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Towards  
a Networked  
Finland



THE INFORMATION SOCIETY COUNCIL'S REPORT  
TO THE FINNISH GOVERNMENT



# Towards a Networked Finland

FEBRUARY 2005

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# Foreword

On September 4th, 2003, the Finnish government appointed the Information Society Council to act as the negotiating and coordinating body between the various actors in society. The Council, appointed for the term of the present government, consists of key representatives of public administration, organisations and the private sector.<sup>1</sup>

In its first meeting on October 22nd, 2003, the Information Society Council announced its aim to promote open and constructive discussion, co-operation and common decisions. The members and experts of the Council have engaged in active discussion and provided important commentary on numerous issues while also committing to the enhancement of common goals. Thanks are due to all members.

One specific task of the Council is to provide an annual report on the development of information society in Finland. This is the first report by the Information Society Council.

The report aims to provide an overall picture of the current stage of the information society in Finland and its challenges, and to outline actions with which to respond to these challenges. In addition to this overall view on the development of the information society, the report also uses the annexed statistical information to assess the achievement of the goals of one of the Government Policy Programmes, the Information Society Programme.

Each of the seven sections of the Information Society Council has compiled a chapter discussing their respective area of expertise. The commentaries preceding these chapters have been written by Mr. Matti Lehti, President and CEO, TietoEnator Ltd., Ms. Tarja Cronberg, MP, and Mr. Teppo Turkki, researcher. The report has been edited by Dr. Antti Kasvio, Research Director at the Information Society Institute, and Ms. Hanna Liikala, Project Secretary at the Information Society Institute. Ms. Päivi Mutanen-Pirttilä, Programme Co-ordinator, and Ms. Katrina Harjuhahto-Madetoja, Programme Director of the Secretariat of the Information Society Council have participated in the editing of the report. I extend my gratitude to those involved in the production of the report for their excellent work.

MATTI VANHANEN

*Prime Minister*

*Chair of the Information Society Council*

<sup>1)</sup> For the members the Information Society Council and further information on its activities, see [www.infosoc.fi](http://www.infosoc.fi)

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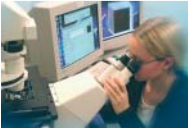
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# Introduction

Information technology is currently effecting great changes in economy, in society and in citizens' daily lives. Finland has been actively involved in this development from the beginning, and in the 1990s managed a high-profile breakthrough to the forefront of the international information society. This development has been driven forward by the powerful growth of Nokia and of the telecommunications cluster as a whole, but it has also been founded on long-term investments in knowledge and competence, public sector activities and citizens' active interest in new information and communication technologies.

## ■ From an era of revolutionary changes to everyday practices

In the 1990s, the expansion of the information industry drew the whole of the Finnish economy into a powerful upswing, and Finland was rated highly in different comparisons of international competitiveness. Finland's ability to construct a dynamically evolving new economy without being forced to compromise its central characteristics as a Nordic welfare society with relative social coherence merited particular attention. Finland has thus provided a viable alternative to the uniformly market-driven approach that has dominated development in California's Silicon Valley, the birthplace of the digital revolution.

In spite of its strong position at the start, Finland has discovered that advances in the field of information technology do not guarantee a smooth path towards increasing wealth, and that it is necessary to prepare for various surprises and discontinuities. The Finnish economy has remained strong and dynamic in its foundation, but its opportunities for future growth are limited by the rapid change in the age structure of the population, the relatively slow growth in the European common currency area and the intensifying challenges of the international competitive environment. The changing circumstances have also called attention to certain weaknesses in the construction work of the Finnish information society, such as the imbalance between the IT manufacturing and the application of these technologies.

Finland is still rated among the most developed information societies in the world, and it has recently received recognition from the Organisation for Economic Co-operation and Development (OECD) for achievements in education. The speed of development is manifested for instance in the doubling of the number of broadband connections in the space of one year. Moreover, Internet commerce is growing solidly with a rate that has in fact managed to exceed many expectations. The use of the Internet has grown steadily in different age groups and usage has also become more versatile. For instance, the Internet has proved to be an important tool enabling Finnish businesses to interact with various authorities.

## ■ Development continues

Although the breakthrough phase of the digital revolution is behind us, the development of information technology continues, and the greatest changes in fact lie ahead. In the industrial countries, mobile phones, computers and the Internet merge into the daily routines of the great majority of people, and the focus of usage is moving towards increasingly sophisticated technologies and applications. As we move from one generation of technologies to another, the information processing and data transfer capacity of the technologies continues to rise. What is more, citizens will, in their daily lives, encounter a growing number of increasingly intelligent and highly inconspicuous information technologies that respond to natural interaction. In the future, information and communication technologies will become an even more natural and unaffected part of the activities of citizens.

Mobile phones are spreading rapidly, especially in developing countries and economies in transition. This, however, is only one step in the broad-based mobilization of resources that is occurring in many rapidly growing and densely populated developing countries. As people are exposed to information about the modern way of life, they try to make the best of the opportunities it offers. Although the most visible manifestation of this development so far has been the concern for the relocation of jobs from industrial countries to areas with lower expense levels, the current development offers a significant push for the whole global economy. The acceleration of economic growth also benefits industrial countries, provided that issues concerning the management of natural resources and environmental capacity can be controlled.

### ■ **Growth of knowledge as the key to development**

Certain economists have recently stressed the significance of knowledge as a factor affecting growth and productivity development in contemporary economies. When talking about the information society, it is also useful to direct attention to information technology's role in enabling the processing of vast amounts of information. It is this particular feature that has enabled, and continues to pave the way for, many other scientific and technological breakthroughs. The opportunities for increased productivity that are opened up by the new means of information processing contain no absolute limit, and even the advanced industrial countries have only just reached the very first steps of knowledge-based growth.

Yet, it is important to realise that recent global problems speak volumes about how contemporary societies are unable to control their own actions and conflicts. In a deeply divided society, people often find it difficult to know whether new information is being produced for their benefit or to be used against them.

### ■ **The Policy of the Finnish government**

The Finnish government is committed to active promotion of the information society. This work reached a new phase in spring 2003 when the government began the implementation of four Policy Programmes to facilitate cross-sectoral co-operation in fields deemed important, in light of its objectives. The promotion of the information society was chosen as the topic of one of these programmes, to be headed by the Prime Minister himself.

The Information Society Policy Programme is intended to improve competitiveness and productivity, to enhance social and regional equality and to advance the well-being and quality of life among citizens through the application of information and communication technologies in all realms of society. Moreover, it aims to maintain Finland's position as one of the main producers and users of information and communication technologies. The programme provides the opportunity for a more efficient co-ordination of work carried out among different branches of government to promote the information society, while at the same time seeking active co-operation with various national and international actors. The Information Society Programme is led and co-ordinated by the Prime Minister with the help of the Programme Director, operating from the Prime Minister's Office.

The programme consists of the following eight areas: telecommunications infrastructure and digital television; citizens' ability to function in the information society and make more efficient use of information society services; education and training, working life and research and development; online services in public administration; the development of social welfare and health services through the means of the information society; the development of e-business and digital contents and services; government information management; and legislative measures central to the promotion of the information society.

The main priorities of the Information Society Programme have been defined in the government's strategy document. The plan for the programme's implementation, approved in April 2004, defines in concrete terms the projects to be carried out in the different sectors of the programme, and the authorities responsible for their execution. The ministerial group overseeing the implementation decided on the following five general priorities for the programme: 1) horizontal and vertical co-operation, 2) the development of service production with the help of new information and communication

technologies, 3) education, training and information society skills, 4) telecommunication infrastructure and 5) legislation and operating environment. In identifying these priorities, the ministerial group stressed, however, that all projects in the Information Society Programme must proceed according to schedule and that numerous new initiatives will be launched during the term of government.

The programme places particular emphasis on concrete actions and, in accordance with this policy, the government has begun to monitor and reward best practices in different areas of the information society. In December 2004, the first 'Best Practice in Everyday Information Society' Award was presented to the mobile SMS ticket service developed by Plusdial Ltd. This service is currently in use in the Helsinki area public transport system and has attracted considerable interest internationally as well. Many other good practices were also rewarded and the prizes will be awarded again in 2006.

The programme's progress in achieving its aims will be measured annually against metrics of national and international development of the information society. The Information Society Council has committed to producing annual progress reports on the information society in Finland.

### ■ European and international dimensions

In addition to the national project of constructing an information society, Finland actively participates in promoting a European information society in the framework of the European Union. Finland is committed to the achievement of the aims set forth in the eEurope 2005 Initiative and is actively involved in the planning of the subsequent stages of the Initiative. Particular emphasis is laid on activities aimed at improving information security, delivering reasonably-priced broadband connections for all Europeans, promoting European content production, developing online public services and enhancing the uptake of the next generation Internet.

The most central of the European research programmes in this respect is the IST Programme, which seeks to construct a user-friendly information society. Finland is involved in the formulation of the contents and aims of the programme, and Finnish research groups and businesses have actively participated in the practical implementation of the programme. Recently, the focal point of the programme has started to shift towards intelligent applications embedded in everyday environment.

In addition to these concrete measures, an active discussion on the need for reforms in European societies and the formation of a common European Research Area (ERA) is currently taking place within the European Union. Finland perceives active advances in these areas as a prerequisite for the practical implementation of the Lisbon Strategy, with the objective of transforming Europe into the most competitive economy in the world by 2010.

In recent years, the information society has emerged as a central theme in the functions of the UN as well as in the development aid policies of Finland. Together with other EU countries, Finland is involved in the preparations for the World Summit on the Information Society to be held in Tunis in November 2005.

### ■ The nature of the report

The central goal of this Information Society Council report is to analyse the development currently taking place in Finland as compared to European and worldwide trends, and to recommend tools for setting the direction of future development. The report is not, therefore, intended exclusively to provide a description of the Information Society Programme and its advancement or to report on the activities of its sections. The analysis does, however, endeavour to take into account those aspects of the Information Society that the government has chosen to highlight in its own strategies. Certain central issues have been reported to the government on separate occasions. The national Information Security Advisory Board, for instance, published its own report on December 14, 2004.

The present report is the first publication by the Council to address the entire scope of the development of the information society, and therefore concentrates on analysing the current situation in Finland and setting goals for the future. In the second report, to be published in 2006, the focus will be on measuring development, whereas the third report, in 2007, will concentrate

on the conclusions to be drawn from the Programme and will offer recommendations for future activity. These reports are not intended solely for experts, but are meant to serve anyone interested in the information society and the work carried out to promote its advancement.

Three commentaries from actors outside of the Information Society Council have been included in this report. They are written by Mr. Matti Lehti, CEO of TietoEnator Ltd., Ms. Tarja Cronberg, a member of the Finnish parliament with a background in different tasks related to the promotion of the information society, and Mr. Teppo Turkki, a visiting researcher at the University of Waseda in Japan. They were asked for a fresh and original perspective on the discussion surrounding the Finnish information society.

The sections of the Information Society Council have produced the following seven chapters, each of which describes the current state of the Finnish information society from the viewpoint of their respective focal areas, envisions desirable future scenarios and suggests measures for their achievement. The final chapter contains a summary of the measures directing the development of the information society and draws together conclusions. Statistics describing the attainment of the aims set for the Programme and a list of legislative projects related to the information society are provided as appendices.

We hope the report will bring an essential and constructive addition to the discussion on the information society at a time when the idea of the information society must, to an extent, be redefined. Based on the analyses in the report, it would seem that the construction of the Finnish information society is proceeding on a number of different fronts, but is also faced by significant challenges. The question of how the Finnish society can enforce its innovativeness appears to emerge as a central concern. Thus, the main issue is not simply promoting the efficient development and uptake of new information and communication technologies, but also locating the means through which Finnish society and its different functions can reform themselves.

# Information Society and Finland's Competitiveness

MATTI LEHTI

The first decade of the Internet revolution has provided us with a relatively clear view of how the information society will develop and the changes that it will entail for Finnish society. The most important impetus for change is

digitisation, the conversion of products and services into zeros and ones and their subsequent online availability. The Internet offers customers cheaper, faster, safer and more environmentally sustainable access to products and services compared to traditional means of production and distribution, such as road transport.



## ■ Challenges for competitiveness

The effects of the new technologies on competitiveness are felt in two ways. They increase productivity in all fields of society, and offer new earning opportunities for the providers of Internet-based products and services. The most important indicators of competitiveness in the information society are the speed with which new means of production are introduced and the global market share that is achieved by companies in new digital products and services. The development is proceeding rapidly in Finland, but this is also the case in many other countries. Achieving greater speed and depth in the transition, compared to other national economies, is crucial from Finland's point of view.

To ensure continuing development, we need cheaper microprocessors, simpler user interfaces, broader data transmission bands and lower telecommunication costs. However, the most important vehicles for development are increasingly sophisticated products and services suited for the Internet. When it comes to microprocessor prices, Finland is wholly dependent on foreign manufacturers, although prices are continuing to decline as production volumes escalate. In approximately ten years time, the number of microprocessors communicating with each other will surpass the world's population.

A central factor in Finland's development is that mobile devices using wireless technologies are becoming the most important platform for Internet access and Finland is one of the world's leading countries in developing user interfaces for these devices. The construction of a national telecommunications infrastructure and the development of telecommunications costs are largely in our own hands and, in these issues, advances are partly dependent on the actions of public authorities. An interim report on the implementation of the national broadband strategy published by the Ministry of Transport and Communications in December 2004 contains a well-planned action programme that is not, however, likely to strengthen national competitiveness, even when successfully implemented. In order for Finland to gain an actual competitive advantage internationally, the public sector must pick up the pace of its own investments and become more active in the provision of financial incentives to encourage the growth of the private sector.

## ■ Transition of the service industry

Aside from digitisation, a major factor affecting the growth and competitiveness of Finnish society is the rapid rise in the skill level of developing societies. As increased digitisation and a rising skill level come together in the global information network, their effects are felt most prominently in the most labour-intensive area of society: the service sector. This leads to a broad automation of services and a new distribution of information-intensive service

work between industrial and developing countries. As a result of service automation, knowledge-intensive service work is divided into self-service, which is performed by customers, tasks which are performed by servers and access devices, and background work that involves the maintenance and support of these services. With global information networks, this background work can be carried out almost anywhere in the world. In the future, knowledge-intensive services will be produced near the customer, in areas where production costs are the lowest. This means that people in developing countries are able to participate in the service production of industrialised countries without having to leave their native country. At the same time, the industrialisation of the service sector is becoming increasingly reminiscent of the automation and internationalisation that took place in industry in the 20th century.

For firms offering these types of services flowing freely on the Internet, specialisation is as significant for competitiveness as it is in the manufacturing industry. The most important differences between the two forms of industry concern capital needs and the significance of distance. In the physical production of goods, capital investments are directed to production equipment, and transport distances to the main market are a central factor in competitiveness. In knowledge-intensive service production, the focal point of investments lies in developing competence and brain power, and transport distances have little significance for products and services that are distributed at the speed of light.

Like industrial automation, service automation also brings with it great leaps of productivity, greater wealth and shorter hours. Instead of a collective change in working hours, the hours are shortened on a highly individual basis. Based on a conservative estimate, the automation of knowledge-intensive service tasks reduces the number of jobs in the service sector by approximately 10 percent, or 160,000 jobs, by the end of the next decade. This number roughly equals the anticipated loss of labour supply due to retirement by 2020.

With the development of information and communication technologies and the new international distribution of labour, the greatest challenges face companies operating in the most knowledge-intensive service fields, such as the finance sector, telecommunications, entertainment and the media. Competition is forcing these businesses into major transitions that only the most skilled and regenerative actors will be able to survive. No field of business can remain unaffected by this change. In the public sector, the greatest pressure is on knowledge-intensive public services and health care. Due to lack of competition, changes in the public sector must be motivated from within.

#### ■ Premises for Finland's success

Finland's progress in the realm of information society thus far and its opportunities for future success could be rated as mediocre or good. Finland has managed to remain in the running, but has not achieved a significant competitive advantage. The ingredients for success are there, and our capacity to exploit them will be determined over the course of the next fifteen years. By 2020, all knowledge-intensive products and services will be available online, infrastructure covering the entire country will be completed and citizens will be fully trained in the use of online services.

Finland's position as an exporter of competence and knowledge-intensive services depends primarily on businesses' capacity for innovation and learning. Conversely to the situation in the early 20th century, the economic, educational, capital and even age structure of Finnish society favours accommodation to the changes ahead. The public sector must display innovation as well as the capacity for change in the uptake of the new means of production. Simultaneously, it must create incentives for growth in the private sector through developing the systems for education, training and innovation, labour markets and social security, as well as the fiscal system. The Finnish economic policy must have the capacity to adapt to a new kind of union of services and technology, and do it more rapidly than competing countries. At the same time, the resources of society must be directed in such a way that they can be used to support the generation of new Internet-based service products and jobs.

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# Alone in the Information Society

TARJA CRONBERG

In Finland, the development of information society has been largely understood as the development of mobile phones, the Internet and broadband connections. Advances have been measured in the number of users and the speed of technology, and the human element has been left aside. Citizens have



been transformed into users and presented with the responsibility to acquire the necessary information and to participate in the deployment of various technologies. The public sector has been left with the mission to support this development by making its services available online. Even in the field of democracy, the current trend anticipates the use of voting machines.

## ■ Loneliness in society

It is paradoxical that as the number of mobile phones has increased, the loneliness experienced by people has grown. The Mannerheim League for Child Welfare recently carried out a study which concluded that children's loneliness is an important problem and stressed that children need the presence of an adult who is not constantly busy with something else. Another organisation, Support for the Welfare of the Aged, has found that loneliness presents a problem for the aged, especially if their health begins to deteriorate. In addition to children and the aged, middle-aged singles also experience loneliness in a society dominated by family values. However, membership in a family does not necessarily eliminate loneliness, and the image of a child spending time alone surfing the net in his or her room remains strong. Simultaneously, parents become exhausted as the rhythm of working life is constantly accelerated.

Mental health problems are accumulating in all age groups. The consumption of alcohol and the resulting rapid exacerbation of health risks are also increasing. Health care expenses are exploding. Domestic violence presents a chronic problem, and feelings of insecurity are mounting in homes and in society. Why did Finland fail to become the dream land of the information society, as anticipated by Pekka Himanen and Manuel Castells?

## ■ The three stages of the information society

The development of the information society can be described through three stages. The first stage is access to technology and existing networks. The invention of the telephone had no relevance until other people also acquired telephones. The same is true of the Internet. The opportunity to make use of different technologies is the ticket of admission to the information society –without it, inclusion is impossible from the outset.

The second stage of the information society is linked to competence and knowledge on the usage opportunities of the devices. Aside from mastering the use of the technologies, it is also important to possess the skills necessary for working-life participation in the information society. Knowledge of the basic rules and the capacity to move fluently along the highways and footpaths of information are requirements for obtaining a driving license in the information society.

The third and most important stage of information society citizenship is the "membership card" phase, which entails actual participation in the communities of the information society. This involves a sense of belonging and functioning together with others in efforts to build a common future.

### ■ **The significance of a sense of community**

The promotion of a sense of community has been largely missing from the goals set for the information society. This trend has been particularly clear in Finland. Finns are technology optimists; we like to make use of new technology without questioning how and why. In the present situation, forgetting the fundamental issues concerned with the primary uses of technology is reflected even in the development of Nokia. Finland is no longer doing quite as well as it used to in international comparisons, because our ways of understanding the life that technology is meant to complement are in some way inadequate.

In traditional agrarian societies, the village community afforded people roots and instilled a sense of unity among them. In the industrial society, it was the work community that linked people to society and included everyone in the development of the welfare state. In his visions from the early 1980s, Alvin Toffler suggested that in the information society, the sense of community would originate in the home and the immediate environment of the individual. It was his idea that local communities would reach an unforeseen prosperity while an increasing share of work would be carried out from home. The physical limits of these local communities could be specifically defined in the same way as the old village communities of the agrarian society, but they would also be largely international and multicultural.

The increased loneliness of modern society attests that Alvin Toffler's vision is not becoming reality. The number of single-person households in Finland is 900,000, which is more than one fifth of the country's population. When single parents and other people living outside a permanent relationship are included in the figure, the number reaches almost 1.5 million. No signs of the renaissance of the local community can be detected. On the contrary, existing common facilities such as village schools, community libraries and youth centres are being run down.

### ■ **A membership card to the information society**

We are lacking a membership card to the information society and to local communities that we could see ourselves belonging to. Virtual communities, chatrooms and discussion boards are not enough; we have a pressing need for actual physical closeness. At this stage in the information society, we should invest all available resources not in technology, but in the endorsement of communities. Support is needed to create and maintain common facilities, associations, youth work and culture. Also the skills of caring, communication and living together require support and practice.

Public libraries are in a key position in this development. They constitute a genuine space in the information society, the meaning of which has been obliterated in the technology fever of recent years. Libraries provide us with access to information and the help of information professionals, and they also enable us to meet other people. It is remarkable that when the library doors open at 11 a.m. in a little town in North Karelia, fifty people are waiting at the entrance. A library is an open space, with a low threshold for visitors. Libraries carry out important social work for the prevention of loneliness, and this work also includes young people. It is libraries that enable the participation of everyone in the information society. With a view to the future development of the information society, it is particularly important that libraries are near to everyone and that, in addition to the newest technologies, they also contain capable instructors. Most importantly, the library must be open when it is needed.

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# The Asian Pioneers of the Information Society

TEPPO TURKKI

Japan's and South Korea's perception of the development of the information society is much broader and more comprehensive and dynamic than the view highlighted in the Finnish discussion. Both countries have been quick to recognise the social, societal and communicational changes associated with digital technologies. At the same time, they have also embraced the fact that the market



for new technologies and services emerging as a result of technological convergence will form a central part of national competitiveness achieved through the means of information society policy.

Both Japan and South Korea have understood that the terms of success, from the viewpoint of nations and corporations as well as individuals, are more and more dependent

on the capacity of these actors to adopt and master the use of new technologies and their skills in communication and developing their environment. In this way, technologies, their application and a more general development of the information society form an increasingly central part of the politics practiced by Asian governments.

## ■ Towards ubiquitous computing

For the Asian countries, the development of the information society equals coping in the global economy and finding ways to convert innovations into products. Particularly in Japan, it is understood that the information economy and new digital technologies are in fact synonyms for an innovative economy.

In order to manage the ongoing transition, characterised by a simultaneous change in social, economic and technological systems, Japan and South Korea have developed a broad and integrated model of ubiquitous services. Japan's U Society Strategy in ambient intelligence is matched by South Korea's IT839 Strategy. The numbers in IT839 signify eight new services promoted by the strategy, three aims related the development of infrastructure and nine new ICT product concepts enabled by the infrastructure.

The ambient intelligence societies described by both strategies are based on an integration of networks that enables public services, work-related communication and transactions as well as the entertainment, information management and communication of private individuals to move seamlessly across and between different networks and platforms.

In the ambient intelligence society, the production of meanings and communication occupy a central position. Other central concepts include information security, customer and user-orientation, and learning systems.

## ■ The degree of progress depends on the viewpoint

The development of the Japanese and South Korean information societies appears in a slightly different light if we observe them from the viewpoint of civil society and public services rather than through the lens of market economy.

South Korea has long maintained a strong national consensus for a swift transformation into the world's leading information society. South Koreans are deeply committed to supporting the development of their society, and

wish to improve their nation's competitiveness in the field of information technology. They view this type of development as related to their own advantage in the future.

Conversely, in Japan, the development of the information society seems to have frozen in its tracks, mainly because the eJapan strategy formulated by the government has run into firm opposition from citizens. The reasons for this resistance are linked to the operations of a web service called Juki Net and a centralised database managed by the authorities, which would function as the core of Japan's information society.

### ■ **Problems in Japan's e-service strategy**

The practical implementation of Japan's e-strategy has been hampered by the fact that, unlike in Finland or the United States, the Japanese authorities did not have existing personal electronic identity keys or social security numbers that they could use for the service. An identification system had to be developed quickly, and an eleven-digit ID card was launched for this purpose.

Two years ago, however, the smart card and the Juki Net service portal became the target of severe criticism from the media and citizens. Fears about information security and suspicions connected with the misuse of electronic information have always been strong in the minds of the Japanese. The builders of the Japanese information society seemed to be out of touch with the people's deepest fears and assumptions, and with political thought on issues of information security.

The government's promotion of the ID card and the Juki Net service has been insufficient and focused primarily on the technical. The strategy for implementing the reforms has been largely top-down, bureaucratic and highly theoretical in its rhetoric. In the eyes of the Japanese, the information society appears somehow distant, less concrete and, despite its promised efficiency, a political vision that is perhaps too radical in its aims to change the practices of daily life.

By the autumn of 2004, an estimated 0.5 percent of Japanese had acquired electronic ID cards and registered as Juki Net users. This means that some 99.5 percent of the Japanese are still outside of the system, either passively or as an active expression of opinion.

### ■ **South Korea's way forward**

South Korea can perhaps be considered the most developed nation in the world, especially if we focus on online services, information security, and electronic dialogue between citizens and authorities or different commercial services.

It can be assumed that South Korea will become the first country to achieve a level of societal and technological development characterised by wireless ambient intelligence and a broad citizen-centred culture of using information society services.

### ■ **What about Finland?**

When comparing Finland and the Asian countries on the structural and legislative issues tied to the future development of the information society, Finland still seems to possess some momentum, particularly in relation to Japan. The most important strengths for Finland are functioning administrative and public services, the high level of trust in the government, advanced technological competence, highly developed digital infrastructure, and legislative and structural circumstances favourable to reforms.

The particular strength of Japan lies in the intensity with which the authorities approach the work of developing the information society and in the great determination that is shown in the implementation of the chosen strategy. The most important challenge for Finland is to strengthen and speed up our own decision-making culture.

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Shopping for cocoa powder in the 1960s.  
Photo: Ensio Kauppila  
Vapriikki photo archive

# The Development of e-Business

## ELECTRONIC BUSINESS AND DIGITAL CONTENT SECTION

The rapid development of information and communication technologies and the increased deployment of information technologies in business activities has created a need for a new term, e-business, which covers a broader range of issues than electronic commerce. The problem with the new term is that it generates an image of electronic business activity that is in some way separate from the company's primary or traditional business activities. In this sense, it is perhaps more fitting to refer to the phenomenon as the digitisation of business processes.

The relationship between information and communication technologies (ICTs) and business has been the subject of study for many years. One promising but challenging approach is to perceive the relationship as a dialogue between business and information and communication technologies, enabling the assessment of the development and future potential of both, simultaneously. In this vein, it may be appropriate to talk about knowledge business, which concentrates on developing the competence of the company as well as the partner network, adopting new business models and creating added value by exploiting the opportunities offered by new technology.

In the early stages, e-business activities were marked by a strong focus on technology: attention was directed to the construction of electronic infrastructure, the diffusion of new devices and the digitisation of various customer interface processes. From this, we have proceeded gradually to the digitisation of products and to a heightened emphasis on services in commerce and content in technology. Simultaneously, we have advanced further towards the electronic organisation of business. The challenges for leadership and management have progressed from the digitisation of individual processes to increasingly electronic business-to-business interaction. Like all ventures, investments in the promotion of e-business are expected to provide important returns in the form of increased efficiency, improved services and higher profitability, for example.

### ■ e-Business development in contemporary Finland

The current stage of e-business development can be observed through an analysis of three forces of change. These are (i) the development of technology, (ii) advances in business and (iii) the capacity of the organisation to adopt the practices of e-business. The last aspect also involves the organisation's conception of its opportunities to benefit from e-business (see Figure 1).

The rapid development of information and communication technologies has produced a societal transition in the face of which enterprises and entire fields of business as well as the public sector are actively seeking new ways of operating. New phenomena such as e-commerce, mobile applications and interactive television are radically transforming the operating environment of companies and, at the same time, different challenges and opportunities are



*The Rasmus shooting a music video. Playground Music Scandinavia*

opening for conducting business. Rapidly declining prices of ICT equipment and the development of smaller access devices are opening up new areas of application. This development may also generate new fields of business.

The development opportunities of a company are essentially tied to its operating and competitive environment. Changes in competitive circumstances may demand the reorganisation of production, customer services, logistics, product development or some other function crucial to the operation of the company. Business is no longer organised around the manufacturing of certain products, but an increasing share of it concentrates on the production of value added services accompanying the products and the delivery of other companies' competence to customers.

Figure 1.  
Forces affecting the development of e-business

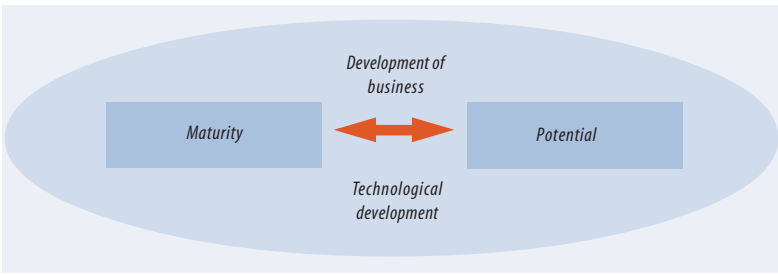
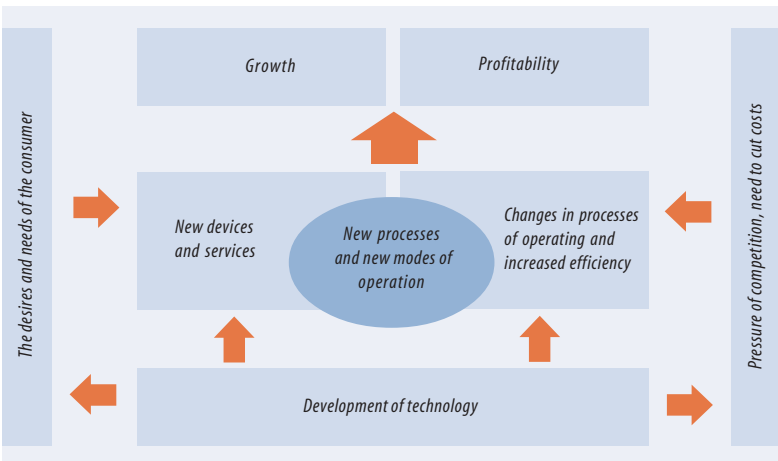


Figure 2.  
The operating environment of e-business



Some circumstances affecting the development of e-business are outlined in Figure 2. The figure departs from the observation that companies striving for growth and profitability are forced to increase efficiency and alter their business processes under the pressure of competition. The development of information and communication technologies provides constantly improving opportunities for this. The company must prioritise the needs of the customers and their desire to adopt new products and services, which may at times appear almost irrational. The development of new products and services requires efficient exploitation of new technologies, but at the same time the companies must also be prepared to update their business processes and develop their ways of operating.

#### ■ The new digital infrastructure

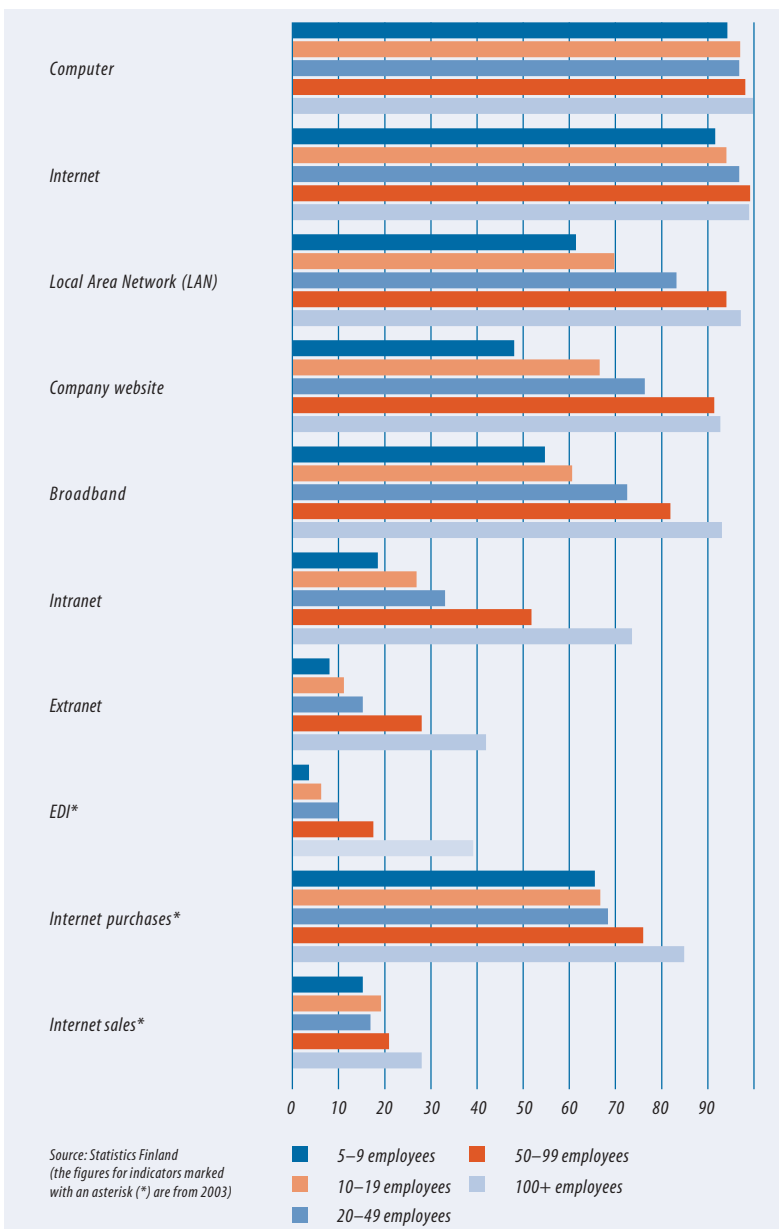
e-Business took its first steps in the 1960s, as major corporations began to use computers in the automatization of office work in large administrative units for tasks such as payroll computation and accounting. At first, attention was drawn more to the functions of the machines than to the development of the automatized processes. The mini computers introduced in the next decade and particularly the personal computers of the 1980s resulted in an immense surge in the exploitation of information and communication technologies. As computers became cheaper and smaller in size and their dependability and usability improved, they could be deployed in entirely new fields of application and soon spread to all units of the organisations. As computers and software became more sophisticated, development was further enhanced by the launch of

packaged software. Prior to this, each application had been tailored for the needs of each individual organisation.

In the 1990s, the rapid development of information and communication technologies enabled a variety of new fields of application to promote increased efficiency in business. The development of information networks has enabled communication between systems, and with the Internet this communication has become extremely cost effective, irrespective of geographical distances. At the same time, the applications have moved towards greater integration and, instead of single-function software, development has begun to favour more holistic solutions, such as enterprise resource planning systems. The information networks have also generated new software business models, such as Application Service Provisioning (ASP), which enables the rental of a variety of business software applications over the Internet via a host enterprise.

The systems used by companies are today increasingly built up from different software components offered by various service providers, with the aim of producing a system that best covers the needs of the user. The launch of laptop computers has enabled work away from the office desk. Wireless networks and mobile applications are gradually liberating the use of information systems, too, from the ties of location. At the same time, information systems have penetrated all areas of life, at least in the form of embedded systems, as information technology is increasingly utilised in devices that are deeply integrated into the daily lives of citizens.

Figure 3. The use of information technology according to company size in Finnish companies, spring 2004



From an international viewpoint, the penetration of e-business technologies in Finnish enterprises is relatively high. According to Statistics Finland, in spring 2004 some 94 percent of Finnish companies with five or more employees had an Internet connection, and with 63 percent of enterprises the connection was broadband. A total of 62 percent had their own website, which indicates an interest in the possibilities of e-business. In terms of infrastructure, the majority of Finnish companies thus have the opportunity to develop their e-business activities through the Internet (Figure 3). While before, because of closed networks and the high cost of EDI solutions, large scale transfer of business data between companies was possible only for large corporations, the spread of the Internet now allows small companies to digitise their operations for a much lower cost than earlier.

Electronic commerce taking place over the Internet has grown rapidly in recent years. According to estimates based on surveys carried out by Statistics Finland, in 2003 ten billion euros worth of Internet orders were made by Finnish companies with five or more employees. Two thirds of the Internet sales occurred in industry and one third in the service sector. The volume of Internet purchases by consumers in 2004 is estimated at two billion euros, which is double that of the previous year. Business-to-business transactions account for most of this electronic commerce.

