ICT best practices

in Denmark, Estonia, Finland, the Republic of Korea, Sweden and Switzerland

Rundfunk & Telekom
Regulierungs-GmbH

RTR

Schriftenreihe der Rundfunk und Telekom Regulierungs-GmbH

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1   Introduction

Information and communication technologies –
Key factors for an attractive business location

The i2010 initiative was launched by the European Commission as a new strategic framework for the creation of an open and competitive digital economy. The goal of the initiative is to create an integrated overall package of EU policies regarding the information society and audiovisual media, with the ancillary objectives of promoting the competitiveness of the single markets and providing stimuli for the labor market. The priorities defined by the European Commission in this context are to create a single European information space, to increase innovation and investments in ICT research, and to promote an inclusive European information society.

What do ICTs mean for Austria as a business location?

Information and communication technologies (ICTs) are already a major engine of growth and will become even more so in the future. With total revenues of EUR 14.55 bn,[1] more than 120,000 employees and a GDP share of approximately 3%, the ICT industry is already a substantial economic factor in Austria and has a stimulating effect on other sectors, such as trade, e-commerce, tourism, transportation, etc.

The benefits of using ICTs are widely varied and obvious: The benefit to the economy lies in increased productivity, a higher level of information and faster access to information. Everyday life in both the professional and personal spheres will be characterized by increased flexibility and the simplification of many processes.

Among the 104 countries in the World Economic Forum's Networked Readiness Index, one of the most significant indices in the field of ICTs, Austria is ranked 18th. In terms of broadband penetration, Austria was originally among the pioneers in the EU; with a household penetration level of 25% and broadband penetration of 13% of the population, Austria is now only in the middle range. Therefore, Austria's current

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[1]   Not including e-commerce (B2B, B2C)

situation is close to the average. Without coordinated long-term measures, however, the country runs the risk of falling behind.

ICT Master Plan and ICT studies: Input for an overall Austrian ICT strategy

Austria's ICT Master Plan, which was drawn up by the Austrian Regulatory Authority for Broadcasting and Telecommunications (RTR) on behalf of the Austrian Federal Ministry of Transport, Innovation and Technology (BMVIT) and presented in November 2005, underlines the importance of ICTs for Austria as a business location and for the economy, industry and the population. Its objectives and measures for enhancing Austria's attractiveness as a business location are largely based on the principles of the i2010 initiative.

As the result of intensive research, the ICT Master Plan is based on an integrated four-stage plan with the vision of positioning Austria among the top five countries worldwide in the ICT field in the medium term. Based on the strategic and operational goals of the ICT Master Plan, a package of 44 implementation measures were developed and classified according to four strategic objectives:

■ Raising awareness of the importance of ICTs
In order for Austria to earn a top position in international competition among business locations, it will be necessary to raise awareness of the importance of ICTs to Austria at the political, national and international levels. In terms of their effects on society, information and communication technologies are comparable to the printing press or the steam engine. They are already revolutionizing everyday life and affecting all areas of society. ICTs should be understood and managed in light of their significance as one of the most fundamental skills.

■ Improving Austria's attractiveness as a location for ICT companies
More than ever, promoting research and development as well as pro-viding training and education in the ICT field will be essential factors in strengthening ICTs and thus also in enhancing Austria's attractiveness as a business location. Only in this way will it be possible to ensure high quality in the relevant products and services. In order to achieve this end, it will be necessary to facilitate business startups, for example by promoting networks of "business angels."

■ Expanding ICT infrastructure throughout Austria

It will also become increasingly important to promote the development of infrastructure throughout Austria under competitive conditions and to ensure the sustainable provision of broadband services for the entire population. In order to realize this objective, it will certainly be necessary to promote broadband services on the supply side. Moreover, the national promotion strategy should be combined with local initiatives in order to eliminate "dead zones" on the map as effectively as possible. However, this will require regular monitoring of Austria's ICT status. In addition, the plan suggests measures to facilitate the development of ICT infrastructure – for example by laying empty cable conduit or streamlining approval procedures.

■ Promoting the use of ICTs

These measures refer to the fulfillment of educational requirements, the enhancement of security and confidence in the use of ICTs, the promotion of innovative services, the creation of the appropriate conditions for terminal devices and additional incentives for broadband use.

| No.	Basis		Level	Master Plan
1			Vision	■ Securing Austria a sustainable top position in the information society
2			Mission	■ Comprehensive and coordinated procedure = Master Plan
3	+ / −	Strengths / weaknesses analysis Potential	Strategic objectives	■ Awareness ■ Infrastructure ■ Location ■ Usage
4	Position 1	Best practices	Operational objectives and measures	■ Operational objectives for each strategic objective ■ 44 measures (including best-practice examples)
			Activities	Implementation

Figure 1: Structure of Austria's ICT Master Plan

ICT benchmarking study: Success factors in the implementation of ICT strategies

In order to specify its ICT Master Plan more concretely, RTR prepared an ICT benchmarking study in the first half of 2006. This study examines the factors which contribute to the successful implementation of ICT strategies in Denmark, Sweden, Finland and the Republic of Korea – countries which are at the top of international ICT rankings.

One of the major success factors identified was that those four countries had concerned themselves with ICTs systematically for 10 years or more, as well as regularly adapting their ICT strategies to changing general conditions.

In the Republic of Korea, the first Internet-related initiatives were launched as early as 1993, and in 1994 an IT commission was founded in Sweden to develop ICT strategies. One year later, Finland followed with its first ICT master plan, which focused on increasing productivity and effectiveness. By launching these initiatives in a timely manner and concentrating on ICTs over many years, those countries have been able to carry out a large number of measures and develop their strengths.

The government of the Republic of Korea made huge investments in infrastructure and was thus able to attain a broadband penetration level of over 80%, the highest worldwide. This infrastructure is used intensively by Koreans, with Internet usage amounting to 72%. With the help of large IT companies such as LG and Samsung, the Republic of Korea plans to take on the role of forerunner in defined new technology areas. ICTs play such an important role in the Republic of Korea that they already account for one quarter of the country's GDP.

Sweden enjoys modern and expansive ICT infrastructure: More than 80% of all households in Sweden have a PC. The population itself exhibits a high level of IT knowledge, which is a fixed component of each educational path in Sweden. The country benefits from large IT companies such as Ericsson, Telia Sonera and Tele2, and pursues an active policy of attracting new businesses.

Finland is now among the top countries in the usage of mobile services. The Finnish government decided to focus on e-commerce, and as a result 98% of companies currently have access to the Internet. The Finnish ICT strategy, which arose from a severe economic crisis, is borne out by long-standing regional telecommunications companies, with Nokia playing an especially important role.

In contrast, Denmark's economic structure is characterized by small and medium-sized enterprises which benefit from neighboring countries. Denmark's focus on ICTs is promoted heavily by the government, and many initiatives have already been carried out in the field of e-government.

For example, e-invoicing has already been introduced in the public sector: Companies are required to submit invoices to government bodies in electronic form. In the field of education, an independent IT university provides for a sufficient number of qualified specialists.

Therefore, each country has its own specific strengths which place it at the top of international rankings. With regard to organization, informal structures have turned out to be highly important in ICT strategy implementation in Scandinavian countries. For example, lobbying associations and business networks have had a decisive effect on raising public awareness of ICTs in Sweden and Denmark. Interest groups, companies and government authorities communicate intensively at informal levels in order to advance the ICT field and to bundle their activities. One common element in all of the top ICT countries is that strong forces in the public sector provide decisive stimuli for ICTs, thus creating spillover effects in the economy and society. For example, the Ministry of Finance in Denmark has played a key role in developing the ICT sector. Along with the introduction of ICTs, the Ministry simultaneously promoted structural reform in the public sector. As the parties involved are aware that a great deal of money can be saved using these technologies, the Ministry is pushing for the rapid implementation of e-government.

