlighted the fact that email is a considerably more important tool for communication than other WWW-based solutions, such as chat rooms and notice boards. Email was considered an important tool for social interaction by more than 57 per cent of the Internet users, whereas the figure for WWW communication was slightly over 25 per cent. Based on the results, it seems that Internet and email communication function mainly to enhance pre-existing relations. The role of the Internet in the establishment of new relations concerns only a relatively small portion of citizens.

An interesting subjective insight can be obtained through the question 'Would you say that the Internet has improved your social life?' Some 20 per cent of respondents using the Internet agreed either fully (3.9%) or somewhat (15.8%) with the statement. Conversely, the share of Internet users disagreeing with the statement was 54.9 per cent. This finding highlights the fact that technological innovations such as the Internet are fundamentally hollow entities. The signified importance of a specific technology derives mainly from the related social interactions. It can also be argued that even 'one way' information provision is mostly socially driven: people tend to seek information relevant to their lives. These life contexts are social constructed. A central conclusion that can be drawn from this is that with deeper consideration, technology (in this case

ICTs) actually becomes insignificant and the most central aspects originate in the practices of everyday social behaviour.

The mobile phone is an example of a technological solution that has brought new added value to citizens (as consumers). Particular importance was afforded to mobile phones in the experience of safety. Mobile communication, which is in one sense free from distance, has generally enhanced the feeling of security among the respondents (80.1% agreed fully or somewhat). There is a significant gender difference here. It appears that women perceive the change as more significant than men. However, with both genders, the clear majority agreed rather than disagreed with the statement.

Comparing the technologies assessed in the survey, it is evident that mobile communication has had the strongest impact on daily life. Only 11 per cent of the whole sample population disagreed (fully 2.8%; somewhat 8.2%) with the statement 'Mobile phones have significantly contributed to making my life easier.' Interestingly, the youngest age groups evaluated the change as the greatest. The positive assessment of mobile communication is easy to understand. Wireless communication has provided considerable benefits and improvements in daily life. The unequalled penetration of mobile phones among citizens worldwide has demonstrated the speed of technological diffusion. The benefits of mobility are clear to most people and the development of easy-to-use interfaces has evidently been a determining factor of success for business in general.

The speeding up of society, stress at work and individualism

The third dimension of the empirical segmentation concerns the 'speeding up' of society. Juha Siltala (2004), a Finnish historian, has discussed the birth of 'turbo capitalism'. He uses the term to describe the increasing project-nature of work with tight and often too narrow deadlines. Score cards, gross incomes and deadlines

have entered the common language of the contemporary work sphere.

The following statements were employed in the survey to get an idea of the dynamics of these problems. First, we asked whether or not the respondents were feeling more stress, in their own opinion, than they were three years ago. The portion of citizens agreeing with the statement fully (20.8%) or somewhat (25.7%) was slightly less than a half, whereas one third of the group disagreed with the notion either fully (15.4%) or somewhat (18.6%). Whether or not these differences are significant, it can be said that there is a large group of individuals that experience no increase in their personal stress level. Second, I wanted to review the respondents' opinions regarding the mixing of home and work spheres. With the claim 'Work and home spheres are mixed in my case', 53.6 per cent of respondents fully disagreed and only 5.1 per cent fully agreed.

The result is clear. The intertwining of home and working life that is often discussed in the information society literature empirically concerns only a small portion of the total population. Third, I asked about the respondents' conception of their own Internet usage. The exact formulation of the claim was: 'In my own opinion, I use the Internet too much.' Methodologically, the question is problematic as respondents have a tendency to provide answers that are more neutral than their daily reality. However, the share of people agreeing either fully or somewhat was less than 4 per cent. Viewed in this light, it seems that 'net addiction' concerns only a relatively small minority of the population.

If we look at the explanative factors behind the distributions, it becomes clear that the increase in stress is more pronounced in the more educated parts of population. The most important explanative socio-economic variable is current employment status. The computer and Internet usage levels are closely linked to the phenomena. Persons using ICTs on a daily basis are more

likely to experience stress frequently. The results support earlier studies (e.g. Blom et al. 2001) analysing the socio-economic dimensions of working life and work experiences. The results are also regionally biased. Respondents from the City of Tampere differ from respondents living in small towns and rural areas. The regional difference can be understood via socio-economy because a larger proportion of highly educated respondents (those with an academic degree) are from the regional capital.

The work orientation of ICT usage became clear from the claims concerning distance work. I wanted to look at the question of distance work from the viewpoint of respondents' general possibilities to engage in distance work if they wished. Two opposite claims were used: 'Is it possible for you to work from home if you wish?' and 'Distance work is not suitable with my line of work'. According to Statistics Finland, the amount of distance work carried out in Finland is between 10 and 20 per cent, depending on the definition used. This data indicates that a little less than 15 per cent fully agree with the statement that they have the option to work from home if they wish. More importantly, more than 50 per cent (precisely 51.2%) fully disagree with the statement about having the opportunity to work from home.

Innovative and creative work is always connected to a personal thinking process and the immaterial production of knowledge and practices. Thinking is, in most cases, a process that is not spatially bound to any particular location. This is not to say that the intellectual environment in general would not have an impact on individual creativity; however, this concerns brainstorming and the collective exchange of ideas. In many cases, knowledge exchange can take place effectively also through ICTs. However, at the moment, it seems that the growth of distance work may remain stagnated until there is a new increase in the number of 'knowledge-intensive' job positions. Of course,

employer attitudes and beliefs related to working from home also continue to constitute a crucial bottleneck in this respect.

Regarding working life and the observed technologies, it seems that the number of knowledge-intensive workers or people in occupations requiring efficient and fast ICT connectivity is limited. For example, less than 20 per cent (16.9%) of respondents assessed that they require, even occasionally, work-related mobile applications such as data transfer, conference options (multi-voice and loudspeakers) and laptop synchronised calendar options. These tools are designed to meet the needs of workers 'on the move'. Contrasted with the findings regarding the possibilities to engage in non-location bound work, it seems that the two issues go hand in hand. When the working culture in general moves toward location-free knowledge intensiveness, the interest in data transfer and its significance for the population increases. On the other hand, it will be interesting to see whether or not the increase in knowledge intensive work will actually mean an increase in marketing and project management positions promoting increased consumerism and, at the same time, the increase of short-term project-oriented work with low security in terms of continuity.

Discussion: Signification of practices and technological determinism

I have demonstrated some examples of predefined arguments and their relative distributions in a survey concerning 2,000 citizens of the Tampere Region. The citizens' perspective is the most essential if a socially sustainable information society is to be constructed. An essential consideration here is that of the routines embedded in daily life. This simply means that the practices of daily life commonly constitute routines. Even the most innovative work tasks or activities are, in essence, often carried out as routines. This refers to the automation of life: we generally do things we are

good at. This has the consequence that we tend to 'practice' them, and after a sufficient period of time has elapsed we no longer stop to think of the actions and tasks involved in a holistic way.

How does all this relate to ICTs or the information society? Most of the activities carried out through these technologies are not seen as problematic for individuals. They are embedded actions taken for a specific purpose. The situation can be compared to the use of the fixed line telephone. The device itself constitutes an uninteresting tool – the actual element of interest is network creation. The tool as such simply constitutes a 'practical' question of engineering. In Finland, the engineering rhetoric has, however, had the loudest voice so far: technological determinism and the inevitability of technological development have undeniably formed the framework for the linguistic construction of the information society.

An essential element of 'practicing' the unproblematic is the two-fold organisation of current urban life. The distinction between leisure and work has formed the dominant dichotomy in the lives of citizens since the era of industrialisation. There are several arguments (e.g. Siltala 2004) supporting the claim that the importance of work and success holds a significant position among current lifestyle values. Based on empirical results, it seems clear that with reference to current values, these commentators are looking quite far into the future. At the moment, citizens' evaluation of information society technologies takes place in relatively practical terms. Interestingly, in the majority of the cases, the advances in ICTs are reported and discussed only in terms of the sharpest edge of current developments. In many cases, new technological innovations replace older ones before they even properly reach the market. The increase in computing power has made its mark on the microchip industry ever since its emergence. Whether or not citizens (consumers) can keep up with the developments appears, regrettably, (in most cases) an irrelevant question.

Conclusive reflections on the future

Perhaps the most essential point in this consideration is to position the ordinary citizen at the fundamental core of society. The vast majority of information society literature perceives the citizen as a target. Innovation processes and actions are designed to produce and facilitate new methods and activities, and citizens are expected to adopt the new innovations handed down from above. In economics, Say's law refers to 'supply side economics', stating that the supply creates its own demand. Our consumer choices are therefore in most cases predetermined and the 'free' choice is more a myth than existing social reality.

The analysis brought up the following essential issue in the information society development, including the creation of knowledge and competence. Most of the technological solutions are designed with the goal of being 'as easy to use as possible'. Information society is thus also a question of power. These power relations constitute a division between those who are able to understand the operative structures beneath the 'creamy surface' and those in a subordinate position in society. In many cases, it seems that the 'easy-to-use' ideology will inevitably lead to a more biased society with a small fraction of real computer professionals and a vast majority of 'push-the-button users'. The development started when graphic user interfaces began their triumph in the early 1990s and, in particular, after the launch of Windows95™. Whether or not this is desirable is another question, but it is evident that knowledge regarding computers has become less important for citizens who are commonly viewed as objects not expected to think but to 'do it the easy way'. Through this type of development, the information society is in danger of drifting further away from the knowledge society.

This question also has an impact on working life. In many offices and workplaces, the increasing tightening of e-security has

led to an arrangement where only certain system administrators are able to install programmes and software onto the workstation. This can cause delays of many days, naturally depending on the organisation, as IT support staff are often profoundly over-employed and thus rarely have the opportunity to attend to basic operations such as installing relevant programmes. These issues have an impact on the production paradox and on why increases in ICT investments fail to introduce the desired increases in total productivity. There are also experiences that system administrators, aware of their superior knowledge, may act arrogantly towards those requiring their help with their workstations. From an economic point of view, these are relevant questions of efficiency and organisational functionality.

Moreover, study on mobile communications has yielded a number of socially interesting findings, including the expectation of constant accessibility. In other words, the development of ICTs fosters social behaviour based on instant communication and constant accessibility, regardless of situation. In this way, technological development functions to alter the fundamentals of human behaviour, but these changes do not derive from the technologies themselves. They originate in the adoption process and the routines of daily life. It is also essential to understand that the most significant technological changes are often invisible to ordinary citizens. The end-user products analysed in the empirical part constitute only a fraction of the entire spectrum of life-changing technologies introduced in recent years. As demonstrated in the analysis, their significance should not be overestimated, as often happens. In one sense, this connects the information society to the consumer society. The information society is in many cases constructed through business, marketing and technology industries.

We might analyse the data also from a comparative viewpoint. If the obtained results are benchmarked with other

statistical resources concerning citizens' ICT usage in other cities and regions, it seems that whether or not the Tampere Region is seen as being at the forefront of national information society development, at least the statistics for Tampere are above the level of average national figures. However, it should be remembered that the comparability between different datasets obtained by different surveyors is rather low. Often, only indicators concerning technology penetrations, device ownerships levels, technology usage times and Internet usage contents are comparable. More complex and 'experience-related' indicators are easily affected by the phrasing of the question. Essential characteristics of the Tampere case involve investments to educational events targeted at ordinary citizens.

Several projects focusing on computer training among specific target groups are currently active in Tampere. The communication and data transaction speeds continue to develop. With a view to future developments, it remains to been seen whether or not this will generate new and enhanced practices of everyday life. As discussed earlier, there are various alternative social pathways that may actualise in the future. Education is an essential element in the increasing of knowledge. ICT should be incorporated at all levels of educational systems. Preferably, education will lead to a more conscious society that is also aware of the problems related to increasing digitisation of services and activities.

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Marika Lehtonen and Hannu Soronen

Challenges to e-Inclusion in a High-Tech City

Introduction

What is e-inclusion?

It is needless to say that citizen participation is a crucial part of democratic governance. Many cities have taken this into account by making specific efforts to guarantee their residents' opportunities for participation.[1] Rights to participate in and influence city government have also been extensively acknowledged in legislation.

Among other things, participation requires channels for receiving as well as sending information. This chapter deals with electronic participation as a way to expand the public's opportunities to contribute to government and be an active part of civic society. Electronic communications – i.e. the Internet and various mobile solutions – can offer new channels for participation. For instance, the City of Tampere has already introduced several opportunities for electronic communication and e-business.

From the social perspective, citizen participation is a way to receive direct and fast feedback on the actions of public administration. In an ideal case, participation helps to establish a genuine interactive relationship with the citizens, who should be the ones benefiting from the work of the administration. Moreover, in the case of electronic participation, reducing expense and streamlining administration can be expected. For instance, by using electronic communication systems in elections, the costs of hiring election assistants would most probably be reduced. In addition, a well-designed opinion polling system might reduce

the workload of officials and facilitate more interaction between administration and citizens.

From the citizens' point of view, diverse participation opportunities promote networking, new forms of civic activity, access to information and e-business. Access to networks is the first requirement for electronic participation. In addition, citizens must have the necessary skills and motivation to use electronic communication systems. Without access to networks or skills and motivation, a serious risk of social exclusion emerges. In today's world, electronic communication and different electronic services have become such a widespread means of interaction and finding information that those who, for one reason or another, do not rely on the use of information technology are becoming a minority. Being part of this minority can, in some cases, be a disadvantage. For instance, employers often expect job seekers to have good IT skills and experience. In this connection, the concept of 'digital divide' is widely used to refer to the social gap between those who have ICT access and those who do not.

Digital divide

The new technology entails a built-in threat of producing marked social differences. According to the *moderate expectation,* the resulting inequalities are only temporary and concerned with peoples' skills and ability to use networks. There will always be differences in these skills. The *extreme expectation* claims that the Information Society builds new gaps and strengthens old ones between social groups. (See e.g. Sassi 2002.) According to the more optimistic views, inequalities belong to the first phase of the Information Society, and the differences will diminish with time. It has been argued that previous inequalities are already diminishing. It is true that in Finland the gap between the sexes has already disappeared in this respect and that the elderly are eagerly learning how to use the Internet. However, deeper

problems still exist. The Information Society, therefore, must be built alongside the physical and social society. Comprehensive access to and use of technology is not an easy solution to the problem, but it can help us find new ways to build a better society.

The debate on the digital divide has been going on for decades. In the 1970s, the focus was on television, radio and telephone, and discussions revolved around how new information and communication systems would attempt to narrow the gap between the developed and developing countries. The traditional media are important symbols of modernisation, but they also represent a means to participate in the democratic process (Sassi 2002). The Internet, however, is truly another matter: 'Information technology and the ability to use it and adapt it is the critical factor in generating and accessing wealth, power and knowledge in our time' (Castells 1999). Freedom of action, two-way communication, online participation and the ability to form networks do set the Internet apart from other media. It is thus crucially important that everyone has access to the Internet as well as both the skills and motivation to use it. In Europe, the role of active citizenship (community participation) has been emphasised; while in the US the major concerns have been those of the markets and economy (equal access to the Internet promotes competition).

The term digital divide means inequality regarding access to information or knowledge and user skills. The divide is not simply technological in nature. It is more than a lack of computers (Servon 2002). According to some, the digital divide is just a new concept for poverty: 'It appears that the Information Society is not creating inequality but merely moving poverty and other social problems and inequalities from one place to another' (Hietanen 2001). It is poverty that produces the divide, not vice versa. It is also clear that the problems tend to polarise. Society

will be equipped with a highly skilled elite who have it all, who live in certain well-off areas and have excellent job opportunities. On the other hand, there will be a growing number of people who have no value in the job market, who live in problematic low-value areas and have little interest in and limited access to the Information Society (Castells 1999).

Inequality is a multifaceted phenomenon. In fact, it is a 'process, not a condition. Those who are excluded and included, change over time depending on education, demographic characteristics, social prejudices, business practices and public policies' (Castells 1999). The most vulnerable people are (OECD 2000):

- people with special needs or physical handicaps
- the socially and economically underprivileged
- ethnic or language minorities
- the socially excluded
- people living in rural areas
- the elderly
- people who are alienated from technology.

In the background of the social exclusion, one can typically find poverty and problems concerning employment, democracy, the welfare system and family/community. If one of these areas is weak, the others should compensate and help the person to overcome his or her troubles. In true social exclusion, all these problems tend to exist in parallel with each other.

In Finland, the Information Society has been built upon the welfare state. The welfare services (education, public libraries, democratic governance and social services) were developed a long time before anyone had even heard of the phenomenon called the 'Information Society' (Hietanen et al 2004). This may be a key element in understanding the successful progress of the Information Society in Finland.

In Castell's famous words, 'the real digital divide starts when you are connected'. The question now remains: when we reach the theoretical 100% access to the Internet, can we say that citizens are equal? Clearly, the answer is no. Inequalities will persist. The use of the Internet will be in focus this time – for example, do people use the network for personal growth, or will they just seek entertainment and shopping opportunities? Are people participating in building the digital world? Are they producing web content or demanding content for themselves? The inequalities seem to lie deep in the heart of the structures of society.

The digital divide can also present itself as a geographical division. This will most likely occur between urban and rural areas. Metropolitan areas as well as other large cities can be seen as centres of wealth, power and development – including technological development and the use of new technologies. On the other hand, rural areas often face the problems of economic stagnation and migration to the cities.

Urban bias in the distribution of any kind of welfare is especially clear in many African countries. In former colonial countries, large cities have, for historical reasons, gathered together administrative and private-sector activities, leaving the rural areas behind in development (Hope 1998). Nevertheless, urbanisation and the rural/urban division are also current phenomena globally. One of the trends of the *Information Age* is the birth of megacities (Borja & Castells 1997). At the same time, the world's total urban population is increasing rapidly. It has been estimated that by the year 2025, 61% of the world's population will live in cities (United Nations 1996). In the case of ICT, it is yet to be seen if and when the rural dwellers will have equal opportunities for e-inclusion when compared to urban residents.