The internal integration of the business processes within a company usually proceeds faster than their integration into the systems of customers or suppliers. Figure 4 illustrates this, grouping companies according to size. The comparative study is based on data from Eurostat and on an investigation by the European Commission on the use of ICTs in companies in 2003.

The incompatibility of software and systems and the lack of common standards form the most central impediments to the integration of companies' internal processes as well as to the integration of processes between firms. Public authorities have a central role in the development of standards that support small and medium-sized companies and promote co-operation between different fields of business.

Information networks offer a variety of different distribution channels for digital content. New distribution channels include mobile networks and digital television, both of which originated in the consumer market but have since made a gradual entry into the business sector. The uptake of mobile phones in Finland has been high from the outset (currently over 90 percent of the population owns a mobile phone), and new services have been adopted relatively openly. The transition to digital television began fairly early in Finland, but in such a sparsely populated country, the construction of a new distribution infrastructure and the launch of suitable access devices into the consumer market has posed a challenge. For this reason, the business activities connected with digital television are still in their early stages. They are, however, expected to grow relatively rapidly and to expand the opportunities of television as a distribution channel for the business sector in the near future. One of the most pressing concerns in this respect is the possibility that the interactive features will remain the technology of a narrow user group, in which case the user base will not be broad enough to form a new market of consumers or to ensure profitability.

The electronic identity card or citizen's PKI (Public Key Infrastructure) certificate distributed by the Population Register Centre, intended as the killer application of digital citizen identification, has not diffused as planned and hoped. So far, no more than 50,000 cards have been distributed to citizens. The rapid proliferation of the personal certificate would significantly enhance the reliability and usability of online services of public administration and e-commerce among consumers as well as businesses. A large user base would also encourage public sector actors and enterprises to develop and offer new services. Achieving this critical user mass, however, will require special measures.

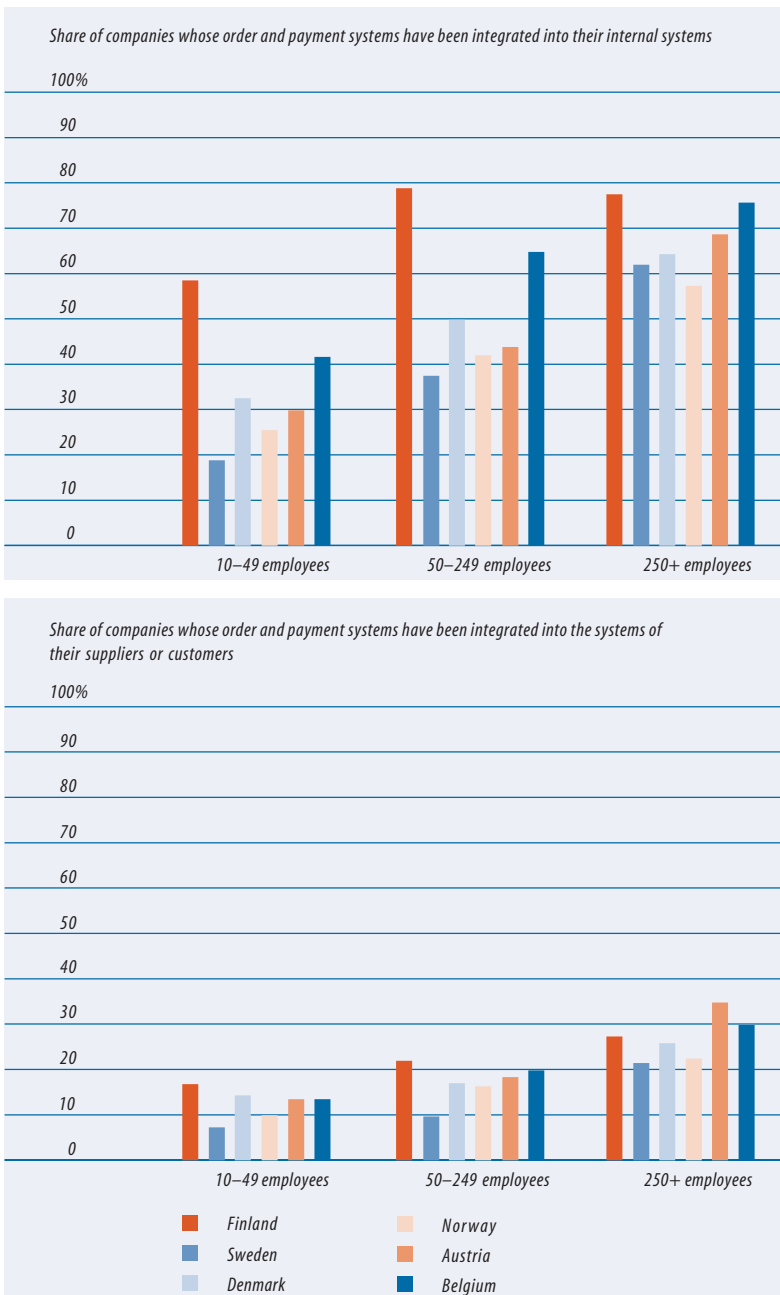
#### ■ Development of e-business

In addition to the digitisation of the different functions and processes of the company, the term e-business is used to signify the emergence of digital products (an increasing focus on services and content) as well as an increasingly electronic and networked customer interface. The development of e-business has resulted in major changes in the business processes of many companies operating in the more traditional fields of business.

Traditionally, the clothing industry designed, sold, manufactured, stored and delivered its products to a large group of customers in different parts of Finland. Now, a large international chain operates with only one Finnish sales manager, who meets with three to five distribution chain buyers regularly, three to five times a year. The buyers are presented with computerised sketches of the next season's models, which are developed in co-operation with the buyer. The sketches and the changes are delivered to an outsourcing company specializing in fashion design. On the basis of their designs, the clothes are then manufactured through outsourcing networks operating in the Far East or the Baltic countries. Distribution is carried out in co-operation with forwarding companies in charge of intermediate storing.

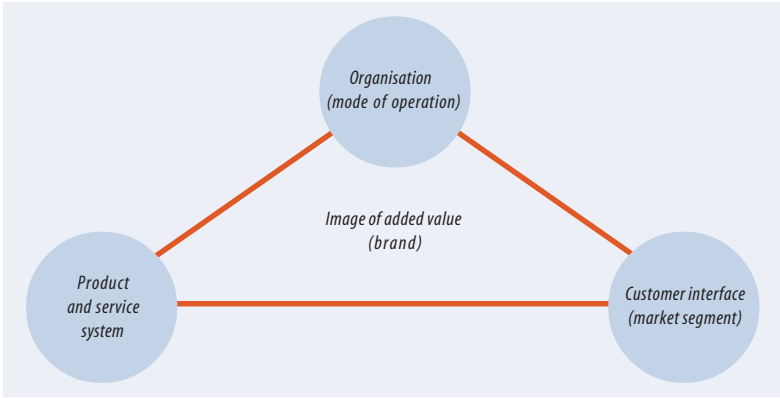
The development of e-business has increased the complexity of the business models and profit-generation models of companies. The classic description of a business model is based on added value generated in the compatibility of three areas, which enables the company to carry out its main function: making a profit for its owners. The three critical areas of a business

Figure 4. The frequency of internal (above) and external (below) integration of systems for orders and purchases in seven sectors of activity in firms according to company size, in Finland and some competing countries



Source: OECD Information Technology Outlook 2004, p. 127

Figure 5.  
The components of a business model



model are the product and service system, organisation (mode of operation), and customer interface (market segments).

The product and service system describes the added value that the company produces to merit its niche in its business environment. It is in the company's interest to protect its competitive position in order to maximise profit. Traditionally, this is best accomplished if the product can be patented. The organisation of the company refers to areas such as management, operations, structure, partnership strategy and networking. The company's most important tool is its organisation: it provides answers to such basic questions as "how does the company produce its products or services and sell them to its customers?" The customer interface consists of the customer and all the functions and processes through which the company comes into contact with the customer. The combined effect of these two areas produces an image of the added value created by the enterprise: the company brand. The brand is the reason why various stakeholders – the most important of which are the customers – will invest in the company.

Electronic customer relationship management has emerged through the new marketing and communication opportunities provided by the Internet. The electronic management of customer information is the next phase in this development. Currently, customers have the opportunity to influence the content and quality of the product or service they receive; sometimes they can even participate in its production. Increasingly, products sold constitute licenses to either physical services (a journey, perhaps) or digital services (an online game, for example). The manufacturing of customer-specific products has increased recently with the broader availability of different forms of mass personalization. The integration of production to design and customer systems has enabled the cost-effective manufacturing of clothes and shoes made to measure, as with the Left Foot Company, for example. The development of e-business has also led or contributed to many changes in customer behaviour, such as the erosion of customer loyalty.

In the product and service system, the emergence of e-business has improved the efficiency and impact of production. This has been evident for example in the movement towards a mode of operation focusing on services rather than products and on the transformation of certain products into digital form. Aside from individual products, firms can produce customer solutions, where different services play an increasingly significant role. A business model that allows for the distribution of products free of charge is an example of this development. In a case like this, the firm's business activities are based on the production of services related to the product. Moreover, the development of e-business opens up entirely new opportunities for business in the form of different products and electronic services involving information technology. Their growth is slowed down by the lack of pre-designed business models and profit-generation models.

From an organisational viewpoint, the development of e-business manifests in the digitisation of systems of management and administration and as changes in the boundaries of organisations. In the early stages of e-business, the focus was on distributing information – such as customer orders – through internal channels. At present, operations take place increasingly in networks,

which means that the company is producing customer solutions in co-operation with its partners and even competitors. Changes in work practices resulting from the introduction of information and communication technologies are an important part of an organisation's transition to e-business. The current development is heading towards integration between the firms' internal processes and the processes of other companies in the value network.

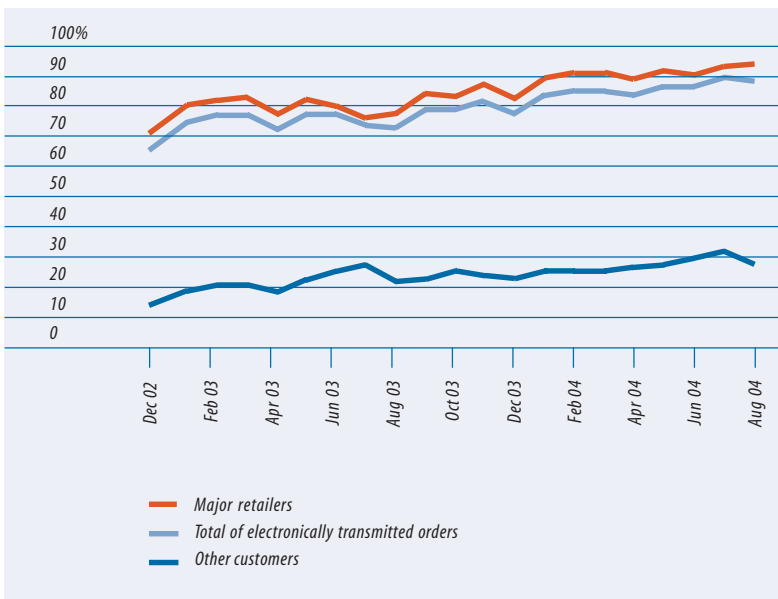
Standards and the interoperability of the external processes between businesses bear a great significance as accelerators of greater integration. The challenges posed by integration are particularly daunting for companies operating in the international business environment, which continues to expand as competition intensifies and the development of information technology lowers the threshold for internationalisation everywhere.

### ■ Stages of development in different organisations

A company's level of preparedness for e-business activities varies greatly in different fields of business. In banking and insurance, for instance, electronic systems have been in use for a long time and their impact on business activity has been enormous. At the same time, in more traditional fields the uptake of digital systems has been very slow. The pace of change has depended on the potential that different fields of business have identified in the development of electronic systems.

Large corporations, with their demands for interoperability for their partners, function as important engines for the digitisation of business processes. In most large corporations, e-business was introduced already in the 1960s or 70s. The Internet, intranet and extranet systems were introduced in the mid-90s.

Figure 6.  
Electronically transmitted orders as a share of all orders received from major retailers and other customers by an individual traditional manufacturing firm in Finland



In larger companies, the basic requirements of e-business are common knowledge. However, as competition continues to intensify, the reliability of the digital processes has become a standard requirement that no longer automatically produces a significant competitive advantage for those operating in the international business environment.

Figure 6 presents the digitisation of business processes in one medium-sized Finnish enterprise. It portrays the share of electronically transmitted orders out of all orders in the company between 2002 and 2004.

In small and medium-sized enterprises, the development of e-business has begun through individual applications. The larger customers have begun to require compatible interfaces, which has accelerated the companies' need for a more thorough digitisation of their activities. The potential of small and medium-sized companies remains largely unharnessed in this respect, and their transfer to e-business in a more comprehensive sense has only just begun. Factors constraining this development have included an imbalance between

the supply and demand of applications as well as insufficient know-how about digital systems.

For small companies, the opportunities for e-business have opened up mainly through the proliferation of the Internet and the fall of ICT equipment prices. Even the smallest companies are beginning to have at least an Internet connection for the use of electronic banking services. Their participation in business-to-business processes, however, remains more rare, and is often accomplished on an individual basis through different interfaces. Small companies did not perceive the development of e-business as a strategic-level objective but rather as a means to carry out individual processes more fluently.

In Europe, the Nordic countries are among the top countries in the development of e-business. This is evident in a survey of 4,300 companies in four Nordic countries, implemented for the first time in 2003. Compared to the other countries in the study, Finnish companies of all sizes seemed to afford a very high priority to the development of e-business. In Finland, the companies were more focused on the promotion of competence and continuing education and the recruiting of highly skilled professionals. The profile of Finnish professionals is more technology-oriented than in other Nordic countries.

### ■ The future of electronic business

#### Targets for the future: 2008-2010

By 2010, Finland, drawing on its history as an egalitarian welfare state, will have adopted the position of future-development laboratory. This position will not be based simply on the readiness of citizens and companies to experiment with new technologies but also on the general functionality of society.

Finland will also have constructed a secure and large-capacity broadband network covering all homes and businesses and based on the interoperability of fixed network and wireless solutions. The network will enable a vast range of different services. The interaction of businesses and citizens with public authorities will exploit the most recent technology with maximum efficiency. Important advances will have been made, particularly in the fields of health care and education.

The opportunities provided by e-business will be clearly acknowledged by companies. Networking between companies will be both horizontal and vertical, often transcending the traditional sectors of business activity. Problems in system integration between companies of different sizes and from different sectors will have been solved. e-Business activities will form an integral part of company strategy, and the integration of processes will cover all stakeholders in companies of all sizes. The public sector will function as the enabler and promoter of e-business. This development will afford significant competitive advantages to businesses in their efforts to distribute their products and services in the global market in a cost-effective manner. Strategic level co-operation between companies and the public sector will generate entirely new types of service-intensive business. Wireless solutions will provide micro enterprises with new business models that will enable them to benefit from the flexibility that is characteristic of their business activities.

#### Targets for the future: 2005-2007

By 2007, the development of e-business will have been proceeding at a rapid pace. The digitisation of the processes of financial administration in small and medium-sized enterprises and the vast proliferation of electronic invoicing systems will have functioned as engines for this development. The Finnish standard for electronic invoices will have established itself as an important standard within the EU. In addition to the banking sector, the paper industry and in part also the information and communication industry may be in a position to act as pioneers in international standardisation. From an international viewpoint, Finland will remain a comparatively small actor, and its main focus will have been on adapting its systems to those of global actors. Both companies and authorities will have enhanced the development of standardisation and interoperability as well as the monitoring of the development in various international forums. The public sector will have promoted the development of interoperability through its acknowledgement of interoperability as a central factor in public sector purchases of ICT applications.

The public sector will be actively involved in the promotion of e-business in small and medium sized enterprises. New interactive services will have been launched for the online interaction between public authorities and businesses.

The production of digital content will be growing steadily. The competence of content production firms aiming at the international market will have broadened in the realm of both business and internalisation. Technology designed to protect copyrights will be increasingly secure. Copyright legislation for digital content produced while in employment will have been clarified. The digitisation of public information will have proceeded apace, and clear regulations enhancing the generation of new business models will have been introduced for its utilisation and pricing.

Government e-services demanding strong identification will have been enabled over the Internet with the quick spread of citizen's PKI certificates into public usage. This will have been aided by the distribution of the certificates to citizens free of charge.

### ■ **Challenges posed by these future targets for different actors**

Accomplishing the future scenarios described above requires trust in the dynamic nature of private business and entrepreneurship and its capacity to generate added value for the rest of society. Companies wish to advance e-business in co-operation with their stakeholders and within the value networks they have created for themselves. This requires the opening of processes and interfaces to other companies, which may be regarded as partners in some respects and competitors in others. The need for trust is thus very high. Public sector measures take the role of catalyst with a view to the pace and depth of the process. Certainty over transition periods and the standards used form an important part of these measures. Moreover, the interoperability of different systems is a basic requirement for the integration of business-to-business processes of the strategic level. The responsibilities of the different parties in the implementation of the strategy can be perceived as follows:

#### a) **Public sector**

The public sector must focus mainly on its role as enabler but, particularly on the local level, it also needs to work actively to develop and implement modes of operation based on public-private partnership. It also needs to know when to dismantle regulation and to encourage units to invest. The public sector, too, exists in the network economy, and it must have the capacity and willingness to commit representatives of the private sector to the preparation and implementation of economic, industrial and technology policies. In the promotion of competence, a significant portion of the resources must be directed to interdisciplinary centres of professional expertise and the rapidly developing local centres of competence.

#### b) **Society as the foundation for entrepreneurship**

The European Union has set as its goal to attain and surpass the United States, for instance in the breadth of investments directed to research and development activities. It is, however, necessary to attempt to see behind the figures. Whereas in the United States investments are generally directed to individuals and entrepreneurs, in Europe and in Finland they are too often targeted at technologies, projects and, at best, corporations. Encouraging individuals must be acknowledged as an important factor in the construction of an economy and society based on competence, or rather, on skilled professionals.

The promotion and encouragement of entrepreneurship poses a constant challenge to Finnish society, and its significance continues to grow in a rapidly ageing population. To maintain international competitiveness and to attract the best professionals to live and work in Finland, it is crucial to encourage the most highly-skilled professionals to entrepreneurship. These goals are not accomplished simply by increasing the incentives or waving a bigger carrot; the importance of withholding the stick must also be acknowledged. For instance, there is no more room for fiscal measures that punish the entrepreneur.

### c) Universities

In the field of technology, the research and education in Finnish universities often meet the highest global standards. The situation in the business sector is much more challenging, and investments in research and education on international e-business should be increased from the present level. Moreover, there is a need for more units in business science able to attract top international researchers as well as highly skilled Finnish professionals.

With current structures of state funding, universities have very little means with which to encourage their researchers and units to active participation in EU-financed projects and different practical assessments. There are hardly any incentives for the development of international Master's programmes.

### d) Businesses

Because of its high level of technological competence, Finland has a significant advantage in the development of e-business. This competence and particularly its application should be enforced and translated into international products and services. This requires efficient distribution of knowledge and a high level of trust between various organisations and fields of business.

The promotion of e-business demands an active use of networks which means that companies must be able to build co-operation models that transcend traditional boundaries of business activity. Companies must also include the development of e-business in their strategic processes and constantly train their employees. Specific processes and solutions must be designed for the promotion of e-business in small and medium-sized companies; they should not be satisfied with stripped-down versions of solutions constructed for the needs of large corporations. Particular attention should be paid to the internationalisation of business and the promotion of growth-oriented entrepreneurial activity, in order to prevent the realisation of the threat of Finland's role in e-business becoming that of an incubator for affiliate companies with the benefits of the innovations produced leaking elsewhere. In the process of digitisation, factors contributing to the well-being of employees must also be considered. With regard to the technologies deployed, existing technologies should be utilised to their maximum effect.

## ■ Proposed actions

- ◆ The majority of content production is already in digital form. The issue of copyright has a central role in the preconditions for both digital and traditional content production. It would be highly beneficial to develop a simple solution for identifying the owner of the economic rights to material subject to a copyright in employment relationships, in a way that is clear to both employers and employees. The copyright law should be changed so that all rights pertaining to works, photographs, lists and databases, disregarding those rights mentioned in 3 § of the Copyright Act, are transferred to the employer by law, unless agreed otherwise. This change would facilitate the operation of small content-production firms in particular.
- ◆ The rapid proliferation of citizen's PKI certificate maintained by the Population Register Centre into different card platforms would significantly enhance the uptake of online services and also promote e-business. Expanding the uptake of the certificate is crucial to the extent that it would enable profitable service production and business based on the certificate. To speed up the uptake, citizen's PKI certificate should be made available free of charge until a critical mass of users has been achieved. The loss of income generated by the period of transition should be compensated with budget funds. Opportunities offered by mobile certification should also be acknowledged.
- ◆ Re-use of public information should be promoted, for instance by defining the online publication of official statistics for general use as an activity that, providing information to the user free of charge, is carried out with budgetary funding. Examples of comparable services include statistical publications and statistical databases. Services tailored for the individual customer would remain liable to a fee.

- ◆ Online transactions and purchases by citizens and businesses, new content production, and software accessible through the Internet all benefit from fast connections. The actions proposed in the national broadband strategy must be implemented with determination and without delay.
- ◆ Preparedness for e-business must be strengthened by means of sufficiently resourced long-term education, training and research.
- ◆ A national strategy for the development of e-business must be introduced that will place special emphasis on the creation of new and improved cultures of operating and the development of new products and services with the aim of achievement of a leading position in Europe, in terms of increased profitability, through the exploitation of e-business solutions.
- ◆ Growth-oriented, entrepreneurial companies are often the most innovative and efficient in the deployment of e-business solutions and serve as encouraging examples to other companies. As a decade of entrepreneurship (1995–2004) comes to an end, a decade of growth-oriented entrepreneurial activity (2005–2014) should be launched. Success in growth-oriented entrepreneurial activity requires commitment, responsibility and investments, not only from the entrepreneur but also from various stakeholders such as business angels, venture capitalists and people engaged in various activities intended to render prospective ventures attractive for investors. The achievement of growth should not be on the shoulders of the individual entrepreneur.

Success in the promotion of growth-oriented entrepreneurial companies is of vital importance from the viewpoint of national economy, and to achieve success attention must be paid not only to the entrepreneurs themselves but to the role of other stakeholders, business environment and society. The entrepreneur does not achieve success by himself or herself alone, but it is also clear that without entrepreneurs there will be no success. Creating a base for success requires persistent work, starting from entrepreneurial education at comprehensive school and a change in the general climate to enable the acceptance and appreciation of financial success also in other areas than just sports. In an innovative system, investments should be directed increasingly from analysis to implementation, from the development of technology to its application. The practices of rewarding skilled professionals should be reconsidered also in terms of taxation, regardless of the sector.



A paperboy at Helsinki Olympics in 1952.  
Photo: Kalle Kultala  
The Finnish Broadcasting Company, TV2, photo archive

# Telecommunications and Digital Television

## TELECOMMUNICATION INFRASTRUCTURE AND DIGITAL TELEVISION SECTION

The aim of the Finnish information society and communication policy is to create a good operating environment for the use and provision of relevant services through means such as legislation. Central aspects include the promotion of the well-being of citizens and improving the profitability and competitiveness of economic life as well as public administration.

### ■ Current situation Telecommunications

The technologies of digital communication have proliferated widely in Finland and their infrastructure is well-developed. In spring 2004, 63 percent of households owned a computer and some 50 percent had an Internet connection. Nearly every Finn is using a mobile phone, as 96 percent of households possess one. Only 57 percent of households have a traditional fixed line phone. The diffusion of digital television has progressed well: in autumn 2004 the device could be found in 516,000 households, or 22 percent of households (Consumer barometer, November 2004, Statistics Finland). Finland is the global leader in the penetration of terrestrial television.



Photo: Ministry of the Interior, Citizen Services

Recently, the growth of broadband in Finland has been the fastest in the world. Moreover, the regional accessibility of broadband is constantly improving. The Finnish telemarket has proved its functionality in its rapid creation of national broadband accessibility. Local and regional authorities have also done significant work to improve accessibility as the broadband strategies drafted at the regional level are being implemented throughout the country. At the end of 2004, more than 90 percent of Finns lived within reach of broadband services and, with the realisation of the regional broadband strategies, the situation is constantly improving. The prices of broadband connections have dropped more than anticipated. Simultaneously, the connection technologies have improved and new and enhanced solutions have entered the market.

The achievement of these excellent results has been entirely market-driven with no external subsidies. Finland has for a long time been in the forefront of the global development of information society, but maintaining this position requires constant investment. The information security of products and services must be addressed, and the speed and costs of broadband connections can still be improved. The communication devices must also

Table 1.

The number of broadband connections in Finland (the figure for 2005 is an estimate)

Targeted impact	Number of broadband connections in households and businesses				
	June 1, 2003	Dec 1, 2003	June 1, 2004	Dec 1, 2004	Dec 31, 2005
1,000,000 broadband connections by the end of 2005	315,000	470,000	670,000	750,000	1,000,000

Source: Ministry of Transport and Communications and [www.laajakaistainfo.fi](http://www.laajakaistainfo.fi)

Table 2.

Availability of fixed network broadband services (the figure for 2005 is an estimate)

Targeted impact	Access to ADSL or cable modem, percentage of households				
	Jun 1, 2003	Dec 1, 2003	Jun 1, 2004	Dec 1, 2004	Dec 31, 2005
Fast and affordable connections available to everyone by the end of 2005	75.7	81.5	88.3	90	96.8

Sources: TeliaSonera Finland Corp., Elisa Corp. and Finnet Association

Table 3.

Finland's position in EU comparisons of broadband diffusion (the figure for 2005 is an estimate)

Targeted impact	The position of Finland in the relative number of broadband connections among EU countries (EU-25)				
	Jun 1, 2003	Dec 1, 2003	Jun 1, 2004	Dec 1, 2004	Dec 31, 2005
Finland in the forefront of Europe in the use and accessibility of broadband connections	6	6	5	4	3-4

Source: The European Commission

have meaningful use, and for this purpose increasingly sophisticated and versatile solutions must be created for needs emerging from work, free time and administrative services.

### Digital television

The launch of digital television in Finland originated in a government resolution taken in 1996 on the digitisation of television networks, and on August 27, 2001 Finland became the fourth country in Europe to begin broadcasting. The coverage of the channel bouquets A (YLE) and B (MTV3, Subtv, Nelonen) offered through terrestrial distribution networks at the end of 2004 was 94 percent of continental Finland, and the objective is to build more stations in order to raise the coverage to 99.9 percent by the end of 2005. The coverage of channel bouquet C (including payTV channels and local TV channels) is at the same time some 72 percent of the population.

Finland has several locally-operating cable operators. The cable operators distribute the channels of terrestrial network license owners and various individual channels, some of which are packaged into pay TV bouquets. According to the November 2004 Consumer barometer by Statistics Finland, some 2,250,000 Finnish households have a TV set and 47 percent of them have cable TV (Kaapelitelevisiotoiminta Suomessa [Cable television in Finland], September 2004, Focus Consulting, Tikon Consulting). The number of cable television connections has been increasing solidly throughout the 2000s, and the figure is continuing to grow at an annual rate of 6 to 7 percent.

Cable television networks have been digitised and more than 50 digital TV channels are offered. Analogue pay TV has been almost entirely replaced with digital service, a transition that will be completed by the end of 2005. Some 50 to 70 percent of the networks have been upgraded to enable interactive service, including broadband connections and transmission of speech. By the end of 2003, 87,000 broadband connections were through the cable network and by the end of 2004, that figure is expected to rise to 117,000.

The spread of digital television originates in a consumer-driven market. Viewers must be provided with the type of programming and services that make the move to digital television attractive. In 2003, digital TV channels offered 290 hours of programming a week, which is 9 percent more than the previous year. In addition, the programmes of all of the Finnish analogue TV channels (397 hours per week) were also offered in digital form (Suomalainen televisiotarjonta [Finnish TV programming] 2003, Ministry of Transport and Communications, Publications 58/2004). Receivers or other functions associated with the digitisation of television have not been subsidised in Finland, leaving the consumers free to decide independently on the chosen content or technical properties of the receiver.

Experiences from the early stages of digital television can be summarised as follows:

- The launch of digital broadcasts has been the easiest for analogue channels, the contents of which are simulcast digitally. This has not generated

too many additional expenses, but neither has it introduced any essential novelties compared to analogue content. The launch has been the most difficult for new commercial channels, as the formation of new viewing habits takes a certain amount of time, which means that the accumulation of advertising income also requires time. Some channels have tried to alleviate the difficulties of starting a new digital channel by also allowing the distribution of their signal in analogue format through cable networks. The licences of some channels have expired but new licences have also been allocated.

- Pay TV channels have not become the engines of digital television in Finland, although they have some significance in cable networks because they offer a broader selection of programmes (penetration approx. 6 percent). In cable networks, pay TV supply has broadened significantly from the analogue era and also contains channels intended for more narrow user groups. Interactive services have not become the breakthrough application for digital television, although it is possible that their time will come later. The most central obstacle to the spread of interactive services has been the poor availability of MHP (Multimedia Home Platform) terminals: for instance, terminals of this standard have not been available for cable networks. Still, cable networks constitute one significant broadband technology offering a feasible return channel solution for digital television.

- In its early stages, the development of digital television has been more or less technology-driven and the needs of the viewers have not been accounted for nearly enough. The content of new TV channels and a superior sound and image quality in comparison to analogue television have emerged as central drivers of the development. The change has been particularly noticeable in households relying on an individual antenna.

The proliferation of digital television is affected by a government resolution taken in spring 2004 on the cessation of analogue broadcasting. The decision is based on a unanimous proposal by a parliamentary committee (Kohti digiaikaa [Towards the digital age], Ministry of Transport and Communications, Publications 52/2003), and is likely to render Finland the first country in Europe to switch to solely digital broadcasting at the beginning of September 2007.

The proliferation of digital receivers is followed closely through studies by Statistics Finland and Finnpanel as well as the statistics of trade. In November 2004, a total of 516,000 households, or 22 percent of households, were in possession of a digital receiver enabling the reception of antenna, cable or satellite transmissions (Consumer barometer, November 2004, Statistics Finland). The sales figures received in autumn 2004 indicate monthly sales of some 40,000 receivers. Yet only a small portion of the devices sold (some 5%) constitute MHP devices allowing the reception of interactive services. It can be assumed that the speed of receiver acquisition will pick up as the end of the transition period approaches. Of the most recent network technologies, broadband television is already in limited use and mobile television based on the DVB-H standard and integrated into mobile phones is in technical test use.

## ■ The future telecommunication and communication environment in Finland

### a) Telecommunications

Regarding telecommunications, the objective is that in ten years' time both fixed and wireless networks will cover the entire country and enable efficient use of the services of the information society for a reasonable cost.

### b) Fixed networks

The broadband connections of fixed network will be widely used and connection speeds will have increased significantly from those in use today. Optical fibre technology will be deployed where it is economically and technically possible. While development in population centres and scarcely populated areas may not be simultaneous, the final objective is to secure largely uniform opportunities in all parts of the country. The supply of connections and the increase in connection speeds will be largely market-driven. The inclusion of the most difficult to reach areas will be promoted through subsidies from society, for instance using EU structural funds.

Telecommunications will move toward a broader deployment of the Internet protocol. One irrevocable trend is the transfer of speech over Internet networks. The demands for improvements in quality and information security in Voice over Internet Protocol (VoIP) technology will be largely met. At the same time, the preservation of alternative means of implementation and the functionality of traditional telephone networks will be attended to. It is understood that in a society entirely dependent on the functioning of telecommunications, all data transfer cannot be based on a single technology. Ensuring a steady supply of electricity in all circumstances is also perceived as an important consideration.

The explosive growth of increasingly Internet-based telecommunications will lead to the rollout of the next generation Internet protocol. Transition to the new IPv6 protocol will eliminate restrictions on the number of addresses and significantly improve the security of the network. The transition will occur gradually and both protocols will, in places, still be used simultaneously. The transition to a new protocol will speed up the acquisition of new software and new computers.

The construction and deployment of optical fibre technology will be enhanced. The uptake of optical fibre will be the easiest in new residential areas, where new homes will be equipped with the most recent technology already during the construction phase. In larger renovations the wirings will be done using mainly optical fibre.

Society will support the proliferation of broadband connections also in those households that have difficulty in keeping up with the changes in society. The means applied will include the extension of tax allowance for purchases.

#### c) Wireless networks

Third generation mobile communication networks and devices will be widely used within the next few years. In addition, services based on this technology will be offered widely. Access devices will be easy to use and dependable. Networks, too, will be dependable. The settings and service menus required by the different services will be incorporated into the terminal devices in such a way that their utilisation does not require great effort from the consumer.

Terminal devices and networks will enable the user to transfer from one network to another without disruption of service. At least in the early stages, the access devices will be able to switch fluently between 3G and GSM, GPRS, EDGE and WLAN networks. This functionality is described through the concept of an invisible or ubiquitous network. Offices and homes will increasingly deploy wireless local networks, such as WLAN. Broader regional networks will be implemented, for instance through WIMAX technology. Increasingly sophisticated information security solutions will be developed in connection with these networks.

The different networks and the access devices that use them will function together in such a way that the consumer is not always aware, and perceives no need to be aware, of the technology or network deployed. While indoors and in otherwise restricted areas the networks deployed are the fast and wireless WLAN and WIMAX networks, in built-up areas and population centres 3G networks are used, and in the more remote areas GSM, GPRS and EDGE networks are used. In addition to Bluetooth connections, the technologies used for short-range wireless communications include RFID technology with its small, inexpensive transmitters that operate without electricity and are used for a variety of different purposes. Intelligence will also enter clothing and fabrics. In addition to Local Area Networks (LAN), Personal Area Networks (PAN) are already entering common consciousness.

The converged deployment of different networks can also be described through the concept of fourth generation (4G) networks. Their speeds of data transfer will significantly exceed those currently offered, and the interoperability of the networks will be seamless.

With all their added features, wireless devices will have become veritable tools for life management. In addition to the telephone function, a single device incorporates email, calendar, Internet, videophone, video camera, radio, television, information storage, notebook, tool for presentations and so forth. The devices choose the network that provides the best service and operate in accordance with the standards used in the present location.

#### d) Digital television

A good, strong and competitive national television with versatile programming that meets the needs of the citizens will continue to be an important goal for Finland also in the future. Television companies will focus on the production, development and acquisition of programmes and services. In addition to the channels' own productions, content production will rely heavily on the competence of small independent producers, the share of which is increasing in importance. All TV companies incorporate nationally significant competence and this will be actively maintained in all sectors of digital television. Key competence areas in this respect involve storytelling, programming and additional services linked to the programmes.

Digital television is the best access device also for content that is not traditionally associated with television. Interactivity will provide interesting entertainment content and online services facilitating daily life. The supply of interactive services will broaden as the devices' capacity to support them is enhanced. Use of these services requires that the device is connected to a network enabling a return connection (telephone, cable and broadband network).

Digital receivers will have spread widely to Finnish households, in good time before the switch-off of analogue broadcasting. The devices enable the access of television content also via portable and mobile terminal devices. Broadband connections function as the return channel for digital receivers, which will facilitate the use of interactive services and create the facilities for the provision of increasingly versatile services. Open standards will become increasingly commonplace and enable many features useful for the consumer, such as the saving of programmes on hard drive. Easy usability and dependability are important features in both receivers and services.

The proliferation of wide-screen, flat-screened receivers and the competition between DVD and satellite-mediated HDTV channels will lead to the rollout of high-definition broadcasts also in terrestrial television. In digital networks, the change will have been implemented gradually so that HDTV programmes are simulcast with regular television broadcasts. The frequencies freed from analogue broadcasting will be used increasingly for these new interactive services (MHP) and mass communication services received through wireless access devices.

In the longer term, one vision for the future is to enable the use of television services irrespective of time or location. New distribution methods to complement current terrestrial cable and satellite distribution will include, probably among others, broadband television and mobile television (DVB-H). As the number of alternatives increases, it is necessary to ensure that copyrights will not form a barrier for the transmission of contents from one distribution route and user environment to another.

#### e) Convergence

One central aspect of future technological development is the convergence of different alternatives. When all forms of communications switch to entirely digital production, the transfer of bits can be carried out through a number of different methods. Still, network technologies should be concealed from citizens so that the visibility would focus on the actual services. From the user's viewpoint, it is essential that the services appear easy to use, familiar and accessible regardless of time and location. In the living room the most convenient access device is the television while at the bus stop it is the mobile phone. This development naturally presumes the discovery of coherent, preferably channel-independent solutions that support open standards.