	ICT implementation structures			Overall structure
Level	- Formulation of ICT policy - Vision - Strategy	- Coordination of implementation	- Inclusion in implementation of measures ● Govt. bodies ● Businesses ● Academics ● Population ○ Others	de-centralized / centralized — formal / informal ● Planning ● Implemen-tation
Rep. of Korea	- Government	- Ministry of Informatization - Instructions to other bodies		
Sweden	- Government - Sector plans, no overall coherent ICT plan	- Strategy Group in the Ministry of Industry as a discussion forum and coordinating body		
Finland	- Government - Government program + individual responsibility	- Information Society Council, chaired by Prime Minister, launches initiatives		
Denmark	- Government	- Ministry of Finance - Ministry of Science, Technology & Innovation - Local authorities		
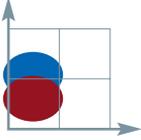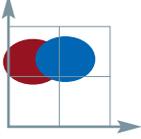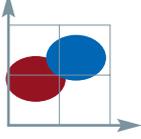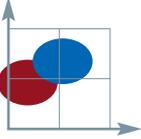
Source: RTR analysis, Simplified presentation

Figure 2: ICT implementation structures

In general, it has become clear that most ICT initiatives are planned centrally by one or more government bodies, with the business world and academic circles more heavily involved in the planning process in Scandinavian countries. Implementation, on the other hand, is decentralized and involves all of the parties concerned. In this context, informal contacts support the process of consensus-making as well as rapid implementation.

What lessons can Austria learn from those countries?

The absence of large companies in the ICT sector (as in the countries discussed above) means that the positive "pull" effect of such companies is lacking in Austria, but at the same time this prevents excessive dependency on individual large companies and thus minimizes the risk that a single company could drag an entire sector into a state of crisis. Therefore, Austria's economic structure – with its many small and medium-sized businesses – need not be considered a disadvantage, as the Danish example clearly shows. In Denmark, the targeted promotion of ICT startups has turned out to be highly compatible with such an economic structure. With the right focus areas and measures in education to ensure that the required specialists are available, Austria will succeed in advancing to a top position. As Denmark has shown, the creative entrepreneurial spirit has to move far beyond core ICTs, and innovations will only arise through fruitful combinations with other areas. In this way, new areas of professional activity can be created and the use of ICTs will take on a key role in all sectors of the economy.

Conclusions and recommendations for Austria

1. Austria's ICT policy should be sustainable and concentrate on predefined focus areas. Within those areas, it is also important to strive for technological leadership.

2. In this immediate context, Austria's ICT program should aim to identify and specifically promote growth engines, that is, areas related to key research focuses.

3. The programs and initiatives must be subject to ongoing progress monitoring and continued development.

4. In education, ICTs should be taught in connection with other subject areas. This synergy with other fields will promote new and innovative uses of ICTs.

5. In order to ensure that the population benefits from these innovations, it will be necessary to take measures to increase PC penetration, especially as owning a PC is one of the most important requirements for using ICTs.

6. Another requirement is the creation of infrastructure, which should include forward-looking technologies and reach the entire population.

7. Securing a top position for Austria will require both formal and informal cooperation as well as close coordination among all stakeholders.

As discussed in the master plan, which also accounts for these seven success factors, it is now time for Austria to develop much-needed detailed plans and specifications and to secure itself a top position in the ICT world.

Summary

Austria is still in the process of raising awareness and sensitization to the importance of ICTs; the other four countries have long since passed through these stages. The efficient implementation of an all-encompassing ICT strategy throughout Austria will depend heavily on making ICTs a high priority and on the full commitment of all stakeholders and responsible bodies. Therefore, the recommendation is to develop realistic objectives in the form of projects, to continue developing them systematically, and to monitor their status and progress on an ongoing basis.

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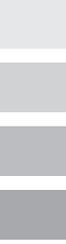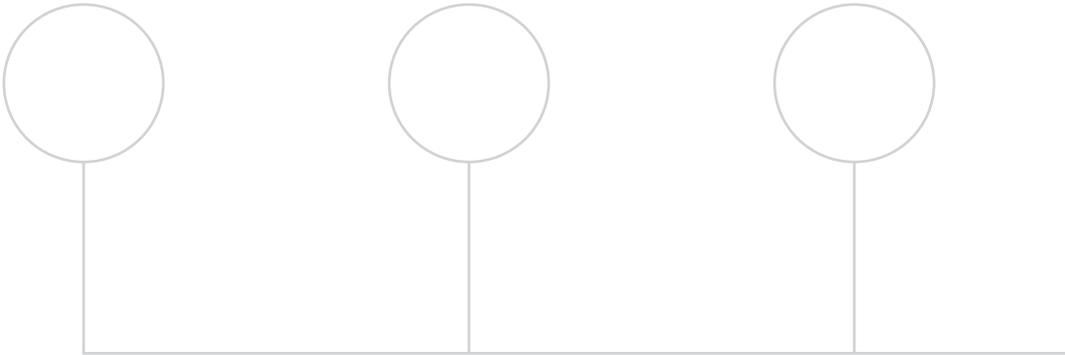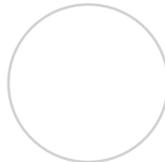
Denmark

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Danish National IT and Telecom Agency
The Danish National IT and Telecom Agency is part of the Ministry for Science, Technology and Innovation and has a staff of about 250. The Agency's principal task is to develop and implement initiatives within key areas of the government's IT policy strategy. A strategy that aims to ensure an optimal framework for IT and telecommunications and conditions that will enable citizens, businesses and the public sector to realize the network society.

2 Pervasive e-government – the case of Denmark

2.1 Introduction

This chapter will outline the Danish effort to push through ICT reforms and increase digitization by addressing the challenges facing Danish society and the strategy and organisation devised to counter them. Following this, a number of examples are presented to illustrate the variety and scope of Danish ICT reforms. In conclusion, the paper suggests some lessons learned, that would help other ICT reform promoters obtain a smoother progress.

The primary tool to facilitate e-government is an agreed infrastructure based on common, open standards. The Danish ICT policy objective is to use ICT to create prosperity through three strategic focus areas: the citizens, the businesses and the public sector. The means are a strong political devotion and an organisational framework at the highest level of public servants.

2.2 Background and definitions

In this chapter, ICT reform is largely synonymous with e-government (electronic government). The reason for this is mainly the fact that Denmark has a quite large public sector compared to many European Union states. Hence, the incentives to push for e-government are strong, as large economies are possible and as wide stretches of society can be pushed directly towards e-government. From this precondition springs the Danish implementation method of legislating for e-government.

Some other preconditions exist for the e-government strategy:

- Currently, the national budget is running a surplus, and unemployment is at a record low
- Subsequently, and as the Danish work force is highly mobilised, no labour reserve exists to draw from, hence the need to "use fewer hands".

On a more general level, Denmark has a three-tiered governance structure, i.e. the state government and its respective ministries and associated agencies etc.; regions/counties ("amter") governing various tasks such as health care, roads, etc.; and local government in the municipalities ("kommuner"). Currently a major local government reform, "Strukturreformen" or The Structural Reform, is being implemented, creating a new map of Denmark. 98 municipalities will replace the previous 271, and counties are abolished to give way for five regions. Widespread opportunities for spurring on e-government initiatives are anticipated on the back of this reform.

2.3 Challenges – why e-government

The Danish economic model faces a number of challenges. The primary challenge is a demographic one, as the population ages significantly over the next 35 years with the withdrawal of the post-WW2 generation from the labour market. In 2040, the ratio between the work force and the number of people living on transfer income will have risen from a percentage share of the total population in the low twenties to the high thirties – if no countermeasures are launched. Similarly, public finances will deteriorate from a 1-2 pct. surplus to a 3 pct. deficit resulting from demographic change alone, which poses a financing challenge.

Secondly, as the labour force dwindles, the public sector faces an impending recruitment problem as well as an obligation not to consume an increasing share of the newly educated.

Thirdly, the public sector must expect increasing expectations – from citizens to the provided level of service and from businesses to the public services with a view to the international competition. The combined impact of these three challenges requires a more efficient government administration. It requires a rise in the service level in terms of quality as well as of quantity as well as less bureaucracy and red tape.

2.4   Strategy – e-government and ICT

In 2001, the Danish state along with the local authorities set out a strategy named "Projekt Digital Forvaltning", Project e-government, to counter the challenges listed above. The strategy also works in conjunction with the "Moderniseringsprogrammet", The Modernisation Programme, launched by the Danish government at its inauguration in 2001. The aim of this effort has been to deliver government access and services to citizens and businesses 24 hours a day, 7 days a week. In more general terms, the aim has been to create a more open and user-oriented administration, leading to more citizen involvement. Following this, there has been a sequence of joint strategies for state, regional and local government 2001-2004 and 2004-2006, which has been supported by measurable goals.