Telecommunication connections in Finnish households

Recent changes in the distribution of telecommunications

The prevalence of mobile phone connections among citizens offers a good foundation for various mobile services: currently, over 90% of the Finnish population have a private mobile phone.[2] Despite the high number of connections, mobile services have not yet made a clear breakthrough. Only among children and teenagers have some mobile services become relatively popular. However, the success story of mobile phones has resulted in the decline of fixed-network telephone connections. Over the course of 10 years from the early 1990s, the penetration of fixed-network telephone connections in Finnish households fell from 94% to 64% (Ministry of Transport and Communications 39/2004, 7). The change in the situation has also been facilitated by price developments; in other words, the prices of fixed-network telephone connections have gone up and those of mobile phone accounts have come down (Ministry of Transport and Communications 21/2004).

Together with the dramatic decline of fixed-network telephone connections, there has also been a change in the division of different types of household Internet connections. The number of modem connections has decreased in line with fixed-network telephones, while at the same time, broadband connections have become increasingly popular (Ministry of Transport and communications 39/2004). In June 2005, Finland reached the milestone of one million broadband connections, and currently some 37.5% of households have a broadband connection (Website of the National Broadband Strategy). The percentage of households with some type of Internet connection is approximately 50% (Information Society Council 2005). The increased popularity of broadband is also due to price-cuts

in these types of connections. In addition, the rather aggressive advertising and fierce competition between service providers have increased consumers' consciousness of broadband. Furthermore, many regular Internet users have gotten used to having a fast Internet connection either at work or at school; they have thus started to demand more from their home connection and, in many cases, replaced their old modem connection with broadband.

However, the basic use of the Internet does not require a broadband connection. Even with a dial-up modem, one can receive and send email or pay bills. Still, the prevalence of broadband connections has risen very quickly. The subjectively felt need for broadband has penetrated the whole population. The broadband connection (ADSL) has gradually become a synonym for the Internet. For the past few years, the Tampere Region has been a pioneer in this process with remarkably higher penetration rates than the rest of the country. The eTampere (http://www.etampere.fi/en/) service has also provided a web-based, unbiased fee calculator for finding the best broadband service provider in the area, which has helped people in the acquisition process and developed the market.

Users and non-users of broadband

Even though broadband is becoming a more and more popular route to the Internet, it has not spread evenly among different social groups. For instance, broadband continues to be a more common type of Internet connection in wealthy households than in low-income families (Ministry of Transport and Communications 37/2004). A study conducted in the spring of 2004 by the Finnish Ministry of Transport and Communication (N=1001) shows that in households with annual gross earnings of over 30,000 euros, there are nearly twice as many broadband connections as in households with lower incomes (ibid., 10–11).

Whereas 28% of the households in the higher income groups have broadband, only approximately 15% of the households with annual gross earnings of less than 30,000 euros have this type of connection. This is a very strong indication that the costs involved with the use of broadband connections are too high for many low-income households. In fact, another study by the Finnish Ministry of Transport and Communications (27/2003) showed that, in many cases, the reason for the rejection of broadband may well be cost-related. This qualitative study points out that people who have financial difficulties may feel that they cannot even afford to buy a computer. Furthermore, while the monthly usage fees of broadband connections have decreased in many regions of the country, they still add up to a considerable amount of money per annum.

Table 1. *Households with broadband according to annual household gross earnings (%), N=1001*

	INCOME 2004			INCOME 2002		
	Less than 15,001 EUR/a	15,001–30,000 EUR/a	Over 30,000 EUR/a	Less than 15,001 EUR/a	15,001–30,000 EUR/a	Over 30,000 EUR/a
Households with broadband	14	16	28	5	5	12
Households without broadband	85	82	68	92	93	86
Do not know	1	2	4	3	2	2
	100	100	100	100	100	100

Source: Ministry of Transport and Communications 37/2004, 11

There may, however, be some positive developments ahead, since user fees have just started to approach the level which the interviewees considered reasonable in the aforementioned survey

(ibid.). If the prices of computers and other appliances continue to decrease as well, these changes may very well make it easier for low-income households to receive broadband. In addition, the less expensive joint broadband connections for apartment buildings can also improve the situation in urban and suburban areas.

Educational level, occupational status and age are also important factors dividing those who have broadband at home from those who do not. Of those survey respondents who have a higher education degree, 29% had a broadband connection (Ministry of Transport and Communications 37/2004). Of the respondents with secondary-level education and of those with below secondary-level education, only 23% and 13%, respectively, had broadband. Correspondingly, students (32%) and the employed (25%) were much more likely to have a broadband connection than people who, for one reason or another, were out of work (15%).

Table 2. *Households with broadband according to respondents' occupational status (%), N=1001*

	OCCUPATIONAL STATUS 2004			OCCUPATIONAL STATUS 2002		
	Employed	Unemployed	Student	Employed	Unemployed	Student
Households with broadband	25	15	32	11	3	13
Households without broadband	69	80	61	87	97	83
Do not know	6	5	7	2	–	4
	100	100	100	100	100	100

Source: Ministry of Transport and Communications 37/2004, 11

When it comes to the age of Internet users, broadband is mostly part of the life of teenagers and young adults. In the age group of 45–74, only 11% have broadband at home, while in younger age groups about 30% have this type of Internet connection. Households with several people living together are also more likely to have a broadband connection than households of 1–2 people. Obviously, families with children have realised that because of the fixed monthly price, broadband is the most convenient option for them: when there is no economically based need to control the time used on the Internet, every member of the household has the opportunity to use it as much as necessary (ibid.).

Single and two-person households seem to be much more doubtful about the suitability of broadband for their situation. While about 30% of households with 3 or more occupants have broadband, in households of 1–2 people the proportion is 13–16% (ibid.). One reason for these differences in ownership of broadband connections is again the cost of Internet use: fixed monthly rates may seem too high in single or two-person households unless there is a need to use the Internet extensively.

However, there is also another reason concerning single households and those living in a rather small apartment in particular, as some participants in the qualitative study felt that it would be difficult to find a place for a computer at home (Ministry of Transport and Communications 27/2003, 32). This is a matter of taste – and also simply of space. When there is not much room, one really needs to consider which items of furniture and technology can be brought into the home. Furthermore, using the computer and the Internet at home may also change the nature of the space; in smaller apartments, the computer is often placed in the bedroom rather than in the living room or the kitchen. The bedroom, however, is traditionally considered to be a space for rest and relaxation, and bringing in a computer may

create a sense that the nature of the space has changed altogether in a more active direction.

In addition, computers continue to have the appearance of office appliances, and some people may not want to bring these types of items to their neatly furnished, cosy and small apartments (ibid.). Nevertheless, there are some promising changes already taking place. There are flat screens and laptops on the market whose appearance is already much more attractive than that of a traditional-looking PC. It therefore seems that, in this regard, designers and manufacturers have taken the changing needs of consumers into consideration.

Interestingly, the place of residence also affects the choice of the type of Internet connection. Of those who live in the city area, 28% have a broadband connection, while in rural areas, the proportion is only 8% of households. It seems that the reason for the paucity of broadband connections in the countryside is not a lack of interest alone (ibid., 12), and that the absence of broadband services offered continues to play a major role in many areas outside urban and suburban areas. However, this factor is now changing, since broadband service providers are becoming more interested in the potential customers living in rural areas. Still, the lack of commercial competition in the countryside has, to date, affected the monthly usage fees of broadband connections in such a way that the fees are usually higher in rural areas than in the larger urban areas. This has made it easier for cities to attain e-inclusion of all residents. It must be said, however, that in the long run having rural residents fall behind in the use of ICT is not a positive development from the viewpoint of city residents, either.

It is possible that personal computers with an Internet connection will never cover the entire population, simply because of the costs and the lack of computer skills. However, the television has inhabited Finnish living rooms for decades and,

in the near future, digital television will make limited Internet connections available to every household. Finland has decided to discontinue analogue television broadcasts by the end of 2007. At the time of this article being written (Oct 2004), the prevalence of digital set-top boxes was 16% of all Finnish households. This means that the numbers have tripled in just one year (Finnpanel 2004). It looks as if the idea of 'the Internet for everybody' could well become reality through television. Tampere has been aware of this and already started producing current-topic content via digital cable broadcasts.

Ways to promote Internet use in cities

Education and Internet skills

The Internet has quickly become an essential part of everyday life in Finland. Every hour, it is used in thousands of schools and workplaces for communication and information searches. How has this been achieved in such a short period of time? A lack of Internet skills and knowledge can be a strong barrier to the use of the Internet. It is relatively easy for naturally curious and technologically oriented people to learn even difficult Internet skills spontaneously or with peer tutoring. For most of the population, however, this requires a specially designed curriculum with a professional instructor. For beginners, high-quality instruction is crucially important. According to the latest surveys, a third of the Finnish population wants to have Internet education, and among those who are suspiciously disposed towards the Internet, the number is even higher. Still, it must be noted that Finns are not prepared to pay high fees for this education. Almost one fifth of the respondents were only interested in free education. Adult education centres are often regarded as the best places to have good, inexpensive education.

It is therefore evident that educating the whole nation would require public funding.

Beginner Internet users are quite demanding when it comes to how the education is organised. Instructing those who, at present, have no experience in the use of the Internet at all will present considerable challenges for the educational administration. It is important that the teacher is skilled in both the technology itself and in the content of the Internet. But the teacher must also have pedagogical skills. He or she will need X-ray eyes to identify those students who need extra care or display anxiety when asked to use technical devices. A good teacher should be encouraging and easily approachable. The students should feel comfortable talking to the teacher, who should therefore use non-technical concepts and plain everyday language. Especially for those suffering from technophobia, it is crucial that the first encounter with personal computers is a positive experience. A negative one might stop the student from trying. In some cases, it might be useful for the teacher to be a peer who knows the group of students as well their individual needs and levels of skill.

It is also advisable to proceed slowly in the education and allow the student to absorb new ideas and information at his or her own pace. The new skills should be integrated into the student's previous abilities and working styles. The examples used in the instruction should include some specific, familiar situations. The curriculum should always include something personally relevant to the student. For one student this might entail websites on genealogy while for another it could mean an e-shop selling seeds of rare plants. After the beginners have begun to feel more secure and confident with their new skills, they may be introduced to more versatile uses of the Internet (discussion forums, e-shopping, ordering tickets, etc.) if they so desire.

For most people, mastering the *basic use of the Internet* is all they want. Basic use includes receiving and sending *email,*

searching for information with search engines or ready-made portals as well as *paying personal bills*. In fact, e-banks have become extremely popular in Finland in just one decade (Fig. 1). More than half of consumers pay their bills via the Internet. Only senior citizens (over 65 years) still prefer the more traditional face-to-face bank services.

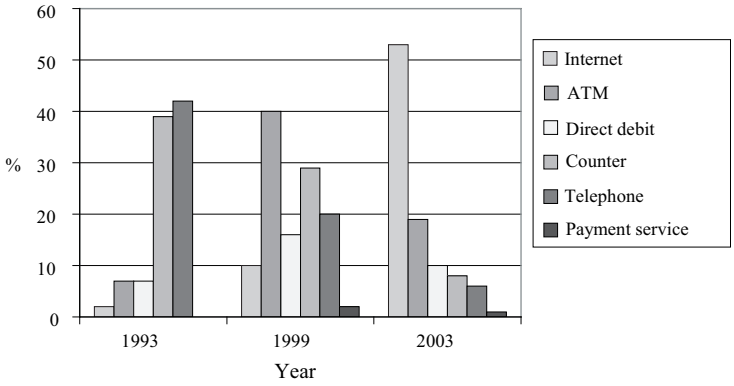

Figure 1. *The most common way to pay bills (The Finnish Bankers' Association 2003)*

The IT courses should be brought as close to the student as possible to allow easy access to the education. This could be done in a café, an Internet bus, neighbourhood office or a meeting place for a housing association/company. In Tampere, education has been organised by, for example, *Mummon Kammari* ('Granny's Room'), a local meeting place for senior citizens. The place is sponsored by the Evangelical Lutheran Church of Finland and run by volunteers. *Mukanetti* is an association which was established in 2000 to provide education in Information Society skills for senior citizens in the Tampere region. The association provides basic training in information technology, personal

introduction to the computer and instruction in different kinds of situations, in addition to tutor training, home tutoring and an Internet café. Courses for advanced users are also available. These are living examples of successful projects that have promoted the equal development of the Information Society in Tampere.

At workplaces, we can clearly see what technology has done and what it has changed. Communication has been sped up by mobile phones and email. Information searches have become easier, but the increase in the amount of information has also created the problem of information overdose. What about future generations? How are our children being brought up to enter the Information Society? If the change has been impressive at work, then the shift at the elementary school level can only be described as remarkable. The use of computers and the Internet is vital for the modern pupil. All elementary schools within the Tampere region are connected to the Internet, and schools will soon get an electronic learning environment which will include teaching material from the national curriculum. This system will enable individual and yet diversified education across school grades, and will also make teachers better-equipped to communicate with pupils and their parents by allowing, for instance, feedback or real-time questions and answers.

The use of technology is incorporated into Finnish basic education. To proceed in studies, students need to have adequate PC skills, for example to find information related to biology or the Finnish language. The use of the computer does not need to be separated from other subjects, and it is inevitable that online activity will increase with new generations.

The use of computers, the Internet and media literacy have even been taken into account in the Finnish day-care system. The personnel are educated in basic computer skills, and day-care centres are provided with equipment and age-appropriate software for children. The day-care centres cooperate with parents

in developing different kinds of activities that can be done with the computer, both for entertainment and useful purposes. With regard to small children, much attention has been paid to the fact that the computer and the Internet also contain serious threats and risks to children's development.

Motivation and Internet content

Education gives people competence to use the Internet but, apart from that, one should have motivation. Motivation can arise if electronic interaction offers some kind of advantage compared to traditional face-to-face or written interaction, such as speed, independence of place, the latest information and savings in time, trouble and traffic, especially when one lives outside the city area.

The motivation should, though, begin from the content the Internet has to offer to the user. A personal meaningful relationship with the Internet and its services is the most positive reinforcement for future use. It may be fairly easy to create services for the skilled user, and the services can be experimental and even technologically demanding (such as e-voting or e-shopping). But what to offer inexperienced users or the general public? During a training course, a person may use a whole range of Internet services but fail to continue to use these services when acting independently. As mentioned earlier, it should be realised that for a great number of people, basic use of the Internet is sufficient. More advanced use will gradually grow with more experience. One of the most sought-after contents is *information*. People will always need timetables, contact information or records of municipal administrative decisions. A beginner will definitely appreciate information that is gathered into one place instead of searching for the bits of information from separate sources.

It is also important that users have the opportunity to participate in producing content for the Internet. Only when true participation is made possible is the commitment of all parties

guaranteed and the content utilised continuously. A good example of this is the Helper Portal (the 'Valid for Information Society' project[3]), which is currently being developed for the disabled in co-operation with volunteer organisations, employment authorities and social welfare authorities. Its goal is to provide a complete database of professional aid workers for disabled people. Companies and entrepreneurs that produce home care and health services are included in the system. Users can contact the portal by telephone, computer and, later, digital television.

Some disabled people have excellent occupational abilities but lack computer skills. Physical or psychological working conditions may also restrict their opportunities in the labour market. For them, the utilisation of public education services is difficult due to obstacles in the teaching environment or a lack of aids or skilled helpers. Even the speed of teaching may not take their disabilities into account. Tampere has launched a special project (the Tre@validia project), funded by the European Social Fund, to provide education in computer skills for the disabled.

Public and mobile data terminal devices

As we have seen, some citizens may have difficulties obtaining a broadband connection or purchasing the appliances necessary for Internet access (i.e. a computer). For this reason, the e-inclusion of all citizens requires efforts to improve Internet access for those groups in society who otherwise would be in danger of being left outside the reach of electronic communication. The ways in which Internet access is improved must thus be varied. For instance, Internet cafés may fit the urban lifestyle of busy people constantly moving from one place to another – when there is some spare time, one can pop into a café and glance through the daily electronic papers or send a few emails. However, if the objective is to promote the accessibility of the Internet to the current non-users, the usage fees should not be too high.

These public Internet access sites should also have the kind of atmosphere in which many different types of people feel comfortable. The places should therefore not be designed solely for 'the young and fashionable', since the more mature generations also need to participate in civic society via the Internet. This factor will become more and more evident as the age structure in Finland changes, as it will also do in other European countries. There will be a large proportion of senior citizens who are still very active users of different services and willing to participate in public decision-making. In addition, there should be staff available to give proficient and friendly assistance to customers in the Internet cafés. As discussed above, many of those who do not use the Internet regularly also have insufficient computer skills. Nevertheless, public Internet access sites should also attract those who feel that they cannot cope with a computer without the opportunity of asking for help.

To reach the most excluded sections of the population, however, Internet cafés should not be the only sites for public Internet access. For some social groups, the best place to use the Internet might be presented by the familiar surroundings where they go about their daily activities. Such places as railway stations and super market entrance halls could, therefore, be used as public Internet access sites.

The City of Tampere has made an interesting and also very successful effort to improve public Internet access by introducing an Internet bus. The name for the bus, 'Netti-Nysse', was coined from the Finnish-language colloquial term for the Internet and a local nickname for buses (www.tampere.fi/kirjasto/nettinysse/). The Netti-Nysse is part of the Tampere City Library organisation and also connected to the eTampere programme. The idea of the Internet bus is to encourage people to become acquainted with computers and the Internet. Free-of-charge Internet courses are organised in the bus for all Tampere residents. Courses are offered

in different parts of the city, since the bus can easily travel around and come, for instance, to the customers' own neighbourhood.

The public library organisation has, on the whole, a pivotal role in offering opportunities for Internet use in Finland. The national library network is extensive, and library services are free of charge for all citizens. In addition to book borrowing and other information services, libraries offer the opportunity to use computers with Internet connections. Libraries also organise Internet courses for their clients. These practices are in line with the EU Parliament's report (October 1998) stating that the basic function of libraries is to offer free access to the sources of information regardless of one's place of residence, education and social status.

e-Inclusion is about making it easy to get connected in any place and at all hours of the day. One way to promote this is to improve the possibilities for mobile Internet connections. The need to access the Internet with one's own data terminal device on a temporary basis is clearly growing. In many jobs, moving from one place or office to another is already so common that mobile Internet access is almost a necessity, which means that there is a demand for the development of ambient intelligence solutions. In this area of research and development, there seems to be considerable potential. Furthermore, in the future, the need for mobile connections will spread from the work context to all areas of life.