In the future, television broadcasts will be received through digital television, broadband connections and mobile television. Similarly, Internet content can be accessed through digital television and smart phones as well as broadband connections. Digital television and broadband connections will converge, as broadband connections increasingly function as the return channels for digital television. In the future, digital televisions and set-top boxes will be equipped with a feature that enables their connection to broadband networks.

The services provided can be adapted to the technological environment available at any given time, and the strengths and weaknesses of different user interfaces can be taken into account. Among the most relevant variables are screen size and the speed of the connection used. Successful convergence

demands a technology-neutral approach to both regulation and the implementation of the services. The converged networks can be widely deployed, also in the activities of the public sector, such as schools, universities and libraries.

#### f) Exploitability of the infrastructure

The pricing of the services will allow active usage. Broad based exploitation will ensure the maintenance of profitable and constantly evolving business. Regulations will support competition and enable profitable business. The capacity and willingness of businesses to invest in the field will have also been addressed.

It is impossible even for good infrastructure to realise its potential unless users have the capacity to use it and the infrastructure provides useful services that inspire usage. The goal is thus to develop both aspects simultaneously.

#### g) Information security

Significant improvements will be made in the field of information security. This will be achieved by improving the information security level of software and enhancing the users' knowledge on issues related to information security. Information security attacks and spam will be penalised by law all over the world. With convergence, computers, digital television devices as well as the increasingly computer-like mobile communication devices will be protected from viruses, worms, hijackings and saturation attacks. This will require the systematic use of firewalls as well as anti-virus software and operating systems with automatic updates.

The problem of junk mail will be tackled with, among other things, legislative measures targeted at the sender. Although censorware designed to filtrate email has improved constantly, one alternative solution will remain the move to closed email systems. This means that email is received from authorised addresses only or that the users retrieve their email based on notices they receive.

### ■ Proposed actions

#### a) Fixed network

In order to raise the number of broadband connections and increase connection speeds, it is necessary to implement the measures suggested in the national broadband strategy and by the working group nominated to monitor broadband development. The responsibility for the implementation of these proposals falls mainly to the Ministry of Transport and Communications, the Finnish Communications Regulatory Authority and the Finnish Competition Authority. From a regional viewpoint, the Regional Councils share the responsibility for the development of telecommunication networks in their area.

Increasing the speed of broadband connections and the number of optical cable connections is the responsibility of companies in the field. Appropriate guidance from government officials can support this. The measures enhancing competition will promote this development, but at the same time it is important to ensure that the capacity and willingness of businesses to invest is not lost, so that the development of the physical infrastructure of the information society is maintained at a sufficiently high level throughout the country.

Finland must continue to defend its national interests in the European Union in the preparation of telecommunications regulations. The specific features of Finland should be taken into account to the necessary degree.

#### b) Wireless networks

Third generation wireless communication networks and devices must achieve a broad user base. The Ministry of Transport and Communications must ensure that the standards for licenses are met, for instance concerning the coverage of the networks.

The proliferation of the services based on the use of the networks must be supported through measures promoting competition.

#### c) Digital television

Digital television remains an important target for development measures. The government must ensure a good operating environment for the future of a competitive Finnish television sector through decisions on issues related to communication as well as cultural and economic life.

### ■ Actions for the next year

- ◆ To move forward and comment on the proposals in the Communications Market Act (Stage III). (Government)
- ◆ To implement the proposals of Television Broadcasting and the National Broadcasting Company (YLE) in the Finland 2010 group. (Government)
- ◆ Implementation of the communications plan by the digital television communications group: the objective is that Finns have enough accurate information and instructions so that the transfer to the new television technology will not prevent anyone from viewing television. (Ministry of Transport and Communications and other instances represented in the group)
- ◆ Plan for the digitisation of SVT Europa. (Ministry of Transport and Communications)
- ◆ Frequencies freed by the move from analogue to digital must be enabled for use through decisions made in the RRC-06 conference on radio frequencies.
- ◆ Digital television receivers are recommended to be equipped with an Ethernet connection, instead of the minimum recommendation of phone modem, to enable better and easier connectivity and compatibility. (The NorDig standardisation organisation for the Nordic countries)

### ■ Actions during the term of the present government

The government will ensure that

- ◆ Copyrights will not present an obstacle to the transfer of contents from one distribution route and user environment to another; simultaneously, unauthorised use of contents (piratism) will be prevented effectively.
- ◆ The introduction of digital television in public institutions (such as schools, hospitals, nursing homes and prisons) will proceed without delay for both antenna networks and TV sets.
- ◆ Competence and educational policy can respond to the long-term needs of digital television in all areas (contents, technology and usability).
- ◆ The transferring of public services online and through digital television will be implemented with determination, in a cost effective manner and without delay. This promotes the accessibility and usability of interactive services of the information society through both digital television and the Internet.
- ◆ Other content and service production in the field of digital television will be promoted through co-operation between different administrative branches, the National Technology Agency Tekes and businesses.

Many issues affecting wireless and fixed telecommunication networks are of a global nature or are the object of decision-making on the European level, for which reason the government of Finland must engage in active international politics to find solutions beneficial for Finland. These include:

- ◆ interoperable technological solutions based on open standards
- ◆ the promotion of healthy competition
- ◆ the elimination of administrative impediments and the dismantling of regulation, aiming at technology-neutral regulation.



Lumberjack at work in 1956.  
Photo: Otso Pielinen  
Enso Collection, The Finnish Forest Museum

# Working life: From Information Society to Innovation Society

## WORKING LIFE SECTION

Finland is a high-level information and knowledge society. This, however, is not enough. Maintaining our competitive advantage presumes a transformation into a knowledge and innovation society.

The welfare society is strongly supported by the Finns, and in an era of globalisation, its existence is founded increasingly on constant economic growth. Economic growth relies on the development of labour investment, capital investment and total factor productivity. The most central factor in capital input is the degree of investment, whereas the degree of labour investment is largely defined by the size of the workforce. Total factor productivity is most crucially based upon the productivity of labour.

Changes in the size of the workforce can be anticipated with relative accuracy. According to estimates by the Finnish Labour Administration, approximately one million people will depart from the Finnish workforce

between 2000 and 2015, which is almost a half of the total workforce in 2000. Depending on the flow of immigration, the number of people entering the workforce annually will, from now until the end of 2020, be 10,000 to 15,000 less than the number of those leaving the workforce. Accelerating growth in productivity is a central way to compensate for the problems resulting from a diminishing workforce. The OECD examined the change in the Finnish age structure and labour policy in a report published in 2004. Assuming that levels of work participation for different age groups and genders remain similar until 2050, the situation will result in an average of 0.46 percent yearly decline in the GNP per capita compared to the development between 1950–2000. For the rate of growth to be sustained at the same level, the decline must be checked by accelerating the growth of total factor productivity or increasing capital investment.

Sustainable development demands growth in productivity on a broader front. How to generate the necessary super productivity becomes a key question. A small country that has opted for knowledge intensity as its most central success factor can improve productivity through measures that improve the quality of working life and are targeted at the structures and direction of work. Some elements that contribute to the desired development include factors describing the social development of the work community, such as well-being at work, and lifelong learning, and factors describing the functionality of processes, such as the level of innovation, breaking of old boundaries and purposeful generation of value networks.



Photo: Metsäliitto Group

The Working Life Section has observed the current situation of the information society, described targets for the future and drafted the necessary suggestions for actions from the viewpoint of four key areas: 1) increasing competence and innovation in working life, 2) transforming competence and innovation into job-generating growth, 3) managing change in the workplace and 4) managing change on the level of the labour market.

### ■ Current stage in the development of working life

The development of the information society has signified a remarkable change that penetrates all of working life. Public debate and research on the topic has focused largely on the issue of telework, but with the acceleration of communications and the development of work methods enabled by information technology, the spread of different work and operating cultures has emerged as the most essential trend.

The development of information technologies has enabled the efficient networking of functions located at a significant distance from each other. Markets and functions have had to accommodate themselves to rapid internationalisation. Companies aiming at the global market are focusing increasingly on their own core competencies and the processes structured around these competencies. Functions are constructed as value chains and value networks, and many support and other functions have been outsourced. We can also speak of a transition into global competition for work. International development is an important factor in the changes in working life occurring on the national level and in the opportunities for managing change on the societal level.

Finland's position in this is two-fold. In certain aspects, Finland has been very successful in the international job competition. Particularly within the telecommunications cluster, Finnish competence is extraordinary, the productivity of labour has been on a high level, and the growth in productivity has been rapid. Similar developments have also occurred in the traditional process industry, which has modernised its functions through the incorporation of the most recent technological developments into the work of process development. The productivity of other sectors has, however, remained rather clearly below the level achieved in the most developed industrial countries, and the growth-rate of productivity has been relatively modest. This, despite the fact that the ICT equipment level of Finnish workplaces is, based on international comparisons, relatively good (see Figure 7).

Figure 7.  
Growth in the productivity of labour in different branches of manufacturing 1995–2003 (%)

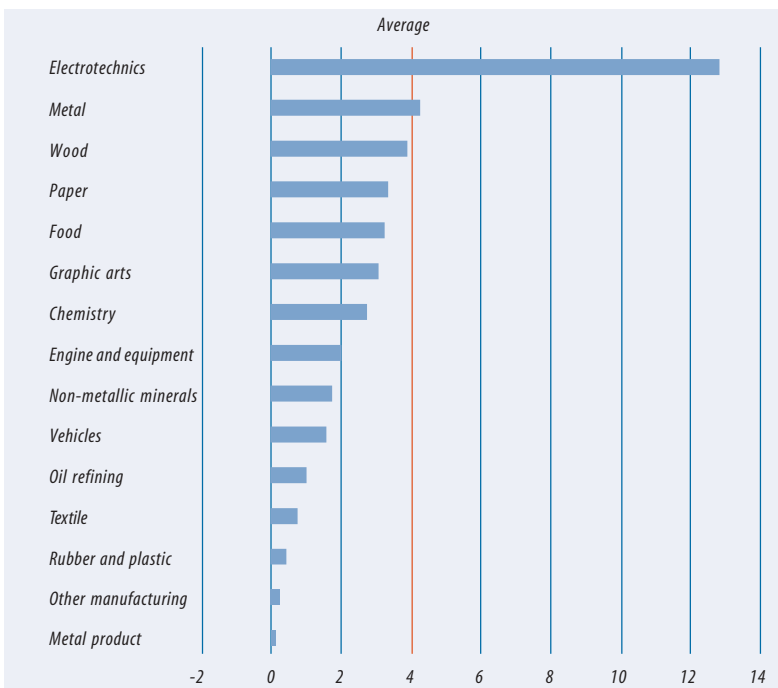
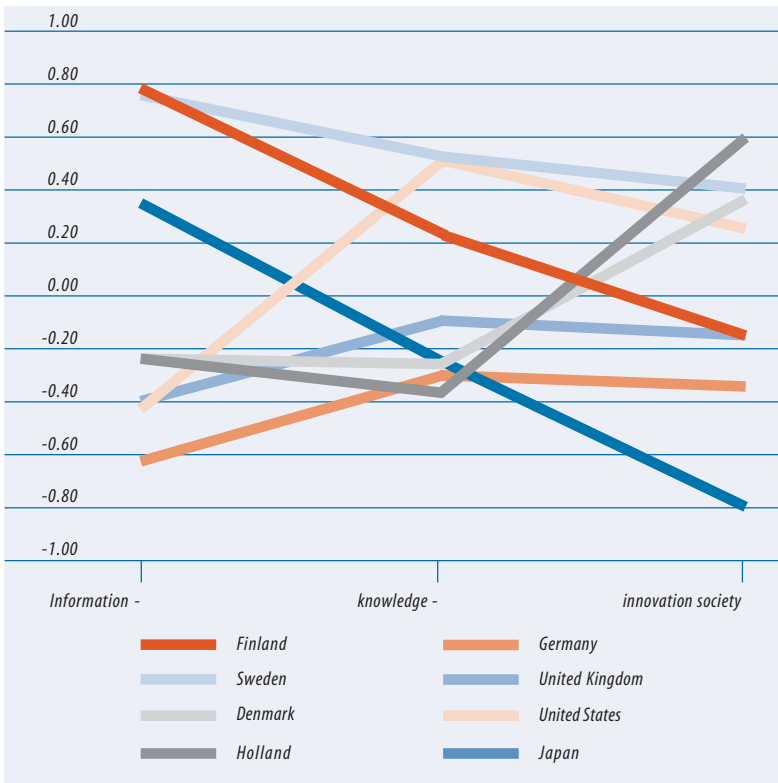


Figure 8.  
An indicator description of certain industrialised countries on the dimensions of information, knowledge and innovation society



Source: Finnish Association of Graduate Engineers and the VTT Technical Research Centre of Finland: Technology barometer, Helsinki 2004

Already in the 1980s, the OECD found that a country's ability to make use of technological advances was a central factor in that country's success. The greatest productivity advantage from technological breakthroughs has generally been reaped by businesses or nations that were not the most active pioneers in the development phase of the new technology. This observation is taken further in a Technology Barometer report by the Finnish Association of Graduate Engineers and the VTT Technical Research Centre of Finland, which brought a new viewpoint to international competitiveness comparisons. It provides separate assessments for countries as producers of information (information society), users of information (knowledge society) and beneficiaries in the use of information (innovation society). According to the first Technology barometer report published in 2004, the relative position of Finland in comparison to six countries is constantly declining, as we move from the production of knowledge to the use of knowledge and further to the exploitation of knowledge. To simplify, Finns are not very good at translating the information available into international success stories.

A current and pressing problem is that Finland has not managed to create a sufficient number of profitable jobs. As a result, the average level of work participation remains clearly below that of other Nordic countries. Moreover, unemployment has reached a high level and has, in part, become structural. These difficulties are particularly acute in areas outside of growth centres. Finland has invested heavily in the educational system, but the transfer of knowledge from education to working life and its transformation into employment-intensive growth do not occur effectively.

The collaborative development of workplaces and organisations is generally considered to be one of Finland's strengths. However, not all aspects of Finnish working life have made satisfactory progress, and the problems manifest for instance in the quality of working life and a tendency towards early retirement. When the management of organisations and the ambience of work communities fail to support innovative development, intellectual capacity is often left unused and the workload is distributed unevenly. Furthermore, balancing the demands of work and life outside of work is often difficult.

Problems have also arisen in how the agreed-upon norms are applied in practice. Not all workplace operating cultures are equally well-developed, and their dynamism sometimes leaves room for improvement. In addition, high

labour costs and inflexibility in work legislation affect in particular small companies' ability to hire new employees.

Despite increased immigration, the internationalisation of Finnish working life remains rather superficial, and the employment of immigrants has posed many problems. Finland has not been very successful in attracting a great number of highly skilled foreign professionals either. This, together with the limited adaptability of the educational system, has contributed to the fact that, despite the high general unemployment rate, some of the most dynamically evolving fields have experienced recruiting difficulties. Supply and demand fail to meet.

Recent changes in Finland are likely to be only the beginning of the great structural transition in working life that is currently taking place on the global level. In the future, Finland will face an increasing amount of competition from areas in Eastern Europe at the same time as China, India and some other countries begin to attract functions of increasingly sophisticated skills level. Several countries in Western Europe are carrying out reforms to improve the functioning of the labour market and the competitiveness of jobs. Finland must react to this development with its own active measures. These pressures for change are encountered at a time when the baby boom generation born after the Second World War is leaving working life and the supply of labour is beginning to decline. The use of information technology will broaden in all fields of work, and effective exploitation of information technology will provide a necessary, though not sufficient, condition for the achievement of high productivity.

The development of the information society and the growth of the new economy have opened up many new work and career opportunities for skilled people throughout the world. The proportions of this change can be glimpsed by considering the volume of engineer training. Last year, almost one million engineers graduated in Asia, and the global figure approached two million, whereas in Finland the figure was 7,500. Instead of quantity, the most crucial success factor for Finland is the quality of education. We must venture deep enough into the difficult multidisciplinary problems uniting theory and practice and must have the courage to occasionally make difficult choices.

When enhancing our national competitiveness by investing in quality and top professionals, we must also cater for the competence and well-being of those already working, especially those with long work careers behind them, both professionals and general workers. As competition intensifies, the hectic pace of work, growing demands for productivity and the lengthening of working hours make their distinctive mark on working life in the information society. The legislative foundation of working life should evolve to match the demands of the new forms of work.

#### ■ **Vision of Finnish working life in 2015**

In 2015, comparisons on the development level of working cultures will rate Finland among the top countries. The competence capital of the work community will have become a key factor for success, affected in particular by the systematic professional development, capacity for rejuvenation and dynamic management of processes of both individuals and the community. Other success factors typical in Finland will be factors describing structural capital, such as developer networks, the use of customer networks and profit-generation models based on value networks.

Finnish workplaces will use the best available information technology efficiently and cost-effectively to create conditions for high productivity in all central fields. At the same time, the creative and innovative capacity of the personnel will be harnessed to assume active responsibility for the quality and productivity of the organisations. Technology alone, no matter how sophisticated, does not guarantee the achievement of the targeted level of productivity, but the crucial issue is the parallel development of technological and social factors. This means that, in addition to the technological factors, attention must be paid to humans and the social structures of organisations. The technological and social success factors form a complex whole that must be developed systemically

and persistently on a long-term basis. Leadership that encourages participation plays a crucial role in this.

Due to the rapid expansion of the global knowledge base and disparate labour costs, an increasingly large share of industrial mass production and also software development work will have shifted away from the western countries. Finland will have attracted high-level investment from abroad. Crucial factors in attracting investment will have been, on the one hand, certain basic elements of income formation, such as the use of global value networks in operations and productivity and, on the other hand, things like customer-based innovation and design, the implementation of plans, efficient production of goods and services, sales, marketing and distribution logistics that affect a company's capacity for income formation – all in the broadest and most profound sense imaginable.

Active exploitation of information technology is linked to the general developing of modes of operation. The involvement of employees is a central factor in this. Working life will experience a prominent shift from knowledge-based competence towards an emphasis of new visionary knowledge. Moreover, knowledge management and process-methods of work will occupy a pivotal position. Workplaces will have been transformed into laboratories of continuous learning, and people participating in working life will have the opportunity to build their competencies effectively and to progress into increasingly demanding positions in the course of their careers. On the other hand, they will also have the opportunity to move fluently into less demanding roles if so desired.

Thanks to the competitive advantage of Finnish working life, organisations will be achieving the goals set for them and jobs will be maintained without the employees having to sacrifice their health and the rest of their lives to comply with their requirements. The atmosphere in the workplaces will be good, and management culture will be positive, which will further encourage people to continue their participation in working life for longer than they used to.

The development level of Finnish work culture and its genuine multiculturalism will function as factors attracting foreign professionals to Finland on a permanent basis. At the same time, the general employment situation will have improved, raising the employment rate to 75 percent. Despite the low unemployment level, the labour market will be functioning efficiently and flexibly so that organisations will be able to satisfy their resourcing needs. In addition, the transition from education to working life will occur efficiently, and educational institutions will actively develop the structure and contents of education and training so that all aspects of the changing demands of working life will be accounted for.

Ninety percent of companies operating in Finland will continue to be small businesses employing less than ten people. Legislation and the flexibility of the labour market will create good conditions for the operation and growth of small companies. New forms of work will have gained ground: temporary agency work, new arrangements of working hours, joint contracts and labour pools will have enhanced small businesses and promoted microentrepreneurship.

In 2015, Finland will be a pioneer in the creation of new opportunities for participation for people who find it hard to find work in the standard competitive job market. Advanced information technology will be broadly exploited in measures that facilitate entry into working life for those who are in danger of becoming isolated from society. Moreover, employment insurance arrangements will encourage the unemployed to make use of these opportunities and to avoid long periods of unemployment in their future.

As Finland ensures the functioning of its working life institutions in an exemplary manner, it will also be actively involved in the efforts to control changes in the global labour market. The objective will be to guarantee everyone the opportunity for full-fledged participation in working life as well as the chance to work in reasonable conditions and to enjoy the rights generally granted to an employee. Finland's participation will be based on the conviction that the development of working life on the national level depends increasingly upon global development trends.

## ■ Proposed actions

### a) Endorsement of competence and innovation as the guiding principle

The government has set as one of its fundamental aims the generation of 100,000 jobs by the end of its term in 2007, and the achievement of this goal is an essential condition for the success of the Information Society Programme. This is why it is the position of the Working Life Section that this aim must be pursued and the government must be prepared to undertake all measures necessary to achieve it.

In addition, it is important to continue active measures to promote growth and to generate new jobs also within a longer time span in order for Finland to meet the employment objectives accepted by the EU in the Lisbon Strategy for 2010 and for the development to continue from 2010–2015 at a pace that would enable a 75 percent rate of employment by 2015.

As the most important condition for the achievement of employment goals is the strengthening of competence and innovation in all areas of the Finnish society and particularly in the realm of working life, it is imperative that the education of adults already in the workforce is also rendered a target of systematic measures. The operating culture must focus on innovation and systematically enforce positive synergies between development in technology and new ways of functioning in the different fields of society. The focus must spread from individual professionals to the management and manifestations of competence in organisations and national innovative environments.

The most essential question is how to transform competence and innovation into employment-intensive growth. This requires an increase in entrepreneurship, increasingly efficient interaction between the interfaces of success clusters, more efficient conversion of innovations into products and services, and the capacity to act efficiently in the global market, enforcing the innovative capacity of employees and finding new solutions to improve the opportunities for participation among groups at risk of social exclusion.

The Section therefore suggests that the cultural development of work communities and the methods of this development are selected as the most central target of actions. This area has been described in detail in section 4 of specific suggestions in this chapter. The most pivotal targets are: 1) the culture of working together, 2) the efficient exploitation of new information and communication technologies, 3) work processes and process methods and 4) innovation, anticipation and the management of innovations.

New methods and measures for the improvement of work cultures, the evaluation of the results attained and the rewarding of success in ways that enhance working together and promote long-term development must be created for the use of work communities. The infrastructure of development activities needs strengthening, particularly with regard to scientific expertise on the functioning of work organisations and the education of new generations of researchers. Particular weight should be afforded to post doctoral education and the recruitment of researchers and development consultants with versatile and profound experience in working life. As the current working life development programmes are completed, the continuity of development activity must be ascertained. A more long-range approach must now be adopted in the areas of development activity perceived as being the most important.

An essential element in the renewal of Finnish working life will be the development of public sector operations. A significant portion of the workforce in state and municipal employment will be replaced during this period as a result of retirement, and at the same time pressures to increase productivity in public organisations will mount. The public sector must strive for a pioneer position in the development of the organisational capacity to reform: with management practices that encourage participation and responsibility, the active exploitation of new information and communication technologies and the adoption of best practices in its operations.

The high level of structural employment cannot be efficiently lowered without new measures to arrange alternative means of employment and to develop unemployment insurance. Particular attention must be paid to social entrepreneurship and the opportunities provided by ICTs in the creation of jobs in sparsely populated areas.

In addition to these national measures, Finland must also assume an active role in the actions to strengthen the competitiveness of the European

Union, the creation of new jobs at the European level and the reforming of European working life in accordance with the strategic aims set for the development of the Union. Finland must actively follow the global trends in work and ensure that we have the necessary amount of scientific knowledge on the problems and challenges to be faced in the course of these changes.

#### b) Specific suggestions

1) Aside from technology, it is also necessary to invest in social, organisatory and business innovations.

◆ Technology is an important engine for economic growth in Finland, but technology alone is unable to create a competitive advantage for the country. Finland must significantly increase its R&D investment, but simultaneously, and most importantly, it must adjust its research and work cultures in accordance with the suggestions provided in this chapter.

◆ As Finns have a tendency to view innovations and the information society from a very technology-centered viewpoint, it is important to recall that real competitive advantage originates in the fresh association of the most recent discoveries from different fields of technology and other disciplines and in the simultaneous production of innovations at all levels of societal structures. Boundaries between the structures slow down the flow of innovations. Also, Finnish research and business cultures hinder the development of the critical mass and the capacity for rapid reaction, which are crucial for international success.

◆ The competitive advantage of the future is formed in the efficient exploitation of technology, the acknowledgement of new competitive production areas and the promotion, production and introduction of social, organisational and business innovations. Technology as a product creates new markets only if product development manages to consider the context of the end user to a sufficient degree.

◆ Technology is likely to continue to form the core of many innovations that successfully incorporate various other innovative dimensions. For instance, the interface between culture and business can generate successful innovations even without a technological core, or by utilising technology that has already been created. Many different sources and channels of financing in competition with each other are necessary for the promotion of these innovations.

2) The focus must spread from individual professionals to competence in organisations and national innovation environments.

◆ Individual professionals must remain an important concern. The general level of competence is high in Finland, but that is not enough in itself. We must pay more attention to the recognition and promotion of excellence in all levels of education and in all types of organisations. Full-fledged exploitation of talent and innovativeness requires an adjustment of pedagogical methods and management structures to allow purposeful enhancement of special talent and innovativeness.

◆ Innovation poses a national challenge for learning. The principle of lifelong learning requires that a focus on innovation and efficient knowledge management become central practices in all levels of education. Practices of problem and inquiry based learning as well as the purposeful exploitation of the opportunities provided by e-learning must be promoted, both in the educational system and in working life.

◆ Innovation constitutes a national learning challenge also in the workplace. We must concretize, from the viewpoint of different organizations and institutions, what innovation means, how it can be learned and what it requires on the level of the individual, the organisation and the nation. Increased innovation in work communities must be promoted through all possible means.

◆ The educational system must provide flexible alternatives for those already in working life to upgrade their qualifications. Apprenticeship training must be developed further. In particular, an academic apprenticeship concept must be created through the development of work communities and work processes at the university and polytechnic level, based on the good experiences gained from apprenticeship training. The best practices in retraining and upgrading of qualifications must be charted and exploited systematically in order to create a national system for retraining that is more efficient than the present system. Co-operation between doctoral education and working life must be intensified.

3) Innovation requires competence in commercialisation and the mastery of the international market.

◆ The concept of product development must be perceived more broadly than at present. Increasingly, a product is seldom simply an object; it also incorporates service, methods and processes. The global process of transition to the information society requires that content-based engines, such as welfare, education and innovation systems, exist and function alongside the more traditional motors for growth, such as mobile technology. For instance, health care, conceptualised as an international export, provides a growing platform for the fields of biology and chemistry supporting health care services and information and communication technologies.

◆ A broad understanding of product development serves to unite different disciplines and realms of activity. This requires that we recognise the business concept or the operation model of an organisation as success factors, the development of which occurs according to the same principles as other product development projects. It is absolutely crucial to understand this, for otherwise the multidisciplinary development projects that break the boundaries between technology, other scientific disciplines and applications remain without the necessary funding.

4) Achieving the necessary changes requires purposeful generation of breakthrough projects and national method development work.

◆ The various fields of business, instances carrying out research and development work and those organising education operate largely independently in Finland, and actual co-operation across these boundaries is virtually non-existent. Finns often still work under the assumption that the culture of everyone knowing everyone is enough. It is necessary to initiate cross-sector forums that would carry out projects involving profound and deep co-operation among people representing different fields and groups. This type of co-operation is likely to form important sources of new visionary knowledge.

◆ The development of work cultures in work communities and the measures that are necessary to achieve this must be selected as an important priority. The core targets are: 1) a sense of community and working towards a common goal, 2) efficient exploitation of ICTs and the management of knowledge, 3) work processes and process methods and 4) innovativeness, anticipation and the management of innovations. The objective is the systematic development of professional competence that stresses learning at work and utilises the concepts of innovative milieu, creative tension and professional networks. As a basis for development measures taken in work communities, particular weight is given to management that encourages participation and responsibility, lifelong learning and well-being at work. These elements should be used to create a work environment of sustainable development, where the fundamental values of human and social welfare serve as the basis for economic growth.

◆ More attention must be paid to social implementation and the distribution of results from studies and pilot projects. The gaps in national methodical know-how pose a significant problem. Finland has seen hundreds or perhaps thousands of development projects of a high standard, some even internationally so, but their results are not dispersed efficiently enough for the use of different actors and not refined into operational methods that would increase productivity. It is necessary to finance method-developing institutions that function as open

networks and that have achieved the critical mass, thus possessing the qualifications to reach the top of their trade. Universities need better incentives for the implementation of their third task: to interact with society and promote the societal impact of research results.

5) New and potential fields of success must be identified and linked to national and international value chains and value networks.

- ◆ Numerous pilot projects are being carried out, from both research and practical viewpoints and sometimes combining the two. The exploitation of research results has, however, been left with too little attention. Projects overlap with each other and produce applications that never make it beyond the pilot stage. The productivity of projects like this has not been addressed to a sufficient degree. Results can be improved significantly if the best projects and their implementers are financed to carry out projects that complement and deepen the results already gained. By enabling more long-term development projects and multiplying the volume of current efforts, we may create narrowly pointed but at the same time multidisciplinary spearhead areas that possess the opportunities to achieve success on the international level.

- ◆ The public sector in particular must develop its own innovative modes of operation, describe good practices and spread the experiences that can benefit different levels of society.

- ◆ Small firms' opportunities to work with different regulations must be improved. Barriers to the development of their competencies and the exploitation of this competence in larger value networks must be removed. Effort must be made to facilitate entrepreneurs' struggle with legislation, for instance by differentiating regulation according to company size.

- ◆ Joining international value chains and value networks does not pose a problem to companies that already function in an international environment. Instead, many new companies, old industrial companies operating in traditional sectors and several instances of public administration would be in need of support in their efforts to internationalisation.



Helsinki Tax Office in 1934.  
Photo: Pietinen  
National Board of Antiquities photo archive

# Electronic Government

## ONLINE SERVICES OF PUBLIC ADMINISTRATION SECTION

The Finnish public sector is, at present, making relatively broad use of new information and communication technologies such as the Internet and wireless and broadband services. Most authorities have built their own website, and several ministries and state agencies as well as the largest municipalities are offering a variety of online services. Public administration has also created vast databases of basic citizen information that provide a solid foundation for the development of systems of electronic identification. However, there is still variation in the uptake of the new solutions, as the provision of interactive and customer-driven common services, for instance, remains relatively low.

Information technologies provide different administrative branches with the opportunity to develop more efficient processes and modes of operation, to reform their structures

and to improve the productivity and quality of service production. The promotion of online services is thus becoming a strategic field of development in public administration. State agencies, ministries and most municipalities have prepared action plans and strategies for the development of online services and information management in order to respond to these challenges.



*A chip-based citizen identity card. Photo: Markku Viitanen, Population Register Centre.*

### ■ Current stage of electronic government

#### Service provision

The provision of online services by Finnish authorities has increased in recent years. All ministries, state agencies and municipalities have their own website. Ministries and state agencies can be involved in joint portals by more than one branch of administration, and local authorities may take part in similar ventures uniting the efforts of two or more municipalities or bringing together the municipalities of one region. Digital forms introduced by different authorities are available from the lomake.fi service. Most of the forms are available in printable form, while some can be filled out on screen and then printed – only a fraction of the forms allow for electronic transmission. In autumn 2004, 75 percent of ministries and state agencies and 65 percent of local authorities provided online forms.

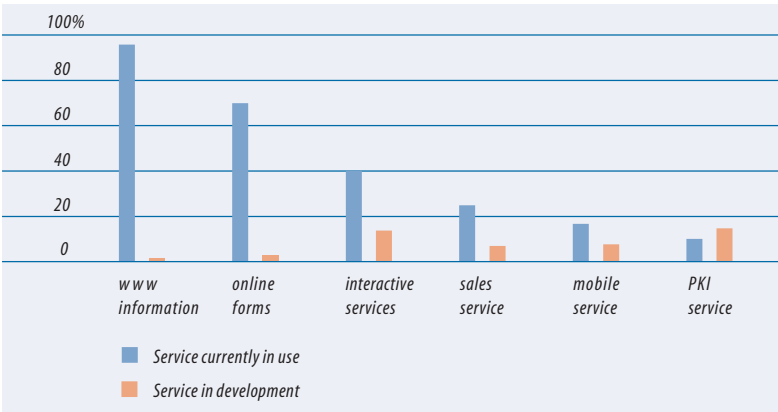
Half of all ministries and state agencies offer various online services.

The most popular of these include:

- TYVI data transfer service from businesses to authorities, currently used by more than 10 percent of Finnish authorities
- job search services (Ministry of Labour)
- enrolment to polytechnics (National Board of Education)
- financing application (National Technology Agency, Tekes)
- the online form service lomake.fi

Figure 9.

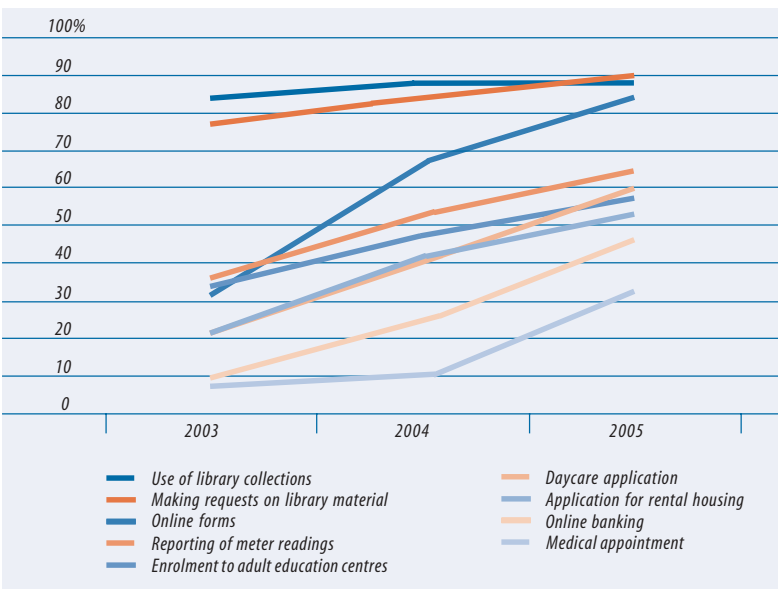
The provision of online services in central administration in autumn 2004. Percentage of ministries and agencies currently using or developing the type of service.



Source: Ministry of Finance

Figure 10.

Provision of online services in local authorities (the figure for 2005 is an estimate)



Source: Association of Finnish Local and Regional Authorities

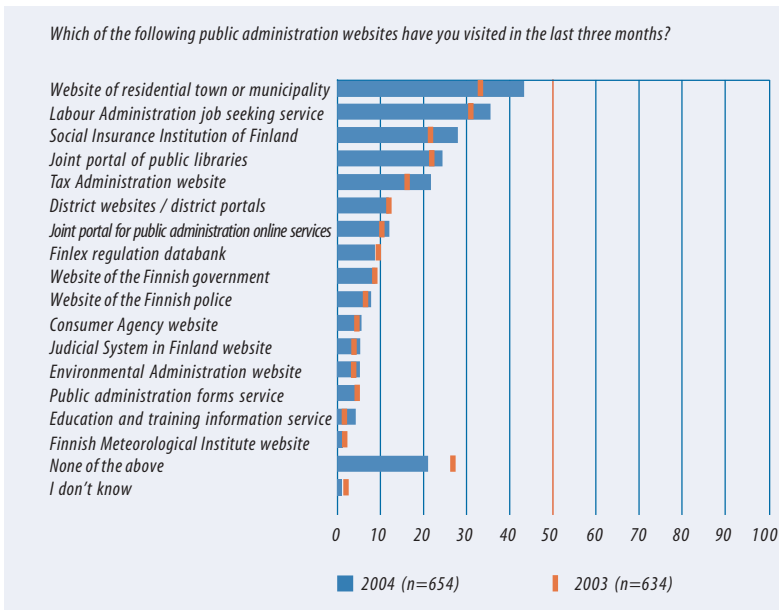
More transactions can be carried out exclusively through forms in central administration than in local administration, which is why the provision of online forms is more limited in municipalities. Applications handled by local authorities, concerning matters such as social assistance and building permits, often involve multiple stages of processing and the work of more than one official, which has slowed down their translation into online services. Forms for less frequently required municipal services, such as daycare and rental housing, are offered online by less than half of the municipalities. Nearly all municipalities (ca. 90 percent), however, are capable of offering the opportunity to browse library collections and make requests over the Internet. Comparable simple and widely used online services benefiting both the user and the municipality include enrolment to courses at adult education centres and reporting the readings of water meters online. These services are currently offered by more than half of Finnish municipalities.