This particular strategy was chosen based on a deep and continuous conviction at the very top level that the benefits potentially gained from digitization necessitate a broad cooperation across all sectors and levels of government on both strategic and practical solutions. Nonetheless, every government body must be responsible for its own transition towards e-government.

The vision guiding the current e-government strategy is that "Digitization must contribute to the creation of an efficient and coherent public sector with a high quality of service with citizens and businesses at the centre". To do this, the strategy defines five e-government goals termed "signposts" to be achieved by the end of 2006:

- The public sector must provide coherent services with citizens and businesses at the centre.
- E-government must result in improved service quality and the release of resources.
- The public sector must work and communicate digitally.
- E-government must be based on a coherent and flexible infra-structure.
- Public sector managers must lead the way and ensure that their own organisations are capable of realising the vision.

In the more specific area of ICT, the government's policies and specific initiatives are described in the action plan from October 2003 "Using IT Wisely", which sets the framework and defines the guidelines for the efforts in the area. With this action plan, the Government has been targeting its efforts at the areas where the use of ICT generates the highest value. The Action Plan presents a number of coordinated and specific initiatives which, taken together, will contribute to maintaining Denmark's position among the world's leading ICT nations, ensuring continued improvement and increased value of ICT activities in Danish society. Denmark is to be among the world's best ICT nations, characterized by advanced and creative use of information and communications technologies in all parts of society. This is the government's ambition and the aim of Danish ICT policy.

In specific terms, it is the aim of the government that efforts in the ICT area should contribute to:

■ Developing the public sector,
■ creating growth in Danish business and industry,
■ qualifying the Danes for the future knowledge society.

2.5   Organisation and resources

To carry out this sector strategy, a joint framework was established in 2001 to promote and coordinate the transition to e-government across all levels of government. To stress an important point, the organisation preceded the strategy by about one year.

As illustrated in fig. 1 below, the organisation is lead by the "e-government board" oversees the general e-government reforms. It consists of permanent secretaries from the main ministries and the managing directors of the local and regional government organisations. As such, the e-government chief players and goals are by and large not afflicted by day-to-day political disputes and will not be overrun by political changes such as a government transition.

The board delegates to a number of working groups headed by the following key e-government players:

- The Digital Task Force based in the Ministry of Finance, focusing on organisation, strategy and government support,
- Danish Agency for Governmental Management, focusing on major state IT systems,
- the National IT and Telecom Agency within the Ministry of Science, Technology and Innovation, focusing on IT and technology,
- sector ministries, regional and local governments are responsible for implementation. E-government must result in improved service quality and the release of resources.

The pivotal characteristic of the organisation of the e-government effort is the joint framework across public sector levels. This follows from the fact that the Digital Task Force as the coordinating body, although hosted by the Ministry of Finance, has been built up of "inpatriated" staff from all levels of government, making this structure unique in the Danish public sector, as it works as an implementation body as well as a coordination committee. As a consequence, all major decisions are taken in coordination between ministries, agencies, local and regional government organisations. This characteristic further contributes to the political independence of the board, resulting in strengthened top-level civil service backing of the strategy.

As for means and measures, the Danish e-government policy has been largely based on

- legislation,
- best practice examples,
- consensus and voluntary agreements,
- centrally agreed standards,
- use of the public sector as a driver and lever for ICT penetration and reform.

Graphically, the e-government strategy is displayed as follows:

Vision ↓	Digitalisation must conribute to the creation of an effective and coherent public sector with a high quality of service, in which citizens and business are in the centre		

Signposts ↓	➔ coherent services with citizen and businesses in the centre **1**	➔ create increased service quality and release resources **2**	➔ work and communicate digitally **3**	➔ coherent and flexible IT infrastructure **4**	➔ managers must ensure that their own organisations can realise the vision **5**

Focus areas	I. Secure and measure realisation
	II. Strengthen management and skills
	III. Renew organisation and corporate culture
	IV. Improve communication, knowledge sharing
	V. Develop incentives and financing
	VI. Enhance infrastructure

Project columns: Medication | G2B services | Children and young people at risk | JEDM | e-Day | www.virk.dk | www.sundhed.dk | EPJ | System modernisation in the Inland Revenue | System modernisation in the police force | Initiatives in individual public authorities | Other local initiatives

Business area | Major digitalisation projects | Local

Figure 1: Danish e-government vision and strategy 2004 – 2006

2.6 Strategic e-government initiatives

2.6.1 Online access to government services

Almost all local, regional and central government authorities have web sites with services to citizens and businesses. From these web sites, in many cases also from terminals located in the specific government body or office, citizens have access to forms and interactive services that are integrated with back-office computer systems. In this respect, the need for identification both demands and creates an increasing use of the digital signature (see below).

Examples of this type of self-service could be online tax filing, ordering a book at the library, a change of address, etc. The independent goal of supplying both households, businesses and public offices with an Internet connection means that almost all people can access these self service solutions either from home, work, public libraries or local government.

2.6.2 eDay – Digital communication between government authorities

Starting September 1, 2003 all government authorities have the right to send documents electronically and the right to demand that documents from other authorities be sent electronically.

Starting February 1, 2005 that right is extended to citizens and businesses and also includes digital signatures. The initiative aims at promoting the use of e-mail and Internet communication in the public sector and reorganize work processes towards paperless administration, making government more efficient. But planning is already ahead of us – by 2012 all digital communication between businesses, citizens and the public sector should be electronic. In this way, digital communication is seen as an option for citizens, but a duty for businesses and public authorities.

2.6.3 IT Architecture – basic rules for government IT systems

Naturally, it is more difficult to integrate existing IT systems across government authorities than to create rules that these IT systems must apply to before they are built. Therefore, the IT architecture action aims at creating an e-government architecture that government institutions must adhere to. The aim is to pose IT architecture plans for all major e-government systems in the future, as e.g. a reference model for service-oriented architecture, a system for identity and access management, standards for portals etc.

2.6.4 Digital signature

Large parts of the self-service infrastructure demand a secure identification system. To this end, the digital signature plays a key role in the entire strategy for e-government in Denmark. As a consequence, the state provides all Danish citizens with a free digital signature, supplied and serviced by a major telecom operator.

The digital signature is legally binding for all interaction on the Internet. Roughly speaking, the Digital Signature comes in two classes: A personal signature for individual private use, and a worker's signature for individual use when engaging in electronic interaction as part of a job, as of now typically in the public sector. The aim of the signature is to ensure

- authenticity, guaranteeing the identity of citizens, businesses and government authorities,
- integrity, guaranteeing that the contents of e.g a message have not been changed,
- privacy, guaranteeing that no one can listen in on the communication.

2.7   Case initiatives

2.7.1 e-Faktura

Quoting OECD, Denmark's e-Faktura, also termed EID, Electronic Invoicing in Denmark, is a good example of how government can apply ICT to redesign common or generic back-office business processes in pursuit of significant benefits, both for government and/or businesses and citizens. The e-Faktura was implemented on February 1, 2005, and later that year given the eEurope award in 2005 in the category Transformation.

In short, e-Faktura meant that all invoices to public authorities and institutions must be in digital form. For vendors to the public sector this meant that all invoices must contain a so-called EAN-location number, an order number and references. The vendor must either create the electronic invoice himself or have the invoice created using an "invoice portal" or by a certified "Read-In Bureau" VAN-network. The invoices must be in the electronic format of OIOXML, which is an XML open standard format published by the National IT and Telecom Agency.

The business case for e-Faktura identified significant savings from moving to a purely electronic approach to invoicing of government organisations. The estimated efficiency and economic benefits of making this change were judged to be of sufficient size to justify a legislatively mandated move to electronic invoicing, coupled with closure of non-

electronic channels for invoicing. As this shift was implemented quite rapidly, consideration was given to the potential impact on both businesses and government bodies.

In this respect, special attention was paid to ensure that small Danish businesses without the necessary ICT capability would be provided with alternative means to present electronic invoices. In essence, this vanguard move would not ignore the needs of those lagging behind.