Local efforts at e-inclusion

The foundation for Internet use in the Tampere Region is solid: 86% of the population own a mobile phone and 71% have access to a computer at home (Inkinen & Kuru 2004). Two thirds of the residents hold an email address and have access to the Internet. Only one fifth have no access to a computer whatsoever. On the

national level, roughly one fourth of Finns have never used the Internet. The figures have remained on that level for some time already and they will presumably not change much. It even seems likely that there will remain a subgroup of Finns who will not use or need the Internet in their lifetime (Ministry of Transport and Communications 48/2003).[4] In Finland, the divide between the sexes seems to have disappeared in this respect. In 2003, 59% of the respondents of the web-based user survey conducted by eTampere were women.

When we look more closely at Internet use and possession of Internet connections, we find that educational action should be targeted at older generations, namely at people over 50. Recent educational projects have improved the skills of the elderly but, clearly, they are the ones who need more education and accessible public terminals. One third of the people in the Tampere Region need education in computers and information networks, and people aged 35–64 in particular feel they need education in this field (eTampere/Infocity 2003). The problem with education in the larger cities is that the courses are competing with all sorts of leisure activities. Smaller towns and communities have reached their seniors with better precision.

In 2003, only 3% of Finns gave up using the Internet. The main reason stated was quitting a job or finishing school, which means decreased access to the Internet. A third of the respondents claimed that they lost interest or got bored with the Internet (Ministry of Transport and Communications 48/2003). This can be considered a very low figure. The Internet has quickly become a highly valued forum of information and communication. When the skills have been established, using the Internet becomes a natural part of communication and daily functions.

The city should provide as much information as possible on its operations via portal-like websites. Tampere has built a

portal that will answer numerous questions from citizens and tourists alike. Tampere was among the first Finnish cities to open a website in the mid-1990s. Since then, the city site has won a special prize in a TeleCities competition for allowing citizens to participate in the decision-making process (budget proceedings, public questions, preparation process) with new means. Today, in Tampere, you can find, among others, the following e-services on the web:

- Housing search engine: with a single form one can search through a database of 11,000 rental flats.
- Information service for daily commuters: timetables for public transportation, bulletins, SMS travel card balance info sent to a mobile phone.
- Electronic route guide for the local bus lines.
- Citizens' kiosk where one can ask questions concerning the city; questions and answers are published.
- Calculator for home care; calculates the costs of home care.
- Mobile services: weather, events, send feedback with SMS, send MMS photos by phone.
- PIKI – the network for libraries in the region; the database includes material and availability information. One can make a reservation or renew loans with this service.
- Health services: the region's health centre contact info, GP info.
- Health services: an online nurse will answer general questions concerning health and illnesses.
- WebTimmi: reservation system for sports halls.

According to the annual user survey, the residents of the Tampere Region use the following website contents the most:

- timetables (buses)
- information on current issues
- city maps
- contact info
- information on office hours (libraries, events)

Eighty-eight per cent of the Tampere residents who have an Internet connection have visited the website (eTampere/Infocity 2003), with 20% of the population visiting the website on a daily basis and another 44% browsing through it at least once a week. It is quite common that if one uses the Internet, one will use it often, almost every day. When one has passed the threshold of starting, using the Internet will become a major everyday activity and have an important role as a means of acquiring information, running errands and entertaining oneself. There seems to be an increasing and constant demand for electronic information in the community.

In addition to the local examples discussed earlier in this article, the following innovations are worth mentioning. A good example of a site offering broader participation is a local community website, or neighbourhood forum, such as the *Mansetori* in Tampere, which includes discussion areas for exchanging views, opinions and information on issues concerning people's own residence, current residential issues, city planning issues, in addition to guides to active citizenship and, of course, recreational tips (http://mansetori.uta.fi/). The fast-paced modern lifestyle does not allow people to take part in all community activities in real life, which means that virtual community sites are an effective way of providing opportunities for democratic action and community participation. This can be further improved by

enabling e-voting. Tampere has established an opportunity to vote in city elections with an electronic identity card providing user authentication (www.etampere.fi/kortti/). In the next phase, the authentication can be carried out by mobile phones.

To date, the Internet has been the predominant channel for public electronic services. Nevertheless, some mobile solutions have also been developed in order to attract specific segments of the population. For instance, the City of Tampere has a mobile service called 'SMS 13132'. It is a service through which citizens can send text messages to various city departments and give their own opinion about matters or make enquiries. However, web services continue to be a more popular way to communicate with city officials. Reasons for the poor success of the city's mobile services lie in the relatively high price of the services and the limited length of SMS messages (*Aamulehti* Karsikas 2004). In addition, it seems that since the number of the service (13132) is difficult to remember, people tend to use the Internet service for sending the message instead of first looking up the number from the Internet and then using the mobile service. Nevertheless, the City of Tampere continues to maintain and develop the mobile services alongside other electronic communication services (ibid.). Developing more diverse mobile services is, indeed, advisable, since the mobility of services will become increasingly important in the future.

Conclusion

The inclusion of all citizens must be the starting point in developing the Information Society. People will need to receive information both about the world in general and particularly about local issues. People need to communicate. Today, the electronic media offer great benefits for communication: more speed as well as savings in trouble and expense. People need to

deal with their finances in ways that are flexibly adapted to the fast-paced modern life style. Furthermore, people will always want to take part in social action and work to improve public life. New technology provides multiple solutions for all these universal needs.

The Information Society should, therefore, offer citizens the opportunity to send and receive email, search for information via the Internet and pay bills electronically. The societies that wish to be at the forefront of the development will also need to guarantee electronic participation for their citizens, including feedback to the authorities via the Internet or SMS, e-voting and discussion forums, to name a few such forms of participation. The City of Tampere has been very active and innovative in this field.

According to Statistics Finland, 64% of Finnish households own a personal computer, and 46% have an Internet connection. In addition, there are plenty of public terminals for free use in libraries, e-corners, workplaces and schools. Still, there could be more of them: in train or bus transit halls, on trains, in hospital waiting rooms, pharmacies, etc. In rural areas, mobile terminals might be more flexible to use, and a rental laptop or an Internet bus could provide the ideal solution. Internet connection fees in Finland have been higher than average compared to other countries, but the overall price level has rapidly come down. This will undoubtedly increase the number of connections, especially in the countryside. Some parts of Finland are so sparsely populated that the building of wired connections may be uneconomic, and in these areas wireless connections (WLAN, UMTS) might be the easiest solution. It looks as if the Finnish government's goal of 50% penetration of broadband connections by the end of 2005 can be achieved.

The ever-evolving technology is finding new areas of application and more detailed services for customers. With ubiquitous computing, our houses are turning into intelligent

homes; they become safer, more enjoyable and healthier places to live. e-Business will become more common with insurance companies and with shopping in general, especially when purchasing entertainment services. These solutions, however, are not needed by everybody. On the other hand, the need to make public sector services more efficient with technology concerns us all. In the near future, we will see major changes in the health care and welfare systems; implementing electronic applications will play an important role in this process.

At present, a third of the Finnish population remains outside the Information Society and there appears to be no rapid change ahead. Non-users of computers claim that they do not need the device for anything. For most of them, the acquisition costs are excessive. Therefore, society cannot completely replace more traditional (paper, face-to-face, telephone) services with e-services. E-services complement traditional services, and it is up to the citizen to choose which option to use in a certain situation.

Almost every household in Finland has a television and a mobile phone. These devices might be the answer to connecting all the citizens to the Information Society. With digitalisation, the television will allow restricted information transfer between the home and the outside world. This will be sufficient for using email or paying bills. Smart mobile phones already have most of the features of personal computers. To make sure that Finland remains at the forefront of development, there should be large investments made in developing services for digital television and mobile devices.

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Endnotes

[1] For instance, the City of Tampere set up a task group in 2003 to present a proposal about the possible ways and means for developing the participation of city residents (http://www.tampere.fi/osallistu/tyoryhma/index.htm).

[2] According to Statistics Finland, there were 4,747,126 mobile phone connections in Finland in 2003 (Statistics Finland 2004).

[3] The project's official name in Finnish is 'Validiksi tietoyhteiskuntaan'.

[4] It has been estimated that 13% of the population are on the verge of exclusion from the Information Society (Ministry of Transport and Communications 48/2003).

Pirjo Rautiainen

Mobile Youth in the Information Society: New Media as Symbols of the Individual and the Community

Multimedia generation?

> After school I called a couple of friends and surfed the Internet. Nice things happened online: there was a nice girl in my regular online forum. We realised that we had been in the same day-care centre when we were little. We have a lot of the same opinions and we had some fun talks. We emailed, which was nice: it's funny how small the world is. Finding all sorts of casual almost-acquaintances in byte world cheers you up.
>
> I did quite a lot more texting in the evening. A boy from our old school kept asking me out, but I told him that if he wants to meet me, he'll have to call me. He promised to call me next week. I suppose he's gathering up his courage. All the same, I won't be starting any SMS relationships. I had one once, but the beeping of the phone isn't all that exciting in the long run, and it costs you money, too. Another boy from the same school also emailed me to say that he misses me. It's easy to be open in a text message but, yesterday, when I went to say hello to him, he was as shy as ever. (Mia, 16, extract from media diary)

The contents of interpersonal interaction have not altered greatly in the last few decades, but the means to engage in it have multiplied. While before, one would choose between a letter and a fixed-line phone call, depending on the length, privacy level or attention value of the message, the young person of today can choose from among email, IRC, a call and a text message.

The mobile phone is a natural, permanent part of young people's daily life, life management and maintenance of social relationships. Adoption of mobile technology by children and young people is not a separate individual issue but linked to a broader communicational context. Young people are making use of the newest technologies in a holistic way. Although young people as a group are not the only population segment to make use of the most recent communication technologies, ICTs give them the opportunity to experiment with new types of social interaction. For young people, the emphasis is on the communicative aspect of ICTs: their value lies in the creation and maintenance of social relationships (Kangas 2002, 29–30). The new media forms a central factor in young people's experience of their generation, thus constituting a unifying form of culture (Oksman & Turtiainen 2004, 321).

Technology has both a material, physical dimension and a cultural, societal one. Moreover, it intertwines with identity processes occurring on the individual level. This article assesses young people's relationship to the media through these three dimensions. The article is based on a research project at the University of Tampere that has explored people's relationships to new media and technology among different age groups. The project started in 1997 under the auspices of the Information Society Research Centre and continues to co-operate with the Information Society Institute. These departments and the general atmosphere of Tampere as an 'e-city' have created the most fruitful and encouraging ground for this research. More than 1,500 Finns have participated in the study so far.

The altered functions of the mobile phone

– Have you talked about mobiles in school?
– Among boys in general, it's probably the most talked about subject at the moment, the mobile. (15-year-old boy in 1997)

Finnish youth adopted the mobile phone as a part of their lives in the mid-1990s when mobile phones were still seen as status objects for teenagers. As the prices and usage costs of mobile phones decreased, the device spread quickly in all age groups. The beginning of the phenomenon was marked by discussion on the suitable age at which a child could acquire a mobile phone, and criticism was directed against 'mobile parents', who were suspected of carrying out their child-rearing tasks mainly via the mobile. At the turn of the millennium, 10-year-olds with mobile phones were getting to be a frequent sight. The mother of an 11-year-old girl commented in 2000:

> Three years ago the age at which you got a mobile was at confirmation (at 15). In a few years it'll be half that. There doesn't have to be any particular reason, it's just that the culture will change so that the age of seven will be the next threshold to get a mobile phone for a child.

Mobile phones were a topic of discussion comparable to fashion or popular culture: young people talked about the appearance, usability and contents of the devices. The contents even functioned as a social measure. Young people compared how many phone numbers or text messages were stored in their phones and in this way sought to demonstrate their position within their group. One concrete signal of social popularity was getting frequent calls.

Text messaging emerged as a central way to use the mobile phone among young people. They developed usage conventions,

rules and contents for text messaging. Chain messages, use of the vernacular, puns, and pictures and animations constructed from letters and symbols enriched the repertoire of SMS messages. A circle of friends could make use of a language code that would be incomprehensible to the uninitiated. The emotional scale of messages for the maintenance of social relationships was wide. Girls in particular began to collect messages in calendars, diaries and even special SMS notebooks. They were also shown to friends and discussed. Text messaging constituted a culture hidden from adults (Kasesniemi & Rautiainen 2001; 2003).

Young people tend to associate the mobile phone mainly with peer communication and criticise parents' attempts to 'invade' their mobile phone. One example of this is the introduction of text messages into the communication culture within families. At first, parents rarely used messages in communication within the family. The situation changed as they realised that young people would often not answer their mobile when they knew it was 'Home Calling', whereas a text message would not be left unanswered.

The mothers of families were the slowest to adopt mobile communication up until the end of the 1990s. It was common that the young person in the family would give their used phone to the mother – this would become the mother's first mobile. However, the role of the mothers altered when they became the communication centres of the family: the mother was often the most active in making calls and sending messages as well as receiving both forms of communication. She was the person through whom family members agreed on matters. According to the teenagers, their parents would first write exclusively factual messages concerning issues such as home-coming times or the distribution of instructions. Soon, more personal messages began to emerge. Both young people and parents described how messages on everyday topics and from everyday situations were

used to express feelings: 'It feels nice when dad asks how I'm doing in the middle of a school day' (Hanna, 16) or 'Mum, I love you, took out the rubbish' (11-year-old Saana's text message to her mother).

In adolescence, young people go through a process of becoming independent, during which their identity, family relations and communities begin to change. Young people have identified new media as a communication channel through which they can maintain contact to their peer group without the mediation of authorities. The mobile phone is used to define boundaries and create one's own space in relation to the social environment. Mobile communication is used to bring together and further consolidate the circle of friends, but it also affords an opportunity to 'sound out' new contacts. Young people's adoption of mobile communication encompasses four central factors (cf. for instance Rheingold 2003, 27):

- Viewpoint of developmental psychology: independence process (identity experiments)
- Social network: socialisation process (peer-centred communication, dating)
- Youth cultures: media and popular culture (consumer behaviour, hobbies, sub-cultures)
- General climate: positive attitude towards young people's mobile communication

The mobile phone as a symbol of individualism

> Last night I gave my mobile a new coat when I was painting my nails. (Anna, 15, in 1999)

An object is not significant only in terms of its possible uses but also because it demarcates personal life spheres (Heikkinen & Kupiainen 1996, 249, 267). The mobile phone became one of

the most discussed objects of its era, a symbol of individualism. Aside from actual communication, young people also express themselves through the choice of the device and symbols attached to it (Oksman & Turtiainen 2004).

As mobile phones grew more common, young people began to decorate their phones. Products designed for the purpose of personalisation began to enter the market: colour covers, ringing tones and logos. The young would also personalise the phones themselves. The covers were painted with nail varnish or industrial paints, the phone would be decorated with stickers, and carrying bags would be knitted or sewn for them. This concerned a type of 'hand-made technology' that was used to extract the label of high technology from a technical device and replace it with a more personal appeal. The appearance of the device said something about the user, in the same way as the text messages and information on dialled numbers or received calls contained in it.

However, the personalisation fad died down after a few years. The mobile phone became more trivial, a useful object for everyday use. Young people would carry it more inconspicuously, and the phones were no longer compared or discussed as much.

– What do you talk about when you talk about mobiles?
– Well, when it was a pretty new thing, it used to be quite a lot about different features. Now it's so common, everyone has one. People don't talk about them that much anymore. (Vili, 15, in 2000)

Young people perceive the current mobile phones as design products. Their appearance is so finalised that the young no longer feel the need to personalise them by hand. Personalisation continues on the inside of the phones, however, as the functions of the phone can be adjusted to suit one's particular needs and tastes. Also, the mobile phone can now hold a more extensive

archive of messages, images and notes. These aspects have become increasingly central in the use of the phone, which is now serving the functions of a communication device, a camera, a calendar, an entertainment centre containing different games, and perhaps even a notebook. It is common that the young person becomes attached to his or her phone, its appearance, user interface and contents. A young person's relationship to his or her mobile phone is highly intimate and emotional: 'It's a friend that travels in my pocket. It is an important part of me' (Anna, 17).

At the turn of the millennium, the interviewees provided enthusiastic visions about the future of new media, and the development of technology was seen as limitless. Today, as multimedia phones have become a reality, young people are questioning whether or not they really want to be using MMS phones: should they invest in multimedia features or would they manage with a regular phone? Parts of mobile phone communication have been transferred to the Internet: text messages are still a popular means of communication, but some of the messages are being replaced with email or instant messaging. The next few years will show the role that image communication will take on through camera mobiles. Young people want different media to provide them with an opportunity for self-expression, and this aspect is strongly present in visual communication.

Young people have become important actors with regard to the operation of markets in society. In the use of information technology, young people are becoming cultural producers; many of them are active producers of content. The new media reduces the traditional opposition between the producer and the receiver, thus intertwining the roles of the consumer and the producer (Oksman & Turtiainen 2004, 328). The focal area of research on innovation has at least partly shifted from the developers of technology to the users of technology and from a technology-driven approach towards a more user-culture oriented thinking.

The construction of new markets cannot be based on what can be done with the technologies – it will have to be founded on what people want to do with them (Mäenpää 2003, 129).

'Media personas'

Most young people have several media devices from which, based on the situation and subject in question, they select the appropriate means of communication and the suitable communication device. A world of virtual relations has emerged alongside real-life relationships. Young people can have a choice between real-life, face-to-face encounters and virtual, technology-mediated contact with people close to them. In addition, the young person may have significant relationships that are realised only through the virtual world, for instance in a chat room on the Internet (see also Oksman & Turtiainen 2004, 328–331). In the virtual world, peer relationships to people of one's own generation are emphasised. No specific pattern exists to describe the nature of these relationships – each virtual relationship has its own particular history.