The integration of online services with back-office systems and operative systems is only just beginning. Often, the provision of online services to citizens and businesses has been slow in those sectors and agencies where information and communication technologies have long played a significant part in the implementation of operative functions. For instance, the slow increase of appointment services has resulted from difficulties in integrating the online appointment system into the organisations' internal systems. In some administrative branches, the operative systems used have enabled easy integration of online services. The services of the Labour Administration are an example of this.

**■ The use of services**

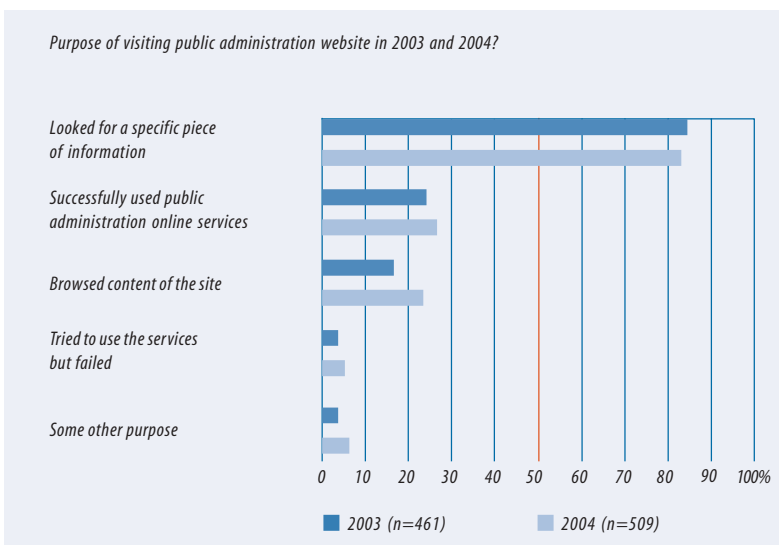
The use of online services has been explored in an annual survey by the Advisory Committee on Information Management in Public Administration (JUHTA). According to its most recent survey conducted in November 2004 (*Julkishallinnon verkkopalvelut* [Online services of public administration], autumn 2004, Taloustutkimus Ltd. and the Ministry of the Interior), the most frequently visited public administration website was that of the person's residential town or municipality. Other commonly frequented sites included, in the following order, job-seeking services (the website of the Finnish Labour Administration at mol.fi), the online services of libraries, the website of the Social Insurance Institution of Finland (Kela), and tax administration services. A little more than a fourth of Finns had not used any of the sixteen most popular public administration online services.

Figure 11.  
Use of public administration websites



Source: Taloustutkimus Ltd., Omnibus, November 2004 KMR/RKO/ca/jso/9722  
*Julkishallinnon verkkopalvelut* (Online services of public administration), autumn 2004

Figure 12.  
Purpose of visit in public administration website



Source: Taloustutkimus Ltd., Omnibus, November 2004 KMR/RKO/ca/jso/9722  
*Julkishallinnon verkkopalvelut* (Online services of public administration), autumn 2004

The clear majority of visitors to public administration websites had been looking for a particular item of information. Almost a fourth reported success in their use of the services. Less than a fifth had visited the websites of public administration only to quickly review the content of the site (Figure 12).

The online services of public administration have added to the information available on the existence and availability of different public services. Also, some individual services have facilitated interaction with officials and made the acquisition of services more convenient for the customer. Still, significant benefits to customers have so far been limited to individual services or cases. Also, the productivity gains for public administration organizations will not realise until some time has passed. The development of online services has been enhanced through good practices and useful projects (e.g. the Prime Minister's Annual Award for Best Practices). Moreover, the JUPA Project for Online Public Services by the Ministry of the Interior is in a phase where it has great potential. Co-operation between the state and municipalities has advanced with the help of the Advisory Committee on Information Management in Public Administration (JUHTA), and the development of Public Administration Recommendations (JHS) has been active.

### ■ International comparisons

Recent international comparisons and estimates provide an interesting background for understanding the bigger picture of online services. When drawing conclusions, however, the different starting points of the comparisons and the inconsistencies in their use of criteria should be acknowledged.

The most important outside estimate on the state of online government in Finland is the *eGovernment in Finland* report published in the OECD e-Government Studies series. The report concentrates on national level policy recommendations and co-ordination, thus excluding regional and local levels of observation. According to the report, the current state of e-government in Finland is characterised by the uptake of agency-specific online services, a reasonable level of financing directed to information and communication technologies, and the development of common change-inducing solutions, such as citizen portals.

The report perceives the next stage in this development as much more demanding. In addition to the constant development of system applications, the report calls for more specific information on the needs of users, increasing inter-agency co-operation and more investments in design processes and management of change. The decentralised administrative system of Finland has not been able to respond to the needs of the citizens and economic life to a sufficient degree. In the development of electronic government, the capacity of the decentralised administrative system to adapt to more efficient planning and distribution of responsibility, as well as the incentives offered to agencies and units lagging behind, play a central role. An important challenge will involve the integration of expertise and resources and finding the right incentives for inter-agency collaboration.

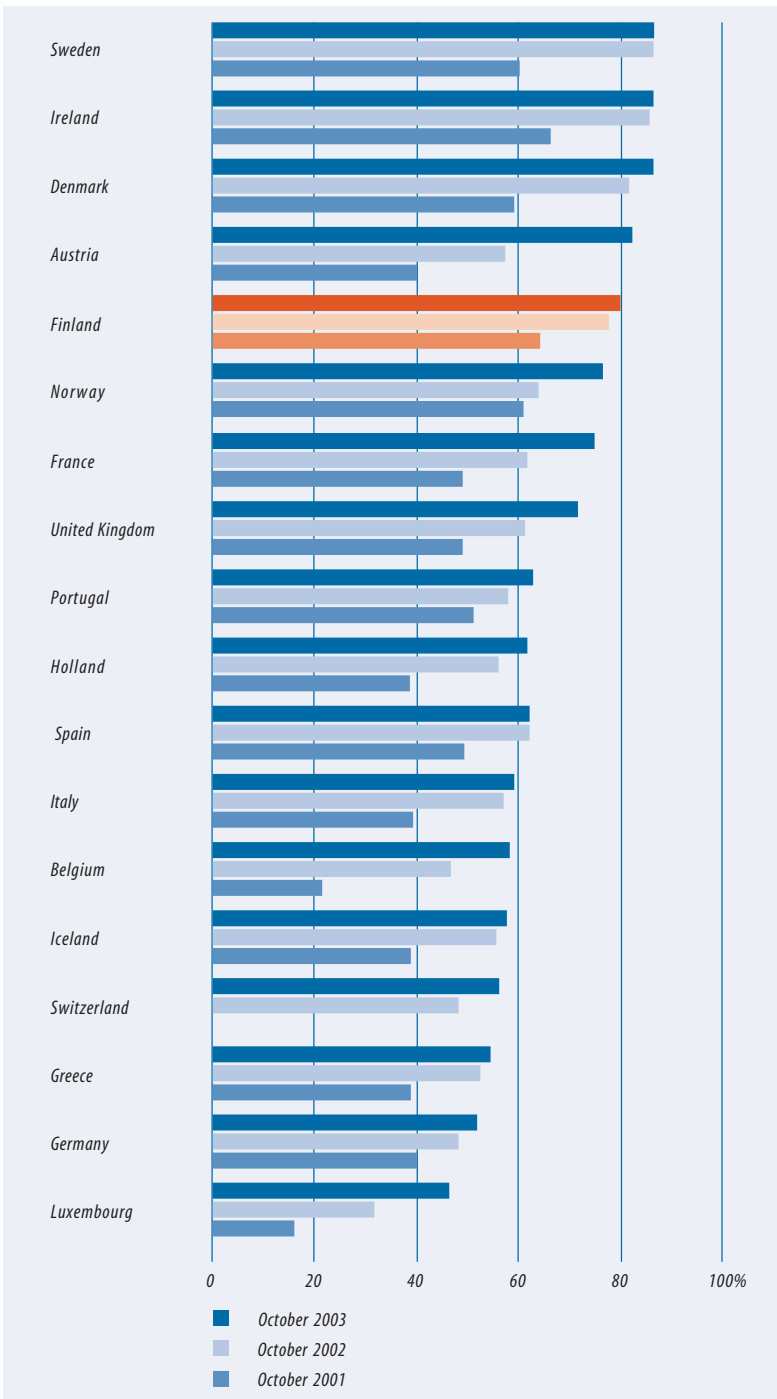
The development of e-government is articulated as one of the most central goals of the eEurope initiative, and the achievement of this goal is being monitored through service provision indicators confirmed by the European Commission. The government-to-citizens services measured in the survey (a total of 12 indicators) include income taxes, social security benefits, declaration to the police and enrolment in higher education, whereas government-to-business services (a total of 8 indicators) included functions related to social contributions for employees, corporate tax and public procurement. The methods and needs in the management of different affairs vary significantly between countries, which makes comparisons more difficult.

The following results were obtained from a benchmarking study carried out by Cap Gemini Ernst & Young on behalf of the European Commission (October 2001, 2002 and 2003). The survey involved the EU-15 countries and Norway, Iceland and Switzerland (although the results from Switzerland are not included in the average). The survey measured the level of online sophistication of the services, which increased from 45 percent in October 2001 to 67 percent in October 2003. In the same timeframe, the online sophistication of services targeted at citizens grew from 40 to 58 percent, and the sophistication of services targeted at businesses increased from 53 to 79 percent. The development of government-to-citizens services still remains below the rate of business services.

In the October 2003 survey on the online sophistication of services, two new countries, Austria and Norway, joined Sweden, Ireland, Denmark and Finland, all of which had crossed the mark in previous years, to reach the 75

Figure 13.

## Level of sophistication in online services: Enabling of two-way interaction



Source: Cap Gemini Ernst & Young 2001–2003

percent mark. This percentage indicates the level at which two-way interaction is possible (electronic transmission of forms, identification). Only Luxembourg remains below 50 percent (simple online information provision). The average percentage of other countries remained between 50 and 75, signifying mostly one-way interaction (e.g. printable forms). The development from October 2002 onwards has been the fastest in Austria (27 percentage points). Also Luxembourg, Belgium, Holland and France have seen a development of at least ten percentage points (Figure 13).

Since 2000, Accenture has implemented international benchmarking studies on the level of online sophistication of public services. In *eGovernment Leadership: High Performance, Maximum Value* (2004), the fifth report in the series, Finland merited a shared fourth position. Canada, Singapore and the United States have held the top positions more or less throughout the series. Finland has generally been rated sixth or seventh in the comparisons (see Appendix 1, Figure 23).

All in all, the results provide some indications of Finland holding a solid position in e-government comparisons and remaining among the top countries in this area. It must be noted, however, that the indicators used in the survey still contain some room for improvement.

On the basis of such benchmarking exercises, it would seem that Finland should focus particularly on the modernisation of government and the transformation of government officials into customer-oriented service providers. The ultimate goal is the reorganisation of administrative processes and practices in order to yield the maximum possible gain from information and communication technologies. Areas meriting particular attention in this respect are value-added services, interactivity (particularly the relationship of administration to citizens and economic life), functional portal solutions, co-operation between different authorities, seamless services, structural reorganisation and strategic development vision (Ari-Veikko Anttiroiko: e-Government-alan tutkimustarveselvitys [Research needs in e-government], Reports by the Information Society Institute 3/2004, University of Tampere).

Despite the general positive tone of the reports, the comparisons suggest that Finland has not been able to expand electronic government in accordance with the expectations that followed the positive development that began in the mid-1990s. The comparisons rate Finland among the most successful countries in the field. The current "third wave", presuming active participation, interaction and critical mass, thus poses a real challenge for the various levels of government in Finland. We must be able to modernise processes and create real added value in the realm of administrative practices, organisation of services and democracy (Ari-Veikko Anttiroiko: e-Government-alan tutkimustarveselvitys [Research needs in e-government], Reports by the Information Society Institute 3/2004, University of Tampere).

#### ■ The future of electronic government

One solution for the challenges posed to public administration by the ageing of the population and accelerating global competition is seen in a rise in productivity gained through information and communication technologies. Exploited to their full potential, information and communication technologies provide an opportunity to significantly increase the efficiency of service processes. For citizens, the change is the most visible in the emergence of interactive online services or, in the best scenario, in service processes occurring without any intervention. The work and costs incurred from redesigning the processes of operation should be viewed as a normal part of operations. The actual launch of development activities and their resourcing must occur immediately.

The reform of direction and organisation of government information management has formed a part of the Information Society Programme. The TIME committee nominated for the purpose has envisioned a target situation with regard to the most central operating principles of ICT activity, a model of organisation and leadership and a model of economic management. According to the committee, the projects of electronic governance must be prioritised on the grounds of the productivity demands of public administration and the needs of the citizens.

The uptake of new service models necessary for the reform of service processes cannot be managed by local authorities with the current operating structures of individual municipalities. The co-operative structures essential for efficient service provisioning will in the future operate increasingly on the regional or district (seutukunta) level. The acquisition and use of information systems presumes the generation of new co-operative structures. Many municipalities have already voluntarily formed corporations or other new co-operative organs in order to create a more expedient operating environment in this respect.

To achieve seamless customer service, the implementation of an efficient service system must be based on clear architecture and standardised open interfaces. As the means to produce services become more varied, mastering the information systems and their information content becomes a central tool in the direction of service activity. As the integration of Europe progresses, the opportunity to access online public services in other European countries becomes increasingly important for citizens. The development of the Internet (XML, web services, semantic web and Service-Oriented Architecture, SOA) provides a good foundation for the development of globally integrated and

cost-efficient electronic service production systems. The global diffusion of the HTML browser interface for the Internet offers an example of the opportunities entailed in comparable developments.

Most future scenarios are rather unanimous in their vision about online public services becoming a natural part of people's lives in their roles as citizens, employees, consumers and members of families and social communities. The various channels provided by the information and communication technologies offer the opportunity to use public services in ways best suited to the situation at hand, either exclusively online or by communicating with service personnel through contact centre solutions or joint service points. Self-service by customers will increase. The increasing sophistication of mobile devices and information systems will enable easier use of services irrespective of time or location. In order to gain the citizen acceptance required by broad-based usage, the development of the services must be customer-oriented. One of the most basic conditions for the success of online services is their dependability from the customer's viewpoint, which further emphasises the significance of information security and secure identification.

The co-operation of different actors enables the construction of various services and processes in such a way that the services facilitate the users' everyday lives and at the same time free the hours of service personnel for tasks where human interaction and work effort generate actual added value for the user. This progress is gradual, but demands multidisciplinary research and development work as well as broad-based co-operation between actors. It is commonly acknowledged that the constantly advancing information and communication technologies provide good opportunities for increasing the productivity of service production, thus enabling the maintenance or even improvement of the level of services, despite the challenges of ageing and globalisation. On the basis of its high level of competence, Finland can remain at the forefront of this development and continue to gain great benefits from it.

#### ■ **Proposed actions for the development of e-government**

To remain at the forefront of the advances of e-government, Finland will require constant investment in development measures. The primary motivation for the development of online services and e-government is the development of better and more cost-efficient public services. This requires strong leadership. The growing needs of customers and the productivity demands set for administration presume broad exploitation of information and communication technologies. To achieve this, management must have the capacity to recognise new opportunities and to carry out reforms on all levels of government. In addition, policy makers must take a firmer stand and set clear strategic goals for the development of electronic government. One of the most central needs for reforms in management and direction concerns the co-ordination of the funding for different development projects and the centralised funding of jointly implemented projects.

The online services of public administration must be developed in broad co-operation, aiming at common solutions where possible. In addition to work carried out in the Online Services of Public Administration Section, these aims are also pivotal in the on-going reform of information management (work carried out by the TIME committee) and in the strategy for public administration online services currently in preparation. The commitment of different parties to a common strategy is an important premise for better co-ordination in the development of e-government. The strategy work can also offer a framework for developing online services based on commonly accepted aims, modes of operation and possible common solutions. As part of the Information Society Programme, the Project for Online Public Services (JUPA) promotes the online availability of services by local authorities and the development and exploitation of common solutions in their creation.

The future visions described above can be best achieved by further developing the funding schemes for jointly implemented projects, improving the knowledge-base of different actors, increasing research on the impact of online government, enforcing standardisation work and promoting electronic transmission of documents and information. The actions proposed by the Section support the on-going modernisation of information management in state and local government.

### Funding schemes for jointly implemented projects

Online services combining the efforts of different authorities have so far been scarcely available. An important reason for the slow progress lies in the arrangement of funding for projects that combine the efforts of many different organisations, which often involves some conflict in the distribution of the gained benefits and the sharing of expenses. For this reason, it is necessary to chart possible alternative funding and investments schemes for jointly implemented projects. Moreover, new mechanisms must be created for the allocation of investment returns, which requires extracting the fruits of increased efficiency from all parties to the process. The main goal is to improve the opportunities for the implementation of joint projects and to arrange their funding.

- ◆ A separate project is carried out to explore and develop funding schemes for extensive projects by several different institutions as well as related schemes for the allocation of investment returns.

### The mapping and structuring of information related to the development work of e-government

Structured information on the measures for developing online services throughout public administration is necessary to direct future measures in the field. One opportunity to form a picture of the present situation in the area is to create a project map illustrating the current state of online services development, naming current projects and indicating possible development prospects in online government. The objective of the project map is to help identify the areas of development that need broader co-operation, as well as to recognise the focal areas in the field. Also, a project map would encourage the generation of broader development programmes.

- ◆ A project map describing the current activities in the field of online government is created to improve the knowledge base and to define the focal areas of development activity.

### Research on e-government

The innovation, development and uptake of the operating models of online government requires the support of research. Knowledge gained through research is necessary for profound modernisation of administrative processes and ways of operating. Without the solid foundation provided by knowledge gained from research, it is difficult to form a structured view of the alternatives of investments and operational solutions, to assess the impacts of different alternatives and to locate the best methods and competence both for decision-making and the implementation of reforms.

- ◆ A specific research programme is needed to chart and understand the multifaceted phenomena, development issues, development trends and impacts related to e-government. Systematic information is needed particularly on the benefits and impacts introduced by online services.

### Utilisation of standards

To achieve seamless operation and improve cost-effectiveness, the development of online services must be based on clear architecture and open interfaces developed on the basis of standards. For instance, the W3C standardisation of the Internet provides a solid foundation for the achievement of this goal. There is a need for uniform specification of both information content and interfaces, including the features of identification and information security. The aim of the standardisation is to support the development of services that are simple to use and easily accessible to customers.

The public and private sectors must engage in close collaboration in the development of standards for online services. The demands posed by different standards and recommendations must be taken into account already when planning ICT acquisitions. The specification and standardisation work done in certain sectors, such as social welfare and health care, can, in part, be exploited in other branches of administration, for instance through the means of the Advisory Committee on Information Management in Public Administration (JUHTA) and Public Administration Recommendations (JHS). In the future, the interoperability of systems will play an increasingly significant role. The

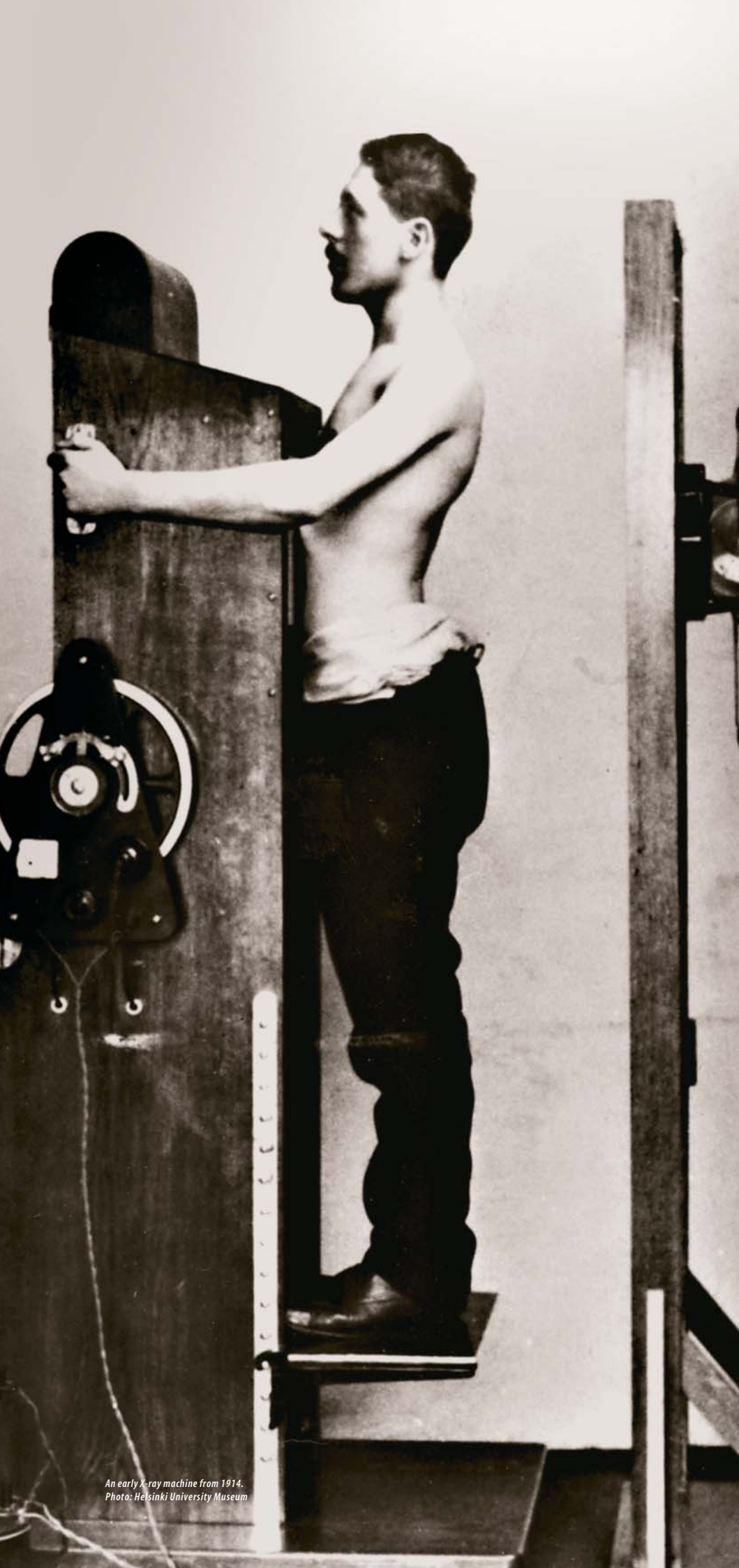
construction of new systems based on internationally accepted standards may promote the emergence of solutions that may also find markets outside of Finland.

- ◆ The standardisation of information systems is developed for the needs of public administration, taking into account the growing needs for co-operation between public administration and the private sector as well as international standardisation development.

#### Electronic transmission of documents and data (and eDay)

The exchange of documents between different authorities – particularly state government and local authorities – is still mainly handled in paper form even though the documents have been prepared electronically. Despite the widespread use of email and the Internet in the public sector, they do not offer sufficiently secure means for the transfer of documents and information between authorities or between authorities and businesses. The necessary distribution channels are available only for certain public administration services (e.g. certain announcements in the TYVI data transfer service from businesses to authorities). The technology for secure email is already available but, so far, its use has been limited. In order to effect change, it will be necessary to further specify and develop interfaces and message handling and to agree upon common procedures between parties. Broader digital transmission of documents and information would have significant impact on productivity, and would also foster the construction of online services.

- ◆ The digital transmission of documents and information has increased both within administration and between administration and its customers. If necessary, a particular campaign day for digital communication (cf. eDay in Denmark) could be arranged. In addition, it should be determined whether it is possible to set a date by which the majority of official documents will be transmitted electronically.



*An early X-ray machine from 1914.  
Photo: Helsinki University Museum*

# Information and Communication Technology in Social Welfare and Health Care

## SOCIAL WELFARE AND HEALTH CARE SECTION

Information and communication technologies can offer important benefits in the promotion of health, equality and well-being and provide solutions to present and future challenges in the field of social welfare and health care. Improved opportunities to manage and process information broaden citizens' opportunities for choice regarding both lifestyle and use of services. At the same time, increasingly sophisticated processing of information fosters improved and more efficient functioning of the service system.

Well-functioning online services can serve to diminish the demand for other services. Information and expert services offered online can be used to inform and instruct the customer more effectively, thus supporting the person's own life management.

Virtual self-help groups may offer support that cannot be provided through traditional expert services. Information systems are highly useful in designing services to meet the needs of individuals, in the uptake of new regional or district-level operating models, in avoiding overlapping and inappropriate examinations and treatments, in introducing data based on evidence to support treatment as well as in standardising, monitoring, evaluating, reporting and compiling statistics on treatment practices.

The connections between the information society and social welfare and health are broad and multidimensional. National development work currently focuses on the specification of technological structures, the networking of actors and the construction of a legislative foundation. The common foundation supports the modernisation of operational processes, the broad application of operative innovations and the enforcement of the role of the citizen.

### ■ The present stage of development

So far, the uptake of information and communication technologies in the field of social welfare and health care has not yielded sufficient gains at the national level. The level of investments in information and communication technologies has been relatively low in this sector – approximately two percent of all expenditure. The adoption of new applications of information and communication technologies in this field, as in public services more broadly, has been slowed down by the lack of pre-designed models and modes of operation. The lack of direction and standards has led to a broad spectrum of one-off systems with little technical interoperability. Due to the decentralised decision-making system, the networking of actors poses a particular challenge in Finland. Therefore, the most important task of the Information Society Programme in this respect is to unite different actors for the purpose of implementing common goals and to harness the vast array of competencies available for the common good.



*A radiologist examining computed tomography results on the Internet.  
Photo: Timo Läfgren. Hospital District of Helsinki and Uusimaa, Department of Radiology.*

### a) Social welfare<sup>2</sup>

In the realm of social welfare, the fragmentation is even more prominent than in health care. Each municipality organises their own services and ICT acquisitions, and the significance of joint municipal authorities is relatively low. Particularly in small municipalities, social services have little competence and resources to invest in the upgrading of information technology. Acquiring computers and Internet connections for the use of employees has been the easiest step to take.

In social welfare, information and communication technologies have been used mostly for services that involve computing and monitoring the benefits allocated or fees charged for the services. In 2001, software intended for children's daycare was the most commonly used (85 percent of municipalities). Other popular software included software designed for the handling of maintenance allowance, for social assistance, for daycare invoicing and programmes used in care-at-home services and social work. In 2004, the situation of basic systems was estimated as being relatively good. However, the utilisation of ICTs in the production of social services is minimal.

Information systems are updated at regular intervals, but social services rarely take part in their actual development work, with the exception of the bigger towns and cities. Purposeful development of work processes via process thinking has not been apparent in inquiries carried out on the topic, nor has the need to associate the development of work processes with the design of information systems. The connections of social services to other services by local authorities are evident in the fact that, already in 2001, 80 percent of social welfare offices were connected to the municipalities' local area networks. However, the level of connectedness among the more remote offices is not known.

Already in 2001, 44 percent of social services employees had access to the Internet. The situation was the best among social workers, nearly all of whom had Internet access. In 2001, mobile phones were most commonly used in care-at-home service (85 percent of respondents), whereas portable computers were relatively rare. Other mobile technology was also quite scarce.

A project focusing on the promotion of ICTs in social welfare will be carried out as part of the social services national development project. The project plan was completed at the end of 2004. Key issues in the project include the development of social welfare client information systems, the promotion of information management and ICT skills among social welfare professionals, the construction of online services for social service professionals and citizens, the promotion of information security, data protection and the use of client information, as well as the organisation of national guidance and co-ordination. The implementation of the project will be a long-term process.

The eConsultation for Social Welfare project (the Ministry of Social Affairs and Health and the National Research and Development Centre for Welfare and Health 2001–2005) has promoted the opportunities of social workers and other social service professionals to acquire professional information and broaden their competence by means of information technology. Local sub-projects have developed and experimented with consultation services based on the use of information and communication technologies. The Sosiaaliportti (Social Gateway) portal, to be launched in early 2005, offers fresh information, an expert index, discussion forums and closed work spaces for the use of professionals. One of the goals of the project is to acquaint social service professionals with electronic information retrieval and the use of online services.

The ITSE project carried out between 2001 and 2004 (the Ministry of Social Affairs and Health and the National Research and Development Centre for Welfare and Health) was aimed at promoting independent living among the elderly and disabled people. This objective was sought through increasing the knowledge of social welfare and health care professionals on the opportunities of using information technology as tools in their work. The

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*The most recent nation-wide investigation of information systems and the use of information and communication technologies in social welfare was carried out at the end of 2001 (Sosiaali- ja terveydenhuollon tietojärjestelmäkäyttö [Information systems in health care and social services], Publications by the Network of Excellence Centres 1/2002). Only a third of municipalities answered the survey, which means that the results should be considered as merely indicative. Regional investigations from 2004 are from Southwest Finland (Timo Kestiliä, Suvi Pitkäranta & Hannu Salmela: Varsinais-Suomen sosiaalialan tietohallinnon nykytila [The current state of information management in social welfare in Southwest Finland], Turku School of Economics and Business Administration) and Eastern Finland (Sirpa Kuusisto-Niemi & Antero Lehmuskoski: Tietohallinto Itä-Suomen sosiaalitoimessa: Selvitys sosiaalitoimen tietotekniikasta ja tiedonhallinnasta keväällä 2004 [Information management in social welfare in Eastern Finland: Report on the use of information technologies and information management in social welfare in spring 2004], University of Kuopio). The report on Eastern Finland covered the operating area of the East Finland Social and Welfare Centre of Expertise, i.e. the Regions of Kainuu, North Karelia, North Savo and South Savo.*

project was implemented through eighteen regional sub-projects. The networks generated in the ITSE projects are being established as permanent networks of technology-assisted operation, and the new methods of operating will continue to be practiced in the area of the project, gradually diffusing to other parts of the country.

Exploited accordingly, the rapid development of solutions supporting independent living offers more ageing and disabled people the opportunity to live at home. It is important that professionals of social welfare and health care contribute their own competence to the work of developing new technologies. Those working in customer service must be given the opportunity to maintain their competence and continue to familiarise themselves with the developments of welfare technology.

#### b) Health care<sup>3</sup>

Primary health care has switched almost entirely to electronic patient record systems. In early 2004, such a system was in active use in 147 (93.6%) of the studied health centres (Table 4), when the corresponding share in 2001 was only 63 percent. The system's usage rate in all health centres was more than 90 percent, meaning that paper records functioned solely as archives of historical information.

In hospital districts, this development has been much slower. The electronic record system was used in four out of five university hospitals in the administrative sector of conservative treatment and in all four administrative sectors of the Oulu University Hospital (Table 5). In hospital districts, the usage rate of electronic patient record systems was also notably lower, which

Table 4.  
The central key systems at health centres

Central key systems (n=157)	In use for (years)	In productive use	In experimental phase	Planned	Not in use
Electronic patient record	6.0	93.6%	-	4.5%	1.9%
Electronic referral and feedback	2.2	24.2%	8.3%	19.1%	47.8%
Teleradiological transmission for X-rays	1.9	8.3%	5.1%	17.2%	68.8%
Digital imaging system (pacs)	1.6	17.2%	1.3%	18.5%	62.4%
Regional reference database for radiological examinations	2.1	5.1%	1.9%	17.2%	73.2%
Regional database for laboratory results	5.0	21.0%	0.6%	15.9%	59.9%

Table 5.  
The central key systems of hospital districts

Central key systems (n=21)	In use for (years)	In productive use	In experimental phase	Planned	Not in use
Electronic patient record	2.0	57%	14%	29%	-
Electronic referral and feedback	2.6	48%	14%	14%	24%
Teleradiological transmission for X-rays	3.4	67%	19%	10%	5%
Digital imaging system (pacs)	2.3	57%	5%	29%	10%
Regional reference database for radiological examinations	1.0	14%	-	48%	38%
Regional database for laboratory results	3.0	29%	-	33%	38%

3) The indicators measuring the use of ICTs in health care are based on an inquiry carried out by FinnTelemedicum, the Centre of Excellence for Telehealth at the University of Oulu, between 2003 and 2004 (Kari Kiviha, Ilkka Winblad & Jarmo Reponen: *Terveydenhuollon toimintaprosesseja ja asiointia tukevat atk-sovellukset Suomessa: Kartoitusta ja käyttöanalyysiä ICT-solusioilla tuettujen terveydenhuollon palveluiden ja toimintaprosessien käytössä Suomessa*). Publications by the Network of Excellence Centres 8/2004, [www.oskenet.fi](http://www.oskenet.fi)). The responses received covered all 21 hospital districts. From the field of primary health care, 157 health centres, with a combined population coverage of 78 percent, responded to the survey. From the private sector, 44 companies took part, among them most of the largest service providers.

means that most of the patient record information continues to be produced on paper. An electronic referral and feedback system is gradually being introduced. The system exists in one fourth of the health centres and half of the hospitals (Tables 4 and 5), but so far the usage rate remains low.

From the viewpoint of international comparisons, the integration of ICTs into the health care system seems to be on a high level in Finland. According to the Eurobarometer study carried out in 2002, the usage rate of electronic patient records among Finnish general practitioners is the third highest in Europe. Only Denmark and Holland rate above Finland.

The use of electronic information systems in health care is not direct evidence of their capacity to generate actual value. The systems are usually not interoperable, the information security may be unsatisfactory, and the systems do not always provide the relevant operational guidance or the necessary support for clinical decision-making. Attempts are being made to improve the quality of patient record systems by the end of 2007 through the construction of a nationally-integrated electronic system. To promote better access to patient information in the information systems of different registrars in treatment situations, a project administered by the Ministry of Social Affairs and Health has produced national specifications on the requirements for the content and structure of information systems concerning open interfaces, data protection, information security and the construction of information system architecture. The project also concentrates on electronic certification and the distribution of classifications and codes necessary for information systems.

For the most part, the applications of social welfare and health care make use of the public network. The problem is that the current bandwidth is not sufficient for the needs of social welfare and health care in all areas. In health care, for instance, the transmission of digital radiological images renders the need for larger bandwidth greater than in public administration in general.

Unlike the systems of health care, the information systems of social services mainly utilise municipal information networks maintained by the information management departments of municipalities. District-level co-operation for the development of shared ICT infrastructure and networks between neighbouring municipalities has already occurred in some areas. In many cases, however, investments in information technology infrastructure continue to be made on a too narrow population base. In the future, common efforts should be aimed at transgressing the substance boundaries of social welfare and health care as well as the administrative boundaries of municipalities: co-operation should be active on district, regional and even broader levels. The regional information system services should generally be arranged on as broad a base as possible – in the case of infrastructure services, it may, on occasion, even be worth considering national arrangements.

The Act on Experiments with Seamless Service Chains provides the legislative foundation for the building of regional co-operation in matters of information management, with the aim that information concerning the client of social welfare or health care can be passed electronically from one organisation to another. As a result of the design of regional reference databases that originated in the social welfare and health care networking project Makropilotti, the Helsinki and Uusimaa Hospital District and the UUMA project of Uusimaa Region have been making use of a regional database since 2003. In the Tampere and Satakunta Regions, a reference database was launched in summer 2004. The reference database provides the caregiver with information on which basic system contains data on the patient and, with the patient's consent, this information can be retrieved from systems of other organisations. The temporary act has been extended until the end of 2005, and presently the experiment involves all hospital districts and most municipalities. The greatest challenge for the experiment on seamless service chains lies in the organisation of regional co-operation.

An integrated national solution is the aim of the experiment with the electronic prescription system, where the transfer of information is based on a database maintained by the Social Insurance Institution of Finland (Kela). A decree on the topic was issued by the Ministry of Social Affairs and Health in autumn 2003, and the system is currently in test use in four areas: Kymenlaakso, North Karelia, the Hospital District of Helsinki and Uusimaa and the City of Turku. The objective is a nation-wide model that can be imported to other regions based on the experiences gained from the pilot

projects. In the Finnish model, the system allows the client to choose the pharmacy where they wish to purchase the medicine.

There is a clear need for open and high-quality health information online. Important questions here concern making the information easily locatable and ensuring the maintenance and quality of the information. The National Public Health Institute is currently starting a project to build a health information portal for citizens. The eEurope initiative of the European Union also stresses the developing of online services targeted directly to citizens; the objective is to make online health education and expert advice available to citizens by the end of 2005. According to an investigation by FinnTelemedicum, nearly all central hospitals and most health centres maintain a website offering information on their activities and services, but the provision of other online services remained rare (Tables 6 and 7).