Despite this, during implementation a range of unanticipated problems has threatened achievement of expected savings from e-Faktura, at least in the short-term. Technical implementation has been more difficult than expected, and businesses have responded by charging additional invoicing fees and presenting incomplete or duplicate invoices. Government organisations have also reacted in unexpected ways. For example, municipalities have requested financial compensation for implementation costs.

2.7.2 Borger.dk – One portal for government services to citizens

Borger.dk is an ambitious plan to create a single entry point to the public sector for citizens in need of information and services in order to perform the most common administrative tasks. The first version will launch on January 1, 2007 and combine services from the main state and municipal portal, danmark.dk and netborger.dk, accordingly. The next generation, planned for 2008, will include a personalized page for citizens and will be based on a reference service architecture and a set of common service components.

2.7.3 Virk.dk – Portal for government services to businesses

Virk.dk is a single entry point for information and services needed by businesses in order to perform almost all administrative tasks. This portal allows businesses to interact with government in an automated and integrated process that maximises speed and efficiency. It is financed as public-private partnership, but operated by a private company. Next generation is being planned for 2007.

2.8   Conclusion

Denmark is often found at the top of the list when measuring e-readiness, e-penetration and e-government. The reasons for this have been partly a need – demography places hard exigencies on policy makers to push up efficiency in a large and costly public sector. It has partly been due to the sound decision making climate at the civil service top level in which the e-government strategy was conceived and agreed upon, almost unanimously. In addition, all tiers of government have been included in the process as equals from the very beginning. And it has been partly due the solid measures of legislation that the state has applied to both its own institutions and to its citizens. Nevertheless, Denmark is a case in point to prove that centrally agreed strategies and centrally decided standards can clear the road ahead for e-government and ICT policy reforms.

2.9   More information

General information about Denmark: http://www.denmark.dk

Information about activities in the Danish National IT and Telecom agency: http://www.itst.dk

Information about e-government and infrastructure initiatives: http://www.oio.dk

The Digital Task Force (Ministry of Finance): http://www.e.gov.dk

IT and Telecommunications Policy report 2006: http://videnskabsministeriet.dk/site/forside/publikationer/2006/it-and-telecommunication-policy-report-2006

Key figures on the Danish Information Society 2006: http://www.dst.dk/ICT.aspx
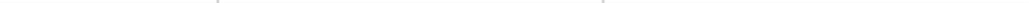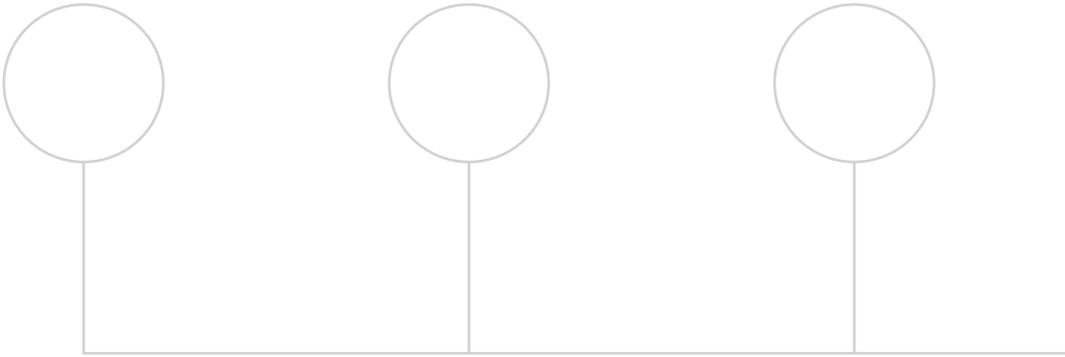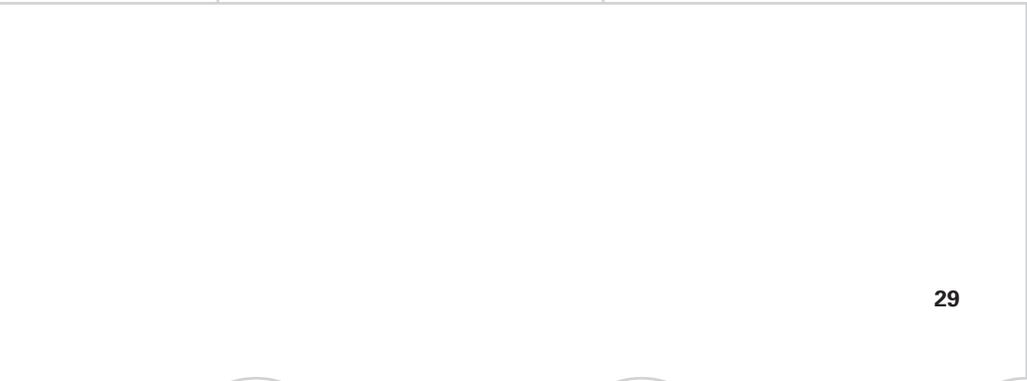
Estonia

Ando Rehemaa
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Ando Rehemaa is Director General of the Estonian National Communications Board since June 2004. Mr. Rehemaa has gained his business experience in various functional areas in global and medium-sized firms, operating in different industry sectors. He has managed international projects and has leadership experience from managing multi-skilled virtual teams in multi-cultural environments. Ando Rehemaa has been working in the telecommunications sector since 1997 as a manager in the EMEA division of MCI and as a management consultant with Gemini Consulting. He is a graduate of the Nijenrode University in the Netherlands with the post-graduate degree of International Master of Business Administration.

Estonian National Communications Board (ENCB)

The Estonian National Communications Board (ENCB) is a governmental agency acting in the administrative field of Ministry of Economic Affairs and Communications and fulfilling several different tasks like management of radio frequencies and numbering as well as regulation of electronic communications market and postal market of the Estonian Republic.

The main tasks of the ENCB include the creation of necessary conditions for the development of electronic communications and postal sectors, promotion of the development of electronic communications networks, publicly available postal and communications services without giving preference to specific technologies and ensuring of the protection of the interests of users of telephone, mobile telephone, data, international telephony, cable distribution and postal services by promoting free competition, quality of service and the purposeful and fair planning, assignment and use of radio frequencies and numbering as well as exercising the supervision in all sectors of its activity.

3 ICT experiences of a small country, first fifteen years

3.1 Introduction

In recent years Estonia has appeared in many international studies as a successful implementer and user of information technology. One of the recent examples is a study from Capgemini, published in June 2006[1]. On request of the European Commission the company is measuring the European countries on their progress with the online public service delivery. Estonia is sharing the respectable third and fourth places together with Sweden and after Malta. The undisputed leader on the list of most successful countries is Austria.

Naturally, good comparative rankings make one feel proud of its own country. Many have asked about what have been the enablers of such relative success for a small country. Probably there are many different answers as there have been hundreds of different factors, some of them more and some less significant. Some of those factors are probably given or unique, some of the factors can be considered for implementation in other circumstances.

On August 20, 2006 Estonia celebrated the 15th anniversary of its re-establishment as an independent Republic. Fifteen years ago the country had many things to rethink in its past and many decisions to be made about its future. In year 1991 the Soviet block had collapsed bringing with it economic crisis and hyper inflation. The old economic models were out of date and work principles had to be redefined. Was it a collapse with no direction and no hope or was it an opportunity? There were some preconditions for success, which the country had inherited from its past and current situation at the beginning of the 1990's.

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[1] Online Availability of Public Services: How is Europe Progressing? Web based survey on Electronic Public Services Report of the 6th Measurement, Capgemini, June 2006: http://europa.eu.int/information_society/eeurope/i2010/docs/benchmarking/online_availability_2006.pdf

3.2   Preconditions

The following preconditions supported the start of the rapid ICT-infra-structure development:

■ Relatively good technical education and availability of good enginee-ring skills,
■ urgent need to immediately abandon the old systems and structures combined with the need to build and implement new systems,
■ timely coincidence of the build-up period with the rapid phase of tech-nological development in general. Possibility to implement immedia-tely the most innovative solutions and technologies,
■ well developed neighbouring Nordic countries close at hand as exam-ples providing good learning opportunities,
■ small size of the country or "manageable size of the test ground".

The transition at the beginning of the 1990's created several countries with similar preconditions and with a similar urgency to redefine and rebuild their societies. Below an overview of motivators and initiatives, which have further supported Estonia in its ICT-sector development.