The relationship to the media starts to differentiate in the early teenage years and the subsequent process of acquiring independence also manifests itself in the individualisation of ways of using media. Young people change, and their evolving lifestyles and ways of life are reflected in their use of media (Oksman & Rautiainen 2002; 2003). The following examples describe the various attitudes of young people to the media. Most young people do not fall exclusively into one particular category but, rather, represent combinations of the types.

The Gourmet is a passionate, large-scale consumer of a certain media: a music or TV series enthusiast, film buff or active gamer. They carefully select their preferred media contents and may plan their daily schedule around the use of media. For these people,

the use of media is a social occasion: watching films and TV series takes place together with friends or discussions are exchanged real-time through SMS with a friend watching elsewhere. The Gourmet also looks for Internet sites connected with TV series, films or games and may themselves create fan sites or fanzines. They also read magazines on popular culture. For Anna, 15, following the activities of her favourite band through the media is important:

> After school I go directly to the HIM website and take part in discussions there. I also visit other forums and chat with people I know. Then we can send a message or an instant message to a friend if HIM or one of my other favourite bands is on TV or on the radio and in that way let each other know where they can be spotted.

The Nomad opts for the media most suitable for the situation or the need in question. They use the media occasionally and media use does not regulate the course of their daily lives. The Nomad occasionally visits the Internet to find out about an individual topic of interest and occasionally browses magazines. They are not active followers of any TV series and do not play computer or console games regularly. Most of the Nomad's time is spent on active hobbies or with friends. Kai, 16, talks about his free time:

> I do a lot of sports and we have practice almost every night and you've got to see friends, too, and do your homework. I'm not at all interested in surfing the Net; sometimes I look for information for schoolwork. On TV, I watch the occasional good film.

The Dataist is interested in staying at the frontline of technology. They are highly knowledgeable in their use of computers and software; for the Dataist, the computer constitutes a versatile information and entertainment centre. They know the technical specifications of the devices and master their use. The Dataist

goes to the virtual world for excitement, and can sometimes prioritise Internet communication over face-to-face interaction. Ville, 17, offers the following description of his day of media use: 'I'm on two IRC channels simultaneously and surf the Web, listen to music, do graphs and homepages. That usually takes about six hours. Then I wake up and think, what have I been doing all day?' The Dataist keeps a close eye on technological innovations and wants to acquire the most recent and best quality technology. 'I bought a WAP phone and later a camera mobile once they were on the market. The first products always have a lot of things needing improvement, and I've given a lot of feedback to manufacturers through the Internet.'

For *the Reflector,* the media provides a channel for self-expression. They produce content themselves: write diaries and Letters to the Editor, compile home pages, analyse matters and are interested in stating their opinion. The Reflector reads a wide variety of magazines and literature. Liisa, 17, writes a diary and short stories and collects text messages in a notebook. She reads books, newspapers, tabloids, youth magazines and hobby magazines. Liisa met her best friend through her website. She is interested in the opportunities to publish content online. In the following, she describes an online service for creative output:

> A little while ago I registered on this site called aukea.net. It's a virtual gallery for creation. It has sections on photography, other visual arts, literature, music. People send in their work and you can comment on them if you are a registered member. It's a lot of fun. You get loads of new photos every day. You can post one picture or an exhibition with a lot of different pictures. You can give one to five points for the images and you can give your comments on them.

Studies have indicated that the ties established to the virtual worlds of the Internet are not of a highly permanent nature

(Oksman & Turtiainen 2004, 331). For instance, when the two girlfriends Tiia and Meiju first became familiar with the Internet, they were occasional visitors in chat rooms. At 16, they both had an active IRC phase during which they spent some four hours on the computer each day. After a year, the enthusiasm for virtual forums died down and in the last few years, as they have approached adulthood, they have only been using the Net to check their email and to look for information – 'Reflectors' have become 'Nomads'. Their interest in media equipment has remained intact, but the use of the media has changed form in recent years.

An interesting observation is that the vast majority of young people perceive themselves as 'regular users of technology'. This phenomenon is, to an extent, in opposition to the cultural notion according to which young people would be the most innovative age segment of technology users, always ready to adopt new products (Oksman & Turtiainen 2004, 333).

The mobile phone occupies a more permanent role than the Internet in the lives of young people. Still, the usage conventions of the mobile phone incorporate changes related to young people's changing life situations, particularly in association with the process of becoming independent and moving to one's own household. The fundamental element of mobile communication remains despite the changes: family and circles of friends offer a more permanent basis for communication than the virtual contacts of the Internet. Also, the mobile phone, functioning as an adhesive, can serve to unite family members separated by circumstance (moving, separations, trips) (Oksman & Turtiainen 2004, 332; Fortunati 2002).

Gender and media

> In the computer room there are these situations where girls are reading their emails and boys are playing Counter Strike or something. At the other end of the room, one boy might be shouting to another, 'The guy is on the roof', and the other one replies, 'Yeah, I'll take him'. Girls are shaking their heads and going uh-huh. (14-yearl-old Anniina)

According to research (e.g. Silverstone, Hirsch & Morley 1994, 25; Oksman 2003, 63), new technologies are enforcing old gender roles and divisions. In families, technological expertise is often perceived as the territory of fathers and sons. For instance, computers and console games are clearly defined more as the devices of boys than girls. It has, however, been observed that there are few differences in the actual ICT skills of men and women, and that the differences emerge from the gender's interpretations of their own skills. This is supported by numerous studies according to which women share a greater tendency to estimate their information society skills as poor, because according to cultural expectations, the information technology expert is a man (see e.g. Vehviläinen 1999; Talja 2003; Nieminen-Sundell 2003).

At the turn of the millennium, girls' computer-use cultures appeared to grow more versatile. Girls began learn the use of computers and the making of homepages together. Important differences can still be identified between the sexes. Boy culture involves elements such as gaming together, exploration of different software, making music and searching for codes and instructions. Chatting, hobby-related websites (e.g. virtual pets and virtual stables) and personal homepages, image galleries and self-produced text (e.g. online diaries) constitute aspects of girl culture. Computer expertise is thus seen as a masculine characteristic and girls often make a conscious effort to

differentiate themselves from it. This might be one reason why girls wish to conceal their computer skills (see also Oksman 2003, 64): 'Some girls sometimes play really stupid about this stuff because they're afraid they'll be labelled as nerds' (Liisa, 15).

Boys' attitudes to new media are labelled by technology optimism, and boys are generally more interested than girls in the development of the devices. Boys perceive the future of technology from a more device-oriented perspective and conceive of the possible disadvantages from a mostly economic viewpoint. Boys wish technology would help them organise their daily life, and for them, technologies constitute a means to regulate and control their environment. They wish for devices that would be able to communicate between each other (e.g. the opportunity to remote control their home through the mobile phone). Girls, on the other hand, are interested in the interactive and aesthetic properties of technology. They wish that technology would serve to make communication between people more versatile and, conversely, are intimidated by the socially isolating effects of technology (see also Oksman & Turtiainen 2004, 334).

Technology determinism and fears related to technology are more commonly encountered with girls than boys, and the negative feelings are generally directed at computers (Oksman 1999). Mobile phones are seen as manageable technology, and they are perceived more as household appliances or consumer goods. With the mobile phone, the rates of usage are very similar for both genders, but the practices and contents of communication differ significantly. Young people themselves often report that girls tend to focus more on actual communication, whereas boys are more interested in off-line features (games, profiles, etc.). For instance, girls send more and longer text messages. Also, girls make 'report calls' that highlight the functions of recounting events, reminiscing and shared reflection. Commonly, a significant amount of girls' communication takes

place between two best friends. Conversely, boys tend to make anticipatory calls that focus on planning events to take place in the near future. Boys' calls are directed to the entire circle of friends and their objective is to assemble the group.

It is good to remember that differences occur more between individuals than genders. For instance, the media types discussed above are equally common among both genders. Divisions between boy and girl culture can be viewed as categorising. Interesting results could perhaps be gained by examining gender and media through the concept of gender production. This viewpoint concentrates on processes in which gender is produced socially and considers the ways in which societal and cultural divisions and definitions are implemented on the basis of gender. Moreover, this approach sheds light on the kinds of targets for identification provided by gender, not only for children but also for adults (Suoranta & Lehtimäki 2005, 190).

Little mobile citizens

> Children are having to use all kinds of media equipment in school, too. If they have the necessary devices at home, it teaches them how to function with them already at that stage. Information society skills, if you will. (Mother of an eight-year-old boy)

Many children and young people are more skilled in the ways of the information society than their parents, and they are often the first to adopt new forms of media. For this reason, claims have occasionally been made that information technology may in fact shift authority positions within the family. Children become familiar with the world of new media already in early childhood – as they become digitally literate – in a way that is profoundly different from their parents' experiences. Children develop and create their own media culture irrespective of formal pedagogies

or curricula (see e.g. Sihvonen 2003, 89; Suoranta 2001, 27; Kasvio 2001, 243; Tapscott 1998). Children's media virtuosity is an object of concern for parents, whose experience of new media is slight or non-existent. This concern is exacerbated by the fact that parents have no points of comparison, as the media culture of their own childhood was very different (Oksman 2003, 67).

For this reason, children's relationship to media equipment raises a great deal of discussion on ethical and educational questions. Contemporary western culture frequently operates on the general assumption that children are creative and skilful in the use of technology. Parents, too, may idealise their children's natural and open-minded relationship to technology and may provide an overly optimistic image of their children's skills in technology use (Oksman & Rautiainen 2001, 79).

Even though children may display advanced motor skills in the handling of the devices, their communicative skills are still developing. Non-verbal communication of expressions and gestures is important for the child, and interpreting the message purely on the verbal level of the 'faceless device' may result in problems. Moreover, the child requires instant feedback for their communicative efforts and, for instance, network sociality is not enough to satisfy the need for social security with under-10-year-olds (Suoranta & Lehtimäki 2003, 31).

Children may have cognitive difficulties with the device and may not know how to react to its signals. Children perceive information and communication technologies as interesting but also unpredictable, as the device behaves differently from what they had expected (e.g. the battery runs out, the computer will not respond). Eleven-year-old Siiri reports:

> At first I was trying it out a lot, the mobile. And I still can't use everything on it. It took me an awfully long time to learn to send a text message. Then sometimes the screen would just go blank and I would be all like, 'what was that?'

When the child is using a new media appliance, the presence of an adult is important to avoid surprises and negative experiences that might cause fears associated with situations of technology use.

Children and adults often have differing conceptions of the significance of media equipment, particularly the mobile phone. As the mother of 9-year-old Lotta explains*:*

> The mobile phone has a completely different meaning for Lotta than it has for us. Lotta wanted one as her friend Miisa had one. Not so much that she was interested in calling mum or dad. We, on the other hand, got her one because we wanted to be able to reach her.

From the parents' viewpoint, the child's mobile phone brings security, but a child may experience looking after the mobile phone as an additional responsibility or a burden: 'I don't always like looking after the phone. My friend sold his mobile because he didn't want to be looking after it all the time' (Topi, 9). A child's interest in mobile communication usually emerges in their early teens, around the age of 10 to 12. At this point, mobile communication begins to be directed more towards friends and outside of the family. The entertainment qualities of the device also begin to inspire an increasing amount of interest.

Media culture is an important part of children's life, and it is visible in their daily activities, play and popular topics of conversation. Children's media habits are affected by the opinions of parents and other adults in their immediate environment as well as the by the models provided by siblings. Even though children may master the technical use of the devices better than their parents, the help of adults is still required in the interpretation of media contents. Because the world of media is global, the responsibility for guiding children in the footpaths and

highways of media is everyone's concern. Media education cannot be separated from other broader societal and cultural factors (see also Lahikainen, Hietala, Inkinen, Kangassalo, Kivimäki & Mäyrä 2005, 200–210; Metsähuone 2003, 134; Tamminen 2001, 239).

A technology nation

Finnish culture has in many instances been characterised as having a highly positive attitude to technology. The attitudes of the Finns are very pragmatic, and the use of technology has been seen as facilitating work and survival in a severe climate. If a device has proved useful, it has been adopted without hesitation (Castells & Himanen 2001, 141–142; 148).

The Finns have, however, criticised the development of the information society. The focus has often been on the amount of technology or on the level of technology penetration within the nation and the level of technological sophistication in society – instead of the quality and content of the technologies (e.g. Oksman & Rautiainen 2005; Suoranta & Lehtimäki 2003, 30–31). Economic interests can also be identified in the background of the official information society discourses, and the actual desire to improve the quality of life among citizens is not always the main impetus for actions.

The new information and communication technologies are seen as a central part of future society. Ensuring that all children and young people have the necessary skills in the use of media technologies is perceived as important in order to avoid a division into skilled professionals and those excluded from society. The Finns are sceptical of the ability of the comprehensive school system to provide the necessary technology literacy for citizens. If the acquisition, use and management of communication devices were left exclusively to individuals and families, some of the children would be left without media skills. It is feared that

the economic inequality between families may result in societal inequalities (Oksman & Rautiainen 2005).

Young people perceive media skills as the citizen skills of the information society. The phenomenon is linked to the broader norm of mastering technology: in order to succeed in society, the individual must master the skills required in the use of new media: 'There's nothing you can do about it, is there? Technology will continue to develop. You've got to keep up with it if you want to make it in this world' (Olli, 18).

According to young people, easy technology-mediated communication has led to a situation where people do not necessarily recognise the easiest way to find a certain piece of information or to manage their affairs. Questions such as 'Which WAP menu do I go to for this information?' or 'Which search engine provides the most accurate result?' are asked frequently in situations where the quickest response could be gained from the person sitting in the next chair. Young people are aware of the uneven quality of the material available on the Internet and acknowledge the importance of comparing different information sources. For many, this has added to the appreciation of the permanence and reliability of print media.

Young people themselves stress the meaning of literacy in terms of media content: not all information available is to be used or remembered. A healthy dose of source criticism is apparent in the comments of the interviewees:

> I like to read the news in a newspaper first, because they have quite a lot of information and pictures. If I want news quickly I check teletext, they get them the quickest. The Internet would be something I'd go to after the event to get a more specific account of whatever happened. (Jani, 17)

The majority of young people stress that they are able to locate the most essential aspects in the flood of information; they do

not experience the presence of different media as disturbing or oppressive in any way. Kikka, aged 15, offers the following description of her own use of media: 'My media use tends to overlap a lot. For instance, texting and television, texting and the radio, radio and a book/magazine. It doesn't give me information overload or anything like that.'

Young people speak for humane technology. The mobile phone is seen as an everyday appliance, a human-centred object that enables the owner to remain connected to his or her circle of friends regardless of their whereabouts. Yet, this online characteristic also arouses critical notions: 'With the mobile phone, people kind of put themselves in a little too important of a position, as if they'd have to be accessible all the time' (Anssi, 17). In one's own life, however, the development of ICTs is seen as a positive thing: 'The mobile has cheered me up on many occasions. It would make you feel a little hollow if you weren't able to contact people in any way' (Tanja, 15).

In the current information society, it is good to remember that earlier generations, too, have lived in the midst of technological changes. People have had and continue to have the opportunity to choose which media and which technologies they want to use.

> Mankind, at least people my age, have never seen a technological development this vast. There is a lot to choose from, and a lot of it is unnecessary. But you don't need to take everything, and no one is able to adopt everything that's on offer. There is quite a range to choose from. After the Second World War, the development was immense and in the 60s and 70s it continued to accelerate. I've enjoyed living in this era. (Oiva, 73)

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VII
Future Directions

Ajeet Mathur

The Future of International Business in the Tampere Region[1]

> For some years, responses to the idea of an information society have been similar to reactions to the sighting of UFOs – if you believe in them, you see them; and if you don't, they have no meaning for you. (Michael Powell, Information Societies and Social Change, UNRISD, 2004)

Introduction

Visions of societal gain through economic and social value from seamless knowledge communications are profoundly palpable in the Tampere Region. Home to Nokia where the global telecom pioneer cut its business teeth, gains from innovation are credible and easily seeded in the Tampere Region. The courage of the custodians of the public purse to invest in innovations is not lacking and it is recognised that fruits of such innovations are not harvestable without cross-border leverage. After the failure of the World Summit on the Information Society (WSIS) in 2003, there is a growing awareness that there cannot be a single information society but only a range of possible ones. Within this diverse range, international business value chains have to embed to function successfully. How successful has Tampere been in promoting beneficient cross-border flows of goods, services, information, workers, incomes and capital – six elements that characterise international flows?

An 'informational city' with a high density of information and communications technology (ICT) penetration for intra-city communications presents no inimitable competitive

advantage bereft of cross-border flows. Local communications can be engaged in myriad ways and the economic cost of ICT investments for the sole purpose of intra-regional ICT connectivity always exceed benefits and are difficult to justify. ICT investments solely for intra-regional consumption are desirable to incubate hubs like science parks for biotechnology. However, such investments become economically profitable only when increasing returns to scale are exhibited beyond a critical threshold and scale and scope effects are obtained through an expanding supply of innovations, services and technologies to meet rising global aggregate demand through participation in product-services linkages in international business.

There are three different ways in which small open economies like Austria, Belgium, Denmark, Finland, Iceland, Ireland, and Sweden have addressed globalisation. The most successful ones like Belgium and Ireland engage in substantial cross-border trade and investments, particularly profitable investments which generate repatriated factor incomes from abroad. In contrast, Sweden and Denmark developed global niches commensurate with sustainable competitive advantage sourced from related industries-agrotech in Denmark, engineering and armaments in Sweden. Austria, Iceland and Finland tried to integrate through an alternative route of procurement from abroad combined with State aid and subsidies to strengthen their value chains based on ICT.

Locale and internationalisation

Castells (1989) observed that internationalisation proceeds simultaneously on all fundamental dimensions, markets, investments, means of production, labour and capital flows. Fundamental transformations concern tight linkages between regional dynamics and world dynamics. Placeless power and

powerless places are not necessarily bridged by ICT unless compelling business logic so warrants. There is profound confusion about whether orchestrated spatial concentration of coordinating entities can substitute for innovation through off-shoring. It is easy to mistake the notion of 'global factory and company town' with global company and ex-factory town, viz. Nokia in Tampere. International Business is inspired, developed and sustained through motives and capabilities of the actors involved. The complex and rapidly changing economic and political conditions require firms to continuously reconfigure value chains hubbed within countries and dispersed and linked across borders. These searches yield opportunities for a variety of forms that international business may take. Trade is one of them involving buying and selling decisions and executing them. Resource pooling through inter-firm cooperation is another. This may take the form of linking investments with other partners. Whatever its form, effects of international business are measurable in flows of goods and services, incomes, labour, capital and profits and successful regions are characterised as dynamic outcomes of 'spaces of flows' (Castells 2000).