Table 6.  
Services available to clients in health centres

Services available for patients (N=157)	In use for (years)	In productive use	In experimental phase	Planned	Not in use
Protected Internet connection for patients	0.5	0.6%	-	10.2%	89.2%
Ordering services through SMS	1.0	-	2.5%	3.8%	92.4%
Call centre	3.4	3.2%	0.6%	15.9%	79.6%
Website with information on operations and services	3.2	74.5%	3.2%	7.6%	14.6%
Self-maintained home care instructions online	1.8	8.9%	5.1%	8.3%	75.2%
Online question-answer service by MD	1.8	1.9%	1.3%	1.3%	95.5%
Notification of test and examination results through email	1.3	1.3%	5.1%	10.2%	83.4%
Notification of test and examination results through SMS	1.2	3.2%	2.5%	10.8%	83.4%

Table 7.  
Services available to clients in the main hospitals of hospital districts

Services available for patients (N=21)	In use for (years)	In productive use	In experimental phase	Planned	Not in use
Protected Internet connection for patients	1.5	-	5%	19%	71%
Ordering services through SMS	0.0	-	-	5%	95%
Call centre	0.0	5%	10%	52%	33%
Website with information on operations and services	3.9	86%	10%	-	5%
Self-maintained home care instructions online	3.5	29%	-	29%	43%
Online question-answer service by MD	4.0	5%	-	5%	91%
Notification of test and examination results through email	3.0	5%	5%	-	91%
Notification of test and examination results through SMS	2.0	10%	-	10%	76%

The websites of nearly all municipalities provide information on social services. At a minimum, the website contains contact information for the department of social services, but generally information on opening hours and content of the services is also provided. However, public services are still scarcely available online and most often culminate in the provision of printable forms.

The online services of social sector organisations offer significant amounts of information servicing citizens. A total of 21 organisations have compiled their services in one portal ([www.apua.info](http://www.apua.info)).

Online services and consultation opportunities targeted at professionals have been developed particularly in the field of health care. Health care professionals are already actively using the [www.terveysportti.fi](http://www.terveysportti.fi) portal maintained by the Finnish Medical Society Duodecim. The eConsultation project of the National Research and Development Centre for Welfare and Health (STAKES) has been developing a corresponding national portal for social service professionals. This portal ([www.sosiaaliporrtti.fi](http://www.sosiaaliporrtti.fi)) will be launched in early 2005. Regional portals are also in use. In addition to information, they provide opportunities for consultation. Video conferencing has been utilised in the organisation of on-the-job training and work counselling in health care, whereas online education has been developed in individual development projects.

#### ■ **Future: From development projects to new ways of functioning**

The evolution and uptake of information and communication technologies can be used to promote the well-being of the population and foster equal access to services within a time span of a few years. The utilisation of ICTs in the distribution, management and processing of information is particularly central. Citizens must have access to information on the health impacts of their choices. Until now, the opportunities of information technology in the promotion of health have not been exploited efficiently. For instance, in the future, the development of genetic engineering and statistical analysis of treatment information will open up new opportunities for the creation and utilisation of personal health profiles and the prevention of health problems in the population.

Citizens need information on the provision of services and their availability, on waiting times as well as the quality and prices of services. Better information management will increase the opportunities for choice when seeking the services. The opportunities provided by ICTs can be used to render the contact between citizens and professionals more flexible. Moreover, in the future, the opportunities provided by information technology can be exploited for instance in the assessment of health care needs, which must be carried out within a certain period of time and is required by legislation. The role of the citizen will be strengthened by secure online access to personal client records.

Citizens' opportunities for information retrieval can be improved by launching a nationally maintained portal for health information within a period of a few years. The portal will include essential up-to-date information on the promotion of health, the prevention of illness, self-treatment and the services available. The service will be subsequently expanded through the inclusion of interactive services produced by various actors in society (public or private sector or non-governmental organisations). The health information portal or a distinct social welfare portal must offer citizens nationally-produced, dependable information on social welfare services and opportunities to enhance the life management of families and individuals.

Improved information management will support the direction of service activity on all levels, from the client-professional relationship to the level of operating units, regional treatment programmes and service processes as well as the national directing of resources. The greatest obstacles no longer derive from technology but from the re-assessment and adjustment of old modes of operation. The uptake of new technologies and the new modes of operation that they enable pose a great challenge to leadership and require specific investments in the training of employees.

Efficient information management in social welfare and health care presumes the uptake of the national electronic patient record system and a client record system for social services. With the ongoing development work in health care, the plan is to launch the system by the end of 2007 so that patient information will be entered electronically in all health care units and the making of entries will be based on a structure of national specifications. With the consent of the patient, patient information will be accessible in real-time

beyond organisational and registrar boundaries. The information systems will make use of national standards and open interfaces. The patient's consent for the release of information will be administered electronically. Health care professionals will employ a system of electronic personal certificates based on national register. A more long-term goal is the electronic archiving of patient records. The development of social services client records will be started in 2005 as part of a broader national social services project.

The adoption of interoperable electronic patient records will promote the development of new modes of operation. Exchange of information between health care units and other actors – statistics authorities, regulatory authorities, pharmacies, the Social Insurance Institution (Kela) and insurance institutions – will occur based on nationally agreed-upon models. Regional solutions are already being tested, but their introduction into broader usage will occur in five years time. Increasingly sophisticated information systems also enable further evolution of health care logistics. A shared technological platform creates room for new innovations, which enables the production of information based on evidence to support decision-making in various service situations.

The various online public services will be introduced on an increasingly broad front. Health care call centres and advice hotlines, as well as mobile solutions supporting online services, will become increasingly common. Online public services will not be sector specific, and the same technological platforms can serve different sectors. The uptake of electronic services requires national level instruction and common solutions with regard to certification. Moreover, new international solutions will be introduced within a time frame of ten years. For instance, an electronic, chip-based version of the European Health Insurance Card enabling the use of online services is currently being developed.

A pivotal challenge for the near future is the arrangement of information management co-operation in social welfare and health care on a more permanent basis than the current project organisations. In health care, a model where businesses owned by municipalities and joint municipal authorities are adopting the tasks of regional information management and the ordering of information technology is currently gaining in popularity. Also in the realm of social services, the increase of district and regional level special services presumes the development of structures of information management that support broader co-operation of local authorities. For instance, current needs include the development of information management solutions for social services emergency duty, foster care units and district-level family shelters. Extending the reach of the services beyond the traditional municipal organisation poses new challenges for the monitoring of quality and costs. At the same time, increasingly sophisticated tools will be necessary for the management of service chains and processes.

In addition to this development work, it is necessary to provide citizens with opportunities to acquire the necessary information society skills and gain access to related services. The spread of broadband connections to sparsely populated areas will significantly enhance equal opportunities in the use of the services of social welfare and health care. Education and the availability of fast Internet connections and public PCs may be highly useful in preventing social exclusion. Particular attention must be paid to affording equal opportunities to people with special needs in the use of the services of the information society.

The development of information society skills among the working population affects their well-being at work and the way in which they perceive their chances to manage the changing demands of working life. This is a prominent issue particularly among ageing workers. With regard to the attractiveness of the social and health care sectors, it is important that employers enable the continuing education of their employees, also concerning information technology skills, and at the same time offer up-to-date equipment for the use of all their employees. The introduction of new models of operating will require commitment from management and sufficient allocation of resources throughout the sector.

### ■ Proposed actions

The actions proposed by the Social Welfare and Health Care Section emphasise concrete actions to be taken in the next few years.

#### a) Acts and decrees

- ◆ Permanent legislation on seamless service chains in health care and social services will be made effective on January 1, 2006. A committee nominated by the Ministry of Social Affairs and Health is currently drafting the legislation. The permanent legislation will include a provision granting the client the right to check the disclosure log of their personal information. The consent information can be maintained in a reference database either nationally or regionally. The Ministry of Social Affairs and Health is responsible for the development work, which is to be completed in spring 2005.
- ◆ The Decree on Patient Documents will be revised to better meet the demands of digital entry of information and the electronic processing of patient information. The decree will contain provisions on the right of the client to receive information concerning him/herself and to check their information in the electronic patient register. The decree will provide instructions on the use of electronic signatures while also catering to the demands of electronic storing of information. Instructions will also be prepared for the provision of nationally specified structural key data enhancing the usefulness of information systems. The Ministry of Social Affairs and Health is responsible for drafting the revision, and the work will be initiated in autumn 2005.
- ◆ A decree will be issued on the entries made in the client records of social services and the storing of the documents. The preparation of the legislation is connected with the standardisation of terminology and the form of the documents that will begin in 2005. The work is to be carried out in co-operation with the planning and implementation of health care. The Ministry of Social Affairs and Health is responsible for the work.
- ◆ The right to receive waiting list information guaranteed in the legislation concerning access to care must be implemented as a real-time service utilising electronic information. The implementation of the service is to be carried out by health care organisations. The legislation becomes effective March 1, 2005.

#### b) Guides and recommendations

- ◆ The Advisory Committee on Information Management in Public Administration (JUHTA) must produce a Public Administration Recommendation concerning the identification of citizens in public administration online services.
- ◆ The Ministry of Social Affairs and Health will offer instructions on how to meet the demands of information security and data protection in social welfare and health care. The aim is to publish a manual on the topic at the end of 2005.
- ◆ A manual will be issued on the use of email in customer service in social welfare (and health care).
- ◆ A recommendation on the interoperable national architecture of health care information systems is being prepared by the National Health Project. Social welfare should, where appropriate, make use of the ICT infrastructure constructed for the purposes of health care. The recommendation will be prepared in co-operation with the Ministry of Social Affairs and Health, the National Research and Development Centre for Welfare and Health (STAKES) and hospital districts. The work will be completed in 2005.
- ◆ A standard procedure must be established for dealing with standards and national specifications crucial for the interoperability of information systems. The Ministry of Social Affairs and Health and the Ministry of Trade and Industry have commissioned a report on the topic that will be finished in February 2005. The need for international and cross-sectoral co-operation must be accounted for in the organisation.

### c) Project funding

◆ Co-operation between financing bodies must be increased and their respective focal areas must be clarified. Compliance with national recommendations and standards is highlighted in the public funding of the projects (e.g. Public Administration Recommendations).

### d) National level services, education, research and development

◆ A citizen health information portal will be constructed. The Section suggests that the project be implemented by the National Public Health Institute.

◆ A national register of health care units and service classification should be introduced and used as a basis for a network solution servicing citizens. The Section suggests the National Research and Development Centre for Welfare and Health (STAKES) as the implementor for the project.

◆ National services (e.g. code service, electronic practitioner certificate, transfer of statistical data) presumed by the uptake of electronic patient record will be realised through permanent budget funding. The necessary preparations will be carried out by the Ministry of Social Affairs and Health.

◆ A social services information technology project will be launched as part of the social welfare national development project on the basis of a plan introduced at the end of 2004.

◆ The permanent maintenance and content development of portals servicing professionals in social welfare and health care is ensured.

◆ The strengthening of information society skills will be aimed for in basic and continuing education. The use of online education and video conferencing must be developed in continuing education in the field.

◆ Co-operation between working life, research and product development is strengthened with the particular aim of improving the usability of the systems and finding opportune models of operating.

### e) International co-operation

◆ Finland's visibility and influence in international activities related to eHealth will be strengthened. The Ministry of Social Affairs and Health is nominating a group to co-ordinate the work of different branches of administration. Nordic co-operation is of particular importance, not only because of the common features of the service systems but also because the Nordic countries form a central market area for Finnish companies.

◆ The government's Information Society Programme will be promoted internationally during Finland's EU Presidency in autumn 2006. The necessary preparations should be carried out by the Prime Minister's Office.



*The first pupils of a in a small village school in 1924.  
Private photo album*

# Education, Research and Product Development

## EDUCATION, RESEARCH AND PRODUCT DEVELOPMENT SECTION

The accelerating scientific and technological development is often mentioned as one opportunity to create a brighter future for everyone. This is generally associated with a more efficient exploitation of information networks and the strengthening of the cross-disciplinary approach. Education and skills are perceived as central for the future of Finland. The progress of globalisation leads to pressures for change in decision-making in education, research and product development. According to established doctrine, education, research and product development create the foundation for all cultural, social and economic activities of society. Education and research are important factors in the creation of a society's mental climate. Different strategies, such as innovation and information society strategies, are key in attempts to capitalise upon this infrastructure as efficiently as possible.



*Katja Anttila, MSc, studies cells through a confocal microscope.  
Photo: Joose Kankare. Department of Biology, University of Oulu.*

When discussing education, research and product development, it is essential to understand the interconnectedness of the three areas, none of which can be assessed separately from the others. The components of the system operate in close contact with each other, forming a whole that is functional only when all of its parts are in balance. Moreover, investing in one area also raises the potential of other areas. We see before us a whole that incorporates simultaneous and parallel research, development, application, modernisation of processes and their transformation into marketable products. All of these aspects are reflected in broad usage of information and communication technologies in society. The fields of education, research and product development come together to form a dynamic loop in which information and communication technologies have the important role of producing competence and the ability to adapt to rapid changes in society.

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The national competitiveness of Finland can be fostered only through the production and maintenance of unique expertise and high-quality research. In order to create the potential for international success, it is imperative to recognise the roles and positions of all participants as dynamic actors in the loop, with roles based on their specific strengths. Moreover, unnecessary or unhealthy competition that would be detrimental to the end result must be avoided. An important short-term goal must be to strengthen and develop co-operation between actors. In particular, collaboration between economic life and the public sector must be enforced. Creating new forms of co-operation and removing the impediments to co-operation is essential. Information and communication technologies play a central role in the development and promotion of a new operating culture.

One essential aspect of this is the modernisation of the various processes taking place in businesses and communities. An important first step lies in ensuring the interoperability of different processes and systems. In some cases this requires public investment (health care systems), whereas other issues will be rectified through the independent market-driven measures of

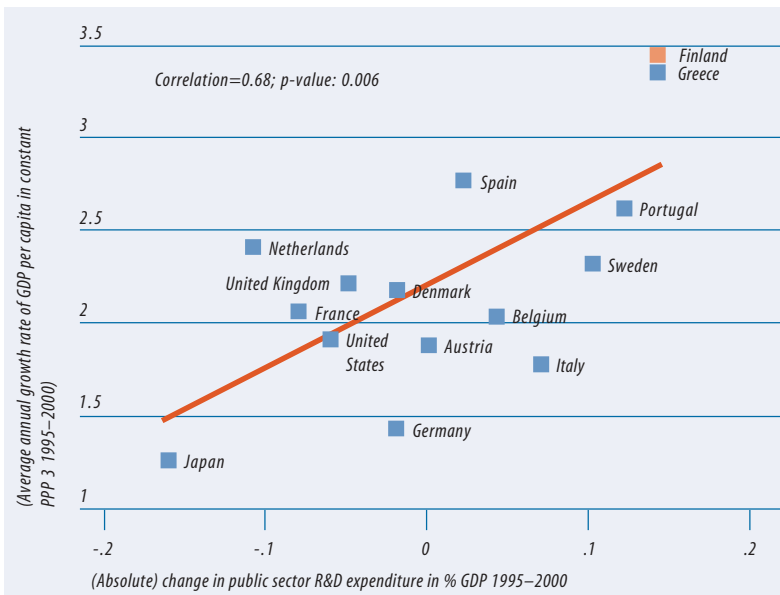
businesses. It is worth noting that the work of developing these processes can be commercialized, which is often product development at its best.

### ■ The current stage of research and education in Finland

Finland has ranked well in different international comparisons and assessments as a developer and user of information and communication technologies. Knowledge exchange and co-operation between businesses and universities, the amount of funding for research and development activities and the large number of people employed in the research and development sector are some of the important strengths mentioned in the assessments, and the significance of investments is visible in the growth rate of the economy (Figure 14). Although the Finnish system has been found efficient in international assessments, there is still room for improvement, for instance in modes of operation and competence. The development work can rely on good quality education and training and firm competence in research.

Figure 14.

Relationship between GDP per capita and public funding for research and development



Note: Ireland has been excluded from the above analysis because of the extraordinarily high growth rate during this period.

Source: EU Commission: European Competitiveness Report 2004, 82

Finland has made significant advances in the application of information and communication technology, for instance in the fields of banking and learning. In the future, the significance and use of information and communication technologies will continue to broaden as new fields of application emerge. Potential, still unreached gains and needs related to education, research and product development remain vast. The management of change becomes a central challenge when the aim is to maximise the benefits gained from ICT usage. Information and communication technologies can generate entrepreneurship in the realm of new business activities – that is if and when we manage to resolve how to effectively translate competence into profitable business and services. The management of change also involves the creation of a new administrative culture. A more open administrative culture enables better interaction between the public sector and other actors.

Information and communication technologies function as a tool and enabler that, combined with more traditional competencies, may help to reform modes of operation to improve productivity. The effective exploitation of information and communication technologies may also be a factor in global competitiveness, as it strengthens national competence and enforces comparative advantages. Although no system based on national strengths can be easily transported to other countries, certain solutions can be marketed as products, which may serve to facilitate entry to international markets.

In the past, education and research have been important pillars of competitiveness of Finland. The strengths of the current system must be

adopted as the starting points for future development. Constant change and development is also necessary, but the evolution of new ways of operating takes time.

The fragmented structure of the Finnish research system has been named as one of its weaknesses. One can ask whether the processes and structures of research and education respond to the needs of the network society, and its citizens and businesses. If we unwisely dissipate our strength, we may end up as losers in international competition from the viewpoint of both research and education. Flexibility and co-operation must be increased on all levels of activity.

It is also important to raise discussion on the essence of the information society and the rules applied in it. The new operating culture and information security are likely to emerge as central factors in the development of the information society. The operating culture is largely built on the prevalent attitudes and the culture of network use. We must not jeopardise the innovation system for instance through fears related to the exploitation of information networks. Information security must be seen as an important positive challenge and opportunity. The promotion of information security may function as the enabler of significant business activity. The tools offered by information security and an increasingly risk-conscious Internet usage culture provide effective means for containing the problems posed by viruses and spam email.

### ■ Towards an increasingly competent Finland

Our future vision of Finland reveals a creative, competent, learning and multicultural society. Finland is a forerunner in developing, applying and exploiting information and communication technologies. Finland has the capacity for growth and success. Finns are capable of learning and reacting to change. Finland has the capacity to constantly create new and meaningful information. Knowledge and competence spread efficiently and unimpeded to economy and society, and there is genuine interaction between the various parts of society. Co-operation in the developing and exploiting of knowledge and learning functions fluently. Cross-sector networking is active on both national and international levels. Citizens are active participants and everyone has access to digital data archives. The production of national content for the needs of the Finnish information society is active.

From the viewpoint of education, research and product development, a central success factor is that the whole, encompassing the three aspects, functions as well as possible. In this way, we can direct our common efforts and competence to the generally aspired direction of the promotion of the information society. All decisions and actions must be based on a common vision. This presumes joint action of different fields. The innovation system cannot be developed separately from the planning and development of, for instance, the fiscal system or policies of immigration.

The information and communication technologies are an important enabler in education, research and product development. In the future, the importance of the new technologies will be even greater. The technologies will blend into the everyday practices of different sectors, but we will also be more familiar with the limits of online services than we are today. In addition to enhancing basic skills, a multi-disciplinary approach and research to advance the development of applications are necessary. One of the success factors for the future will be how to efficiently reap the benefits of the use of ICTs in different fields. Technology must be seen as one of the enablers of success rather than as the sufficient condition for it. Efficient exploitation of the new knowledge and the technologies produced by both national and international research must be enabled through investments in education and learning.

The trends of new technology must be created and followed. The issues of ambient intelligence, e-learning, lifelong learning and the integration of work and learning will possess significant weight in the future. Converting new technologies and new ways of operating into commercial applications and tools of creative work, learning and everyday life will pose an important challenge.

### ■ Proposed actions

◆ Equal investments should be directed to basic education, research, development, application, the transforming of ideas into products, business and the promotion of usage. The innovation system should be developed through interaction and parallel development of these areas. Starting with basic education, the entity should incorporate everything that is needed in order to create, strengthen and exploit competence. In addition, the structures of society, such as the fiscal system and the infrastructure, must be developed to ensure the functioning of the dynamic loop that consists of these different elements. Co-operation between the public and the private sector as well as international actors is crucial throughout. Co-operation should be increased on all levels of activity. In addition to the basic skills of information and communication technology, it is necessary to create new solutions through cross-sector co-operation. Wide-ranging efforts must be made to promote the capacity to use and exploit information and communication technologies by improving know-how related to ICT applications and considering the varying needs and usage situations of different people.

◆ Investments must continue to be made in Finland's areas of strength in the fields of education, research and product development. Investment in research and development should be raised to four percent of the gross national product. New university-business co-operation models must be introduced in order to prevent the fragmentation of funding and project implementation. Investments must be directed to large enough entities that involve co-operation and networking between actors, and to significant concentrations of competence that are also lucrative from the viewpoint of international co-operation.

◆ Co-operation between all levels of education, research and product development must be improved. Actors must maintain their clearly-defined roles in the development, and clear rules must be established for co-operation at the interfaces of segments of society. The role of universities as centres of unique expertise must be strengthened. The role of polytechnics should be to apply research results for the use of businesses and regions. Competition for the allocation of universities' basic funding must be accelerated. The economic autonomy and professional management of universities must be strengthened.

◆ Financial incentives for the refinement and commercial exploitation of education and research services must be increased.

◆ Co-operation between the public and the private sector must be developed further. This can only be carried out with the help of the public sector, public funding and strong co-operation with businesses. Public administration investments in information and communication technologies must be increased and online public services must be developed further.

◆ Projects carried out in the public sector should seek to form larger entities. The public sector may both deliver and commission services and also function as a progressive end user of services. When developing national solutions, it is important to exploit the opportunities for international business and international co-operation that are embedded in the products and services. The opportunities embedded in the open development model must be exploited, for instance in the areas of teaching and health care. The central aims here are interoperability, savings, productivity, decreasing the demand for labour and the promotion of new innovations, business and entrepreneurship.

◆ Efficient exploitation of information and communication technologies must be promoted at all levels of education. This will ensure the development of dynamic competence in circumstances of changing demands for competence. Basic competence in the use of technology is a civic right, the realisation of which must be ensured in all areas and every school throughout the country. Attempts must be made to ensure a supply of top professionals in information and communication technologies by expanding the search for spearhead units to all Finnish educational institutions. The development of methods for

utilising information and communication technologies in teaching must be continued. Research and technology programmes must create and support the transfer of learning into practice through education, training and learning. This will also yield internationally successful applications.

- ◆ The exploitation of network models in education should be strengthened on the basis of the already existing Finnish Virtual University, the Finnish Virtual Polytechnic and various virtual school projects. Resources must be used to strengthen co-operation between levels of education. Good practices and study modules and structures that have originated at different levels of education must be expanded to cover all parties to the educational system as effectively as possible. This requires educational arrangements across sectoral boundaries.
- ◆ International co-operation must be induced already in basic education, providing the students entering university with a model for forming and maintaining these relationships. Students from other countries should be encouraged to acquire a Finnish education and sufficient incentives should be produced for them to remain in Finland after the completion of their studies. The possibility of tuition fees for foreign students should be considered.
- ◆ Public debate must be used to create a climate esteeming high levels of competence and supporting the information society. The view of information and communication technologies as the enabler rather than the cause of change must be put forward. Problems and challenges must also be made apparent. The focus should largely be on social innovations that enable broad societal and structural changes and impacts through the exploitation of information and communication technologies. These changes also require changes in operating cultures. Efficient and increasing use of information and communication technologies presumes, and brings with it, a change in operating cultures. This will generate ICT sub-cultures that, at best, support one another in their evolution.
- ◆ Co-operation between different actors in matters of education, research and product development must be strengthened. National and international co-operation must be promoted. Important areas of anticipating future developments include the anticipation of needs related to competence, research, technology, business opportunities and changes in the operating environment.

**Recent reports published in the field of information society related research and education:**

*Osaava, avautuva ja uudistuva Suomi (Finland: Competent, open and reinventing) – Final report for the Finland in the World Economy project, available at <http://www.vnk.fi/tiedostot/pdf/fi/89904.pdf>*

*Yliopistojen ja ammattikorkeakoulujen tutkimuksen rakenneselvitys (A structural investigation of research in universities and polytechnics) by Jorma Rantanen, Publications of the Ministry of Justice 2004:36, available at <http://www.minedu.fi/julkaisut/koulutus/2004/tr36/tr36.pdf>*

*Välittäjäorganisaatiot Suomessa – rakenteelliset haasteet (Mediating organisations in Finland – Structural challenges) by Markus Koskenlinna, available at [http://ktm.elinar.fi/ktm\\_jur/](http://ktm.elinar.fi/ktm_jur/)*

*Valtion sektoritutkimusjärjestelmän rakenteellinen ja toiminnallinen kehittäminen (Structural and operational development of the sectoral research system in Finland) by Jussi Huttunen, available at [http://www.minedu.fi/tiede\\_ja\\_teknologianeuvosto/kannanotot/Jussi\\_Huttunen\\_2004.pdf](http://www.minedu.fi/tiede_ja_teknologianeuvosto/kannanotot/Jussi_Huttunen_2004.pdf)*



Radio listening in 1947.  
Photo: Ruth Traskman  
Finnish Broadcasting Company photo archive

# Citizen Skills in a Dynamic Civil Society

## CITIZENS' SKILLS IN THE INFORMATION SOCIETY SECTION

The information society can be understood simply as the use of new information and communication technologies in different everyday situations, whether in public administration, business or leisure activities. From the viewpoint of citizens' skills, however, the matter is not quite as straightforward, as information and communication technologies bring the information society into the pocket, on the work desk and in the thoughts of almost everyone. Observed from the viewpoint of citizen skills, in addition to the use of the basic technological tools, the need to develop individual work methods and activity springing from personal motives is highlighted.



*A quick thank you to Santa. Photo: Hannu Virtanen.*

The information society can be understood as a preordained model of society, but it can also be viewed as a dynamic civil society originating in the individual and involving the active exploitation of technologies as well as the skills required by this type of society. The Citizens' Skills in the Information Society Section aims to strengthen the notion of citizens as being active in their everyday lives. The Section envisions that by 2010 the Finnish information society will have evolved into a culturally, socially and economically developing civil society.

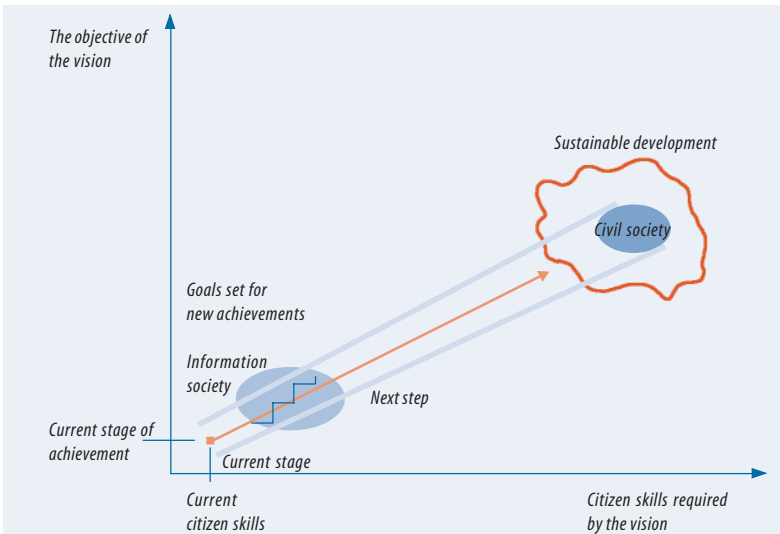
We start by describing the skills necessary for citizens in a dynamic civil society. From the viewpoint of citizen skills, it is important to gain a sufficient understanding of the significance of technology and its impacts on different areas of life and on the various situations of daily life. This enables us to develop our own skills in the right direction.

Citizen skills must be understood here in a broad sense. For instance, terms such as digital literacy, media literacy and ICT skills narrow the viewpoint to public media and the mastering of the technologies. This obliterates the significance of the varied situations of daily life where the citizen appears as an individual or a member of a community functioning as an actor in the information society – whether as an entrepreneur, family member, student or perhaps as an amateur photographer. It is important to realise that different competencies are relevant to different people with varying motivations to their actions. Consequently, people's skills and their relationship to the information society are constructed from a vast spectrum of factors.

### ■ The use of ICTs

Citizens' exploitation of information and communication technologies can be divided into seven relatively general areas. The division can be used to clarify discussion on a topic that so far has merited only superficial treatment and that different actors may, perhaps without realising it themselves, approach from very different perspectives. The information and communication technologies themselves appear largely similar in all of these seven areas. Also, with the continuing convergence of technology, their basic infrastructures are integrating. However, the people's individual needs and uses for the technologies are segregating to produce new and increasingly specialised products and services. As a result, the citizen of the information society may feel lost in the jungle of new technologies and specifications, as the words and expressions used often only cause further confusion.

Figure 15.  
Towards a dynamic civil society



Source: Manninen, Viherä & Viukari 2004

From the viewpoint of the citizen, important fields of ICT application include online services in e-commerce and e-learning, for example. Other essential solutions include the online services of public administration, banking services, online newspapers and mass communication in general. Media cultural content – such as films and entertainment – is commonly used and available in electronic form. The main instigators of new activity have been businesses and organisations interested in transforming prior forms of service into self-service and boosting their sales by expanding into new distribution channels. They can also introduce new or modernised content to be sold online. Comparable reforms originate largely from the companies' or organisations' own needs. Advances of technology or the notion of automation seem to provide the impetus for change in many organisations and actors in the information society. In cases like this, the activities often arise from the assumption that the mere adoption of new technological solutions is enough to improve quality and efficiency.

The pressures of efficiency often seem to erase the ordinary citizen and his/her needs to send different messages, to be involved in the activities of the immediate environment and to maintain contact with other people. The division into seven areas of usage (see Figure 16) combined with a future-oriented approach can help us to focus on the fundamental question: what actions are needed to improve the capacities derived from the citizens' own needs with a view to the future civil society?

#### The citizen skills required by the use of information and communication technologies

Citizen skills consist of three factors: the motivation of the individual, the competence of the individual and access to relevant technologies.

The motivation of individuals originates largely in their need to function in society and their immediate environment. People's perception of the

information society and their own membership in it is intellectual. This concerns the person's capacities for structuring information, such as analysing and conceptualising. However, a person's association with his or her community takes place also on the emotional level, thus necessitating other kinds of skills, such as participation and belonging and working together in a group. On the level of society, competencies associated with the strength of will and capacity for action play a primary role.

In the realm of competence, skills related to the use of technology, communication, retrieval and exploitation of information, consumer behaviour and acting in the information society are emphasised. Knowledge of the central concepts of the information society and the structures enabling acting in society also form a central aspect of competence. For instance, it is important to have a conception of online ethics and other rules of functioning on the Internet and to acquire at least some knowledge of media and source criticism. In addition, full participation in the information society presumes technical access to the information network (Internet connection) and the networks of people beyond it (see Table 8).

The development of citizens' information society skills (citizen skills) can be construed in different ways, for instance according to levels. The different levels of citizen skills can in this context be conceived of as levels of basic, unaffected and proactive use.

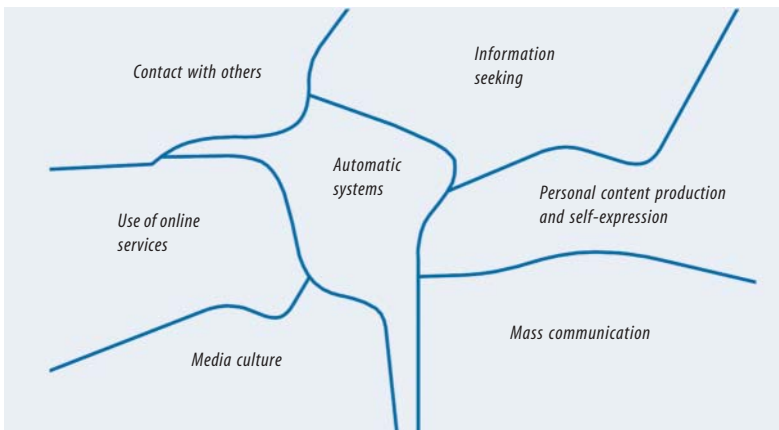
*The basic level* consists of access to the Internet, competence to use different services and acknowledging the opportunities provided by information and communication technologies. The basic level can be measured with the following statement formulated by Statistics Finland: "I feel left behind by the information society." The objective should be that no one feels they are getting the short end of the stick in the development of the information society.

*At the level of unaffected use*, the use of information and communication technologies has become an integral part of daily life. Unaffected use can be measured with the statement: "The use of information and communication technologies does not create problems in my everyday life." All students should have the opportunity to acquire the knowledge and skills presumed by the level of unaffected use during their studies. Also, people in working life should have the opportunity to use information and communication technologies flexibly in a way that accounts for their current needs.

*At the level of proactive use*, people act to alter existing practices of operating and, in the long term, entire operating cultures. The proactive use of information and communication technologies can be assessed with the statement: "Information and communication technologies enhance my participation as a citizen." This means that information and communication technologies are exploited broadly for purposes such as furthering tenant democracy or to reform the person's own practices in daily life.

One central risk associated with the current societal development is the emergence of new types of digital divide between different groups of people. This occurs if only one section of citizens can enjoy the benefits introduced by the information society while a significant portion of citizens are left entirely outside of the sphere of networks.

Figure 16.  
The different areas of ICT use from the user's viewpoint



Source: Manninen, Viherä & Viukari 2004

Table 8.  
Skills needed in a civil society today and in the future

User's need	Motivation	Competence	Connection
1. Maintaining contact	Structuring, belonging, doing, civic participation, maintaining contact to others, studies, free-time activities	Social, communicative and technological skills	Telephone, mobile phone, camera phone, SMS, group SMS, email, MMS, instant messaging, phone circle, voice mail, etc.
2. Information seeking	Learning, information seeking, working, curiosity, remaining up to date, problem-solving, etc.	Finding information, assessing the truth value of information, verifying information, assessing the context of the information, etc.	Telephone, Internet connection, search engines
3. Online services (purchases, administrative services, banking services, studying, democracy, expressions of opinion)	Efficiency, easy accessibility at all times and locations, ease of use, etc.	Technical skills, information security skills, skills in banking and other management of affairs, finding appropriate services, ordering products and services, etc.	PC, connection to the Internet, mobile phone, SMS, GPRS phone, bank account, information security services, etc.
4. Automatic information and process systems	Efficient and economical, professional competence	Technical skills, organisational skills, archiving skills, etc.	PC, Internet connection, necessary databases, computing software, information security software
5. Mass communication (journalism, communication, advertising, marketing)	Desire to act as a member of the civil society, publicity, education, entertainment, remaining up to date	Skills of functioning as a citizen, publication skills, media skills, ability to install and use a digital receiver, ability to tune and use different channels	(Digital) television, radio, video, newspapers, magazines, publication software, etc.
6. Media culture (games, music, films, learning material, art, etc.)	Entertainment, learning, leisure activities	Technical skills required by gaming, understanding the logic of games, multimedia literacy, skills related to studying, etc.	Efficient PCs for work, games software, learning platforms, fast Internet connection, etc.
7. Own content production and self-expression	Self-expression, distributing personal knowledge, desire to state thoughts and opinions, political participation	Both content and technological know-how: writing, filming, editing, publishing, etc.	PC, camera phone, Internet connection, digital camera and video camera, word, image, video, and sound processing software, publication software

#### a) Contact

It is central to human existence to be able to structure our thinking in association with others, to connect to others on an emotional level and to find interesting ways to spend time. As the practices of working life are evolving through the development of information and communication technologies,

4) The statistical data presented in this chapter is based on the reports *Suomalaisten viestintätavalmiudet 2000-luvun vuorovaikutusyhteiskunnassa* (Finns' communication skills in contemporary interaction society) (Statistics Finland, Reports 2004/4) and *Tietoyhteiskunnan kehkeytyminen: Suomalaisten tietoyhteiskuntavalmiuksien ja -asenteiden muutokset 1996–2002* (The emergence of the information society: Changes in Finns' skills and attitudes in relation to the information society between 1996 and 2001) (Juha Nurmela and Marko Ylitalo, Statistics Finland, Reports 2003/3).

daily encounters and contacts with other people are also transforming. Because of this, it is increasingly important to keep track of how the basic needs for human contact are being fulfilled. In 2004, the mobile phone (91% of 15- to 74-year-olds), email (61%) as well as SMS and MMS messages were already used widely to complement face-to-face encounters in people's need for contact with others.<sup>4</sup>

According to Finland's Ministry of Transport and Communications, more than 1.6 billion text messages were sent in Finland in 2003. This means a monthly average of 29 messages per mobile phone subscriber. The corresponding figure in Denmark is 96, 60 in Norway and 21 in Sweden. The number of SMS messages sent by Finns increased from the previous year by nearly 17 percent. The rate of growth remained relatively similar to previous years. (*Metro* newspaper, April 22, 2004 and [www.mintc.fi](http://www.mintc.fi))

Claims about the difficulty of getting a respite from all the communication demands posed by modern life are heard frequently. Yet, for instance in a survey by Statistics Finland, 75 percent of respondents said that the statement "I'm pleased to hear the phone ring" corresponded well or relatively well to how they felt. With senior citizens, loneliness has been identified as one of the most central problems.