3.3   Motivators

3.3.1 Active private sector

The private sector in Estonia had a desire and a firm belief in being able to improve their competitive position with the help of new technologies. New solutions were used boldly. And even though the risk levels of some of the initiatives were relatively high, there were no major setbacks. The successfully implemented solutions provided a good starting speed for new businesses and encouraged further entrepreneurs to follow.

The most visible innovator and probably having the most significant impact was the new banking sector, built up from ashes. The new banks, which were run effectively by a new breed of young dynamic leaders managed to implement in the whole country a well functioning electronic banking infrastructure. The banks managed to convince their clients to use "plastic money" in their everyday actions and managed to divert the majority of transactions into Internet environment. They also

managed to convince the clients in the efficiency and security of electronic transactions. And the clients followed quickly.

The private sector discovered quickly that both the IT and the telecommunications sector offered good development opportunities. Several small companies were set up at the beginning of the 90's for assembling hardware from prefabricated components, programming software or providing Internet or IT infrastructure services. Over the decade these small companies have been able to adapt with the market demand. Many have consolidated. Although no internationally known brands have been evolved, these companies have been a good breeding ground for a generation of innovative ICT specialists.

The most phenomenal in the ICT-sector has been the success of mobile service providers, who in the last fifteen years have been able to convince every Estonian (statistically taken with a 100% penetration) about the advantages of having a mobile phone in their pocket. The private consumer with an average income of a fraction of EU15 average has learned quickly the advantages of mobile lifestyle and the comfort of new creative mobile services. The operators on the other side have been profitable.

3.3.2 Ambitious public sector

The public sector had the courage to rely on ICT experts and technology in their goal to build an efficient and well functioning public sector governance structure. It fitted with the public attitude of trying to do things differently and better than before. The relative youth of many leaders also in the public sector was naturally a supportive factor.

3.4 Overview of decisions, major initiatives and programmes taken on bringing forward ICT

3.4.1 Principal decisions

The growth of the telecommunications sector was well supported by optimal and quickly implemented political decisions, which enabled the transformation of the telephony service provider from a government agency into a public company, attraction of foreign investment, not too

lengthy concession conditions for the incumbent, later privatization of the government owned majority shares and opening of the fixed telecommunications market in 2000.

The ministry responsible for telecommunications and ICT[2] has laid down main guidelines of development and ensured necessary legislative support. Since 1998 the Government is signing off the "Principles of the Estonian Information Policy"[3], which is the basic policy document in the field of information society in Estonia. The current updated version of the document is in the final stages of preparation. It provides the framework for ICT activities with clear goals, responsibilities and deadlines.

The regulator of the telecommunications sector was established among the first agencies of the new Republic, dealing with radio frequency matters only at the beginning. After reorganisation in 1998[4], responsibilities of managing the numbering resources and market regulation were added. The agency has well promoted the introduction and maintenance of the effective competition among the market players.

The coordinative agency[5] was established in 1993 to support the definition of ICT policies and to coordinate different implementation initiatives within the public sector.

3.4.2 Initiatives in the sphere of education

Tiger Leap 1996 – 2000

The national Tiger Leap Program (http://www.tiigrihype.ee) for computerisation of Estonian schools, launched in 1996 by President Lennart Meri, set the following goals:

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[2]   Ministry of Transport and Communications 1991 – 2002, Ministry of Economic Affairs and Communications from 2002, http://www.mkm.ee
[3]   http://www.riso.ee/en/files/Policy.pdf
[4]   Inspection of Telecommunications of the Republic of Estonia 1991 – 1998; Estonian National Communications Board from 1998, http://www.sa.ee
[5]   Department of State Information Systems, http://www.riso.ee

- Help local governments to develop the IT infrastructure of schools, including support for establishment of Internet connections in schools,
- help Estonian teachers to acquire basic computer skills and guide them to utilisation of up-to-date resources of information and communication technology in subject teaching,
- support updating of curricula by means of an interactive learning environment, promoting learning skills,
- encourage creation of original software dealing with Estonian language, culture, history and nature in compliance with the national curriculum.

Results:

- 25 students per computer on the average in Estonia; there are no upper secondary schools nor basic schools without computers,
- 75% of all the schools have got online Internet connections and the remaining schools have a dial-up option.

Tiger Leap+:

The objective of the Tiger Leap+ development plan is the implementation of ICT in order to provide premises and conditions to create a learning environment in general education schools of Estonia.

The development plan focuses on four priority fields:

- ICT competencies – development of the competencies of graduates from each stage of study, and of teachers and officials in education, by means of up-to-date curricula, in-service training courses and training materials,
- virtual learning – production of electronic training materials and educational software in Estonian, support for virtual collaboration of teachers, in-service training and exchange of experience, creation of virtual upper secondary schools, and legalisation of virtual learning,
- sustainable development of infrastructure – constant upgrading of ICT hardware and software in schools, securing high-level Internet connections and technical support to schools in co-operation with school administrators,

- collaboration of all parties involved – collaboration between the state, local governments, schools, parents and organisations, and elaboration and implementation of principles and different forms of co-operation.

3.4.3 Infrastructure for public sector

PeaTee (MainRoad)

The first major project in public sector in the ICT field with the aim to connect all Estonian governmental institutions via backbone network enabling data exchange with speed 8 Mbits/s. The project was finished on 1998 and more than 200 governmental institutions were connected at the end of 1998 (550 institutions with more than 10,000 computers in 2000). After that the project called Külatee (Village Road) was initiated at the first stage to enable local governments to provide their services via Internet.

KülaTee (Village Road)

The aim of the project was to establish data communication services in the counties and join the information systems of local governments with those of public administration. The project kicked off at the end of 1998 with preliminary studies. Project completion, which meant a minimum of 64 kbps leased line capacity to each of the 245 existing municipalities, was in late 2001.

KülaTee 2 (Village Road 2)

The aim of the project was to create Internet connections of Estonian Public Libraries. Leased-line public Internet access points have been opened at more than 60 libraries all over Estonia. They are equipped with new computers and printers acquired through the public pro-curement process.

KülaTee 3 (Village Road 3)

At the beginning of 2005, the Külatee 3 (Village Road 3) project was initiated by the State Information Systems Development Center, which is designed to guarantee the delivery of permanent Internet

connection in 90% of Estonia. Public tenders are finalised, several networks are in operation and the rest are under construction.

X-Tee (X-Road): data exchange layer between registries and databases

The important step was data exchange layer called X-Tee (X-Road), launched 2002. The project was initially launched for linking Estonian state databases to the common data resource accessible over the Internet. After the successful start of sending database queries and answers over the Internet, the X-Road environment was expanded to send all kinds of electronic documents in XML-format securely over the Internet. Furthermore, X-Road became the skeleton for all e-government services. The use of services presumes authentication that can be done either with the Estonian ID card or by using Internet bank authentication codes.

The X-Road must enable to do any common data processing operation. Proceeding from this principle, several extensions have been developed for the X-Road: writing operations to databases, transmission of huge data sets between information systems, successive search operations of data in different data sheets, possibility to provide services via web portals, etc.

By January 2006, over 355 agencies and 50 state databases had been joined with the secure data exchange layer X-Road.

3.4.4 Public key infrastructure (ID Card and digital signature)

By the end of 2001, ID card enabling secure personal authentication and digital signing as well as the public key infrastructure (PKI) necessary for that had been developed in Estonia. ID cards had been issued since January 2002, and by February 2006 the respective figure was over 900.000 (total population of Estonia is 1.356.000).

ID cards are used for authentication, digital signature, encryption, ID-ticket, e-election. Though small-scale pilots on Internet-based voting have been carried out in several countries, the number of those having been able to confirm the Internet-based votes valid is still small. In Estonia, Internet-based voting using ID-cards was used during the local government elections in October 2005. For the first time, the new kind of voting was applied countrywide (9135 e-votes, almost 2%).

3.4.5 Public services

3.4.5.1 Governmental portal

The Governmental Portal is a common name for closely integrated government portals. The portal offers public information about state agencies functions and services for citizens and entrepreneurs.