The importance of ICT arises from evidence that international trade in intermediate goods facilitates access to key inputs for domestic production processes and contributes to the competitiveness of individual industries. In ICT producing manufacturing (ICTPM), the EU average consumption of ICTPM inputs to produce one monetary unit of ICTPM goods is 0.262, while for Finland this coefficient takes up the value 0.366 (European Commission, 2005, 54–55). The Eurostat NewCronos input-output tables reveal that productivity of highly skilled value-added ICT in Finland is the lowest in the European Union (European Commission, 2005, 62, Table IV.21). Only Greece and Portugal rank lower than Finland in overall terms of GDP contribution per hour worked (O'Mahony & van Ark

2003, 20, Table 1.2) and the labour productivity growth in Finland is negligible despite severe job cuts.[2] Yet, Finland's value added shares of ICTPM and ICT producing services (ICTPS) are above the average of the EU-15 which suggests that Finland's ICT sector, despite lacking competitiveness, was somehow supported.[3] One important dimension of the ICT crisis is the movement away from high cost software development in Finland presciently noted by researchers conscious of the role ICT expansion played in economic recovery in regions like Tampere during the 1990s (Kasvio 2005, 11).

The emerging patterns of international business depend on how countries compete, how business interests and countries cooperate and how firms develop international leverage. In Finland, high intermediate labour skills in niche manufacturing have not transformed into skills in services sectors where knowledge intensity is a driver (O'Mahoney & van Ark, 2003; European Commission 2005, 24). Finland's joining the European Union (EU) introduced four new dimensions. Finland became part of the single market and '*acquis communitaire*', and adopted the Euro. Secondly, as part of the Nordic Union, Finland continued to foster ties with non-members like Norway and Iceland, while a spate of mergers involving Swedish and Finnish firms brought about consolidation in paper, banking, telecom and engineering industries. Thirdly, by virtue of its location, Finland remained interested in trade with Eastern neighbours but the expansion of the EU has introduced new competition from them. Fourthly, EU's ties to non-EU countries including trading blocks like ASEAN, NAFTA and MERCOSUR present new opportunities and these challenges have caused a shift away from Germany, traditionally its biggest trading partner.

Regional profile

The need for regional initiatives – as links in the process that unravel the whole picture – have special importance because national centrality of private businesses, primacy of public ownership, and the welfare state are weakened by post-Fordist paradigm shifts favouring decentralised flexible networking. Finland's regions are the first to undergo Europe's demographic shock and vulnerable (Mathur, Ryynänen & Nystedt, 2003). The Tampere Region, the second largest province in Finland spans 14,300 square kilometers with about half a million inhabitants. It has an international airport, and is well-connected by rail and road links. Tampere is the largest inland city in Nordic countries and at the same latitude as Bergen, in Norway. Traditionally, a Hanseatic League trading town and a major confluence of influences from Russia (Lenin lived in exile here) and Sweden (the Burghers obtained town status from King Gustaf III of Sweden), a part of its dynamism arises from conflicts between left-of-centre forces (the 'reds') and the conservatives (the 'whites') enabling a healthy blend of business and society seeking harmonious co-existence in conditions of creative tension.

The emergence of Tampere Region is intriguing. The concept of 'Pirkanmaa' was originally cultural. Although inhabitants of the region believed it had identifiable geographical contours, no one could draw them with certitude and no cartographic representation of 'Pirkanmaa' existed until 1995 when the telephone directory introduced a map of Pirkanmaa for the first time. The adoption of 'Pirkanmaa' as Tampere Region (and now a recognised County and EU-NUTS region) enabled Tampere to acquire size and allies from among its proximate municipalities. The Tampere Regional Council (joint municipal board), established in 1991, persuaded neighbouring municipalities to let Tampere take the lead while they emphasise they are

geographically close to Tampere (for example, Lempäälä's *leit motif* has been '*Lempäälä on lähellä*', meaning 'Lempäälä is near' rather than propounding any unique distinctive advantage). This has blossomed into a situation where the Tampere Regional Council has a website http://www.pirkanmaa.fi and adjacent localities pay Tampere for the administrative costs of offices established for business development. The Tampere Region is Finland's leading centre of industry with a strong heritage of forestry (paper and paper machinery) and metal industries. Names like Nokia, UPM-Kymmene, M-real, Tamrock, Metso, Kvaerner, Kalmar, Timberjack, Tamglass (Kyro), Tamfelt, Bronto Skylifts, Fastems, Ata Gears, Gardner Denver and Avant Tecno signify top products of world repute in their fields with commanding leads in global market shares. The structural change in the smokestack industries of the region with the winding down and transformations of Finlayson, Tampella, Valmet, etc., and emergence of knowledge-intensive sectors during the 1990s ushered a new era of technological transformation. Home to two universities (the University of Tampere and the Tampere University of Technology), and 36 other educational and vocational institutions, and an International Convention Centre (Tampere-talo), Tampere aspires to be among the foremost dynamic technology and international business hubs of the world and has the potential to do so. The economic distribution of Tampere by income and employment is summarised in Table 1 below:

Table 1. *Economic profile of the Tampere Region 2005*

	Income share (in percentage)	**Employment share** (in percentage)
Agriculture and Forestry	4%	4%
Manufacturing	40%	33%
Services	56%	63%

Source: Tampere Chamber of Commerce and Statistics Finland

The business profile of the region is diverse. Numerous small enterprise associations of firms averaging 1–3 employees/owner-employees exist. Finland has the highest tax wedge in the world between the peak individual tax rate and the company tax rate. It is hardly surprising that individual service occupations like taxi-drivers, truck and van drivers, barbers, cobblers, translators, house-cleaners, construction labour etc. are organised into 'companies' which cannot be compared with statistics of 'enterprises' as commonly understood in Europe. There also exist numerous private companies whose only income is public grants, financed by the public sector (notably Tampere municipality) as a way of outsourcing services. Shops and commercial establishments, factories, representational offices, liason offices, legal establishments, private clinics, book-keeping firms, auditing firms, retail stores are also usually organised into companies. The Tampere Chamber of Commerce has about 1,100 member companies but fewer than fifty would qualify as medium or large enterprises, by sales turnover and employment criteria.

Tampere's glorious past and visions of the future

Nature formed the 18 metre waterfall (known as Tammerkoski rapids) between the two lake systems, Näsijärvi and Pyhäjärvi.

The hydro-energy harnessed enabled the first factories to be established by the rapids. Among these was Finlayson, the textile factory founded by Carl von Nottbeck whose ancestor, James Finlay made his money in tea trading with the East India Company and invested profits, first in Russia, and then further westwards (James Finlay's original company Finlay became Tata Finlay and continues as Tata Tetley, the biggest tea company in the world). Finlayson was a town within a town with its own estate consisting of housing, church, school, hospital, savings bank, and a children's home. The ethos of the old town is well captured by the four statuettes on the bridge connecting the two lake systems reflecting four professional identities-including one of them dedicated to the tax-collector.

Wood-processing industries of Tampere spilled over to Valkeakoski, Mänttä and Nokia. In Nokia, the region's rubber industry was born. Later, engineering industries (known as metal industries in Finland), cables, electricals, data-processing and electronics emerged. The company, Nokia, grew as a diversified conglomerate, with ups and downs until 1990 when Nokia, almost bankrupt, was revived with State aid and vested with technologies in telecom that had been developed in government factories (Ahonen 1995). Very few of Tampere Region's old factories were able to manage transitions or transformations without crisis and many of them were shut down. It is hard to blame the decline of industrial society for this. Such changes happened everywhere in the world and industries usually adapt to new technologies, new management structures, systems and processes successfully, despite some failures. In the Tampere Region, the survival and transformation of old industry to new technologies was a painful process with thousands of job losses. What remained at the beginning of the 1990s was a core of mechanical engineering and automation industry and a nascent

telecom industry spearheaded by Nokia and its affiliates like Telecom Finland (now TeliaSonera) and Tieto Enator while the promise of ICT, media and healthcare technologies beckoned.

The Finnish mindset is conditioned to cluster thinking which often reflects the triumph of hope over experience. In the early 1990s, colourful presentations showing growth of inter-related clusters were fashionable. Such presentations were routinely made at various fora (ministries, ETLA, academia, chambers of commerce) and can be traced to a narrow set of unquestioned authority sources (consultants and real estate brokers) marketing visions of an orchestratable and reliable trajectory for the future. The size, colour and labels of these clusters kept changing but the enthusiasm to depict clusters as dependable beacons of strategy has not diminished. To the uninitiated, these clusters fulfil a dependency need and foster myths that leaders and decision-makers somehow know the future and are capable of social engineering. In Tampere, three such clusters are usually identified: a dependable mechanical engineering and automation cluster with a turnover of about € 2.8 billion with 25,500 jobs and growing at about 3 per cent per annum, an ICT cluster nurtured around the eTampere programme launched in 2000 with an injection of € 132 million under seven sub-programmes contributing to an ICT turnover of € 3.9 billion with about 9,000 jobs in 2005 and no longer growing, and a biotechnology cluster launched in 2003 with a budget of € 100 million producing a turnover of € 150 million and projected to grow at 15 per cent per annum. There is also talk of a media cluster of € 1 billion turnover with 5,500 jobs projected to grow at 25 per cent per annum (see Centre of Expertise Programme at http://www.oske.net).

International Business Strategy of the Tampere Region 1995–2005

Actors involved with formulating the Tampere 'strategy' point to Tampere's 'enabling development' model that sought to substitute overall direction with coordination through allocation of resources to a plethora of specialised development agencies as brokerages which were called clusters (Sotarauta & Kostiainen 2005). Administrators holding roles in the specialised development agencies considered their opinions as 'pure facts' to be carried to ordinary citizens (Ainamo 2005, 2). The Tampere website's participation portal (www.tampere.fi/osallistu) never developed civic functions in accordance with traditions of participatory democracy except for the governance rhetoric (Häyhtiö & Keskinen 2005). Tampere's 'clusters' did not witness sectoral growth of the kind where inward investments and entrepreneurial dynamics are fuelled by available capital and results measured by technological density and value added, a pre-condition for successful ICT agglomeration (Longhi & Keeble 2000; Mariussen 2004). The minimum threshold of 5 per cent of the labour force in productive ICT jobs that would qualify Tampere as an ICT agglomeration was not achieved. Rather, Tampere's growth was chained down to the tunnel visions of its specialised development agencies creating work and jobs for each other in the belief that they were networking for the creation of a sustainable model hub for the European Union. The best exemplification of this can be seen from the logic behind the enabling development model illustrated in Figure 2 in Sotarauta and Kostiainen (2005). Stages I to III of this diagram (proceeding upwards) lay in the comfort zone where the narrow set of actors in specialised development agencies undertook activities inside their monopoly of cluster responsibilities where neither they nor their sponsors ever specified any criteria of accountability for measuring the success

of any of the subsequent stages. Growth could not be sustained for a variety of reasons – some attributable to downturns in global sectoral developments but also to lack of competitiveness and the social cohesion required to leverage intellectual and social capital beyond the actors in the specialised agencies themselves. The 1997 Tampere strategy document *Tampereen tulevaisuus on tiedossa* (translatable both as 'The Future of Tampere is Known' or 'The Future of Tampere is in Knowledge') confused knowledge with information. In making budgetary provisions for ICT, it neglected Knowledge Intensive Business Services (KIBS) until 2002.

Related to cluster-thinking in the Tampere Region has been the quest of 'What is our next big project?' To understand this, it is essential to recapitulate that sharing of business development and marketing responsibilities between private and public sectors historically arose from the notion that technology development and production were the only responsibilities of debt-loaded private firms in Finland. Historically, competitive devaluations were used in Finland to spur exports. Marketing of commodities like paper and paper machinery were syndicated under arrangements brokered by the State – a legacy of Finland's Soviet trade. When the Soviet trade collapsed after the Soviet Union disintegrated, the Finnish State withdrew from this role and substituted incentives administered through para-statal organisations and other forms of subsidies, and regions began to take some responsibility to fill the hiatus. A number of local agencies were created in the process. However, none of these agencies of regional systems developed any international business expertise. Further, in order for all the various actors to combine forces, projects needed to be conceived whereby extra funds could be mobilised to be injected for project networking and internationalisation.

National initiatives of 'Finland Exports', 'Invest in Finland', TEKES, VTT, SITRA, and KTM were thereby mirrored in regions. In some regions like Turku and Jyväskylä, entities were created for comprehensive responsibility. In contrast, the decision-makers in the regional bureaucracy of Tampere were satisfied with dispersed responsibilities and networking between them. Thus, no single point contact for international investments in Tampere existed despite a plethora of actors and agencies mandated with different aspects of business development and internationalisation. Until recently, there was also a widespread belief in Tampere that no other model than the one adopted is viable or efficacious.

Tampere's 'Business Development Strategy' at http//www.tamperebusiness.com has not been updated since January 2003.[4] Under 'Tampere Business Development Strategy', the reader is informed that 'Comprehensive Business Policy is based on six elements: infrastructure, strategic clusters, human resources,business fields and clusters, quality of environment, and regional innovation system' followed by a vision statement: 'Tampere Central Region is one of the most attractive environments for knowledge intensive business and experts in the world.' The Tampere Business Development Strategy lists a single objective: 'To develop a competitive operating environment for knowledge intensive companies and to attract highly skilled labour to live in Tampere Region.'

Yet, KIBS were left out of the Centre of Expertise Programmes in the region until 2002. There was no process outcome or measurable result criteria to account for local initiatives for knowledge intensive business services claimed by Sotarauta and Kostiainen (2005, 5). There are a variety of myths circulating in Tampere designed to foster confidence among residents and prospective partners and investors in Tampere that do not stand up to a reality check. In popular perception, the two

universities, particularly the Tampere University of Technology spawns innovations; these innovations are incubated in a virtual science park; and, incubated innovations create new dynamic enterprises attracting large amounts of venture capital thereby creating a multiplier effect for new jobs and enhanced flows of incomes and asset creation. In reality, public money in the guise of projects has been used to fund jobs with soft targets and when a project ends, a 'next big project' is needed to repeat the cycle, since little of lasting value remains. Names of agencies change, agencies merge with each other to acquire fresh identities, new organisations get mandated and organisational forms undergo such metamorphosis that old wine in new bottles is easily mistaken for a new engine of innovation on which hope is pinned for a while until it is dashed again. Hermia was an ingenius institution that enabled students of the Tampere University of Technology to be drafted into labouring for companies needing cheap student labour while the flowback from the beneficiaries to the University remains unknown. The total amount donated by Tampere Region companies (including Nokia) to Tampere Technical University is about Euro 250,000 according to the list coordinated by the Tampere Chamber of Commerce. With few exceptions, hardly any inventions of the University developed commercially as a return on public subsidies and investments and most of the firms counted in powerpoint presentations evangelising the Tampere model pre-date Hermia or have nothing to do with the Technical University. In making an actual count together with Hermia senior executives, I could locate only 13 enterprises in all under the umbrella of the eAccelerator (the number on Hermia's powerpoint slide was 300), of which just two had something to do with the Tampere Technical University. The first pillar of Tampere's business development strategy, Hermia, was entirely focused on technology and real estate brokering, and never organised to provide any international

business development expertise to existing firms or to new ventures. Hermia officials candidly admit they have no idea where the medium and large enterprises in the Tampere Region obtain international business know-how.

In 1999, a second pillar, Professia Oy, was established from public funds (and mandated to develop knowledge intensive business services in 2002). After five lacklustre years of existence, this agency launched a 'Tampere International Business Office' in mid-2004. This old-wine-in-new-bottle initiative never compiled even a starting kit for investors in the region. Most of its budget was spent on staff salaries for its seven employees and travelling to exhibitions and making contacts overseas to entice investors to Tampere. From € 1 million injected into it, an income of € 28,000 was reported which works out to 2.8 per cent return on net assets, well below long term market interest rates. On 17 September 2005, Professia Oy merged with Oy Media Tampere which employed seventeen persons with a 2.2 per cent return on net assets which is even lower than Professia Oy (according to the press release of the merger announced on 17 Aug 2005). The fused entity in announcing the merger hints at new horizons and a stronger organisation but its business plan remains unclear. The use of public funds in Tampere is not associated with transparency or disclosure and residents are expected to believe that this old-wine-in-new-bottle that didn't deliver much in five years of functioning will now function as the beacon of new hope. 'Project thinking' with soft targets is a hallmark of the Tampere Region. The big breakthrough is always optimistically depicted to be in the future. During spring 2005, hope was pinned that Tampere would host the ASEM summit in 2006 during the Finnish Presidency of the EU and the wave of traffic that would arise through Euro-Asia business contacts. Meanwhile, Hermia leading the ICT sector big projects was being hived and restructured to give way to the biotechnology and health sector spearheaded by

Finn Medi under the ambitious catch-all expression of the next big project Bionext.

The nebulous term 'economic globalisation' has many dimensions (Garrett 2000; Benner 2003). Firstly, there is the globalisation of financial markets. Tampere has no stock exchange or commodity exchange. International banking services are costly because banks charge three times more for SWIFT transactions than their counterparts in Europe. Tampere is also not a hub for the second kind of internationalisation – that of integration of markets for goods and services. Nor is it a transit zone or port. Internationalisation of its companies is largely a matter of company initiatives. Few companies have international operations from Tampere since the Helsinki Region offers more attractive locations where logistics can be organised efficiently as in Kilo by the S-Group. The attractiveness of Tampere stems from the availability of cheap student labour and lower costs of living compared to Helsinki and the quality of life the region offers inhabitants. Business-to-business links developed around traditional manufacturing industries have been the chief magnet for vendor firms to locate in Tampere supplemented by spillovers for Finnish firms expanding in Helsinki and Espoo facing office space constraints and accommodation difficulties for their workers.