Accumulating the social capital of a given society presumes trust, and trust is based on familiarity between people. Chat services and anonymous discussion boards, therefore, are not enough to satisfy basic needs, and services based on traditional telephone technology are also necessary. Phone circles between seniors are one good example of this – the old and familiar access device available to everyone is put to new use.

Services related to maintaining contact between individuals are highly useful, for instance in the organising of events. The organisation of events actually constitutes one field where the use of group SMS has achieved an established niche. During the first three months of 2004, 15 percent of mobile phone users or some 500,000 Finns had sent group SMS. The number of group SMS recipients was nearly double at 29 percent. Half of the messages concerned leisure activities. Women (19%) sent group messages more often than men (12%), whereas the gender distribution of message recipients was equal.

Email has stabilised its position as the main form of Internet usage. Some 88 percent of people with an Internet connection (70% of all people) have sent email. Despite that, 40 percent of Finns cannot be reached by personal email. For this reason, retaining the opportunity to send and receive messages through a variety of means is crucial.

Scouts from all over the world came together over the radio waves and the Internet October 16–17, 2004. Some 35,000 radio stations from more than a hundred countries participated in the Jamboree on the Air event. The Radio Jamboree was arranged already for the 47<sup>th</sup> time. In Finland, there are about a dozen scout radio stations in different parts of the country. In 2004, Finland's main scout radio station, OH2JAM, was broadcasting from the small town of Lempäälä. Thousands of scouts also came together over the Internet, as Jamboree on the Internet took place on supervised IRC channels. (The Finnish News Agency)

With the diffusion of broadband connections, particularly family members and relatives living at great distance from each other are more likely to maintain contact with Internet-mediated IP calls and web cameras. In spring 2004, 6 percent of the respondents had established an IP connection, and 6.7 percent of computers had a web camera installed. However, in a highly sophisticated information society knowing by which particular technique the connection is obtained is not necessarily relevant. The main thing is that the different technologies allow for flexible and versatile interaction.

Traditional sewing circles have, to a large degree, been transferred online. Discussion boards for knitting and needlework can be used to exchange crocheting tips, inquire about embroidery patterns suitable for a beginner, or present photographs of finished works. One website, [käsityökori.com](http://käsityökori.com), offers knitting and needlework supplies and has a discussion board where visitors can share advice and discuss everyday issues. The products offered can be purchased online. The Internet service expands the market of knitting and needlework supplies to areas where similar services are not otherwise available. Finns living abroad have ordered products from as far away as Australia. (*Etelä-Suomen Sanomat* newspaper, September 25, 2004)

The use of information and communication technologies is not a particular problem for people interested in technology. However, not all citizens exhibit a similar interest in the intricacies of technology. For a large number of people, computers and networks are simply tools with which they can maintain contact with their friends, manage their affairs and so forth. The use of information and communication technologies should thus be easy and secure, which it often is not. For instance, it is almost impossible to find a service that would offer unbiased assistance to citizens in the selection of a computer or an Internet connection, in questions concerning the safe use of the computer or in problem situations. Citizens – especially those who are new to the information society – are required to put in unreasonable effort and need the help of a functioning support network before they are able to reap the benefits of the information society.

A study published at the University of Tampere September 21, 2004 concluded that active users of technology experience the computer, email and the Internet mostly as tools for work or as technologies to facilitate work related tasks. The Internet is most commonly used for banking and information searches related to leisure activities. (*Metro* newspaper, September 22, 2004)

In autumn 2004, a new service called Citizens' ICT support was launched in Turku. It has proven its necessity from the outset. The service, provided by students of the Turku Polytechnic, has in a short period of time examined the personal computers of more than 200 citizens. The customer receives personal advice and instruction in any questions they might have concerning ICT, a report of measures carried out on the computer and information on repair shops in cases of hardware repair needs. So far, the most common problems have concerned information security, computer viruses and other rogue programs.

#### b) Information retrieval

The use of Internet search engines is routine among Internet users. Almost 80 percent of under 40-year-olds and 60 percent of over 40-year-olds somewhat or fully agree with this statement. Searching for information on products and services rates close to email in citizens' use of the Internet.

In the course of a few years, the website Poliklinikka.net has emerged as the most popular source of health and illness information in Finland. The website gets approximately 100,000 unique visitors a month. Access to reliable information is perceived as the main reason for the site's popularity, as the content is provided by Finnish doctors. (News at the MTV3 portal, April 7, 2004)

Also information services utilising technologies other than the World Wide Web are gradually establishing their position.

The Finnish Red Cross has implemented a service that provides first aid instructions directly to mobile devices. The service, created in co-operation with Sonera, offers instructions for various emergency and accident situations. The online service provides step by step instructions for car crash and fire situations, for helping a lifeless, choking or drowning person as well as for treating wounds, sprains and bites. (*Verkkotie* online newspaper June 3, 2004)

For many people, their initiation into the routines of information retrieval has taken place on a terminal in a library, searching for information with the help of library personnel. In Finland, 47 percent of the population or 2.4 million people are registered library users. According to some studies, as many as 80 percent of them use the library actively in their daily lives. Libraries can thus be said to reach a significant portion of citizens. A library network of some 1,000 service points covers the entire country. The Ministry of Education has set the goal that each library would provide, for customer use, one Internet-enabled PC per 1,000 inhabitants. This goal has not yet been reached in all areas. The libraries should also be able to provide more instruction in the use of appliances, the network and online services.

In many ways, Finnish libraries have been pioneers in their field. They have adopted the use of information technology earlier and at a faster pace than in many other countries. The Kirjakaapeli library in Helsinki, established in 1994, was among the first in the world to offer free Internet access to all users. Also, libraries were quick to adopt ICT-based systems for customers, which has improved the opportunities for information retrieval and enabled the popular online use of library services. Another reason for the increase in

the amount of services based on information technology is that some of the materials are available only in digital form or existing material has been digitised.

The amount of material available online has exploded. The aim of the libraries is to complement existing search engines by developing increasingly sophisticated information retrieval solutions with features for the evaluation of information and the opportunity to restrict the amount of data tracked. A centrally-maintained online service that would function as a channel to the databases of different libraries, data retrieval services and the online services of the public sector is currently in preparation. This compilation of information services is entitled *Tiedonhaun portti* (Information Gateway), or the citizen's information portal.

The increasing information load poses a problem particularly for the professionals of information technology. Some 70 percent of information workers report that the amount of information involved in their work is more than they can take in. (*ITViikko* newspaper, September 23, 2004)

All public libraries offer PCs with an Internet connection for use by the public. Information forums and various information services provided by libraries – such as the national *Kysy kirjastonhoitajalta* (Ask the librarian) online service, the local SMS services created for teenagers in Lahti and Turku or the mobile *Information Gas Station* (iGS) provided by the Helsinki City Library – indicate that people require personal instruction in the use of various devices as well as in the use of online services.

The information needs of young people in particular are catered for by the Finnish Youth Information Network, covering more than thirty local youth information services throughout the country. In addition to information seeking, a central aspect of the youth information services is processing the information together with the young person. Some of the services are “traditional” youth information centres or service points, while others operate online. A good example of an information service targeted at young people is the Youth Information Centre *Kompassi*, which operates over the Internet. It offers information on areas such as housing, education, work, opportunities for internationalisation, leisure activities, issues related to social welfare and health, consumer issues, environment and sustainable development. Moreover, the site's question-and-answer service offers professional advice on the problem areas of young people's lives (<http://nuoriso.hel.fi/kompassi>). The Youth Information Centre *Nappi*, of the City of Oulu Youth Department, also provides an Internet service for young people ([www.netti-nappi.fi](http://www.netti-nappi.fi)). The service also contains a section for immigrant youth launched in autumn 2004. In addition, an SMS-based youth service for teenagers is operational at least in Lahti and Turku.

In October 2004, the web-based Databank for Organic Farming was launched. It is intended to serve the actors in the chain of organic production as well as its stakeholders and the media. The relevance, reliability and impartiality of the service are based on expert co-operation. The aim of the Databank for Organic Farming is to distribute fresh research results on farming and the food industry in an easily accessible form to people who need it: farmers, processors, retail, consumers as well as those working in education, training, instruction and administration. The site contains news and information on research and various events, both at home and abroad. The site also provides useful links on organic farming. Experts respond to questions and the discussion board enables the exchange of views on organic production. (*Verkkotie* online newspaper, October 13, 2004)

### c) The use of online services

In terms of citizens' information society skills, the use of online services, such as online shopping and banking, presume access to the network, the ability to navigate the Internet as well as the capacity to assess the reliability of the information and take the necessary precautions to ensure privacy protection and information security. Often, the motivation derives from the ease of access and the opportunity to save time. Currently, more than 70 percent of Internet users make use of online banking services. The opportunity to manage personal affairs through email or the World Wide Web has affected the decision to purchase a computer either significantly or somewhat with 95 percent of under 40-year-olds and with 84 percent of over 40-year-olds.

The opportunity to manage affairs over the Internet appears to be a central reason for acquiring information and communication technologies, and

the provision of services is vast on the local level, too. However, it is good to remember that the majority of Finns still prefer the telephone and traditional person-to-person service. It remains to be seen how answering machines and long waiting times for telephone services affect the popularity of the traditional channels. From the viewpoint of citizen equality, it is necessary to guarantee the availability of reasonably priced, good quality off-line alternatives to online services. One solution might involve versatile telephone service and information centres or multi-service call centres that would be able to handle problems with throughout the entire chain necessary for completing the service. Creating a service of this type would require significant improvements in the systems and their modes of operation.

According to a study by Taloustutkimus Ltd., about 1,165,000 Finns between the ages of 15 and 74 had purchased items or services liable to charge over the Internet by September-October 2003. The most typical Internet shopper is still the 25–34-year-old male with disposable income who uses the Internet daily and lives in the capital area. The most commonly purchased items are clothes and accessories. Other popular purchases include books, music, and computer accessories. Female customers also frequently purchase items related to home decorating. Despite the increasing popularity of e-commerce, many continue to have misgivings about making purchases over the Internet. However, the credit card service company Luottokunta records very few cases of misuse of credit card information or unexplained withdrawals from credit accounts. (The Finnish Information Agency, March 1, 2004)

In spring 2004, Finnish polytechnics organised, for the third time, their application process over the Internet. Some polytechnics received 85 percent of their applications over the Internet. The joint application process took place between March 15 and April 2. The total number of applications was nearly 70,000. Most of these – 66 percent in all – were entered through the online service (46,198 applicants). The total number of applicants did not increase significantly, but the share of online applicants rose by more than 20 percent from spring 2003. (Online newsletter of the Ministry of Education, April 21, 2003)

Online shopping is, at best, a well thought-out and conscious activity. The enlightened consumer can make accurate comparisons between different products and services for the purposes of buying and selling and using Internet auctions. However, in the world of the Internet, the consumer is less firmly protected against the actions of other people, which increases the importance of personal responsibility and alertness. Yet, by enabling price and quality comparisons across national boundaries, online commerce also increases the power of the consumer in comparison situations. The greatest weaknesses of online services have been identified as complexity, an emphasis on technology, and the fact that the rules of fair play are not always followed.

An increasing number of Finns have purchased goods and services directly from a foreign website. According to Statistics Finland, 790,000 Finns or almost a third of Internet users had also made purchases online. The most commonly purchased items include trips, hotel reservations, clothes and shoes. A third of the buyers or over a quarter of a million Finns have purchased something from a foreign website. The most popular types of products purchased from foreign websites include entertainment electronics, digital cameras and DVD films. (*Helsingin Sanomat* newspaper, September 29, 2004)

Education and training have made relatively broad use of different online services, both to support the work of teachers and to help students in organising their studies and provide assistance for independent studies. Educational institutions, such as community colleges and adult education centres, that support the continuous education of adults are making their services available over the Internet, and in many institutions certain study modules are implemented partly or wholly online. In addition, online learning material and interaction are increasingly becoming a part of regular courses.

Statistics Finland offers a free of charge service, Verkkokoulu (online school), where citizens can learn, for instance, the basic concepts of statistics. The online school also offers training in the basics of statistical thinking, statistical literacy, graphics and the presentation of statistical information on a map.

The service is available at <http://www.tilastokeskus.fi/verkkokoulu>.  
(The Finnish Information Agency, February 25, 2004)

Citizens' use of online services is complicated by the need for identification, which manifests in abundance of user IDs and passwords. In many situations, however, this is necessary in order to secure the position of the service provider and to ensure the protection of the user's own privacy. Users are already familiar with user IDs and passwords allocated by their service provider and banks' own IDs. Electronic certification solutions have also been available for some years. The need for purchasing and installing card readers and software has, however, slowed down the uptake of these solutions. The personal certificate will soon be available also for mobile devices, which is likely to facilitate their use in online services. Ease of use must also be a central aim in identification and signature solutions. According to research, citizens have strong confidence in systems already in use, and this provides a solid foundation for the future development of online services.

#### d) Automatic control and process systems

People often see the proliferation of automatised systems as increased complication of their lives. For owners of small businesses, the development may manifest itself as toughened competition or even exclusion from the ranks of entrepreneurs. In businesses of less than five employees only 40 percent of employees have access to the Internet, whereas the percentage in companies of more than 500 employees is 77 percent. The mobile phone has become the most commonly used ICT application in small companies, and it is used to arrange logistics as well as to make orders and reservations. In the future, particular emphasis should be placed on the information society skills of small company employees. Network secretaries, working as independent entrepreneurs or through cooperative societies, may help small business owners to develop their operations. In people's daily lives, automatic systems are visible in functions such as distance maintenance and security services for houses and summer cabins and the archiving of household information.

Interactive online services are a demanding target for development, and they often generate new tasks for organisations and presume changes in the modes of operation. The development and implementation of online services requires changes in people's activities. Changes resulting from work processes can lead to fundamental reforms in the information systems or at least to significant developments. The reorganisation of work processes and information systems demands wide and active participation in the preparations for change, purposeful training in new ways of working and the adoption of more developed ways of operating. This requires time and acclimatisation, especially when the changes are directed to large group of workers and other actors using their services.

The Social Insurance Institution of Finland (Kela) has launched an online service where parents receiving parental allowance can check their personal information. The service offers mothers or fathers who have applied for maternity, paternity or parental allowance, or special care allowance for parents the opportunity to monitor their allowance information. They can, for instance, find out whether their application has been processed. The service can also be used to check the dates of future payments as well as the situation of payments made. (Social Insurance Institution of Finland, Press Release, June 1, 2004)

The following headline appeared in *Helsingin Sanomat*: "Modern farms order feed through SMS." The article reports that the emptying of silos in farms is monitored by a mobile system. When supplies run low, the sensor installed in the feed storage automatically transmits the order to the feed manufacturer's ordering system. An SMS message is sent to the farmer's mobile phone, in response to which the farmer can either accept or reject the order. It is also possible to join the SMS ordering system without the feed guard or the sensor installed in the silo. (*Helsingin Sanomat* newspaper, September 29, 2004)

#### e) Mass communication

With mass communication, the citizen is largely positioned as the target of journalism, marketing and communication. The objective of media education is to prepare citizens for the use of different media (radio, television, films, advertising, video, press, electronic communications) as both the recipient and

sender of messages. The objective is fluent media literacy or the skill of “reading and writing media” which means the capacity of citizens to critically interpret and create media texts: verbal, visual, vocal or different combinations of these. Media skills have become part of a new kind of communicative general education.

The Internet has opened up new possibilities for mass communication, functioning as a distribution channel for newspapers, radio, television and communication. In fact, it seems that citizens are gradually finding mass communication on the Internet: 58 percent of under 40-year-olds and 44 percent of over 40-year-old Internet users have read an online edition of a newspaper during the first three months of 2004, and after January of the same year, 23 percent of under 40-year-olds and 9.4 percent of over 40-year-olds have used the Internet for radio listening or TV-viewing. At least 65 percent of under 40-year-olds and slightly less than 50 percent of over 40-year-olds use teletext on a weekly basis.

The following news was published in spring 2004: Aalto 2004, the main exercise of the Finnish defence forces, starts Monday June 7, 2004. The events and course of the exercise can be followed at [www.mil.fi/aalto](http://www.mil.fi/aalto). The exercise, lasting eleven days, will focus on maritime defence. (*Verkkotie* online newspaper, June 7, 2004)

The Finnish Broadcasting Company has carried its own responsibility in the field of media education by producing dozens of TV and radio programmes for the use of Koulu-tv (school television, programmes intended for use in teaching and aired during the daytime). More recently, the promotion of media-related skills has been incorporated as one of the topics of adult education programmes. The media as a phenomenon has been discussed in a variety of series, where its power and responsibility in society has often been questioned.

A service functioning on the website of the Finnish Broadcasting Company provides the means and instructions for individual content production. It also prompts the user to enter a certain amount of meta-information, making the information more easily available to others. Whether or not the content is published is up to the creator. The experiences gained thus far from the service indicate that the Finns' publication threshold is surprisingly high – the working space has many excellent stories produced by the grown-up population in particular, often over-critical of their own work. Allowing citizens the opportunity to produce and publish their own content on the Internet, the Koostamo service is a prime example of the implementation of media education. The direction of mass media from one to many gains a new form: a public service accepts a product by an individual and affords it “public space”.

Young people assume the role of mass communicators at Free Your Mind ([www.yle.fi/free/](http://www.yle.fi/free/)). The service combines different media: Internet radio and web TV. Free Your Mind, run by the Youth Media Centre of the Youth Department of the City of Helsinki, is implemented as the joint effort of two public administration actors, the Finnish Broadcasting Company and the Youth Department of the City of Helsinki. The content is created by the young people themselves.

In the November municipal election, voters had, for the first time, the opportunity to follow the counting of the votes over their mobile phone. MTV3 and TietoEnator sent messages about the situation of any of the candidates as responses to SMS queries. This was the most extensive mobile service provided during an election so far (between officials and citizens). The service offered two alternatives. The more concise option provided information about the real-time situation of a specific candidate. With the second option, the information on the candidate's situation was updated every 15 minutes throughout the vote count. (News on MTV3, October 20, 2004)

#### f ) Media culture

The roots of media culture are in music, film, games and various educational programmes. Some of the most familiar products of media culture are probably the different logos and ring tones for mobile phones. The most active users of media culture, particularly in terms of downloading games and music, are young men (Suomalaisten viestintävalmiudet 2000-luvun vuorovaikutusyhteiskunnassa [Finns' communication skills in contemporary interaction society], Reports

2004/4, Statistics Finland). It has been said that only 5 percent of broadband users use 80 percent of the entire capacity of the network. The sharing of music and other media culture through peer networks is an important factor in the creation of this network load.

Online real-estate services have gained vast popularity among 25–34-year-old affluent professionals living in the capital area. In addition to people looking for a new home, the services also attract people who are interested in the development of prices but have no intention to buy. As many as one third of the users had visited the sites with no interest in buying. According to a TNS Gallup poll, real-estate services have, to an extent, been transformed into entertainment portals. (*Uutislehti 100* newspaper, June 3, 2004)

The Swedish Minister for Social Affairs Berit Andnor demands more research on the impact of computer games. According to TV4 in Sweden, young people are playing increasingly violent games. Frank Lindblad, a child psychiatrist at Karolinska Institutet in Stockholm says that research on the topic clearly indicates that people exposed to vast amounts of TV violence behave more aggressively. According to Lindblad, videogames may be even more detrimental than TV programmes. (*Verkkotie* online newspaper March 2, 2004)

The field of media culture involves great opportunities for transforming old content into new electronic forms, to produce and develop entirely new kinds of services. One example could be an information package about a patient's illness, put together during a visit to their doctor. In its simplest form, this may be a recording that enables the patient to replay the instructions they have received. Examples and possible uses are limitless. One common feature of new ideas like this is that they generally require good information society skills from the citizens. Their computers must have a CD-ROM drive or a device with similar data storage capacity (more than 60% already have a CD-Recorder) and speakers (owned by more than 80%). Moreover, they must know how to use them and understand how the information has been arranged in the different formats.

In October 2004, the Finnish game producer Bugbear Entertainment published the first ever Playstation 2 game designed in Finland. In addition to the PS2 game, versions for Xbox and PC were released simultaneously. The car game *Flatout*, combining demolition derby and professional racing, took 18 months to complete. The game is expected to sell hundreds of thousands of copies in Europe and North America. (National Technology Agency of Finland, October 29, 2004)

Citizens' information society skills are best developed by doing. In media culture, too, the focus has gradually shifted from technology to ability and the production of content that is motivating. Unless sufficient resources are directed to the promotion of content springing from the local culture and environment, broadband is likely to remain merely a channel for the downloading and redistribution of products from other cultures. Moreover, it is essential to enable people to concentrate more fully on their life outside of the media when their relationship to it starts to show signs of addiction.

For some years now, the Finnish defence forces have been forced to discharge conscripts with an Internet addiction before the completion of their service. Following the daily rhythm and the rules of the army has proven insuperably difficult for young men accustomed to spending most of their free time in front of the computer. (*Helsingin Sanomat* newspaper, August 4, 2004)

#### g) Independent production

In the early days of home computers, at the turn of the 80s and 90s, the devices were seen as fulfilling two possible functions: they were either used for cataloguing the contents of the freezer, filing recipes or book titles, or for book-keeping, or they were used for word processing and the use of drawing software. Partly depending on the intended purpose of the device, either PCs or Macs were defended with fierce intensity. The former answered to the needs of filing and book-keeping, whereas the latter was more the mediator of thoughts and images and a tool for graphic work. The graphic interfaces transported to the PC world muted this discussion from 1995 onwards.

Today, in the era of digital cameras (owned by 25% of population), camera mobiles (6% of mobile phone owners), video cameras (20%) and digital voice

recorders, this discussion may gain new strength, unless the PC software applications for text, image and sound processing are effectively designed to be simpler to use than they are at present. Information and communication technologies have yet to redeem their promise of citizens' inclusion and presence in the Internet. Only 10 percent of Finns have their own homepage. Blogs, IRC sites and other easy-to-use services that can be viewed as independent content production are diffusing rapidly, particularly among the young. However, these popular functions have the additional feature of personal publicity.

According to estimates, 300,000 digital cameras will be sold in 2004, as stated in photography industry wholesale statistics. The number of digital cameras sold in 2001 was just below 40,000. (The Finnish News Agency, April 18, 2004)

The use of the computer for personal content production is more active. For instance, more than 30 percent of computer users have prepared a card, a book or music themselves as a gift. Forty-eight percent of under 40-year-olds and 27.5 percent of over 40-year-olds have transferred or downloaded digital photographs to their own computer. Multimedia production is thus already here. The demand for national content production and media culture can hardly even emerge unless people are capable of producing content themselves. A comparison can be made here to traditional literacy. A person cannot thoroughly understand what they read until they learn to write; it is this understanding gained through writing that enables them to demand and appreciate better literature and better texts. When this happens in electronic networks, we are able to exploit their best and unprecedented opportunity: everyone can be a writer or photographer, everyone can produce their own content and share it with their immediate community.

Senior citizens in the Porvoo region are publishing their life stories on the Internet. The activity is part of an EU project where stories written by ageing people are stored in portal called Seniorstory. The Porvoo Adult Education Centre is a partner in the international project. (*Verkkotie* online newspaper May 17, 2004 and *Uusimaa* newspaper)

Today, only two percent of manuscripts by both amateur and professional writers get published in Finland. The *Kirja kerrallaan* (Book by book) service operating in the Lasipalatsi building in Helsinki is an example of how everyone can have the opportunity to publish a book. Communication camps designed to encourage the use of information and communication technologies are an excellent way to learn to use ICTs for personal needs, to reproduce one's own thoughts and mental images in a form fit to be shared with others. They are an example of situations that enable the learning of communication in interactive situations and in connection with various activities. The camps are organised around the activities of making a video or a radio programme, publishing a newspaper and preparing food.

Adult education centres throughout the country are currently offering courses in video or digital photography as well as providing a multitude of training in writing and other forms of self-expression. The skills learned in the courses are important in improving the competence necessary for personal production. Moreover, training in the use of software and various ICT appliances will be necessary for many years to come. The Youth Media Centre run by the City of Helsinki Youth Information Centre offers guidance and instruction with young people's own programme ideas, videos and edits. The image and sound studios, editing equipment and computers are all available for use by young people. The *Laturi* Internet youth information service in Jyväskylä contains an online newspaper called *Painovirhe*, designed, edited and published by young people themselves. The City of Jyväskylä's Youth Information Centre organises courses in the making of homepages as well as in writing stories and articles.

#### ■ Proposed actions

◆ The development of citizens' information society skills should be observed through various reports and studies on the basis of the structure, differentiating between the levels of basic use, unaffected use and proactive use. For instance, Statistics Finland could include the monitoring of this development in its activities.

- ◆ Products and services making use of information and communication technologies must be designed so that as broad a range of people as possible have sufficient skills to use them. This presumes an understanding of the varying needs of people of different age groups, different language groups and different skill levels. The products, environments and services needed in the information society must be easy to use, impartial and accessible.
- ◆ Education, training and instruction at all levels is highly necessary. The Finnish Adult Education Association has produced a recommendation for a study module about information society skills. The type of education advocated in the recommendation should be widely available to citizens. The recommendation stresses information society skills as an integral part of the life of an active citizen. The study module would concentrate on the viewpoint of the user of information and communication technologies and the application of different knowledge and skills in everyday life. The study module would correspond to 8–12 ECTS credits, covering the following areas: on the road to the information society, ICT usage skills, networking and communication skills, and skills as consumers and service users. The general aim is that everyone who wanted to could participate in the training. The organised training should also build upon and enlarge the network of professionals trained to support and instruct people in daily life situations and to promote the achievement of goals of different directions and levels.
- ◆ Citizens' electronic personal certificates should be as easy to use as possible. The creation of an easy-to-use system must be supported to achieve the necessary critical mass and to increase the supply and use of services. The use of online services presumes a climate of confidence.
- ◆ The support of the public sector (the Information Society Programme, different ministries, the Finnish National Fund for Research and Development, and the Technology Agency of Finland) as well as the private sector should be directed more openly to projects and measures intended to enforce skills required by independent activity.

In addition, the Section proposes that a national network of information society meeting places be established in Finland to support the planning and implementation of citizens' information society environment.

- ◆ In order to promote citizens' information society skills, a network of information society meeting places should be constructed, with the aim of promoting regional, national and international co-operation between public meeting places. On the national level, the network improves the availability, security and openness of online services and helps to distribute information on central questions to all actors.
- ◆ The network should be used to exchange and utilise successful experiences between the actors of the information society and to promote the equal opportunities of all citizens. The producers of knowledge and content and device manufacturers can interact with other users, receive instructions in the use of online services, test their products and develop as independent content producers of electronic media.
- ◆ Regional meeting places (public PCs and services attached) should be located in libraries, schools, public service points, shopping centres, village shops or other such public meeting places. The telematic and other connections between the meeting places should be good.
- ◆ The network of national meeting places will begin with a meeting place planned at Lasipalatsi in Helsinki. "Windows" will be constructed from Lasipalatsi to other comparable meeting places so that the instruction, speeches, presentations and citizens' products can be seen and experienced interactively on the national level.
- ◆ The human, technological and financial resources necessary for the *Arjen elinvoima* (Active Living) project proposed by the Section in its action plan will be directed to establishing the meeting place at Lasipalatsi and launching its activities.

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## Conclusion

The analyses presented above document how the development of the information society is entering a new phase, both in Finland and elsewhere in the world. The use of new information and communication technologies has largely incorporated itself as an organic part of the everyday activities of businesses, authorities and citizens, and managing affairs through electronic networks has in many areas surfaced as an important alternative to more traditional procedures. This development has naturally increased the demands on the data transfer capacity of electronic networks. The rapid diffusion of mobile phones outside of the developed industrial countries has emerged as a globally significant phenomenon. At the same time, the information society has transformed from a technological vision into a more neutral everyday phenomenon that no longer arouses hyped expectations.

### ■ On the current state of the information society and challenges for development

Finland's position among the most developed information societies has induced discussion and at times even elicited critical tones. The analyses in this report testify that Finland has not remained stagnant, and that the construction of the information society is persistently carried out in many different areas through the joint efforts of numerous actors.

The construction of fast connections and their availability to all citizens has been a central focal area, and good results have also been attained in this field. The uptake of digital television is proceeding at pace with the original plan, and the telecommunications regulatory authorities are actively shaping the development of the competitive environment in mobile services. In the development of e-business, Finland, together with other Nordic countries, is rated near the top in international comparisons, and the applications of e-government are developed actively on the national as well as the municipal level. Electronic services for the promotion of well-being should be observed as their own, distinct field, the development of which poses great demands for instance to information security. The creation of electronic information systems for the use of both social welfare and health care is currently underway in Finland.

Finland also rates highly in the size of investments in knowledge and learning, and has gained exceptionally good results measured by the learning achievement of pupils. The Finnish innovation system is rated among the best in industrial countries, and the level of ICT use in Finnish workplaces is relatively high. However, Finland has so far found it difficult to translate these investments into profitable business activity or employment-intensive growth, and unemployment has remained relatively high compared to other industrial countries. The reputation of Finland as a highly developed information society has not managed to attract significant levels of international investment. In the future, the challenges of the job competition will probably augment as the international outsourcing of functions expands to tasks of increasingly high competence levels. At the same time, as the generation of baby boomers leave working life and social expenditure grows as a result, indirect labour costs will increase more rapidly than in many of the competing countries.

With the increased use of information networks, various problems related to information security and the improper use of networks have reached unseen proportions. Much work has been done in Finland and elsewhere in Europe to ensure information security and to develop security-enhancing practices but so far, the level of security achieved cannot be considered nearly sufficient. Another important challenge is the management of change in a situation where the focal point in the development of the information society is moving from the uptake of the technologies to the adoption of new operating cultures.

A central question from the citizens' viewpoint is, how does the progress of the information society support the development of their opportunities to function in their daily lives? In this field too, numerous interesting and useful initiatives have been launched in Finland, particularly on the local level. However, much more work is required before all citizens can perceive

themselves as real subjects of the contemporary information society. This means that they must be able to themselves define the ways in which they wish information technology and the media environment would best serve them in the different situations of their life.

### ■ The targeted future of the information society

According to the future scenarios presented in this report, Finland is aiming to maintain its high position in international comparisons related to the information society. Increased use of ICTs should not, however, be perceived as an end in itself, but as a means through which Finland may increase the productivity of the different sectors of economy and attain knowledge-based growth. As a well-established information society, Finland manages to attract a growing amount of investment from international companies and highly-skilled individuals from all over the world. Relying on these strengths, Finland can also reach solid macroeconomic growth that enables a significant decrease in unemployment and secures the finances for the maintenance and development of the welfare society.

At the same time, there is a willingness to pursue the construction of the information society based on the Finnish model in such a way that the profits and gains of the information society will be widely available to all citizens and so that citizens themselves are able to determine the extent and form in which different technologies and the content and services distributed through them will affect their daily lives. Citizens' choices should form the engine that directs the construction work of the information society. In this way, as the society begins to develop new solutions to enhance the information society, it is important to grasp the actual societal implications of the solutions. Also, it is important to seek citizens' approval for the solutions in order to ensure their broad-based adoption and citizens' confidence in them.

Based on the visions sketched above for each of the areas, we can conclude that the general functionality of society is seen as a central foundation also for the development of the solutions of e-business. The most essential aspect, however, remains the efficient networking of companies on both horizontal and vertical levels, both within their own sector of activities and beyond it. Citizen's PKI certificate and broad-based digitisation of financial administration are seen as important steps towards the desired future. In the realm of telecommunications, the aim is to achieve national coverage for broadband and to multiply the current connection speeds at affordable prices. The objective with wireless networks is the development of access devices and networks that would transform phones into versatile tools for life management and enable people to move fluently between networks with no disruption of service. The more sophisticated features of digital television are expected to be introduced into broad usage, and a wider diffusion of High Definition technology is also expected.

In the realm of working life, the future of Finnish information society is affected most importantly by the development of work cultures. In the future, the use of information and communication technologies will be widespread in Finnish workplaces, but the most essential factor is the constant accumulation of the competence capital of organisations and the development of operating cultures in a way that enables high levels of productivity while allowing for a sensible balance between work and the demands of life outside of work. The government's aim to raise the employment rate to 75 percent will be attained through social innovation exhibited in the search for high productivity, in investments in new growth industries and in the quest for alternative employment solutions.

The use of online services is expected to become a natural part of people's lives in their different roles. The various channels of information and communication technologies offer an opportunity to use the services provided by society through means best suited for the situation, either entirely online or through personal interaction, for instance through a joint service point. The self-service of customers will increase, and the development of mobile devices and information systems will enable the use of the services irrespective of time and location. The use of the services will be customer-driven and largely based on the customer's confidence in the functionality of information security and identification systems. The future of social welfare and health care

services relies on much the same grounds, with the addition of good information management. In the context of welfare services, good information management enables the users and service producers to know the type of help available to different people at different times, as well as the specifics of the current need for this help.

The central future vision in the area of education and research is the image of Finland as a creative, competent, learning and multicultural society. Finland wishes to be a forerunner in the development, application and exploitation of information and communication technologies. A central success factor for Finland is the capacity to constantly learn new things; this is based on the smooth functioning of the dynamic loop of research, education and product development. With citizens' information society skills, the aim is that by 2010, the Finnish information society would evolve into a culturally, socially and economically developing civil society. The achievement of this aim requires that in the construction of the information society, the attention is focused with increasing intensity on developing people's individual ways of working and development needs arising from their personal motivations.

### ■ How can the goals be attained?

In addition to analysis, the chapters of this report have presented dozens of concrete suggestions through which it is possible to take actual steps towards the envisioned future.

From the viewpoint of *e-business*, the report stresses the dynamic nature of business activity and entrepreneurship as the basis for development that should be encouraged through all means available. The actions proposed for maintaining Finland's lead in the digitisation of business include supporting the broader diffusion of citizen's PKI certificate, adopting a stronger broadband strategy, formulating a national strategy for e-business and striving for leadership in the development of e-business occurring on the European level.

With a view to *telecommunication and digital television*, the actions proposed in the report include the promotion of the Communications Market Act and the proposals concerning the position of public broadcasting, a reform of copyright legislation, enhancing the digitisation of television operations in public institutions and through educational policy, promoting the development of content and services transmitted through digital television, supporting the uptake of open standards to ensure the interoperability of different systems, the enforcement of healthy competition and the dismantling of excessive regulation.

In the realm of *working life*, the main goals are defined as the strengthening of competence and innovation, and the increasingly efficient conversion of these strengths into employment-intensive growth. On the level of concrete measures, the Section suggests increasing the investments in research and development and directing them to the broader sphere of innovative activity, instead of focusing exclusively on technology. Moreover, it is recommended to shift the focus from individual professionals to the level of organisations and innovation environments. In order to elicit change, new projects aimed at the creation of new kinds of work cultures are recommended. The direction should be away from separate pilot projects and the overlapping of similar projects towards value chains capable of forming more coherent wholes.

In the development of *online government*, the report highlights the holistic aim towards a reform of public administration with the goal of producing better services more cost effectively. This presumes strong leadership as well as the provision of political-level instructions for development work occurring on the practical level. In order to incorporate the opportunities provided by online government into this reformation, the Section suggests developing broader jointly-implemented projects and new financing schemes in order to realise these projects. In order to enforce the knowledge base, the Section proposes constructing a model charting online service development projects and increasing research. Also, suggestions are made to develop the standardisation of information systems and the digital transfer of documents.