The presentation layer of the state information system consists of three central components:

- "eRiik" (e-government) http://www.riik.ee, completed in 1998,
- "Teabeportaal"(Information Portal) http://www.eesti.ee, completed in 2003 in the framework of the Citizen's IT environment, available in Estonian, in English and in Russian,
- "Kodanikuportaal"(Citizen's Portal) https://www.eesti.ee, completed in 2003 (in Estonian only).

The usage activity of portals varies a lot, from 2000 visits to the Citizen's portal to 25,000 visits per day to the e-government portal.

The aim of the Governmental Portal is to concentrate government pro-vided information and services in order to mediate services based on GIS systems, X-road technology and mobile solutions to the citizens. The portal offers the end user a single point of access to as many public services and information as possible. This public information can be found in the portal on the basis of state agencies and institutions, different subjects or real life situations of the citizen.

Through authentication by the national ID Card or via electronic banking, this environment offers all users the possibility to fill in and submit electronic forms, access to their personal data on X-road, services related to digital signing etc. Every holder of the national ID card has been assigned an official e-mail address Forename.Surname@eesti.ee, which is the main channel for passing electronic information from government institutions to the citizen. Entrepreneurs using the portal are additionally authorized on the basis of data in the State Commercial Register, which enables them to access additional X-road services, targeted to entrepreneurs.

It can be mentioned that from 2000 the Estonian government has replaced paper documentation prepared for its sessions with digital documents and launched an Internet-based system for government sessions.

Further developments in public sector will be:

■ Document management and digital archiving: increasing the share of electronic document management and launching digital archiving in order to ensure faster, easier and more convenient management of public business.
■ Administration system for the state information system (RIHA): development of a new administration system for the state information system. RIHA will be an integral system covering all components of the state information system, administrating their metadata, providing services, and performing, to the extent provided by legislation, the administrative function of support systems.

3.4.5.2 E-Citizen

E-Citizen is a nation-wide project for developing co-operation between Estonian citizens and the public sector using the Internet. It started with the aim of creating a citizen portal in the Internet, but is now developing into a unique solution enabling citizens to participate in the information society. Every citizen will have his/her own information system (virtual office), which he or she can access with the ID card. The citizen communicates with all other information systems in the state via this personal information system, while these systems have an obligation to communicate with the citizen's office and reflect the state of processing his/her affairs to that office. The citizen no longer needs to search for services, but has the opportunity to order services and follow the processing of these without leaving his/her "office".

3.5   Where do we stand? Some statistics of ICT sector

The initiatives and programmes described above and many others not mentioned have been undoubtedly driving forward the development of the ICT sector. The country statistics related to the ICT sector have been improving year over year. Below an overview of some figures, which are regularly measured and monitored.

According to the TNS Emor (http://www.emor.ee) survey (spring 2006), 58% of Estonians aged 15-74 use Internet. 82,5% use Internet for reading e-mails, 77% read newspapers, 75,29% use e-banking and 69,7% search information on products or services.

According to Statistical Office of Estonia (http://www.stat.ee) 38,7 % of households have Internet connection (Q1 2006).

According to the TNS Emor e-Track survey (autumn 2005), almost every second Estonian aged 15-74 has the possibility to use a PC at home, indicating a significant increase in comparison with 2004 (from 32% in 2004 to 40% in 2005). Another positive sign is that most of the new home PCs are connected to the Internet – 81% of households with a PC have an Internet connection. 73% use broadband Internet, whereas ADSL (47%) is the most widespread type of Internet connection, followed by a cable modem connection (26%) and dial-up (4%).
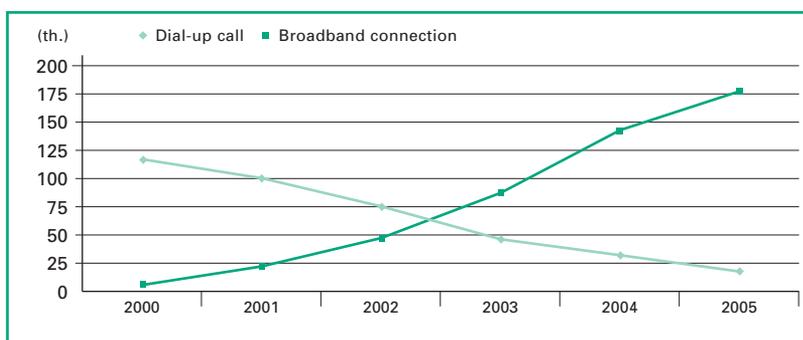
Figure 1: Change in the number of end users of broadband connection and dial-up service[1]

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[1]   Annual Report 2005 of the Estonian National Communications Board
      (http://sa.riik.ee/atp/failid/SA_aastaraamat_2005_ENG.pdf)
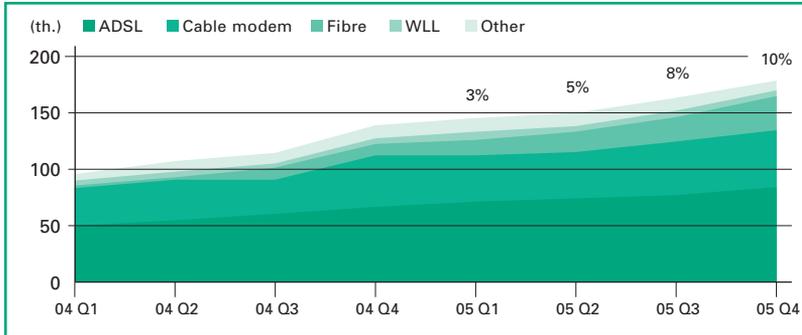
Figure 2: Change in the number of end users of different technical solutions of broadband Internet connection in 2004 – 2005[2]

The number of companies connected to the Internet is also on the rise. In April 2005, 75% of Estonian companies had an Internet connection. Mostly broadband Internet is used, whereas ADSL connection is the most popular.

There are 840 WiFi-hotspots per 45,000 km[2] (http://www.wifi.ee).

3.6   Could we have done better? The obstacles

The modest income levels of private customers as compared to the average prices of ICT services and the average income levels in EU15 countries have undoubtedly had some impact on penetration of services and equipment. Relatively high percentage of ICT expenditures in the buying basket of an average citizen does not leave much space for further increase.

The share of e-commerce is still quite modest in Estonia (8% of Internet users). However, it has doubled from 2004. Using the Internet for phone calls is still relatively new (8% used the service in 2005 and 4% in 2004).

Unsatisfactory status with Local Loop Unbundling: the effective competition is achieved mainly in highly populated areas of bigger cities by cable companies. In rural areas the technological divide remains high. However, recent developments are encouraging: opening the 3,6-3,8 GHz frequency band as the extension to band 3,4-3,6 GHz band for WIMAX applications will enable further development of data communications. Also the public tender for the allocation of frequencies in 450 MHz band for wideband datacommunication is in progress.

The opening of the European labour market and the steep development curve of the sector have brought a new issue in recent years – the adequate supply of qualified ICT personnel.

The cooperation between the public sector organisations and between public and private sector has been promoted for some time and good results have been achieved. However, there is space for further im-provement.

3.7   Conclusions

One could debate that the surprisingly good country rankings in the international ICT-surveys are to be attributed mostly to good starting conditions, where a couple of right decisions combined with a bit of good luck provided the success formula. This could be the argument for the first achievements in the early 90's. However, most of the later results are to be attributed to successfully introduced ICT coordination and management in the country.

The main goal now is to ensure further development of the ICT sector with close cooperation of all interested parties.
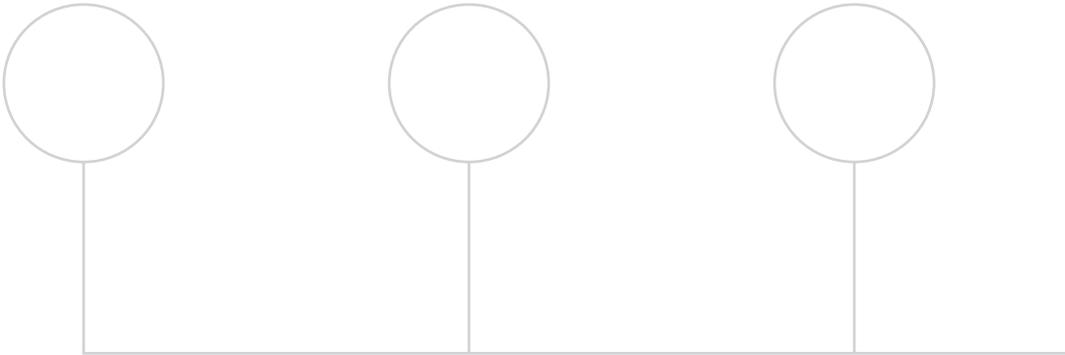
Finland

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Finnish Ministry of Transport and Communications

The Ministry of Transport and Communications is responsible for two broad government sectors: transport policy and communications policy.