The Tampere strategy is not without difficulties. Much of the new growth was pinned on the hope around the information and communications technologies (ICT) sector, and to be more specific around one company, Nokia, and its supplier firms and contractors. The current crisis of the ICT sector has hit Tampere hard. The silver lining of the dark cloud lies in important product innovations in the Tampere Region around opto-electronics, medical equipment innovations, food processing technologies, and biotechnology. Rapid and successful institutional reconfiguration is a strength but the small size of regional

economies increases vulnerability to technical change, market conditions and corporate reorganisations. Tampere's challenge is to accept change as an economic necessity and adjust to it in a social way. This change has not manifested as 'glocalisation' (the interactive process by which global and local combine to produce something new) but is better described by what Ritzer calls 'grobalisation' (Ritzer, 2004) to signify the set of processes in which growth imperatives push regions and businesses to expand globally.

e-Localisation and globalisation

Tampere is a good example of a region where high digital connectivity pervades local decision-making spaces as e-localisation and preoccupation with e-solutions raises hopes of e-globalisation. In developing the continuum between something and nothing in his classic work 'The globalisation of nothing', Ritzer (2004) captures the ethos succinctly when he identifies societies replacing situated entities by their virtual representations in cyberspace. e-Government, internet banking, automated non-services, multi-use smart cards and a host of similar e-innovations are a part of everyday life in Tampere.[5] According to Ritzer, no social phenomena can unequivocally be classified as either something or nothing because it must have elements of both. The main difference between patterns of ICT developments and patterns of BIONEXT developments is that biotechnology (BT) innovations do not easily lend themselves to long-distance connectivity and require trustful collaborative knowledge sharing in a locality. No matter how vast the reach of ICT, it would never substitute transactions and activities requiring a physical hub to incubate. Innovations incubated would not lend themselves to long distance e-networks when techno-commercial leverages of global scale are sought. It is difficult for 'spaces of flows' to

become 'places of something' without understanding the differences between ICT and BT pre-requisites.

The grobalistic aspirations of Tampere resemble a mission impossible if Tampere relies on its current array of networked agencies because they are out of context to value chains that drive international business, being instruments of centralised conception, lacking in distinctive value-added content and relying on brokerage. Constant reframing of public policies, planning strategies, folk narratives and invest-in-Tampere commercials have nothing to do with how smart anyone involved is, but rather express the dissatisfaction that a city that heavily invests from the public purse must face when confronted with coining the next big project. GSM Mobile telephony developed in Nokia's repertoire from 1991 with global breakthroughs after 1995. If the Tampere regional innovation system was serving the cause of innovation, than serving Nokia and its upstream affiliates, it would be reasonable to expect some other globally marketed innovations. However, nothing of the sort occurred. In a thought-provoking paper, Ainamo, Kasvio and Kukko (2003) argue that when a firm like Nokia operates globally, the national or regional systems of innovation that aided it socially construct themselves to be embedded in the firm and that Nokia's success did not benefit Tampere much. This did not stop the Tampere Region from claiming that Tampere's innovation system was the reason for Nokia's success on grounds that R&D projects discarded in Helsinki were pursued in Tampere occasionally leading to some important breakthroughs. This was orchestrated by the City's business development manager Juha Kostiainen and others who highlighted this in international fora and soon Tampere was toasted as a model informational city (Castells & Himanen 2002). Taking the most generous estimates of ICT expansion, including direct and indirect ICT in all wholesale and retail segments even remotely connected to ICT, and including

digital media, the total number of ICT jobs in Tampere is fewer than 15,500 and decreasing. The debilitated entrepreneurial atmosphere is associated with a paucity of new firms aiming at fast growth and internationalisation.

The Tampere Region's Centre of Expertise programmes specialise in Mechanical Engineering and Automation, ICT, health care technologies, media services and the meetings industry. The 'next major project' BIONEXT is targeting investments upwards of 100 million euros and is coordinated by Fin-Medi Research Limited. The identified focus areas for development are imaging, biosensors, microtechnology, e-health programmes, bioinformatics, functional genetics, implants, biomaterials and tissue technologies, immunology and vaccines. The companies at the forefront of this wave are BCI Bioabsorbable Concepts, Biodeus, Coxa, Chip-Man Technologies, FIT Biotech, Genesto, Inion, Irius, Kojair, Linvatec, Santen, Tammertutkan maljat, Vactec and Finn-Medi Research Ltd.

Commensurate growth of knowledge intensive business services (KIBS) remains a major challenge to be addressed. An intriguing feature in the KIBS pattern of growth is that the number of firms multiplied rapidly but the growth in employment and turnover has been modest resulting in sharp declines in employees per firm and turnover per firm. The shortfall in employment projections for 2005–06 is about 10,000 in the case of ICT and 2,600 in KIBS. The inadequacy of business competence in Tampere has also been noted in a recent European Union study (Mansell & Ainamo 2003). Entrepreneurship remains a major problem and international business activities even of established firms take mainly two forms-export marketing to gain volumes, or outsourcing to reduce costs.

A major lacuna in the Centre of Expertise programmes (1994–2001) was the neglect of internationalisation of expertise – left for the very last stage t + 6 years, never reached because

the Tampere Model did not anticipate that innovations would not be sustained without early internationalisation and the reliance on brokers and intermediaries crowded out expertise and resources required for international business development. When the previous big project 'eTampere' was launched in 2001, its eAcclerator arm was designed to specifically correct this by injection of venture capital but the success of eTampere has been modest and hardly any sustainable flows of incomes or jobs were created despite mega-investments. Targets of almost all centre of expertise programmes have since been realistically revised downwards during 2004–05.

Competitiveness

Finland has consistently ranked among the top three in world competitiveness rankings during recent years. All countries that rank in the first twenty in world competitiveness rankings typically attract inwards foreign direct investment. It is therefore particularly intriguing and disturbing that Bank of Finland statistics reveal net disinvestment from Finland instead of investment, year after year, since 1993. It needs research to understand why this is so and clearly beyond the scope of this article. Suffice to state that it is worth hypothesising that competitive advantages in Finland could be sticky in some sense or not available to all investors. The key decision-makers in Tampere acknowledge that competition between management teams is replacing the old paradigm of competitiveness fostered by technical innovation. There is a sense of urgency to develop and disseminate international business management know-how to teams of scientists, technologists and enterprise owners and executives. This came through strongly in my discussions with the key actors in the Tampere Region in the course of researching Tampere's international business prospects.[6] Inexpensive

student labour appears to be an important source of Tampere's R&D competitiveness whereas transactions costs of linking the numerous actors in an eternal project mode constitutes a drain of resources that leaves little room for international business development. Could there be other ways of developing better Tampere models?

New synergy models

Since 2002, there has been considerable discussion on new synergy models between the University of Tampere, the Tampere Chamber of Commerce and the Tampere City Business Development Unit and some of these discussions have also involved the Tampere University of Technology. There is a consensus that a transformative move must be made away from thinking in 'project modes' towards institutionalisation of processes enabling academia, business and local government to intertwine in ways such that the primary task of Tampere's business internationalisation may be reinforced through commonly shared perspectives and specific objectives where the needs of business, academia, community and local governance can be enmeshed. The adequacy of resources to support sustainable institutions on an ongoing basis is not assured and there are conflicts of interests between private actors and public systems. Project modes have the advantage that they are superfluous to structures and role-holders participating in them can camouflage conflicts of interests between public systems from where they derive legitimacy (and which they normatively and primarily serve) versus project organisation roles which provide the basis for engaging in activities beyond the mandates of formal systems. Transactions costs in such an approach are quite high. Figure 1 below presents the islands that first incur costs to survive

and then need more expenditure in the form of a project to link up. The blank island represents the unthought project.

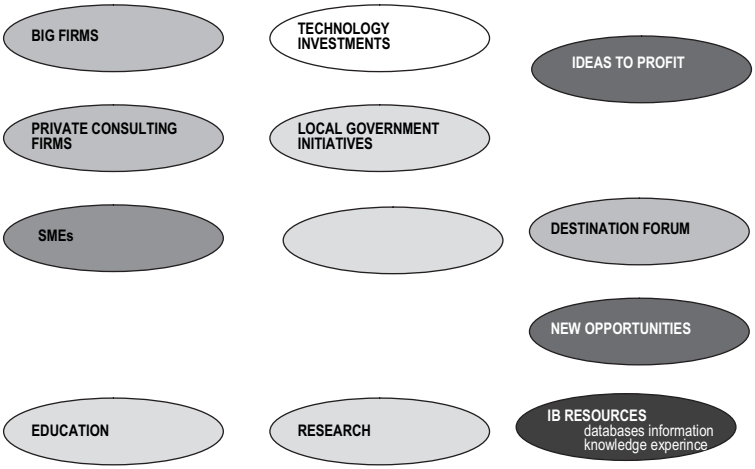

Figure 1. *Project thinking*

In project modes, whatever be the thought-out project, there is no lasting commitment to developing and sustaining international business knowhow and no institutional container that would outlast the project and facilitate the harvesting of triggered processes, knowledge and experiences during the life of the project. Investment in resources and infrastructure for international business education and research and the possibility of developing knowledge and skills through knowledge transfers linking Tampere's educators, practitioners, and students to other knowledge hubs deeply specialising in various aspects of international business knowledge remain unpursuable in project modes. University students as prospective managers and entrepreneurs, business executives of firms, and other

management professionals must look elsewhere to where such knowledge hubs exist because it is impossible for a business firm or consulting firm to compete with or substitute the knowledge resources that can only be secured through academic institutions engaged in international business education and research on a committed basis for a long term time horizon. Knowledge spillovers from projects have short lived impact and sectoral specialisation occurs at the expense of sectoral diversification. Neither firms nor knowledge hubs succeed in fostering dynamic long term capabilities in such cases.

The starting point of synergies in aspiring knowledge agglomerations has to be education and research in business disciplines focused on international business competencies (Etkowitz & Leydesdorff 1997). Small and medium-sized enterprises of the Tampere Region have many good ideas, technologies, products and services but being cash-strapped and stressed into operating routines they can afford neither employees nor buy consulting services. The capital and knowledge gap identified by Jungman and Rasila (2005) and the belated focus on developed businesses rather than spawning new businesses in the eAccelerator programme are poignant reminders that risk-averse venture capital can fail to address SME needs. Were International Business to be embedded in Masters' Degree or Doctoral Degree programmes of a University, advanced students could form teams and contribute to and benefit from hands-on service to SMEs to internationalise and SMEs could be encouraged to avail free services upon registration as members of an international club in the University with a modest entry fee. Medium and large scale enterprises capable of organising their own product development and marketing could be helped in specific destination countries within the network of institutions such programmes could link a University in Tampere to collegiate professionals and students abroad. The business development initiatives of the

city and of the TE Keskus of the State could also use expertise at the University through appropriately structured public-private partnerships. Such process thinking would add vitality and value and sustainability and it would cost less than searching for the 'next big project'.

Depicted in Figure 2 below are potential synergies from building international business expertise in either of the two universities of Tampere.

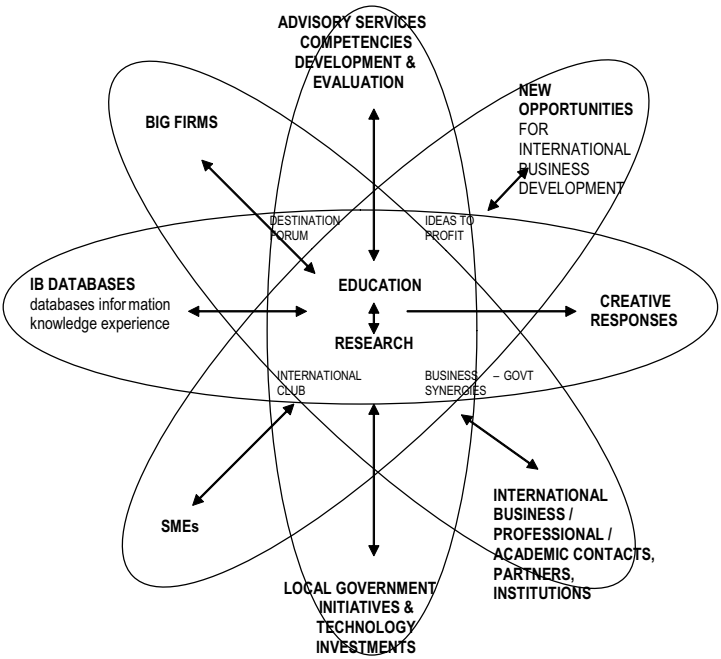

Figure 2. *Process thinking*

It remains to be seen if, and when, Tampere would go beyond 'project thinking' into sustainable process-driven institutional modalities. Innovation processes of regions and knowledge intensive enterprises are usually interactive and this is difficult to achieve unless university-industry-government linkages are institutionalised. Kolehmainen (2005) visualises three possible institutional roles: anchor, magnet and dynamo. The specialised development agencies of Tampere are neither dynamoes nor magnets and have not been successful as network weavers from the perspective of transforming Tampere into a space of flows. These agencies require to be accountably anchored in academia-business interfaces so that universities play a role other than providing cheap student labour.

Conclusions

Tampere is a city with vast potential but an agglomeration cannot innovate by itself unless it supports the activities in business organisations. Despite exceptional networking among all the different agencies, the transactions costs are prohibitive when it comes to development of international business skills and opportunities. The 'enabling development' model created many agencies and numerous brokers but the relationships are primarily connections between individuals working in these organisations creating activities for each other without a true customer base. International Business value chains and constellations can take many forms such as joint ventures for equity financing, manufacturing, distribution or logistics or R&D or licensing – not merely export marketing or procurement/outsourcing. Many of the initiatives from which business firms could benefit are not achievable without lowering the barriers to creation, development and access to international business knowledge and skills in the Tampere Region.

International Business knowhow is best developed through public-private partnerships but impossible to deliver through fragmented agencies, since no agency however large can ever compete with education and research centres instituted inside centres of higher learning. The centres of higher learning have become the crossroads of all knowledge societies. Information conduits cannot deliver value propositions that arise through social and intellectual capital and are fostered in trustful relationships where buying and selling of information is not the primary task. Management education benefits the world over from close praxis in business firms and business firms the world over benefit by investing and harvesting knowledge created in institutions of higher learning. The future of Tampere's prosperity in converting techno-commercial possibilities into viable and sustainable organisational forms requires it. The constraints and challenges to be addressed are not insurmountable – they require a vision of synergies and a realistic assessment. It is not possible to plant an economic orchard in a knowledge desert, nor to preserve a social paradise in an economic graveyard, no matter how technologically advanced.

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Endtnotes

[1] I thank Jorma Sipilä, Antti Kasvio, Olli Niemi, Harri Airaksinen and Vesa Kaasalainen for their suggestions.

[2] During 1995–2001, Finland's annual growth rates of labour productivity exhibit a skewed distribution. The highest growth rates were in electronic valves and tubes (60%), office machinery (43.6 %) communications (12%) and financial intermediation (8.7%), whereas labour productivity declined

in education, healthcare, research and development, scientific instrument-making, transport equipment, construction, mining, radio and television receivers, hotels and catering, ship-building & repairs, insurance and other business activities (O'Mahoney and van Ark, 2003, 126–127).

[3] Nokia accounted for one-third of Finland's annual GDP growth during the 1990s (Ali-Yrkkö et. al, 2000). From 2001 onwards, Nokia expanded its activities abroad rather than in Finland. Nokia provides less than 3000 jobs in the Tampere Region (about 1% of the labour force) and is not Tampere's leading employer. However, its draft on assets, public outlays and resources of the Tampere Region is considerable.

[4] Hosted by the Business Development Centre of Tampere, the site claims for Tampere a net population growth rate of 4,500 per annum which is nine times higher than the official figures from the Central Statistical Office of Finland.

[5] To use the washing machine at my residence in the building basement, I have to use a mobile phone to call a number where a voice activated routine starts up the machine (the same machine previously accepted coins).

[6] The interviewees included, among others, Harri Airaksinen, Harri Jaskari, Olli Niemi and Vesa Kaasalainen.

Antti Kasvio

What Information Society?

A vision and its realisation

During the early 1990s many leading politicians in advanced industrial countries became thrilled by visions of a new information technology revolution and its possible societal consequences. Already during the 1980s there had been a lot of talk about the so-called microprocessor revolution and personal computers had spread quickly, both within the workplace and among households. More advanced generations of computers and software continued to enter the market with what seemed to be accelerating speed. At the same time, people had begun to talk about new kinds of information superhighways, and the popularity of the world wide web was exploding. A new communications revolution seemed to be in the making, and it would evidently have a significant impact upon the everyday lives of citizens. This revolution also seemed to provide the advanced industrial countries with an opportunity to restore their competitiveness and to generate new economic growth at a time when they were on the defensive in many traditional sectors. Articles in Wired magazine and books like Bill Gates' *The Road Ahead* (1995), Nicholas Negroponte's *Being Digital* (1995) and Frances Cairncross' *Death of Distance* (1997) were effectively spreading the message of this new revolution.

Originally, the significance of this new revolution was invented by a few innovation economists. For instance, Chris Freeman and Luc Soete saw that digital signal processing had developed into a common platform for a wide range of different applications, and this observation led them to write about a

major technological breakthrough that would lead towards the development of a whole new technological paradigm (Freeman & Soete 1994). Terms like 'digital revolution', 'new information and communication technology' and 'media convergence' soon became widely used in different contexts. From the outset it was considered evident that the main economic benefits of the new ICTs would not be gained in the production of different information technological devices but rather in the development of new software and applications for these technologies.

One could already see the political significance of this new revolution in the 1992 presidential elections in the United States when both the Democratic and Republican candidates invited technology visionaries into their campaign teams. A little later the so-called National Information Infrastructure initiative became a central part of the Clinton-Gore governmental agenda (Clinton & Gore 1992, 10). In western Europe the building of new information highways was included as an important element of the growth strategy formulated in the EU Commission White Paper on growth, competitiveness and employment that was published in December 1993 (EU Commission 1993). Soon thereafter, advanced industrial countries started a large number of programmes and initiatives in order to promote the spread and use of new information and communication technologies. In addition, the G7 group of advanced industrial countries launched its own action plan in order to promote the development of information society on a worldwide scale (G7 Summit 1994). The term 'information society' became widely used, particularly in the various policy documents published by the European Union (EU Commission 1994). With this terminological choice the European authorities wanted to stress the overall character of those changes that would take place as a consequence of the information technology revolution, whereas more technological

terms – like 'information highway' – were preferred in North American discussions.