In the field of *social welfare and health care*, a central requirement for achieving the envisioned situation is the adoption of more sophisticated operating cultures in all parts of the service system. This aim is enhanced by the adoption of electronic client and patient records throughout the country. In addition, the development of various call centre type services and mobile

solutions is perceived as important. In information management, a central goal is to proceed from the present project-status co-operation models towards a more permanent basis for cooperation. In the efforts to develop the services, guaranteeing clients the opportunity to acquire the skills needed in the use of the services, and ensuring equal access to the services of social welfare and health care also in sparsely populated areas are seen as important goals. Furthermore, a health information portal aimed at citizens is to be created.

The chapter on *research and education* proposes balanced investments in all components of the innovation system, from basic education to top-level research, and the conversion of new solutions into products and services. The development of information and communication technologies for the purposes of teaching must be continued, and co-operation between the public and private sectors must be strengthened. In addition to the study of information and communication technologies, the importance of the activities directed at the application of the technologies is also emphasised. The role of universities as the centres of expertise should be strengthened and competition in the allocation of their basic funding should be accelerated, while the autonomy of individual units should be increased. Another important aim is the creation of a climate encouraging unique expertise through public debate.

With regard to *citizen skills*, a central concern in the designing of new products and services is the objective that the skills of as many citizens as possible would be sufficient to use them. Moreover, the report suggests creating new kinds of citizen meeting places and securing human and technical resources for projects that foster the vitality of daily life. On a more general note, it is suggested that the public sector as well as private investors should, in the future, direct their support primarily to projects and measures for enhancing the skills required by citizens' independent activities.

#### ■ The way forward

This report offers a summary of the current situation of activities targeted at developing the Finnish information society at the turn of 2005, and of the ways in which the development should be continued. It should be remembered, however, that the Information Society Programme is only part of a larger whole, and the construction of the Finnish information society is essentially tied to the contents, tools and environments through which the implementation of the programme is pursued. Based on the experiences so far, it seems evident that in order to gain positive results, a more efficient co-ordination of activities and use of resources is necessary. There should be greater flexibility in the funding of central projects, and funds earned from the sale of shares of the (previously state-owned) TeliaSonera corporation should be made available for the purpose of advancing projects central to the Information Society Programme.

Particular attention should be paid to the promotion of equality between citizens as well as to the aim that small and medium-sized companies, small municipalities and sparsely populated areas receive enough support in developing online solutions and upgrading their Internet connections. The aims of the national broadband strategy should be sufficiently ambitious, considering the technical opportunities opened up by the multiplying of data transfer speeds compared to the standard speeds of current specifications. Information security and citizens' confidence in electronic services should be matters of national concern.

The most central aim remains, however, that the construction of the information society incorporates new actors and that the various actors reach fruitful co-operation. In this way, the work of promoting the information society is reformed, also in content, at pace with the developing circumstances and altering expectations in society as whole. One of the central goals of the information society programme has been progress towards an information society for everyone. This aim is best reached when citizens themselves are involved in the discussion on the goals set for the information society and the ways of accomplishing them. By publicising its report, the Information Society Council hopes that the views and analyses contained in it will serve to promote this discussion.

# Measuring the Impact of the Information Society Programme

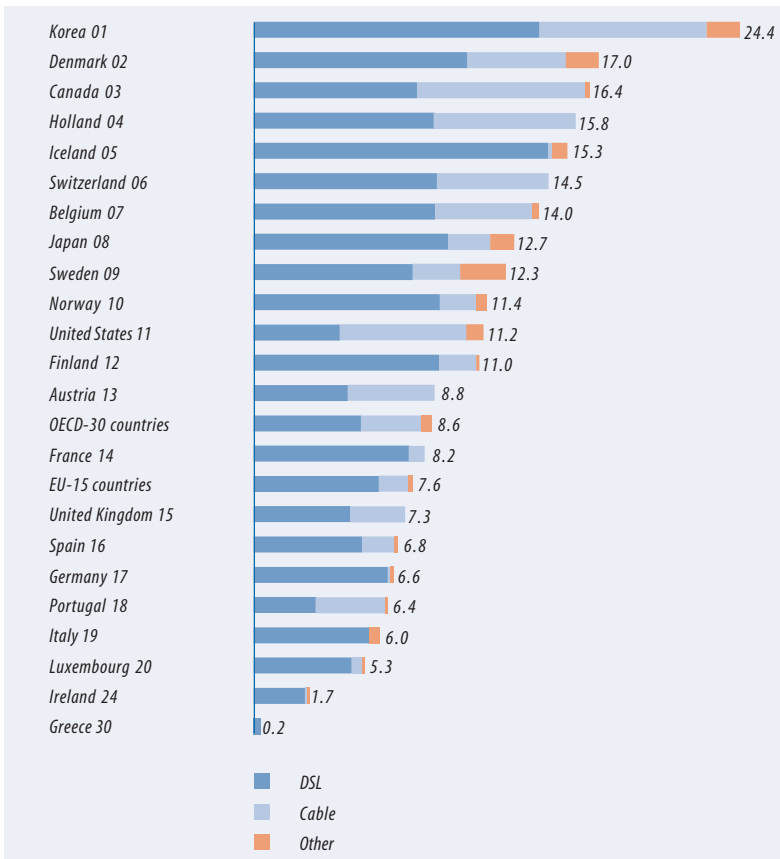
The Information Society Programme has eight main objectives, the accomplishment of which is monitored with indicators. This appendix presents the most central objectives and the most essential aspects of the information contained in the indicators. The Information Society Programme is one of four policy programmes launched by the government, and its overall goal, as stated in the governmental programme, is to increase competitiveness and productivity as well as social and regional equality through the exploitation of information and communication technologies in all areas of society. The achievement of the objectives is evaluated annually throughout the programme.

## ■ Targeted impact:

**The Finnish information society ranks highly in international comparisons and Finnish information society policy has the capacity to influence international development.**

Figure 1.

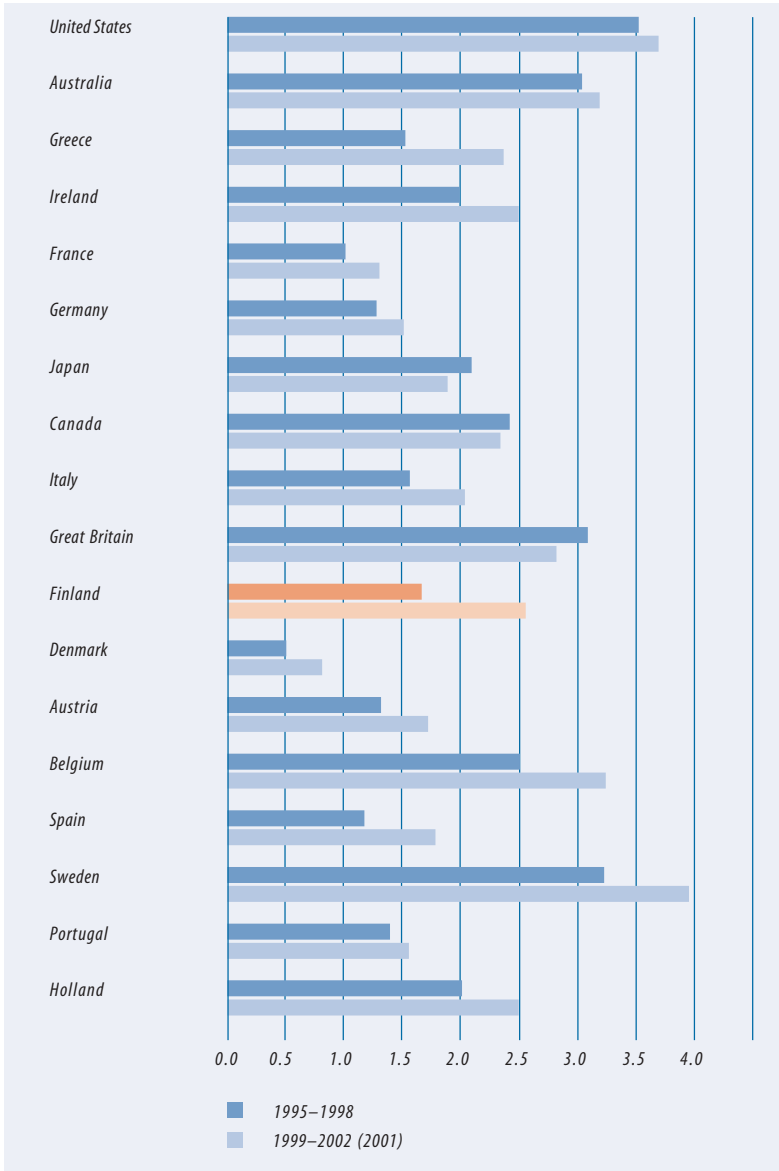
**The number of broadband connections in different countries in summer 2004  
(per 100 inhabitants)**



Source: OECD

*In a comparison of the frequency of broadband connections among OECD countries Finland is located above average, with 11 broadband connections per 100 inhabitants. The average for the 30 OECD countries is 8.6 connections, while the figure for the EU-15 countries is 7.6 connections per 100 inhabitants.*

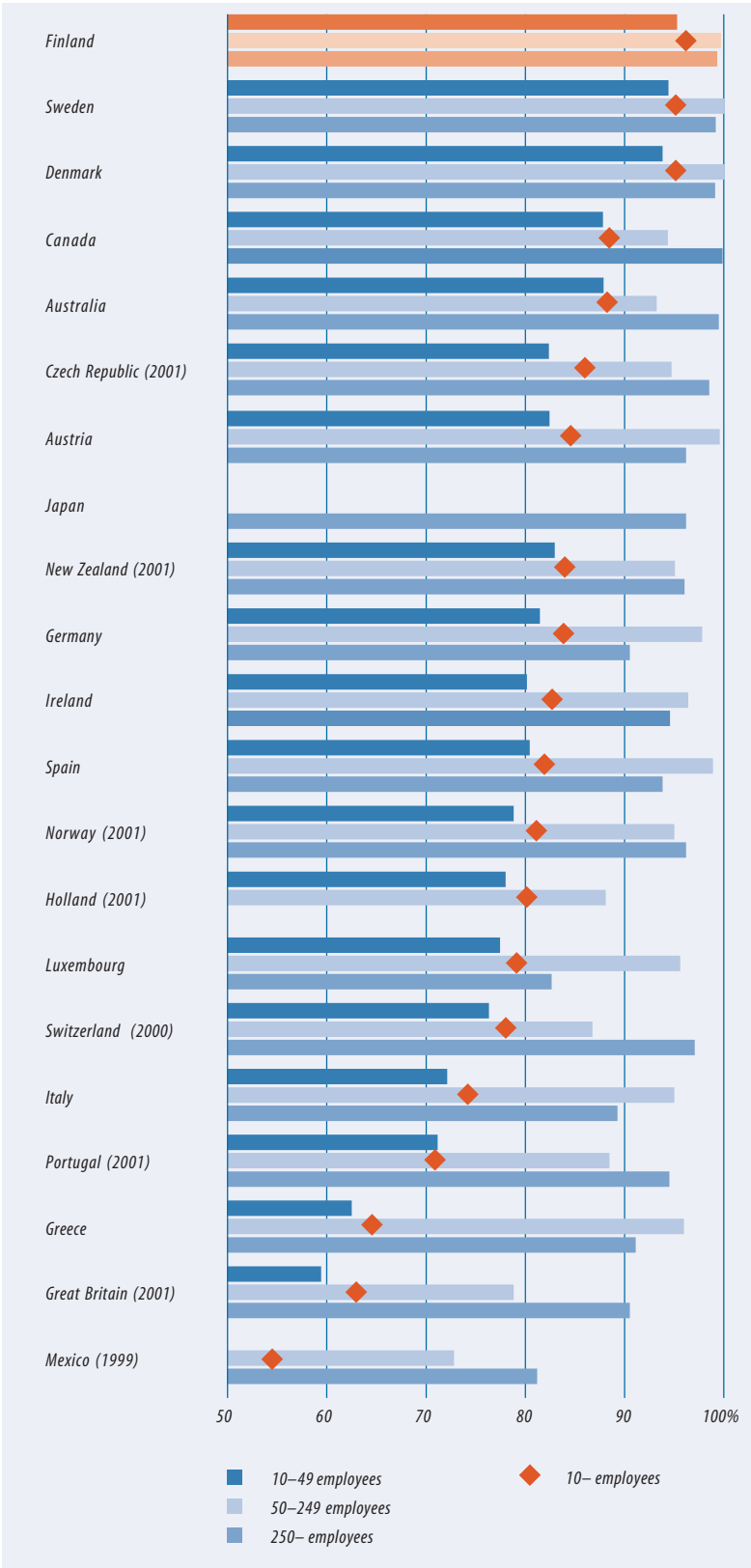
Figure 2.  
The effect of ICT investment on the growth of national economy  
between 1995–1998 and 1999–2002



Source: OECD Productivity database 2004

The volume of ICT investment and the gains yielded by them vary between countries. According to a comparison by the OECD, Finland's ICT investments in relation to Gross National Product have clearly been more productive during the period 1999–2001 (2.54%) than during 1995–1998 (1.68%). From an international viewpoint, the figures for ICT investment productivity in countries such as Sweden, United States and Belgium are above those of Finland. The situation is in part explained through Finland's lower price level and the reparatory investments resulting from Y2K and the transition to the euro. The indicator in question has been criticised for the use of background variables unfavourable to Finland, for which reason the result can be deemed merely suggestive.

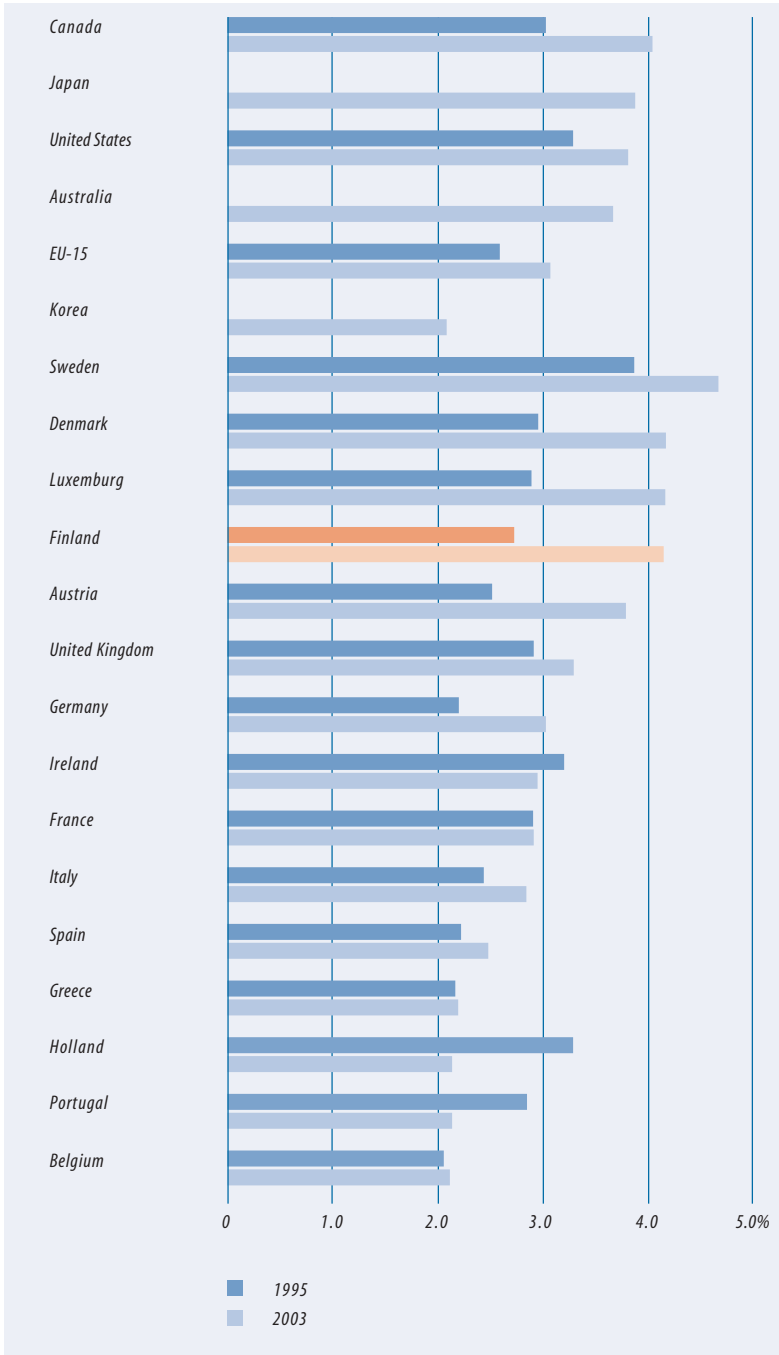
Figure 3.  
Use of the Internet according to company size in different countries



Source: OECD, ICT database and Eurostat, Community Survey on ICT Usage in Enterprises 2002, May 2003

The Internet is used in companies of more than ten employees most often in Finland, Sweden and Denmark. The information is from 2001 or later.

Figure 4.  
The share of people working in ICT professions in different countries in 1995 and 2003



Source: OECD Information Technology Outlook 2004

The figure compares the number of workers in the ICT sector in different OECD countries in 1995 and 2003. The highest proportion of ICT professions is found in Sweden, but Finland and Denmark also rank near the top both among the EU and OECD countries.

### ■ Targeted impact:

Information and communication technologies are exploited in all organisations with the aim of improving service, increasing the efficiency of functions and processes and maintaining and enhancing competitiveness.

Table 1.

Contributions to growth in value added in market production 1975–2001\*

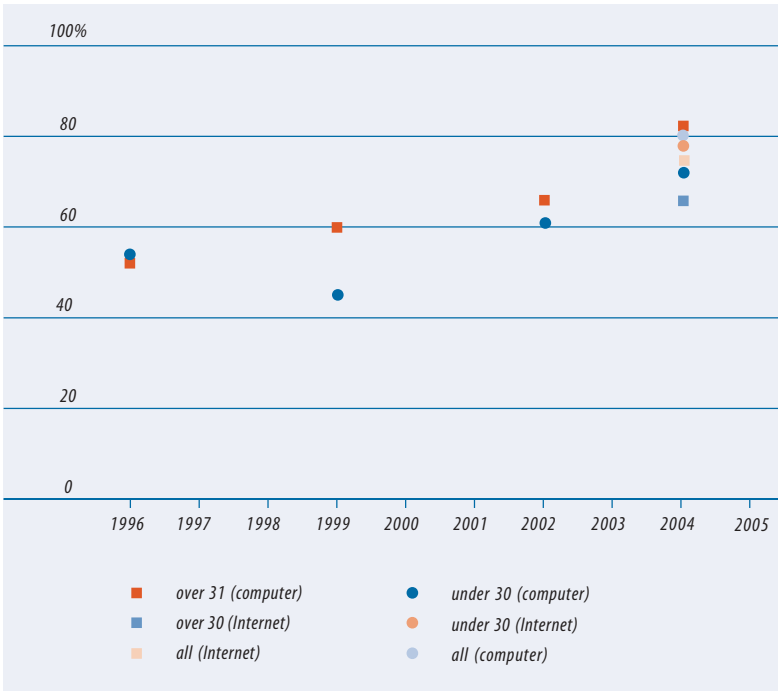
	1975–90	1990–95	1995–2001*
<b>Volume of value added <sup>1)</sup></b>	3.2	-0.7	5.5
<b>Contributions <sup>2)</sup></b>			
ICT capital	0.2	0.3	0.8
Computers	0.1	0.2	0.5
Software	0.1	0.1	0.2
Communication devices	0.0	0.1	0.1
Other capital	0.8	-0.7	-0.1
Labour hours	-0.4	-2.9	1.1
Labour quality (education)	0.2	0.2	0.2
Total factor productivity	2.2	2.3	3.7
<b>Income shares <sup>1)</sup></b>			
ICT capital	1.7	5.0	6.3
Computers	0.5	1.5	2.1
Software	0.6	2.4	2.5
Communication devices	0.5	1.1	1.7
Other capital	33.9	33.8	38.7
Labour	64.4	61.3	55.1
<b>Growth rates <sup>1)</sup></b>			
ICT capital	16.5	7.2	12.9
Computers	29.7	15.1	25.9
Software	12.9	2.7	6.7
Communication devices	9.9	9.1	9.3
Other capital	2.8	-2.1	-0.4
Labour hours	-0.7	-4.5	2.1

\* The figures are an estimate  
<sup>1)</sup> Percent  
<sup>2)</sup> Percentage points

Source: Jukka Jalava, Statistics Finland, national accounts data as source material

Production in the ICT sector has increased rapidly in Finland, which is why a relatively large proportion of the Gross Value Added (GVA) in market production derives from the producers of the ICT sector. Moreover, the productivity of ICT capital grew considerably during the observation period in 1996. In addition, the productivity of ICT capital clearly increased during the observation period 1995–2001, at a time when the productivity of other capital was negative. The productivity of labour improved during the observed period.

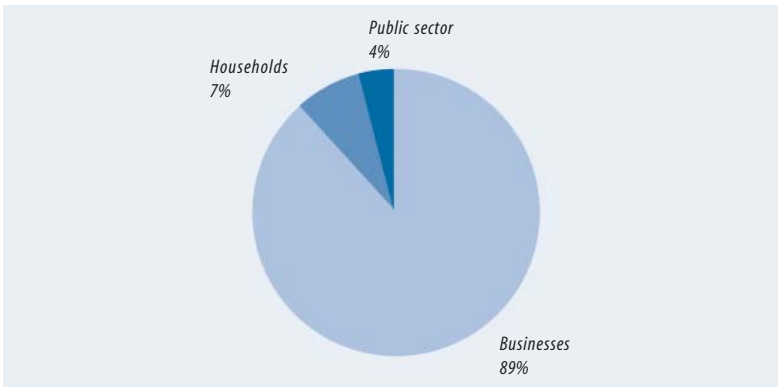
**Figure 5.**  
**Has used the computer and the Internet at work in the past three months: computer in personal or joint use in 1996, 1999 and 2002/ percentage of workers according to age group**



Source: Statistics Finland: Finns and the future information society surveys 1996 and 1999, Labour force enquiry by Statistics Finland 2002, Internet shopping survey, spring 2004

In spring 2004, 80 percent of all workers had a computer at their workplace, either for their personal use or for joint use, and 75 percent of workers had access to the Internet. The use of both the computer and the Internet in the workplace had grown significantly in the 2000s.

**Figure 6.**  
**The distribution of Internet sales by customer group in 2003, as a percentage of the combined Internet sales of companies**



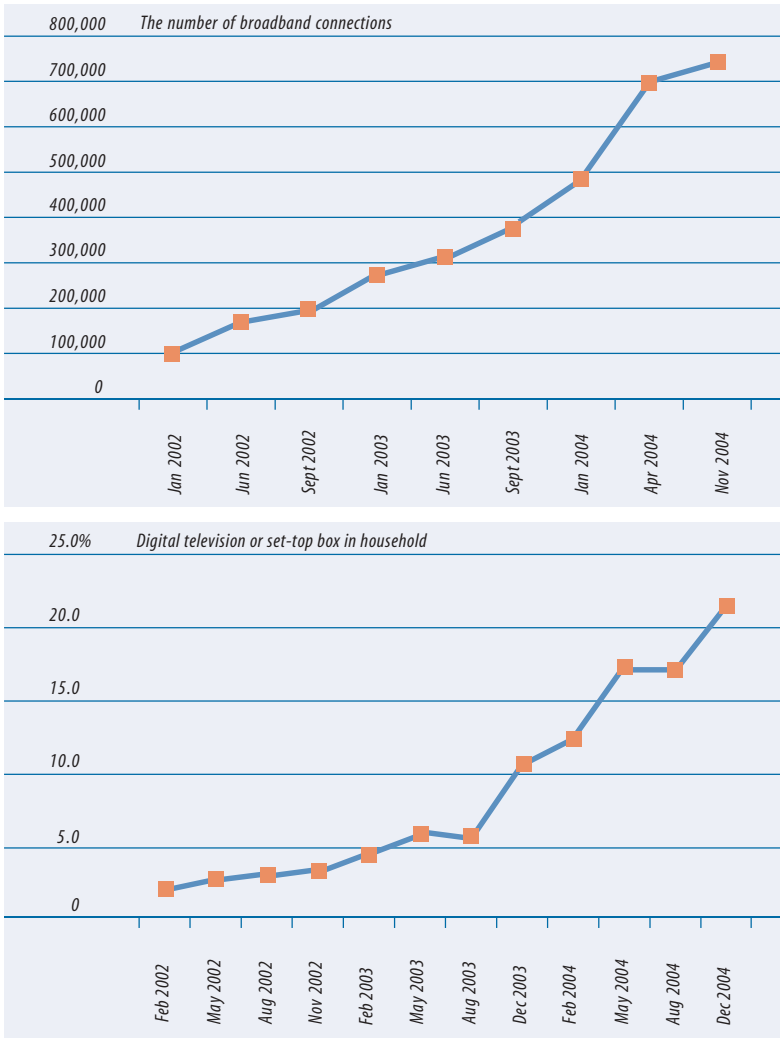
Source: Statistics Finland: Use of information technology in businesses

The vast majority of Internet sales occur between businesses (89%). The share of purchases by the public sector and private households is only about a tenth of the total value. However, the volume of Internet sales continues to grow in all customer groups. The value of all Internet sales in 2003 was approximately 10 billion euros.

**■ Targeted impact:**

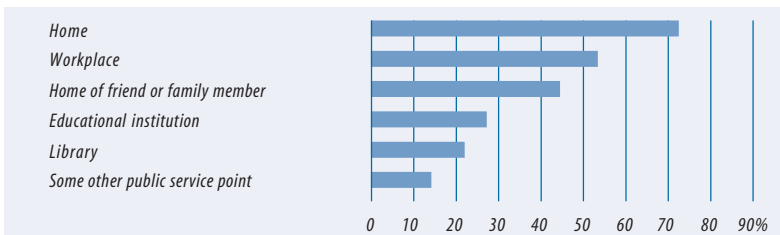
All citizens have the opportunity to make use of the services of the information society, regardless of place of residence or social status.

Figure 7.  
The diffusion of digital television set-top boxes and broadband connections



Approximately 710,000 households (some 30%) had a broadband connection in November 2004. The Ministry of Transport and Communications estimated that, including businesses, the total number of broadband connections is now at least 750,000. The speed, quality and price of broadband connections vary regionally. The geographical reach of the broadband network is constantly being improved. The present network covers 94.1 percent of households. The goal of one million broadband connections by the end of 2005, as stated in the government's strategy, thus appears within reach. The number of set-top boxes is also growing rapidly: in November 2004, 516,000 or 22 percent of households had a set-top box or a digital television.

Figure 8.  
Locations of Internet use according to households



Source: Statistics Finland: A survey commissioned by the Information Society Programme 2004

The home is the most common location for Internet usage. Internet connections established from the homes of friends or family members were notably common, at least during the almost 12-month observation period. One in four Internet users had connected to the Internet from a library during the observation period. Considering the number of libraries, the figure is quite high. People who had used the Internet at some other public service point accounted for some 15 percent, or over 400,000, of 15–74-year-olds. Two thirds of them were 15–39-year-olds and only some 17,000 were 60–74-year-olds.

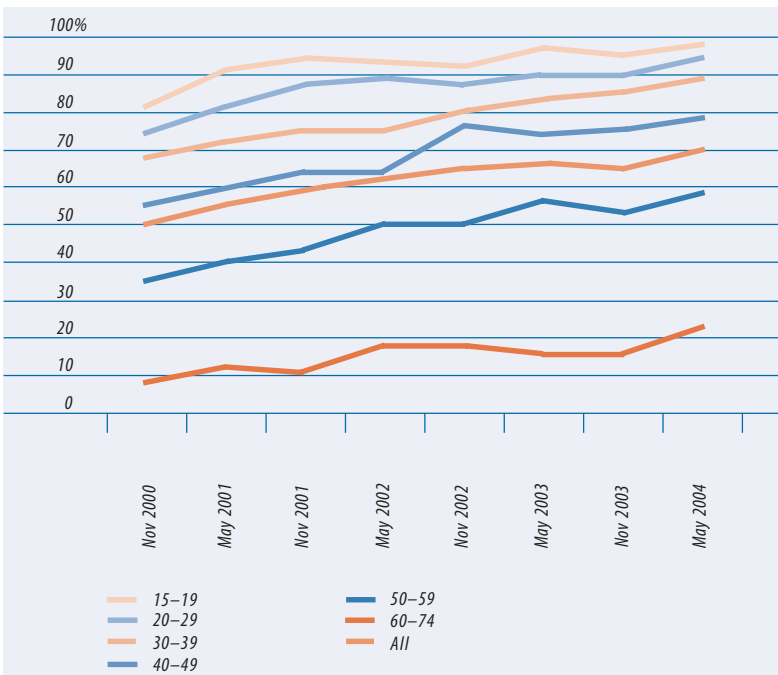
Table 2.  
Computer and Internet access in households according to region

Region	Computer	Internet connection
Helsinki Region	66.4	54.6
Southwest Finland	58.7	45.8
Satakunta	60.9	54.9
Häme	73.5	56.8
Tampere Region	64.0	49.6
Päijät-Häme	61.4	48.4
Kymenlaakso	64.6	51.4
South Karelia	43.4	33.0
South Savo	60.2	38.8
North Savo	55.3	46.1
North Karelia	51.4	35.0
Central Finland	58.5	48.4
South Ostrobothnia	65.4	45.3
Ostrobothnia	57.5	42.2
Central Ostrobothnia	43.5	30.7
Oulu Region	62.6	48.5
Kainuu	51.7	43.3
Lapland	55.0	37.1
Itä-Uusimaa	54.9	45.6
<b>Whole country</b>	<b>61.4</b>	<b>48.4</b>

Source: Statistics Finland: Consumer barometer

From a regional viewpoint, citizens were most likely to have a computer and Internet connection at their disposal in the Helsinki Region, where 66.4 percent of households had a computer and 54.6 percent had an Internet connection. The lowest Internet diffusion rates can be found in the Region of South Karelia (33%), where households were connected to the Internet some 15 percent less frequently than the national average (48.4%).

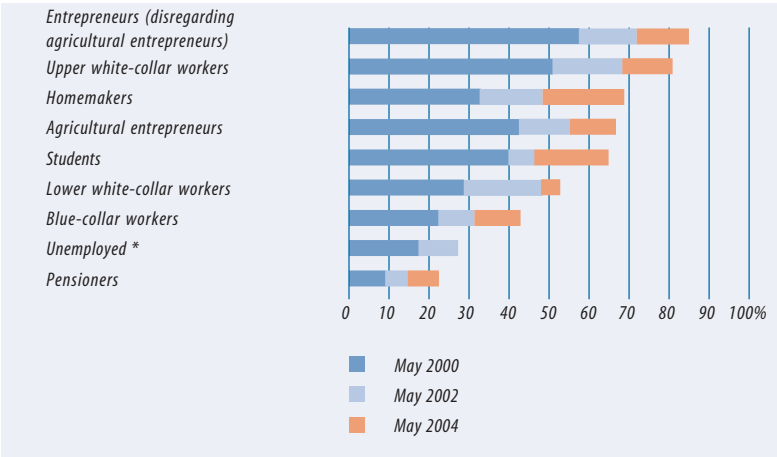
Figure 9.  
Use of the Internet in the previous three months, autumn 2000 – spring 2004, percentage of households



Source: Statistics Finland: Internet shopping survey

The number of Internet users has grown in all age groups in the 2000s. According to a study carried out in 2004, more than 2.7 million or some 70 percent of 15- to 74-year-olds had used the Internet since the beginning of January 2004. The relative increase in Internet use has been the greatest among over 50-year-olds. Internet use was the most active among 15-19-year-olds, nearly all of whom (98%) had used the Internet. Gender differences in the use of the Internet were minor.

Figure 10. Internet connection in households according to socio-economic position, percentage of households



Source: Statistics Finland: Consumer barometer

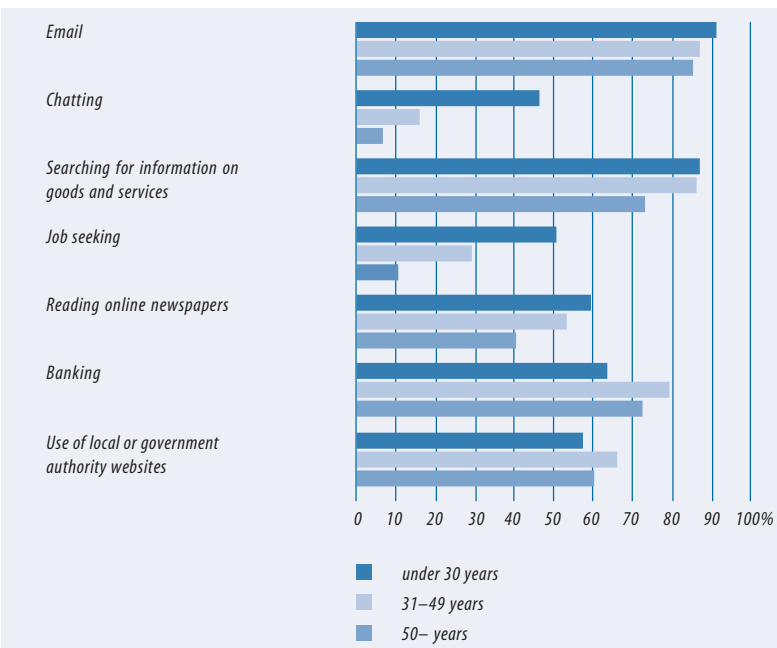
\* The share of households with an Internet connection sank by over 4 percentage points between May 2002 and May 2004

Observing the frequency of Internet connections in households according to socio-economic position, connections were most commonly acquired in the homes of entrepreneurs and professional and managerial staff. Correspondingly, the unemployed and pensioners were the least likely to have an Internet connection. In fact, the number of Internet connections in the homes of the unemployed has actually decreased: whereas in 2002, 27.7 percent of the unemployed had access to the Internet, in 2004 the corresponding figure was only 23 percent.

■ Targeted impact:

All citizens have the opportunity to acquire basic skills in information and communication technologies and media literacy and the ability to make use of those services of the information society that are relevant to their particular life situation.

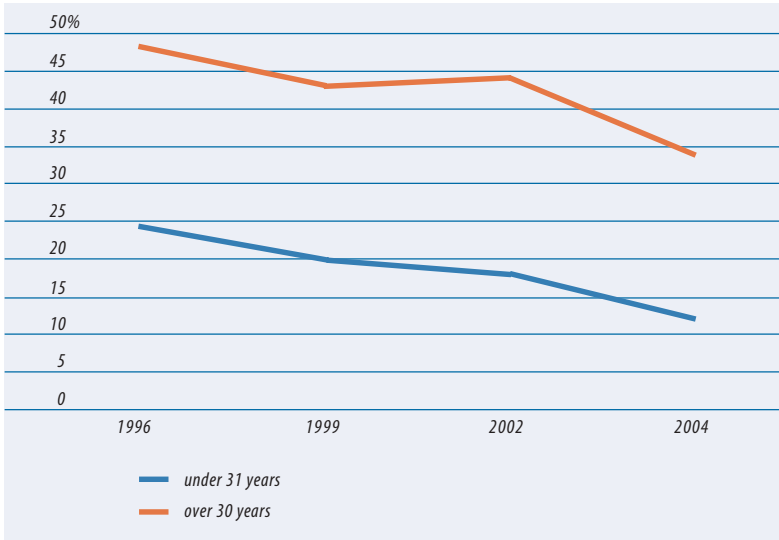
Figure 11. Purposes of Internet use in spring 2004, percentage of 15–74-year-old users according to age group



Source: Statistics Finland: Internet shopping survey, spring 2004

Of people who had used the Internet, nine out of ten had sent or received email. More than two thirds had used online banking services and two out of three had visited public administration websites. Searching for information on goods and services was almost as common as the use of email. Similar usages were perceived as important among both young and old users.