In the transport sector, the Ministry is responsible for transport systems and networks, and for the transport of people and goods. Traffic safety, the reduction of environmental nuisance or damage, and the various means of transport themselves all fall within the scope of the Ministry´s resposibility.

In the communications sector, the Ministry looks after issues relating to communications networks, e-commerce and the media. It monitors the working of the communications markets, the development of the Information Society, and the switch-over to digital television. The promotion of privacy protection and data security, e-business and digital signatures and encryption products comes within the scope of the Ministry´s duties.

4 Creating a safer information society

4.1 Introduction

Information society, information and communications technology and the use and manufacturing of ICT has become a well-known trade mark for the Finnish society. Not accidentally has Finland become one of the most advanced information societies. The secrets behind the success are often asked from the policy makers and industry players. What are the best practices and cooperation and policy building models in Finland that enable the successful use of ICT in many so many areas of the society.

One cannot give just one reason. Most observers anyhow agree on the most important factors behind the success story – mainly the early liberalisation of the telecommunications markets, traditionally high quality and equal educational system and the relatively big R&D investments on ICT in the mid 1990's. In this article I will concentrate on just one field of the information society policy – that of information security. Creating trust and building up commonly accepted information security policy models is challenging. Success cannot be achieved without wide cooperation and commonly agreed policy principles. Information security is a challenging field because it is an interesting blend of the most difficult technical questions, value judgements and economics. Information security also plays a crucial role in building trust towards the new technologies and it is thus in the heart of the information society policy debate.

4.2 The National Information Security Strategy

The Government of Finland made a Resolution on the National Information Security Strategy in September 2003. The resolution has attracted considerable attention in Finland and also internationally. The content of the resolution was based on extensive preparatory work in 2001-2003 in cooperation with the public and private sectors and with users. No party interested in participating was excluded. To supervise the implementation of the strategy the National Information Security Advisory Board was nominated. The Board is chaired by the Ministry of Transport and Communications.

Nevertheless to agree on a common strategy was not an easy process even in Finland. There were many negotiations and some debates about the roles and mandates of different actors, ministries, industry and security officials during the process. Irrevocably interests collide, since every in quarter has its own security needs.

The far-reaching vision embodied in the Resolution is to create a safer information society in Finland. The actions outlined in the National Information Security Strategy are designed to enhance the different actors' trust in the information society. The focus of the Strategy is on combating threats to information security in both normal and exceptional circumstances, and making use of the opportunities associated with information security improvements. Finland is not only a major consumer of information society services but also a significant producer and exporter of information security products. The Strategy seeks to establish common objectives and guidance on information security for the public sector, the corporate sector, other bodies and organizations and the general public.

Under the National Information Security Strategy, a safer information society is possible through national and international cooperation within the sector, improvements in the operating potential for Finnish ICT companies, improved management of information security risks, ensuring that fundamental rights and the nation's knowledge capital are safeguarded, and increasing the level of information security awareness and competence.

It is absolutely essential that the strategy be transformed from words into decisive action. When setting up the National Information Security Advisory Board, the tasks allotted to it included monitoring the Strategy's implementation and the coordination of the various measures involved. The Board's membership represents strategic decision-making interests from all sectors of society. One of the Board's key tasks has been to detect, from even the weakest of signals, which particular measures are needed for maintaining and enhancing trust and confidence in the information society.

A society based on the use of information and communication technologies has new kinds of vulnerabilities. The more advanced the information society, the more important it is to consider the potential

new threats. Information security has tended to be viewed largely as a technical challenge. However, the changeover to an ICT-based economy means that information security is primarily an economic and political challenge. Only very recently have we begun to look systematically at the significance of economic factors for information security. An economic analysis is often more successful than a purely technical one in explaining why information security fails or why there is insufficient contingency for it. The fact is that the standard of information security is typically determined by the resources available for it within a business rather than by what is actually needed for absolute protection against the risks. Investing in information security is clearly a cost and will have an impact on competitiveness. However, anyone who would ultimately bear the cost of inadequate information security will also be more ready to invest in information security. An understanding of this raises the political significance of information security and the level of interest in it.

Information security is not of intrinsic value in itself; its importance is determined only in relation to the benefit derived from it or the problems caused by its neglect. Political guidance must be based on a realistic view of the importance of information security for the functioning of society.

The risks and the consequences must be understood, and information security policy must focus on preventive measures. New sectors of the economy will potentially have more to lose than the more traditional sectors. Even so, nobody would consider computers or the Internet to be completely secure any more. In the mobile phone industry, for example, the image of the entire sector would suffer greatly if viruses and worms were to find their way into phones from unsecured software updates. There is thus good reason to hope and believe that the mobile phone industry will protect itself against future threats more successfully than the PC industry.

The development of national information security policy must be driven by a political need. Information security threats are a threat to the very foundation of a modern information society. Above all, these threats affect people's confidence in electronic services. If this is damaged, the use of such services will diminish. The consequences of this have not yet been seen on a large scale, but the seeds of doubt have been sown. Information security violations have so far been mainly annoyances that

have caused extra inconvenience and trouble. If the present trend continues, it is only a matter of time before something more serious occurs.

The National Information Security Strategy has proved very useful in promoting cooperation between the various actors in the information security sector. Considerable effort has also been made to ensure that a realistic and truthful picture is presented of the present state of information security and that future threat scenarios are assessed. Some of the key actions of the strategy are:

■ The National Information Security Day,
■ the R&D programme called "LUOTI" aiming towards trustworthy electronic services,
■ legislation – mainly updating the privacy legislation in the field of electronic communications and introducing new regulation on security and identification methods such as biometrics.

4.3   The National Information Security Day

Finland's National Information Security Day is an annual event held in February. It is organized jointly by various public-sector bodies, private-sector businesses and other organizations. The purpose is to increase awareness of current threats to information security and the practical ways of protecting against these threats.

The first National Information Security Day was held on February 11, 2004, and the aim was that everyone with a home PC linked to the Internet would ensure that their operating system had the latest information security updates, current anti-virus software and a firewall. A top-level seminar was organised at the Parliament and the Prime Minister was the keynote speaker.

On the first National Information Security Day, over a million Finnish homes were delivered, together with the morning newspaper, a leaflet called "Information security guide for homes", which described, clearly, the basics of how to use the computer and the Internet safely.

The guide was also delivered at the operators' customer service desks. The extended version of the guide was later published at http://www. tietoturvaopas.fi (in Finnish). The online version is constantly updated.

Also the media showed great interest. On February 11, 2004, the major newspapers' front pages had an ad whose picture made the readers think about the seriousness of information security threats. For a week, Finland's biggest commercial television channel ran an information security commercial based on the same pictorial material. In addition, the project participants arranged briefings on the National Information Security Day in large malls in the Helsinki metropolitan area. There were extensive public relations activities and the day was covered extensively by the media.

The 2004 event was a success: according to surveys by Taloustutkimus Oy and Statistics Finland, both anti-virus software and firewalls were installed in a significantly greater number of home PCs in April 2004 than in the previous autumn.

The second National Information Security Day was held on February 8, 2005 and was targeted especially at schoolchildren and their teachers and parents. On the day of the event, material on information security and secure use of the Internet was prominently featured in comprehensive schools, and children had also information to take home with them. The patron for the event was the Minister of Education. Alongside the material for schools, there were also an extensive national publicity and marketing campaign, ensuring that the event is truly a National Information Security Day.

At the events that day, schools were expected to emphasize the following key messages related to information security:

Protect your computer
Every computer with an Internet connection should have an operating system with the latest information security updates, current anti-virus software and a firewall. You should also be careful about what material you download from the Internet. Taking backup copies of all important documents is also essential.

Make yourself secure
Privacy protection on the Internet cannot be taken for granted. You should carefully consider who you give your personal details to and who you chat with. Not everything is nice or true on the Internet.