The visions of a new industrial revolution gained more credibility with the emergence of a new generation of so-called dotcom enterprises, some of which were able to reach amazing rates of growth. It was not long before people began talking about a new economy that would transform the advanced industrial economies. In the space of a few years the new economy evolved from a small number of pioneering enterprises into the main engine of the U.S. national economy. Corporations and private households alike were able to multiply their property by investing in technology stocks that were growing at an unprecedented speed. The pace of change was much more modest in western Europe and Japan, but determined efforts were made in both these societies to narrow the gap that had emerged between them and the United States. One can, thus, very well say that, during the 1990s, information society became the grand societal project of advanced industrial countries in the same way that the building of a modern welfare state had dominated their social and economic policies after the Second World War. Even if the new information and communication technologies seemed – particularly in the initial stages of their adoption – to be mainly concentrated in the advanced industrial countries, it was expected that they would soon be spreading all over the world. Thus, with the right policies it would become possible to narrow the global digital divides, at least to some extent.

Developments in social science

Academic social science did not necessarily share the enthusiasm that many other actors had for the idea of 'information society' as a new type of society that would emerge from the information technology revolution. Social scientists have traditionally been

rather sceptical about talk of major societal changes being caused by technological revolutions. They have wanted to avoid being caught in the trap of technological determinism, and have wanted to make a clear distinction between real societal change processes and rhetorical declarations about changes that are only expected to occur. The concept of information society was originally introduced into social scientific discussion by futurological authors during the late 1970s and early 1980s, but it did not have any clear theoretical status. Thus, until the mid-1990s, most social scientific commentaries of the information society discourse were quite critical towards these ideas (see e.g. Webster 1995; Kumar 1995; Duff 2000), and much more attention was paid to other change processes going on within the advanced industrial societies. There were lively discussions about the post-Fordist restructuring of production, changes in the existing welfare state regimes, new trends in gender identities, and cultural postmodernism, for example. Gradually, however, the spread of new informaton and communication technologies had reached dimensions that prompted some social scientists to think that perhaps something important was indeed happening.

The 'Information Age' trilogy published by Manuel Castells in 1996–97 transformed the intellectual landscape of modern social science. In this book Castells presents a carefully articulated and complex analysis of the 'informational' stage of modern capitalism (Castells 1996–7). The key message of this book is that the advanced industrial societies are indeed entering a qualitatively new stage in their historical development and that these changes are driven by gobalisation and technical change. The changes could be seen within the economy, with globally networked enterprises as key actors, in the world of work, in the spatial organisation of modern societies, in the area of culture, in politics, in the role of the state and in the ways in which people are building their personal identities. Anthony Giddens

immediately hailed the book as a modern classic (Giddens 1996) and, since its appearance, several social scientists have started to systematically study the role of new information and communication technologies in the functioning of modern societies.

As a societal change project, information society reached its climax at the end of the 1990s. By that time it had become evident that the growth of the new economy had significantly contributed to the exceptionally long boom and rapid expansion of the stock markets in the United States. All enterprises wanted to reinvent themselves to be seen as real information-age companies. If clear evidence of the productivity-increasing effects of ICTs had previously been difficult to find, towards the end of the decade a clear upward trend became visible in the national economic statistics. It seemed that the advanced industrial economies might be approaching a new era of sustained, high economic growth and increasing affluence, and that perhaps the traditional boom-bust cycles would also be passing into history. Politically, the world seemed to be moving towards liberal democracy, a process that was supported by the free flow of information within the worldwide electronic networks. It was expected that the world would perhaps also learn to solve international conflicts in a more coordinated manner so that classic wars between nation-states could be avoided. And it was thought that the development of modern natural science would open up new possibilities to cure illnesses and provide citizens with the opportunity to live longer and happier lives (see e.g. Schwartz & Leyden 1997).

Facing new realities

The entire economic and political landscape in advanced industrial countries changed dramatically during the first years of the 21st century. Certain promises connected to the new

information and communication technologies were not fulfilled, the financial bubble built around technology stocks burst and the world economy glided into a new recession. The advanced industrial economies have since recovered from the recession, but their economic growth has been based on very traditional factors, in particular on the consumption behaviour of U.S. households. ICT companies have been forced to adjust their activities to the same limitations as the more traditional companies, and the term 'new economy' has virtually disappeared from economic literature.

Almost equally strong changes have taken place in the area of politics. The earlier democratic trends have given way to the rise of new authoritarian regimes in several countries in various parts of the world. The United States has strengthened its position as the world's leading economic and military power and has shown its readiness to unilaterally use force in promoting its own national interests. Tensions between western countries and radical Islamism have become aggravated, especially after the Al Qaeda terrorist attack in September 2001, and, instead of creating mutual undestanding, the worldwide spread of information may be offering people further reasons to disagree with each other (Kaplan 2002, 5–6). New power struggles have emerged between countries over the control of the world's critical energy resources. Conservative forces are creating new barriers in the development of science, and many people have doubts about whether the potential of science and technology is really used for the benefit of mankind. The prevailing patterns of growth are connected with serious ecological risks, but there is little potential for finding real solutions.

These changes in conditions have led to certain reassessments in social science as well. It has been asked whether social scientists were also carried away by the hyped expectations that led so many investors and policymakers astray during the 1990s.

Rather sharp criticisms have been presented, for instance with regard to the 'phantasmagories' of Manuel Castells (Heise 2002). Frank Webster – the British sociologist who during the 1990s wrote the most authoritative review of the existing information society theories – has posed the question of whether we can really interpret certain quantitative trends as leading towards qualitative changes in the basic institutional arrangements of modern societies. His own stand is hesitant and he believes that it is up to us to decide whether we want to use the term 'information society' to describe the current stage in the development of modern societies (Webster 2002, 267).

At the same, Webster makes an important qualification. While the term 'information society' has been used to refer both to the spread and use of new information and communication technologies and to the growing knowledge-intensity of our activities, Webster suggests that the increasing significance of abstract theoretical knowledge is the more important trend. In this respect we can talk about 'information societies' and 'knowledge societies' as synonyms, and the new information and communication technologies gain importance as technologies that significantly increase our knowledge-processing capacities. This solution brings Webster closer to the thinking of such authors as Daniel Bell (1973), Peter F. Drucker (1969) and Nico Stehr (1994) and those neoinstitutional theorists of economic growth who, during the 1990s, developed their ideas about knowledge-based economy (Webster 2002a, 263–273; see also Webster 2002b).

Manuel Castells' new theoretical position

Manuel Castells has also developed his ideas further (Castells 2004), but he has been moving in an entirely different direction. During 1996–97 Castells gave his trilogy a title 'Information

Age' and, although he preferred to talk about an 'informational society', he did not actually reject being identified as a theorist of information society (see Castells 1996, 21). More recently, however, he has wanted to distance himself clearly from the earlier ideas of information or knowledge society. According to Castells, any attempt to analyse modern societies in these terms is 'an empirical and theoretical error' (Castells 2004, 7). The main reason for this is that information and knowledge have always been key factors in achieving power and wealth in all societies. Castells adds that 'in broader terms of social evolution, the notion of the information society reproduces the myth of the historical continuum from nomadic to agricultural societies, then to industrial society, to culminate in the apogee, obviously in our time, of the information society. Human history is then assimilated to the long march of progress under the guidance of reason (with occasional prayers to God just in case), as exemplified by the wonders of computers, clean toilets, and smart weapons. No conflict, no contradiction, just technologically predetermined change, and resistance to change. And since resistance to reason is irrational, it must be obliterated to clear the shining path toward our promised star' (op.cit., 40).

Evidently Castells wants to distinguish himself from the abstract universal historical theoretisations according to which all societies would be moving from agricultural to industrial and from industrial to information society as a unilinear process driven by the objective laws of scientific, technical and human progress. But this does not mean that Castells would have abolished the idea of analysing technology as the key moving force of societal development. Neither does it mean that he would have lost his belief in the significance of the ongoing information technology revolution. On the contrary, his main thesis is that modern societies have entered into a new type of society, the network society, and that this development has become possible because of

the development of electronic information and communication technologies (Castells 2004, 6). Indeed, he writes that 'on the basis of a new technological paradigm (informationalism) a new social structure has emerged, a structure made up of electronic communication technologies – powered, social networks. . . . Therefore, in my view, we must let the notion of an information society or of a knowledge society wither, and replace it with the concept of network society' (Castells 2004, 41).

Castells defines the network society as 'a society whose structure is made of networks powered by microelectronics-based information and communication technologies'. A network is 'a set of interconnected nodes'. Networks have no centres, only nodes which may be of varying relevance for the network. All nodes are not necessary for the network's performance, and when nodes 'become redundant or useless, networks tend to reconfigure themselves, deleting some nodes, and adding new ones. Nodes only exist and function as components of networks. The network is the unit, not the node' (Castells 2004, 3). The existence of networks is not a new phenomenon; in fact, in line with authors like Fritjof Capra (2002) or Mark C. Taylor (2001), Castells finds that networks 'constitute the fundamental pattern of life, of all kinds of life' (op.cit., 4). He cites those who point out that networks have had a significant role even in ancient societies. The superiority of networks is based mainly upon their high levels of flexibility, scalability and survivability (5–6). However, the victory of networks over vertical-hierarchical organisations has actually become substantiated together with the development of modern information and communication technologies. The main reason for this is that the network form of organisation has always had certain material limits to overcome, and these limits have essentially been linked to the technologies that have been available at that time (5).

If we compare these statements to the comments that Castells presented in 1996 about the concept of network society, we can see a clear shift of emphasis. Even if he already then preferred the term 'network society' as the most adequate description of the character of modern societies, he pointed out that certain components – 'such as social movements or the state' – exhibit features that go beyond the networking logic and, therefore, that this term does not necessarily exhaust all the meaning of the informational society (Castells 1996, 21). More recently, Castells has taken the position that the network metaphor can be used to analyse and to explain all the key processes going on within modern societies, ranging from the competitive strategies of modern enterprises to the 'swarming' tactics of modern high-technology warfare, the functioning of the media and the operational logic of different kinds of social movements.

Despite these kinds of reconceptualisations, most of the actual substance of Castells' description of the modern network society – including his analysis of 'informationalism' as a new technological paradigm, the rise of the network enterprise, the increasing significance of the media, the development of new power structures, processes of spatial restructuring and the emergence of new timeless time – can be regarded as a recapitulation of those theses that Castells has already presented in his earlier writings. We can, however, see that Castells makes a special effort to avoid potential accusations of technological determinism. He emphasises the contingent character of the information technology revolution, which has been an outcome of quite specific historical conditions (Castells 2004, 14–22), and he also stressess that the resulting social structures 'always express, in a contradictory and conflictive pattern, the interests, values, and projects of the actors who produce the structure while being conditioned by it' (24). These kinds of specifications cannot be found in the standard visions of unilateral information society.

Another important element in Castells' analysis is the active search for counter-trends to those ways in which the global network society is currently developing. He postulates that the processes of market liberalisation that led to the post-Fordist restructuring of production in the late 1970s and early 1980s would have had some real alternatives (16–17). He also points out that the question of what constitutes value in modern network societies is basically still open. Even if, according to the logic of capital accumulation, money is the measure of everything, with a different frame 'ideas, or specific sets of ideas, could assert themselves as the truly supreme value (such as preserving our planet, our species)' (25). In a more pronounced manner, Castells thematises the issues of resistance in his analysis of power and counter-power within the network society (34–36) and he evidently has certain expectations about the emancipatory powers of grassrooting which, 'instead of enclosing meaning and functions in the programs of the networks', could 'provide material support for the global connection of local experience' (38). In his cultural analysis Castells sketches an opposition between 'the diffusion of the capitalist mind through the power excercised in global networks' and a process by which 'conscious social actors of multiple origins bring to others their resources and beliefs, expecting in return to receive the same, and even more: sharing a diverse world, and thus ending the ancestral fear of the other' (40).

Critical reflections

Altogether Castells has presented a very bold theoretical thesis which is undoubtedly interesting but at the same time also highly problematic. For instance, the way in which Castells criticises theories of information or knowledge society is not very coherent with regard to those arguments which he presents in favour of his

own network society concept. He writes that it is not sensible to talk about a transition to information society because all societies are based upon information. This is undoubtedly true in the sense that a society cannot exist without at least some kind of common consciousness. But what has actually been presented in recent discussions is that there has been a qualitative shift in the knowledge-producing capacity of modern societies, and therefore all their activities have become much more knowledge-intensive than ever before. Castells writes that the most important new feature of modern societies is their increasing reliance upon networks. At the same time, Castells postulates in another passus that all historical societies have been based on networks and that, in general, there cannot be life without networks. Why is postulating A a logical error while postulating B on the same grounds is not?

It is also worthwhile to ask to what extent Castells has been able to avoid the trap of technological determinism. Although he stresses the historically and culturally contingent character of technological innovation processes, he seems to have a very strong evolutionary vision about modern societies transforming into increasingly complex adaptive systems. This rather straightforward vision leads Castells to say that the structures of modern societies are based upon or powered by the new electronic information and communication technologies. Such a thesis can be criticised by pointing out that social structures tend to emerge through complex historical processes in which technological factors may play a certain role, but one that should not be exaggerated. Similar criticisms can be presented concerning the author's willingness to apply the network metaphor to everything that happens in modern societies. Doesn't this manifest a fairly deterministic stance? It assumes that the various institutions do not have any other choice than to start functioning in a networking mode because it is technically most effective. In order

to satisfy that requirement, they must base their activities upon new information and communication technologies.

From a cognitive perspective, perhaps the most crucial question is: what do we actually get from the thesis which says that in modern societies everything happens through networking? Networks do indeed function under different rules than centralised bureaucracies. But the network metaphor is a very general one, and the more widely we use it, the less it can tell us about the specific features of particular institutions or processes. Let us take for instance the functioning of modern economic institutions. We can postulate a thesis according to which we are moving towards a global network economy. But what does it actually mean? Modern economies are undoubtedly functioning as complex networks in which single nodes are organised as private enterprises that interact with each other through markets. The markets have developed into a complex, decentralised and self-programming system which relies upon the price mechanism. We have a wide body of economic literature that attempts to analyse this system's functioning. Adding the label 'network' to these analyses or interpreting the economy's functioning according to the networking logic does not, in itself, increase our understanding about economic phenomena unless this process leads to some substantially new hypotheses or observations about today's economic phenomena.

One interesting feature of Castells' analysis is that he does not discuss extensively those qualitatively new trends that have been observed after the burst of the financial bubble and the declaration of war against terrorism. In his perspective the most important developments seem to have taken place during the 1990s, with its excesses having simply been a temporary deviation caused by 'the fantasies of business consultants and futurologists who forgot that the key role of the Internet is to power the real economy' (42). Nothing seems to have shaken Castell's reliance

upon 'informationalism' as a new technological paradigm that will one day transform the whole world.

This means that despite Manuel Castell's enormous achievements in modern social science his analysis does not necessarily serve, any longer, as such an adequate and up-to-date 'analysis of the present' as the Information Age trilogy did when it first came out. Castells does not necessarily touch upon those questions that many people consider most troubling or politically relevant at the current stage of societal development. Instead, the continuation of some old themes is complemented in his newer writings with very broad civilisatory reflections, a number of more or less hitting commentaries about concrete issues and elements of social criticism that are interesting in their own right but do not necessarily present a real challenge to the present course of affairs.

Is the information society project still alive?

It is quite evident that building the information society is no longer a particularly hot topic in the advanced industrial countries. Officially, the European Union is still firmly committed to promoting the development of information society and a new world summit has convened in order to discuss this issue (ITU 2004), but leading politicians are not trying to increase their support by presenting themselves as the real pioneers of the information age. For example, if one tries to find out what was said about the topics of 'information society' or 'new economy' in the autumn 2004 US presidential debates, the search engine responds politely that 'we're sorry, your search did not find any matches' (Commission on Presidential Debates 2004). One consequence of this is that not very many heads of state did actually participate in the Tunis World Summit in November 2005.

The main reason for such a change in atmosphere is that the political actors have a number of more relevant issues to deal with. Among these are the questions of economic growth and employment in advanced industrial countries at a time when many companies are relocationg their operations to China and India. Populations are aging, and the existing systems of taxation and social security need to be reformed. There are serious security issues to tackle, the war on terrorism is continuing, and energy prices are increasing. Of course, the information technology revolution is still seen as an important issue, the ICT industry is recognised as a very central cluster and the new information and communication technologies can be used to boost productivity within the public sector. On the other hand, IT investments have gone down, some applications have led to disappointments, many people are still angry about having lost money after investing in technology stocks, and people no longer believe that the information technology revolution will lead to prosperity just around the corner. Politicians do not necessarily want to invest too much of their energy in processes that are going on anyway or in raising issues that do not bring them new voters.

At the same time we can see that in academic social science the previous, somewhat coherent information society discourse has become much more fragmented. Some academics refuse to talk about the western countries being in the midst of some kind of an epochal transformation; according to them, postulates about such fundamental changes have, for the most part, been little more than a myth (see e.g. Salvaggio 1989; Garnham 2002). Others are readier to consider the possibility that such a transformation is really taking place, but they are not able to reach an agreement about its key driving forces or about those terms with which the new society ought to be described. There is a strand of research that is mainly interested in the societal consequences of new information and communication

technologies, with Manuel Castells as one of the leading figures, but there is also another group of authors – including Frank Webster – who stress the significance of knowledge as the most important factor of societal change. One consequence of this development is that the word 'knowledge society' is nowadays increasingly used to replace the earlier, almost universally used term 'information society'. Instead of one information society discourse we now have two fairly different theoretical research programmes, even if these programmes share certain common areas of interest.