Figure 12. People who agreed completely or somewhat with the statement "I feel left behind by the development of ICTs"; percentage of 10–74-year-olds



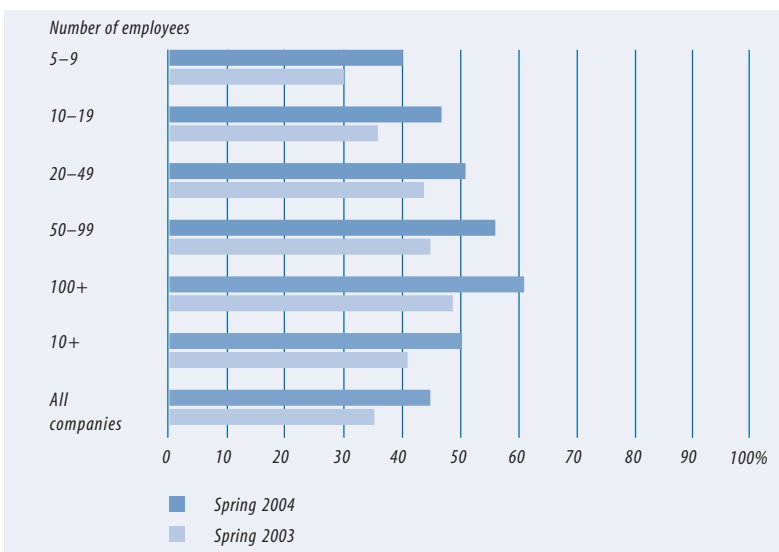
Source: Statistics Finland: Internet shopping survey, spring 2004, Free time survey, 2002, Finns and the future information society 1996–1999

Finns' attitudes do not form an obstacle to the use of information and communication technologies. The sense of being left behind in the information society is not common or strong. When citizens were asked if they feel entirely left behind in the development of information technologies, in 1996 one in four under 30-year-olds and half of over 30-year-olds agreed or somewhat agreed with the statement. In 2004 only 12 percent of under 30-year-old respondents and 34 percent of over 30-year-old respondents agreed with the statement. Yet, the presence of information and communication technologies has increased during the observed period.

■ Targeted impact:

The information security of online public services and information networks and citizens' confidence in online services is at a high level.

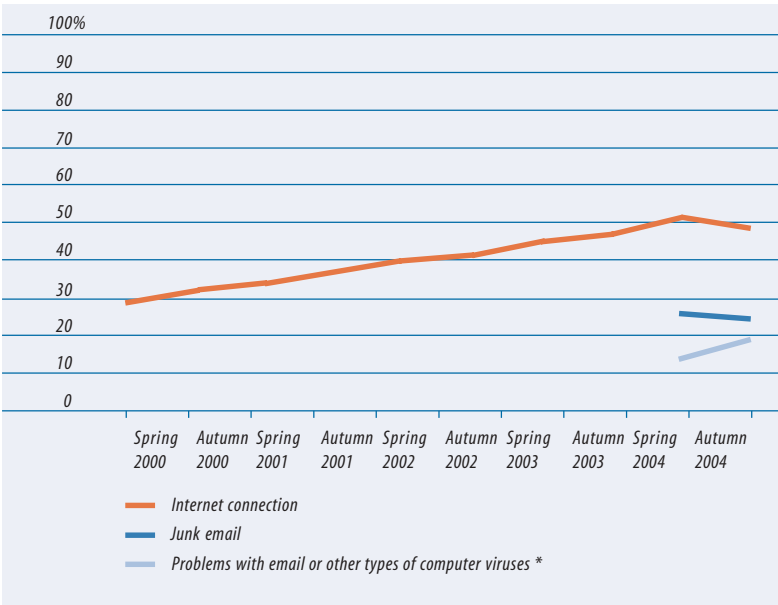
Figure 13. A computer virus has caused loss of information or work time in the past 12 months, spring 2003 and spring 2004, share of businesses according to size



Source: Statistics Finland: Use of information technology in businesses

In spring 2003 approximately every third business (35%) reported loss of information or work time as a result of a computer virus during the previous 12 months. In spring 2004 the corresponding figure had risen to 45 percent of all businesses. The losses caused by computer viruses increase with the size of the company. This is directly proportional to the amount of Internet usage: the larger the business, the more common the use of the Internet.

**Figure 14.**  
**Internet connection in home computer, spring 2000 to autumn 2004; received junk email on the home computer or email or other computer viruses affecting the home computer during the previous six months, spring and autumn 2004, % of all households**

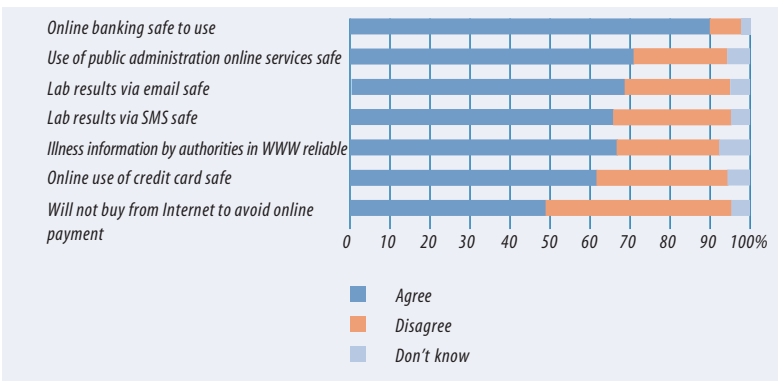


Source: Statistics Finland. Consumer barometer 2000-2004 and Internet shopping survey, spring and autumn 2004

\* In spring 2004 the survey question was formulated more narrowly to refer to email viruses only

Internet connections have become up to 50 percent more frequent in the 2000s. This and other research indicate a decrease in the combined number of Internet connections even though the number of broadband connections is on the increase. So far, the observation period for email and computer viruses has been only six months in length, but the figure indicates a slight decrease in junk email due to the proliferation of filters in home computers. The rapid increase in email and other computer viruses reported in the survey can be explained by the re-formulation of the research question, which means that conclusions can only be drawn after further monitoring of the situation.

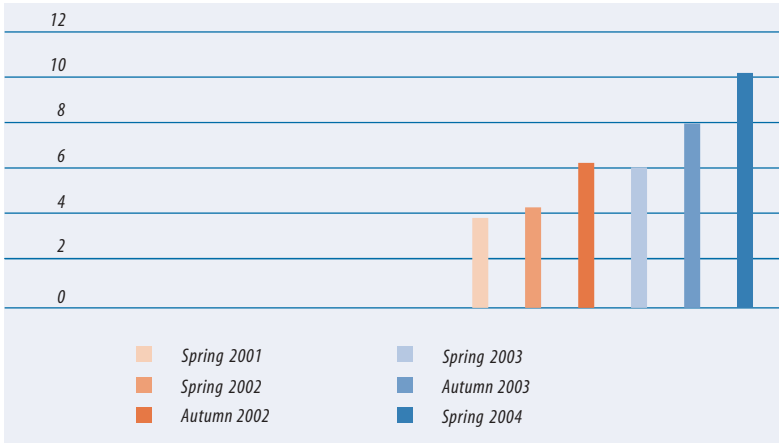
**Figure 15.**  
**Attitudes to opinion statements about the security of Internet services among people who had used the Internet, November 2004**



Source: Statistics Finland: A separate survey commissioned by the Information Society Programme 2004

As a measure of citizens' confidence in online services, Internet banking services are widely trusted. There is a positive attitude towards interacting with officials through the Internet. There appears to be no difference between email and SMS as a channel for distributing health information. However, a third of respondents expressed doubts about using their credit card on the Internet. As many as half agree with the statement "I will not buy a product I am interested in because I don't want to use my credit card over the Internet". This indicates that although online use of banking services is considered reliable, actual online payments (without a bill to the home address) is considered suspect by a remarkably large number of Internet users.

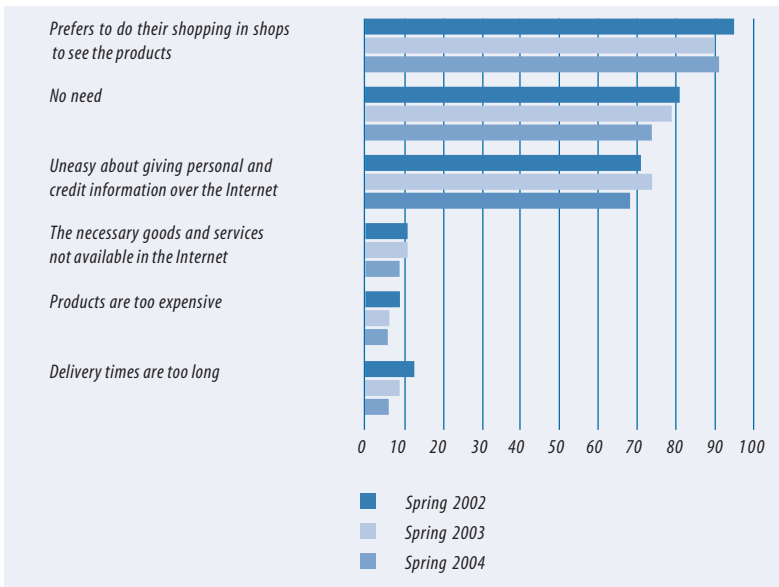
Figure 16.  
Has made an online purchase involving immediate payment during the last three months,  
% of 15-74-year-olds



Source: Statistics Finland: Internet shopping survey

The amount of money spent on Internet shopping is increasing rapidly. The share of online purchases made for private purposes and involving immediate online payment was, in spring 2004, 10.2 million euros. If the figure is expanded to include the number of Internet orders, the estimate is 530 million euros. The number of people making online purchases and orders has increased most rapidly for products with a high average price, such as holiday packages and hotel reservations. The next most popular items purchased over the Internet were clothes, shoes, and tickets for various events.

Figure 17.  
Obstacles to Internet shopping, percentage of Internet users who had not yet purchased items over the Internet



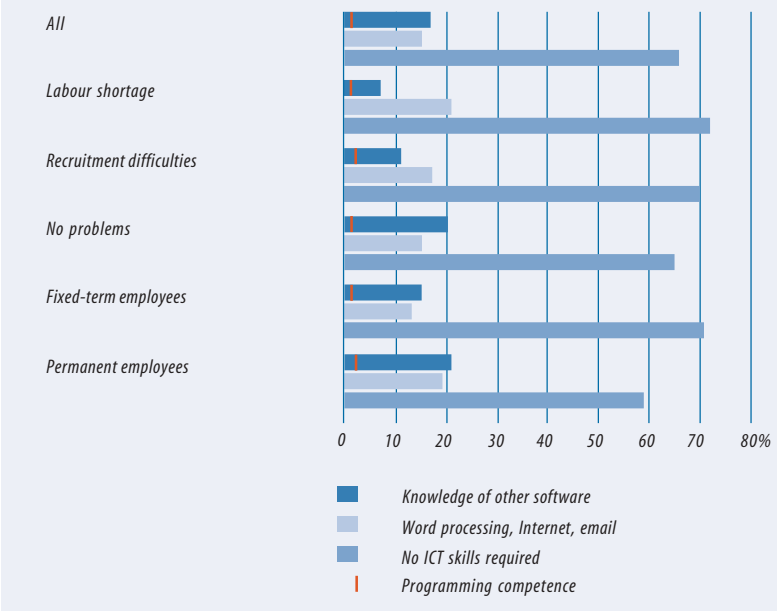
Source: Statistics Finland: Internet shopping survey

According to Finnish households, online shopping has generally occurred without difficulty (67%). Consumers have experienced few problems in online shopping. The most problems have been caused by delivery times (15%). The most central obstacles to making purchases over the Internet are a lack of interest or willingness. In spring 2004, nine out of ten people stated a preference for doing their shopping in shops in order to be able to see the products. Moreover, more than two out of three gave the reason that they are uneasy giving out their personal and credit information over the Internet.

**■ Targeted impact:**

The information society skills of employees are at a high level, irrespective of task and sector, and the supply of skilled labour necessary for the development of the information society is guaranteed.

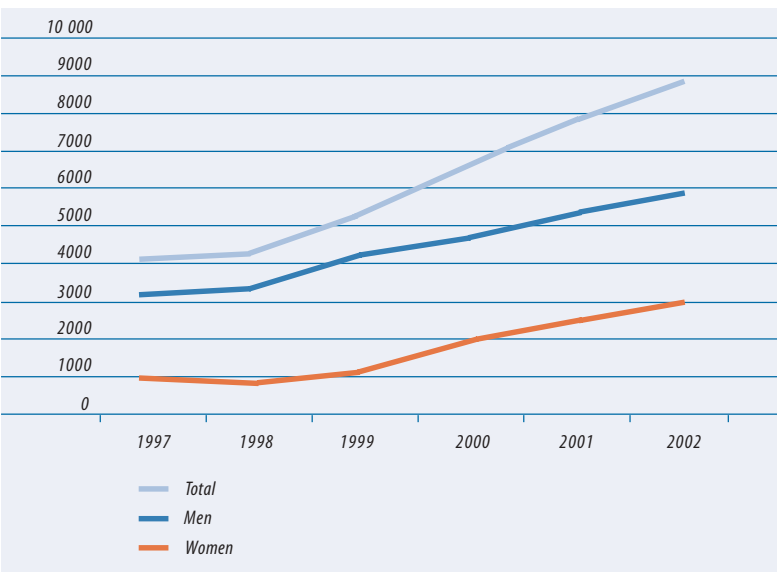
Figure 18. Skill level requirements when recruiting new employees



Source: Statistics Finland/Ministry of Labour: Employer interview 2004, 2<sup>nd</sup> quarter

Employers perceive the ICT skills of recruits as being mostly sufficient. When recruiting employees other than actual ICT professionals, employers generally require basic ICT skills, such as mastering the use of the most common software, and they tend to think that these skills are mostly sufficient. Use of information and communication technologies in the recruitment process was most common in the field of business services. In all sectors most employers (80%) had not experienced difficulties.

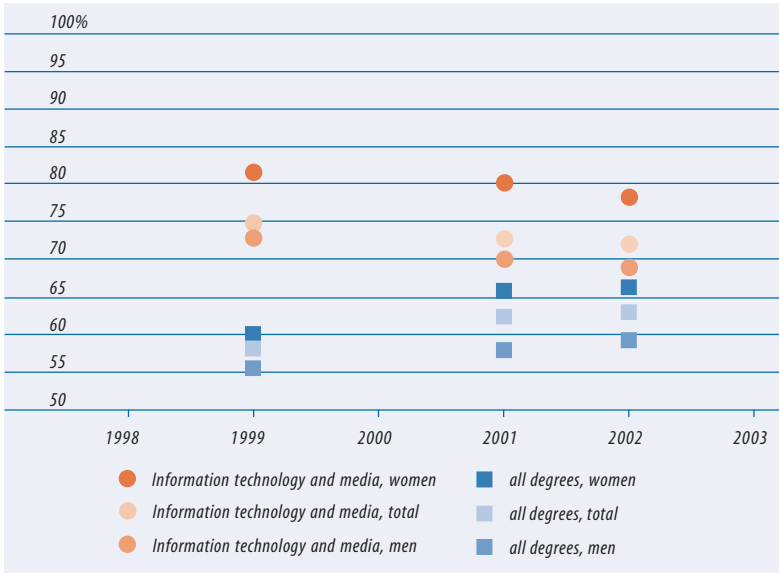
Figure 19. Degrees in information technology and media from 1997 to 2002



Source: Statistics Finland: Education statistics

After the 1990s, there has been an increase in degrees in the fields of information technology and media. However, the fact that the number of men (5,859) receiving their degrees in the field of information technology or media in 2002 was almost double that of women (2,971) can be seen as problematic from the viewpoint of gender equality.

Figure 20.  
Employment rate of people with secondary or post-secondary degree one year after graduation at the end of 1999, 2001 and 2002



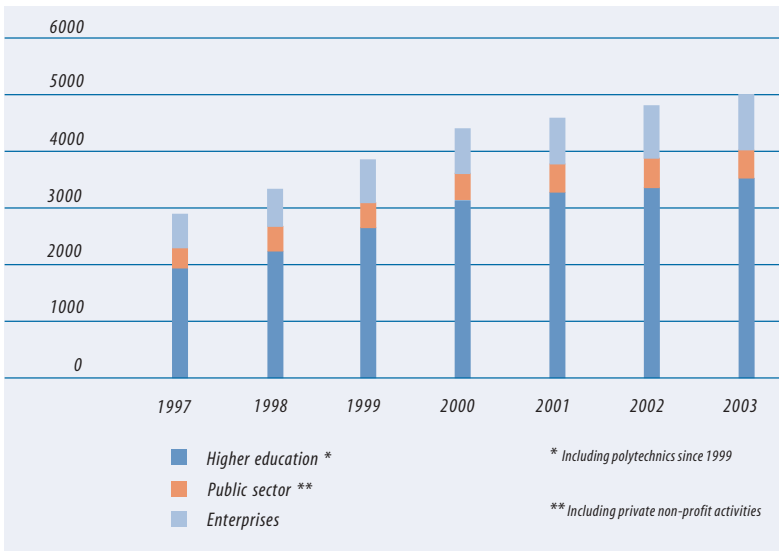
Source: Statistics Finland: Education statistics

As the employment rate of people with secondary or post-secondary degrees has improved (indicated with squares), the employment rates of people with a degree in information technology or media has simultaneously been declining (indicated with circles). This is affected for instance by the increase in the number of degrees, stagnation of growth in the information sector and the entry of employees from other sectors. For instance, between 1998 and 2000, a considerable number of workers starting in the information sector (46%) were coming from other sectors.

■ Targeted impact:

Investments in research and development and their efficient direction will maintain Finland's position among the forerunners of the information society.

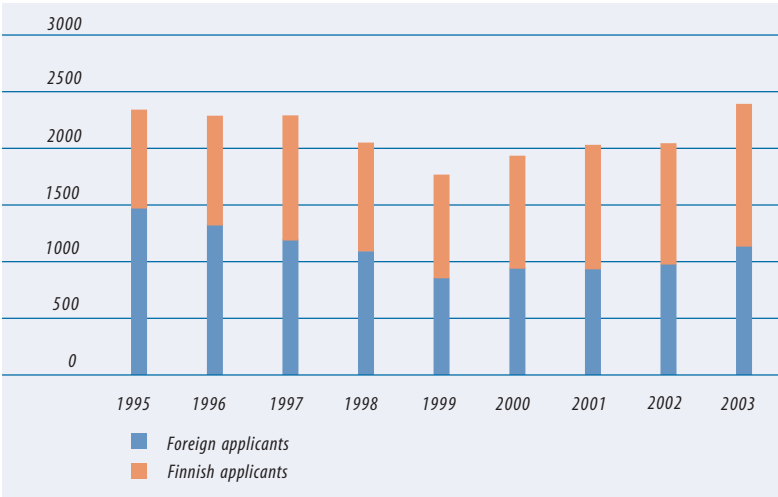
Figure 21.  
Research and development expenses by sector, 1997 to 2003, millions of euros



Source: Statistics Finland: Tutkimus- ja kehittämistoimintatilasto (Research and development statistics)

The growth of research and development expenses has been slower in the 2000s than in the 1990s. The stagnation of growth has been the most evident in the research and development expenses of businesses. However, investment in public research and development activity has grown relatively slowly. In the business sector, growth has been most affected by a considerable decline in research and development investments in the electronics and electrotechnical industry. According to estimates, research and development costs have decreased in 2004 compared to the previous year.

Figure 22.  
Patents granted in Finland by the National Board of Patents and Registration 1995–2003



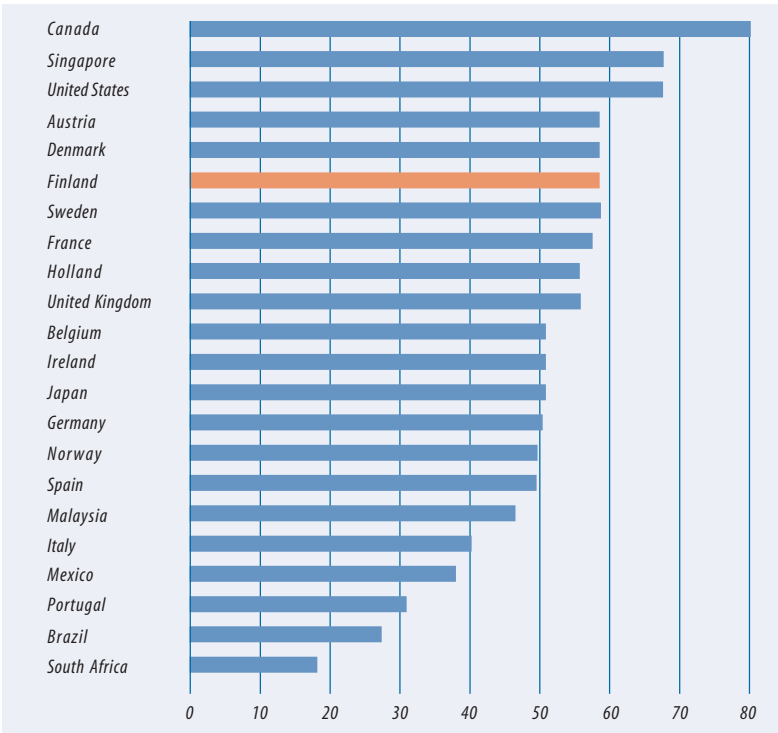
Source: National Board of Patents and Registration of Finland

In 2003, a total of 2,402 patents were granted in Finland. The number of Finnish applicants is slightly more than half of this number (1,241). The number of European patents issued in Finland has increased considerably since Finland joined the European Patent Convention in 1996. The figure in 2003 was 6,266 patents. In 2004, the number of patents granted was 2,057 and the number of European patents was 5,759.

■ **Targeted impact:**

The provision of public administration services is customer-driven, economical and real-time with regard to processes handled both within public administration and in co-operation with other actors.

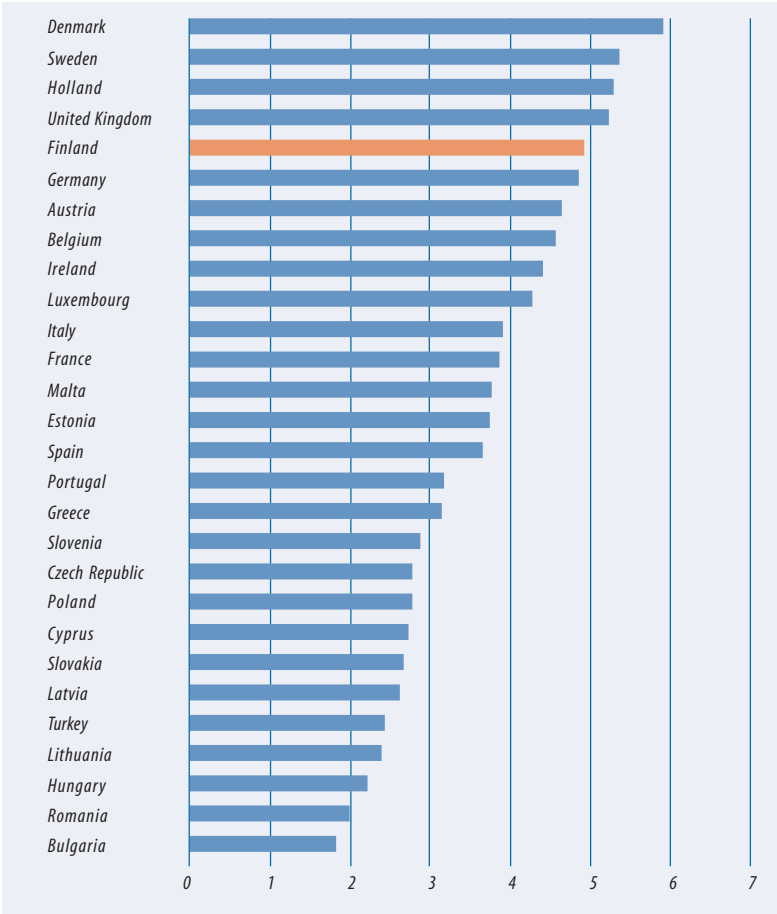
Figure 23.  
Index of online sophistication of public administration services



Source: Accenture 2004: eGovernment Leadership – High Performance, Maximum Value

In the 2000s, the consulting firm Accenture, which specialises in management and ICTs, published annual reports assessing the sophistication of electronic public administration in different countries. The most recent results of the eGovernment Leadership study were published in April 2004. The cross-national comparison afforded Finland shared fourth place in the sophistication of online public services. The study covered a total of 22 countries. Finland's strengths lay in elections, working life, university and secondary education, adult and continuing education, citizens' access to information and use of farming and population registries, for example.

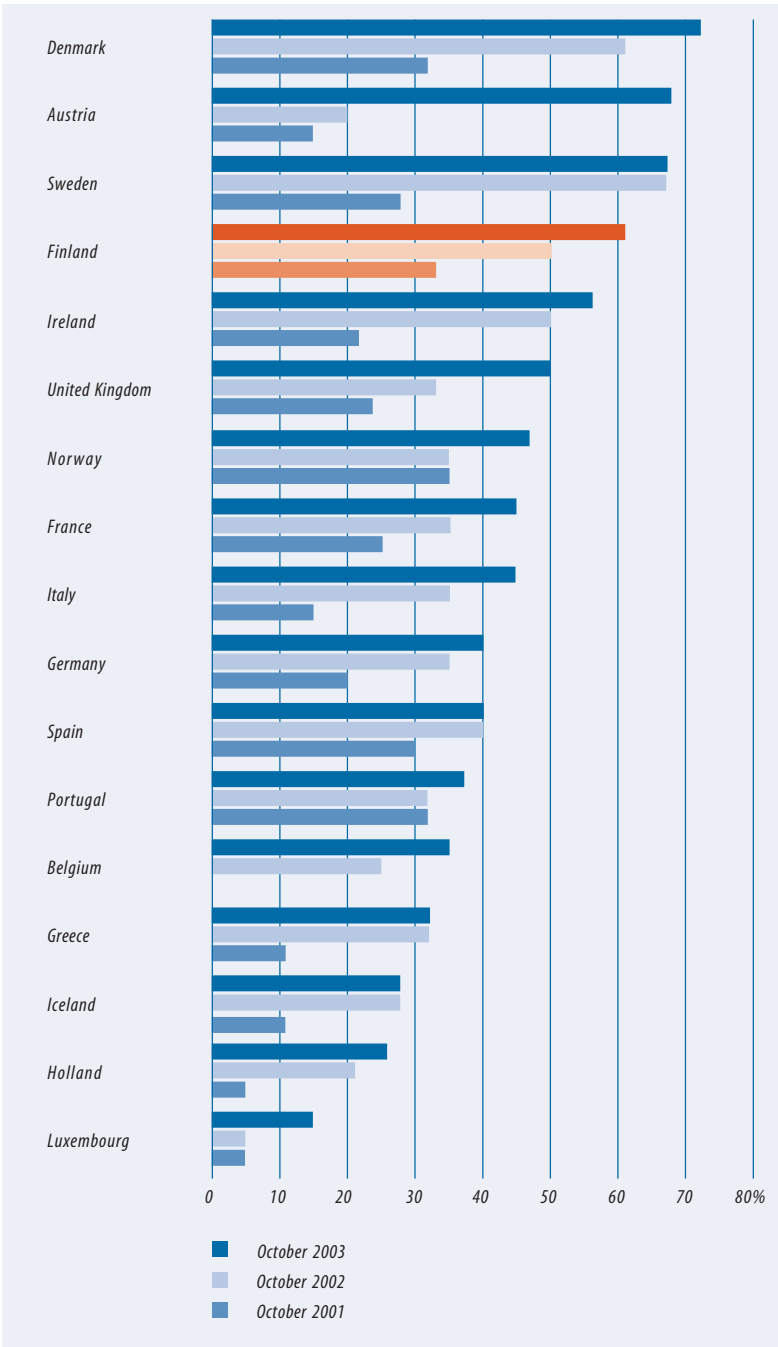
Figure 24.  
eEurope 2005 Index



Source: Insead/SAP 2004: eEurope 2005

In autumn 2004, the eEurope 2005 programme published a study assessing the development of information society related issues in EU member states and candidates for enlargement. One of the measures used was the eEurope 2005 Index. This composite index has gathered information on Internet indicators, public online services, the environment of electronic commerce, information security and the broadband situation. The average of current EU countries measured on the eEurope Index was 4.42. Finland was rated in the highest Global Leaders category and above the average of old member states with 4.92.

Figure 25.  
Online availability of public services in different countries



Source: Cap Gemini Ernst & Young 2004: Online Availability of Public Services – How is Europe Processing?

A study commissioned by the European Commission assessed the availability and quality of public online services. The research was based on a list of 20 most central public services as specified by the European Commission. Two composite indexes have been created, one based on the online sophistication of public services and the other on the number of services with full online availability. The survey has sparked some criticism in Finland for not taking into account country-specific differences in the production of the services. Still, the result can be regarded as indicative: measured on both indicators, Finland and its Nordic neighbours are rated among the most advanced 25 percent.

# Initiated or Proposed Legislative Projects Concerning the Information Society

The government's Information Society Programme focuses particular attention on clarity, consistency, relevance and the anticipation of future development needs in legislation regarding information society issues. The copyright system is being developed in a harmonised way, accounting for the interests of producers, the industry, users and consumers. The impact of all new legislation on information society will be evaluated both while law is being prepared and after it enters into force.

In this appendix, we present a list of legislative projects that have already been implemented or are currently in preparation and that form a part of the Information Society Programme. At the end, we list suggestions for new legislation. Some of these needs for change have emerged during the work of the sections of the Information Society Council.

## ■ **Current and already implemented legislative projects**

### **Act on the Protection of Privacy in Electronic Communications (eEurope 2005) (Ministry of Transport and Communications)**

The Act on the Protection of Privacy in Electronic Communications (516/2004) entered into force September 1, 2004. The purpose of the Act is to ensure confidentiality and the protection of privacy in telecommunications, and to enhance the information security of electronic communications and the development of the services of digital communications. The Act abrogates the earlier law on the protection of privacy in electronic communications and information security in telecommunications. The most significant changes introduced by the new law are connected with the processing of location data and identification data. The Act also specifies the actions that communities participating in the transmission of communications – such as telecommunication firms and corporate or associate subscribers – have the responsibility or right to take in order to ensure the information security of communications and location data.

### **Reforms to regulations on the protection of privacy in working life (eEurope 2005) (Ministry of Labour)**

The revised Act on the Protection of Privacy in Working Life (759/2004) became effective October 1, 2004. The Act abrogates the earlier legislation on the topic (477/2001). The most important changes in this legislative reform deal with regulations concerning drug testing, camera surveillance and the protection of email.

### **Extension for the Act on Experiments with Seamless Service Chains (Ministry of Social Affairs and Health)**

The Act on Experiments with Seamless Service Chains in Social Welfare and Health Care Services (1225/2003) lays down provisions for the regional experiment of a seamless service chain in social welfare, health care and social security, as well as matters concerned with personal advisors, service chain plans, and reference databases. The Act aims to broaden experiences on the utilisation of ICTs in promoting customer service and to improve the use of resources in the field of social welfare and health care.

The extension of the Act is effective between January 1, 2004 and December 31, 2005, and it abrogates the Act on Experiments with Seamless Service Chains issued in 2000.

### Reform of the copyright legislation (Ministry of Education)

The reform concerns changes needed due to Directive 2001/29/EC of the European Parliament and the Council, which deals with the harmonisation of particular aspects of copyright and related rights in the information society as well as other related amendments. The Ministry will also prepare legislative changes associated with the implementation of the provisions of the World Intellectual Property Organization (WIPO) Copyright Treaty and the WIPO Performances and Phonograms Treaty.

The government proposals were submitted to the Finnish parliament March 19, 2004.

### The implementation of the European Council's Cybercrime Convention (Ministry of Justice)

The aim of the framework decision is to synchronise penal regulations applied to serious attacks against information systems, particularly with regard to organised crime, and to strengthen police co-operation in the investigation of such attacks. The decision would render punishable acts such as deliberate intrusion into an information system and interference with system operations or deliberate attempts at such acts. In addition, complicity, incitement and aiding and abetting should be made punishable and the criminal liability of the legal entity should be expanded to cover these crimes. The framework decision also includes obligations concerning the severity of the sanctions and an article on jurisdiction.

The legislative proposal is being drafted at the Ministry of Justice.

### Report on the transfer of real estate in the information society (Ministry of Justice)

In March 2004, the Ministry of Justice appointed a commission to investigate the electronic transfer of real estate and the need for registration. The objective of the committee is to find out the ways in which online services and data transfer can be used to facilitate registration procedures and to improve the information content of the land register. The commission also aims to investigate the need to move to e-commerce and the use of electronic mortgage bonds.

In its interim report from December 2004, the commission suggested changes that would enable a more thorough registration of information on undistributed estates, including real estate. The work of the committee will continue until October 2005 (Project register code: OM016:00/2004).

## ■ Proposed legislative changes

### Bill on the transfer of copyrights to the employer

The Electronic Business and Digital Content Section of the Information Society Council suggested on March 8, 2004 that copyright legislation be amended so that rights for works, photographs, lists and databases created in employment, with the exception of the moral rights of the author, would be transferred to the employer by law, unless otherwise agreed.

The Section's proposal was discussed in the Information Society Council and the ministerial group of the Information Society Programme. In September 2004, the Board of Education submitted to the ministerial group a report on the topic, according to which concrete measures on the basis of the bill can be taken once parliament has passed the proposed amendment to the Copyright Act.

### Permanent legislation on seamless service chains

The term of the Act on Experiments with Seamless Service Chains in Social Welfare and Health Care Services comes to an end at the end of 2005. As the temporary Act makes long-term development work difficult, the Social Welfare and Health Care Section of the Information Society Council suggests that the Act be made into permanent legislation from the beginning of 2006. The Ministry of Social Affairs and Health will begin drafting the permanent legislation in autumn 2005.

### Electronic patient records and the problems of electronic entry

The Decree on Patient Documents (99/2001) does not offer the necessary guidance for consistency in the making of electronic entries. The Social Welfare and Health Care Section of the Information Society Council suggests that the decree should be revised according to the recommendations of the electronic patient record project. The decree must provide instructions for electronic identification and electronic signature and for verifying the applicability of the regulations on archiving to health care information systems.

### The liability to charge for information disclosures within administration

Disclosure of information produced by officials (e.g. data in national base registers) to another authority is often liable to fees. Possible gratuitousness is provisioned in special enactments on a case-by-case basis. A committee from the Ministry of Finance (memorandum: VM 11/ 2004) has carried out an investigation on the topic and suggests a clarification of legislation so that provisions on the information disclosures and possible severance costs collected will be laid down mostly in legislation on the authority disclosing the information, rather than in regulations concerning the official receiving the data, as is the case in current legislation.

### Steering government information management

In autumn 2004 the Commission on the Development of Information Management Methods appointed by the Prime Minister submitted a proposal on the joint steering of government information management and the concentration of service production concerning the joint information management services between ministries and state agencies. The reform is being carried out by the Ministry of Finance and it incorporates legislative changes to enable the joint steering of information management between ministries and state agencies.

### The need for legislative changes concerning public administration information management legislation

The Prime Minister has nominated a committee to develop the interoperability of information management between local authorities and ministries and state agencies. The committee will issue a report on proposed actions to develop co-operation between state and local authorities by June 30, 2005. The work is also likely to yield proposals for changes in the legislation on the organisation of public administration information management.

### The customer's access to log information about themselves

On the basis of the Personal Data Act, the customer is generally guaranteed the right to access information concerning themselves. However, the act does not allow the customer the right to view the log data on the use and viewing of their personal customer records. The Social Welfare and Health Care Section of the Information Society Council suggests that the permanent legislation include a provision granting the client the right to check the disclosure log for their personal information.

### Employment of foreign students in Finland

The Education, Research and Product Development Section of the Information Society Council suggests a change in the Finnish Aliens Act that would enable foreigners who have studied in Finland to remain in Finland and obtain work more easily than at present.

### e-Learning in basic education

The Comprehensive School Act does not allow for the use of distance learning. The Education, Research and Product Development Section of the Information Society Council proposes that, like the General Upper Secondary Schools Act, the Comprehensive School Act should incorporate the opportunity for distance learning, thus increasing the opportunity for e-learning.

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## Towards a Networked Finland

Finland's information society has emerged rapidly from the country's industrial past. The use of information and communication technologies has altered the structures of society and economy and transformed the everyday life of Finns. The foundation for this work lies in investment in knowledge and competence, the work of the most advanced companies, public sector activities and the active interest of citizens in the new information and communication technologies. The first report by the Information Society Council, led by Prime Minister Matti Vanhanen, concentrates on analysing the current situation of the Finnish information society, identifying goals for future development, and defining the means with which to achieve the those aims. The Information Society Council is the body for negotiation and co-ordination among public administration, organisations and the private sector in steering the development of the information society.