The current stage of the information technology revolution

Before rushing to further conclusions about the present theoretical situation, it is useful to analyse the way in which the information technology revolution itself is currently proceeding. The pessimists tend to say that the really radical breakthroughs – like the invention of microprocessors, the development of personal computers, the introduction of mobile telephony and the Internet – have already happened, that many of the key technologies are maturing, and that the miniaturisation of processors as well as the increase in their computing powers are gradually approaching physical limits which cannot be overcome without adopting entirely different technologies. Thus, future developments will be mainly incremental in character and the most essential of their societal consequences will have already been experienced. We have already been able to see, for instance, that increasing Internet usage has not in any significant way transformed the ways in which organisations function. Neither has it led to any fundamental changes in the ways in which citizens conduct their everyday lives.

A certain degree of modesty is undoubtedly welcome after all those hyped predictions of the late 1990s. However, it is also important to pay attention to the fact that despite certain negative trends – like the declining levels of IT investments in some countries – the information technology revolution is still continuing and certain technologies are spreading worldwide even more rapidly than could be expected a few years ago. The most spectacular phenomenon has undoubtedly been the pace at which mobile telephones have been taken into use in all parts of the world. It is nowadays estimated that the number of mobile phone users would increase to two billion by 2006 or 2007. This process has taken place relatively soon after television became a worldwide media. As a consequence of these developments, an essential part of the world population has entirely new possibilities to keep themselves informed about what is going on elsewhere and to connect with other people.

At the same time, the use of new information and comunication technologies has become an organic part of people's everyday activities within the advanced industrial societies. Gradually the emphasis is moving towards more advanced solutions, as can be seen for instance in the fast spread of broadband connections, the introduction of the next generation mobile phones, the development of new enterprise solutions and in an increasing number of 'hotspots' that are offering people in those locations the possibility to connect to wireless broadband networks. These developments are being driven forward by a fast deflation of the prices of different kinds of information technologival devices. Meanwhile, the properties of these devices are also improving from one generation to the next.

One consequence of these kinds of developments has been the observation that ICT has not lost its significance as an important and dynamic force of growth in advanced industrial economies. Recent studies have, as a matter of fact, rather

convincingly demonstrated that the advanced industrial countries can perhaps best improve their productivity and strengthen the overall competitiveness of their economies by increasing their investments to ICT and by offering good growth possibilities for the ICT industry (see e.g. Jorgenson 2004; EU Commission 2004, 155–188; Estevão 2004; PricewaterhouseCoopers 2004).

If we look a little further into the future we can see that, despite more sceptical expectations, the processing power of integrated circuits is increasing roughly according to Moore's law, which will probably continue for at least some time into the future. We will, therefore, relatively soon be approaching a situation in which increasingly intelligent applications are embedded into our everyday surroundings, enabling us to use a broad variety of services in a very natural manner without having to sit at a computer or switch on other electronic devices. We will also learn to take for granted the possibility to connect into different networks wherever we happen to be, whatever we are doing. We are not necessarily so interested in which specific technologies are used in order to establish the required connections; our main attention will be directed to those substantial activities in which we are using these possibilities.

Various terms have been introduced in recent times to analyse these kinds of prospects. For instance, the advisory group of the EU IST programme has been using the term 'ambient intelligence' (see e.g. Ducatel et al. 2001), whereas the term 'ubiquitous computing' has been more widely used in the United States, in Japan and in South Korea. The main message of the different scenarios is, however, basically the same. It is assumed that the increasing computing powers that are surrounding us will significantly transform the ways in which we conduct our everyday activities. Soon we may also be approaching a stage in which the information processing powers of modern computers will equal that of the human brain (Kurzweil 1999).

From information to knowledge society

On the basis of these kinds of observations we can conclude that the story of the information technology revolution is far from being over. It is important to pay attention to the fact that the increasing information processing capacities made possible by modern computers has also opened the gates to many other scientific and technological breakthroughs, among which the mapping out of the human genome has undoubtedly been one of the most important. We can add to this the recent advances that have been made in areas such as biotechnology, new materials, nanotechnology, and others.

This brings us rather naturally to the next conclusion. The development of new information and communication technologies has been important simply because these technologies have offered us the possibility of handling increasing amounts of information. For instance, the rapid worldwide spread of mobile telephones is, in itself, a very important phenomenon, but the purchase of a mobile phone is also merely the first step in the transition into a new information age. Much more important change processes will be launched when people living in widely different cultures and physical environments start using these devices in order to solve all kinds of problems they face in their everyday lives. This will certainly lead to many kinds of social innovations which will have many kinds of consequences for the future development of our societies.

Some economists have emphasised the crucial significance of ideas in the development of modern economies (see e.g. Jones 2004). During the early 1990s the representatives of the so-called new growth theory were able to convincingly show how the advanced industrial societies have been moving towards increasingly knowledge-intensive patterns of growth (e.g. OECD 1996). In the mid-1990s this discourse receded somewhat to the

background as the attention of many economists was focused on analysing the so-called new economy and the interrelations between ICT investments and productivity growth. Now it has become possible to rehabilitate the idea that the production of knowledge is probably the most crucial factor behind future productivity increases. We can also see that there are no absolute limits to those productivity increases that can be attained through better knowledge. In this respect we are only at the very beginning of the actual productivity revolution that will, in future, proceed on a worldwide scale. The traditional knowledge institutions – that is the educational and scientific institutions – will probably have an important role in this transformation (e.g. Roco & Bainbridge 2004; Garreau 2004)

This brings us back to the demarcation that has in recent discussions emerged between the different kinds of information society discourses: those stressing the significance of the information technology revolution and those looking at the development of modern information societies mainly in the sense of a knowledge society. We see no reasons to build artificial divisions between these two perspectives, which could rather be seen as complementary (which was also how Manuel Castells approached the topic in his Information Age trilogy). However, if we have to choose whether we want to analyse the transformation of modern societies either in terms of particular technologies or in terms of their increasing knowledge intensity, our choice is definitely in favour of the latter approach.

Knowledge for what?

Benjamin Franklin wrote to his friend in 1780 that the rapid progress of science 'occasions my regretting sometimes that I was born too soon. It is impossible to imagine the height to which may be carried, in a thousand years, the power of man

over matter. We may perhaps learn to deprive large masses of their gravity, and give them absolute levity, for the sake of easy transport. Agriculture may diminish its labor and double its produce; all diseases may by sure means be prevented or cured, not excepting even that of old age, and our lives lengthened at pleasure even beyond the antediluvian standard. O that moral science were in as fair a way of improvement, that men would cease to be wolves to one another, and that human beings would at length learn what they now improperly call humanity' (letter to Joseph Priestley, February 8, cit. Wheen 2004, 1).

Today we can see that many of the scientific achievements envisioned by Franklin have come true in a much shorter period of time than the thousand years he thought would be needed. We do have magnetic levitation trains in operation, highly productive agricultural brands have been developed, and modern medicine is nowadays able to offer effective medication for most diseases. At the same time, we can see that modern societies have not been able to achieve progress wished by Franklin within the social dimension. Economic growth is nowadays proceeding in a very unequal manner, and most of the riches produced are consumed by a small minority of the world's population. Hundreds of millions are living in extreme poverty and many kinds of tensions and conflicts are dividing different groups of people. Man's power over matter is used not only in order to fulfil the most essential human needs, but also to develop terrible weapons of mass destruction, and it is used in increasingly imaginative ways to feed man's own narcissism. The development of modern human civilisation has seriously disturbed the earth's ecological system, and enormous damages will probably be caused by the warming of the atmosphere in the relatively near future.

Thus, it is fairly easy to say that modern knowledge societies have developed in a very unbalanced manner. We have not learned to manage modern societies as effectively as

we have learned to control natural processes. This is one of the main reasons why many people are nowadays rather sceptical concerning the very future of our civilisation. In today's conditions we cannot put the blame upon the state of 'moral science' as straightforwardly as Benjamin Franklin did during the high time of the Enlightenment. But it is easy to agree with Manuel Castells when he stresses that, in analysing the increasing information and knowledge processing capacities of modern societies, social scientists should pay due attention to the social purposes these forces are put to serve. We should not pretend to be living in an advanced information or knowledge society – or in a network society – if that society is not clearly aware of the real societal and cultural consequences of its doings and if the society is not able to make ethically sound and defensible choices from the point of view of today's human and ecological development. Helping modern societies move in this direction is the worthiest mission that can be presented to theories of information or network society – and this mission remains the same without regard to the particular terminologies used by the researchers.

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VIII

Conclusion

Antti Kasvio and Ari-Veikko Anttiroiko

Moving Forward from the Present Experiences

We hope that the materials included in our book have given the readers a good look both upon the overall dynamics of today's innovative regions and cities as well as into the various ways in which informational developments have been carried out and analysed during the last years in Tampere. Important research work related to these areas has been done as part of the eTampere initiative also in areas that haven't been covered in this collection – it is possible to mention for example the analyses about transformations going on in the world of work (Blom, Melin & Pyöriä 2003), studies about human-computer-interaction (Majaranta & Räihä 2002) or research on games and other new audiovisual cultural forms (Mäyrä 2002; Lehtonen & Herkman 2002). Still, this collection has perhaps offered at least some insights into those innovative processes and research activities that have been going on in this region during the last years.

In many ways the five-year initiative eTampere symbolises the particular way in which informational developments have been promoted in the Tampere Region during the last years. This initiative has received rather much publicity and it has raised many kinds of expectations. For example, already at a very early stage Manuel Castells and Pekka Himanen criticised the programme's self-representation as being 'often couched in the naïve terms of futurology' (Castells & Himanen 2002, 126). But, these same commentators stated also that 'the fundamental concept behind these words seems to be a major innovation on the prior policies of high-technology development. Indeed, the current trends in the expansion of the information society,

worldwide, point towards the increasing importance of the social uses of information technology. . . . To investigate how society adopts and shapes new information technologies, to advance research and development programs along these lines, and to support and launch new businesses on the basis of these strategic anticipations, is a bold project that could bring prosperity to Tampere and innovation to the world at large' (ibid.).

This is not the right place to present any final assessments about the extent to which the region of Tampere has been able to meet the very ambitious objectives set for its future development or the expectations directed towards its initiatives from the outside. The key activities are still continuing during the writing of these remarks, and the planned systematical evalutions about the results of eTampere have not been made yet. In any case, we assume that on the basis of materials presented in this book also some readers might be prepared to agree with our view that informational developments have been carried forward at Tampere in several different dimensions involving a multitude of actors and that there have been serious efforts to bring new strategic elements to these processes in order to create results that would also be socially and culturally feasible. On the other hand, the materials may give an impression that Tampere has not necessarily transformed yet into such a dynamically growing centre of new economic activities as was originally expected. The uses of new information and communication technologies in Tampere have perhaps not been entirely unique in comparison to developments going on in other comparable cities. Neither do the region's scientific accomplishments appear to have reached quite the level and visibility that was originally expected, even if significant progress has been made in certain areas of study.

The results of any development strategy are of course, at least to a certain extent, dependent upon the quality of their practical implementation. But in the case of Tampere, it is

important to consider the dramatic changes that have taken place in the external environment after the goals for the ongoing developmental activities were defined. For instance, planning of the eTampere programme took place at the height of the 1990s economic boom. Since then the burst of the stock market bubble and the worldwide crisis of the telecommunications industry have led into the ebbing away of just that economic wave on which Tampere was expected to continue its stride towards constantly increasing levels of affluence long into the present millenium. The whole Finnish economy has suffered greatly from these changes, and even if Tampere has not lost as many ICT jobs as the other leading Finnish growth centres, the city can no longer expect to reach similar rates of growth as it was able to enjoy in the late 1990s.

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From today's perspective, we could perhaps say that many of the analyses presented in this book have emerged from ideas developed during the late 1990s, and certain reminiscencies can be seen from the mental atmosphere that prevailed at that time. Nowadays we can only wonder how much the world has really changed since then. The information technology revolution may still be continuing and especially mobile telephony is spreading fast all over the world. New applications are taken to use in the advanced industrial countries, and the world wide web has developed into an organic part of our everyday activities. But the visions of information society no longer dominate the social and economic policies of advanced industrial societies in the same way they did during the late 1990s. Some social scientists have began to criticise the use of information society as a key metaphor incorporating the essence of ongoing societal changes. Many actors have started to look for fresh visions for future social and economic development even though the older ideas of

information society continue their existence, for instance, in the official policy rhetorics of many advanced industrial countries.

The efforts towards renewal can be detected also at the level of urban development strategies. In recent times many cities – including the City of Tampere – have either launched or are planning to launch new initiatives in order to promote the growth of their creative industries. Even though the ideas of 'creative city' originally developed by Richard Florida (Florida 2002) may mot be entirely free from the same hype that led to many ungrounded expectations during the late 1990s (see e.g. Mananga 2005, 90–106; Kotkin & Siegel 2004), such activities can also be seen as signs about the fact that urban competition is currently entering a qualitatively new stage. In the changed conditions, also the strategies of urban economic revitalisation must be reformulated.

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One of the recent times' most important macro-level phenomena has been the scale in which people living in China, India and many other developing countries are making efforts to abolish their long-standing poverty and to find themselves a role in the modern economy. This development has led to a significant increase in the worldwide supply of labour, and global job competition is reaching entirely new dimensions. Companies operating in advanced industrial countries have started to relocate activities into areas where the costs are lower and the prospects for market growth better than in their traditional environments. Even if the resulting faster worldwide economic growth will offer many benefits also for the advanced industrial countries, the same process puts them also in front of tightening global competitive pressures. One should take into account that even if initially the level of productivity in most business operations located in developing countries may still be on a relatively low level, the organisations operating in the developing countries are moving

fast forward in their learning curves. Therefore also the advanced industrial countries must move continuously higher in the productivity ladder if they want to maintain their competitiveness despite cost levels that exceed significantly those prevailing in the new fast-growing areas.

In these conditions, it is evident that the processes of economic restructuring must proceed further with an accelerating pace in advanced industrial countries. These countries have to orient towards knowledge-intensive growth, and they must find increasingly sophisticated ways to use new information and communication technologies. Further scientific and technological innovations are needed in order to manage the very difficult resource constraints and environmental risks connected with the present worldwide economic growth. Thus the advanced industrial societies are sometimes said to be transforming into 'cybernetic empires' (Lafontaine 2004) that cannot any longer survive without the continuous functioning of extremely complex technological systems. At the same time, also the future of human species will be increasingly influenced by different kinds of posthuman developments. The dynamically developing urban centres are expected to function as forerunners of this process during the course of which many difficult civilisatory choices have to be made.

It is quite possible that these kinds of developments will dominate the societal renewal efforts and the research agendas in tomorrow's advanced industrial societies similarly to the visions of digital revolution and information society did during the late 1990s and early 2000s. Thus, even if much work remains still to be done in transforming Tampere into a real informational city and even if the eTampere activities will be continued further focusing upon certain specifically selected theme areas,* the local actors are nowadays prepared to move forward in their innovative activities and in the research work connected to them. They are

also willing to actively establish close cooperation with research teams and innovative actors in other cities sharing similar visions of future and of those challenges that need to be mastered before these visions can turn into reality.

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Endnotes

* The new so-called spearhead projects will deal with the promotion of entrepreneurship, the development of new electronic welfare services and certain carefully chosen areas of technological development.

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Antti Kasvio is Docent and Research Director of the Information Society Institute launched jointly by the University of Tampere and the Tampere University of Technology. Previously he has studied extensively transformations in the world of work, but during the last ten years he has organised a large number of new research projects upon different aspects of the development of information society. From January 2006 he will be in charge for social scientific work research at the Finnish Institute of Occupational Health.

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The Rise of the Network Society (1996, revised edition 2000), *The Power of Identity* (1997) and *End of Millennium* (1998, revised edition 2000). Professor Castells has published twenty books, written over a hundred articles for academic journals, and co-authored or edited fifteen books.

Philip Cooke is University Research Professor and founding Director (1993) of the Centre for Advanced Studies at the University of Wales, Cardiff. His research interests include Economics of Biotechnology (partner in CESAGen Research Centre), Regional Innovation Systems, Knowledge Economies, and Policy Actions for Business Clusters and Networks. As a field leader in Knowledge and Innovation Sciences he has co-ordinated and participated in six FP projects since 1995. Professor Cooke has been an EU adviser on Regional Foresight, Universities and Regional Development, and from 2004–5 chaired the EU committee on 'Constructing Regional Advantage'. He is an OECD adviser on Knowledge Economies and a UNIDO adviser on Innovation Systems. He has authored, edited and co-authored many books on topics such as regional innovation systems, network governance and knowledge economy, and is the author of more than a hundred research and scholarly articles in leading journals. He is also Editor of *European Planning Studies*, a bi-monthly journal devoted to European urban and regional governance, innovation and development issues. In 2003 he was elected Academician of the UK Academy of Social Sciences (AcSS).

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Marjatta Hietala, PhD, MSocSc, has been Professor of General History at the University of Tampere since 1996; in 2002 she was appointed Academy Professor. She has worked as Professor of General History in Joensuu from 1994–96 and Acting Associate Professor of General History at the University of Helsinki, and has taught at the universities

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Juha Kostiainen, MSc in Technology, MA in Philosophy and DSc in Administration, is Vice President of corporate planning in YIT Corporation since 2001, where he is in charge of corporate strategies

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Tommi Rasila, MSc (Eng.), DrTech, is CEO of the Tampere Chamber of Commerce and Industry and completed his doctoral degree at the Tampere University of Technology in 2004. His dissertation was a concept-analytical study on V2C, laying the ground for a new perspective on growth business process and professional ownership. He has been involved in several companies as founder or owner, and is

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Marko Seppä is Director of eBusiness Research Centre (eBRC), a university joint venture and a sub-programme of eTampere (2001–2005), at the Tampere University of Technology. Prior to co-founding eBRC, he completed his doctorate in Corporate Strategy at the University of Jyväskylä. From 1986-1996 he served in the venture capital industry, gaining pioneering experience from the Russian and Baltic markets. Since 1997, he has served the industry on a part-time basis. He is a member of the editorial board of *Venture Capital: An International Journal of Entrepreneurial Finance*, and his key research interests cover knowledge capital management, knowledge investments, co-entrepreneurship, and venture-to-capital (V2C) strategies.

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