Follow the rules
The same laws apply on the Internet as in normal life. A crime is always a crime, even in a computer network. Besides the law, you should also follow normal rules of good behaviour on the Internet.

4.4 Towards secure and trustworthy electronic services

The Finnish Ministry of Transport and Communications' information security programme for 2005 to 2006 is called LUOTI, a Development Programme on Trust and Information Security in Electronic Services. It aims to promote information security in new multi-channel electronic services. In the end, its objective is to increase consumer confidence in the use of electronic services.

Within the programme, media houses, other content providers, service and network operators together with the information security sector seek new operating methods for the field. LUOTI also involves the resources of research institutes and universities as well as the views of authorities and legislators. A steering group that has members mainly from the business world is responsible for the strategic management of the programme.

LUOTI brings together companies' new needs and the know-how of the information security sector. Technology (Internet, mobile, digital TV) convergence provides companies developing electronic services new business opportunities but also new challenges in terms of information security. Businesses need to understand the importance of information security and the related risk management to be able to utilise the new opportunities. LUOTI anticipates what types of information security challenges and possible solutions the convergence of different technologies, services and terminal equipment might present.

The rapid technological development, dynamic sectors and the changing role of information security set special demands on developing the operating environment. The programme analyses, in practical terms, the needs to develop the legislation, research, education and training on information security.

LUOTI promotes information security through the existing services and actual user contexts. In the pilot projects of the programme, a new model is being developed, which integrates information security into the electronic services already at the early stages of service development. New methods and processes are expected to increase companies' competitiveness and to be transferable to business operations. LUOTI also provides the pilot projects with information security expert services. The information security of electronic services developed by the businesses will be evaluated and developed further.

Piloting in LUOTI has started in the entertainment services. The entertainment environment is expected to create products, services and operating models that can be copied to other electronic service environments. The programme has commissioned technological background surveys on information security threats in the mobile world and digital TV. Furthermore, a service developer's guide to solving information security questions in electronic services will be made. The information and know-how generated in the programme has been disseminated in LUOTI seminars to everyone involved in the development of electronic services and information security.

4.5   Legislation

Finland has implemented the privacy directive on electronic communications. The law on privacy in the electronic communications came into force on September 1, 2004. The law consists regulation on most of all the processing of traffic data (only allowed on purposes described on law). The law also consists provisions on direct marketing (spam) where Finland has an opt-in system. The filtering of spam is also allowed in the Finnish legislation either by the operator or by the receiver. Filtering measures has shown to be effective in the fight against spam. It has decreased the amount of spam received by the users significantly.

The law also introduces a general provision on ensuring data security in the electronic networks. Nevertheless the means as how to prevent security threats and incidents are somewhat unclear. What is the employer for example allowed to do as regards employee's email. How confidential is the electronic communication of the workers in the working places. The confidentiality of the communications is a basic right for every citizen. The interesting question is what is the right balance between the steering and supervision rights of the employer versus the right for confidential personal electronic communications of the employee.

4.5.1 Ubiquitous information society

There are new challenges ahead. The information society is changing and the new so called ubiquitous information society is emerging. The ubiquitous information society provides enormous challenges but it also opens huge opportunities. The opportunities relate directly to competitiveness and innovation, and thus the attainment on the goals in the EU's Lisbon strategy. This development also underlines the importance of privacy protection and information security for everyone. It means that to be competitive Europe has to promote the use of the new communications technologies and services based on these tech-nologies. New measures will be needed to deal with the new phenomena.

4.5.2 European policy challenges

In the development of national policy on information security Finland is at the forefront in Europe. In this we have something to offer other EU members, too. For Finland's EU Presidency this autumn we have chosen information security as the priority theme. The European Commission published in the beginning of the summer a Communication on a Strategy for a Secure Information Society in Europe. Finland as the president of the Union is now preparing council resolution on the communication. In the resolution the crucial role of common European information society policy should be recognised. The emerging ubiquitous information society should also be acknowledged since it provides a new "threat landscape" which is more complex and difficult to tackle than the current one. The new EU-strategy should also recognise the respective roles and responsibilities of the various stakeholders. An important part of the EU's information security policy should also be the security related research and innovation together with standardisation and certification of products.

The EU has already set up a separate agency, the European Network and Information Security Agency (ENISA), for dealing with its work on information security policies. Political guidance will not come from the agency, however. What the EU needs is a common view of how the competitiveness of its communications sector can be improved in information security terms. Furthermore, the Union must be fully able to participate in combating global information security threats, such as spam e-mail and virus epidemics. This requires political input.

Finland holds the chairmanship at the moment in Enisa board. Finland is strongly committed to enhance the European information security policy. We see Enisa as a tool to create a culture of security to Europe. Enisa should first of all enhance awareness raising, data cathering and networking. It should also be able to do risk assessment and risk analysis and add value to all relevant stakeholder´s activies in the field of information security.
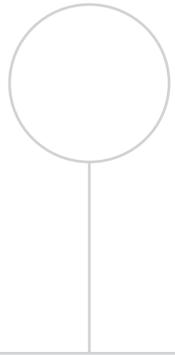
Republic of Korea

Jeongwon Yoon
Director of the National Computerization Agency in Korea

Jeongwon Yoon has been working more than 12 years as Director of the National Computerization Agency, Korea. He is responsible for ITPAP (Information Technology and Policy Assistance Program), assisting more than 12 developing countries in the area of e-government projects.

He successfully launched IT cooperation centers in Mexico and Chile, jointly with both Governments. Prior to this, he was responsible for reviewing BPR of Korean National Finance System, planning National Backup Center, designing Digital Certification Authority, and developing IT Risk Analysis methodology. He also served as Telecom. Sector Coordinator (1998 – 2000) of International Y2K Cooperation Center, Auspice of UN.

As a guest researcher (2001) in National Institute of Standards and Technology in USA, he conducted cross certification testing of Public Key Infrastructures between Korea and USA. He has BS and MS degrees in Computer Engineering from California State University in USA. He is a Ph.D. candidate in Information Management from Seoul University of Information.

National Computerization Agency

The National Computerization Agency was founded on 1986 to serve as a think tank of Korean government in promoting e-government, Broadband Network, and partnership of the public and private sector. The agency has been a key player in shaping project management, consultation, auditing, and national information strategy and policy.

5 The journey to u-Korea – A policy perspective

5.1 Korea's journey in informatization

5.1.1 Transformation of the society

From the emergence of the agricultural society, human history has ceaselessly evolved to create a better environment for living. And evolutions did not show a steady progression. Instead it has come in bursts. In general these burst of evolution have been chronicled by historians as revolutions. Undoubtedly, one of the most dramatic trans-formations of the human society was the industrial revolution of early 1800s wherein a society based on technological innovations and mass production emerged. This society was a society based primarily on the production of material goods. But a new revolution is in progress emerging from the postindustrial society.

The world is now undergoing another evolutionary burst i.e. the information revolution. In this postindustrial society, information has replaced material goods as the primary source of new added value where intelligent information resources become as important as human, natural, and social resources such as commodities, environment and money. And the information revolution has enriched the lives of people with information provided through multiple communication channels – such as PCs and the Internet. Knowledge and information have become the new driving force of the economy creating added value and enhancing national competitiveness. This "digital" age is bringing about a new transformation of the society.

Looking further into the future, the development of the information society coupled with advances in new network and sensing technologies is making possible the emergence of a "ubiquitous" society. In the ubiquitous society informatization of society will have advanced to a point where the surrounding environment itself becomes intelligent and connected with humans through a pervasive and universal network of intelligent sensors.

5.1.2 History of Korea's informatization policy

The transformation into information society has not gone unnoticed in Korea. In fact the last quarter century has been one of tremendous changes. And it is still ongoing.

To cope with such transformation of the society, the government of Korea has made enormous efforts to informatize the society. Government-led nationwide effort to promote information society and create an e-government in Korea started in the late 1980's when the government launched the National Basic Information System Project to deploy IT applications and systems to handle administrative services.

The rapid development of the Korean information infrastructure hinged on key government organizations that were responsible for the informatization strategy. These organizations were restructured in the 1990s. They included the Informatization Promotion Committee, chaired by the prime minister; the Informatization Strategy Meeting, chaired by the president; and the Ministry of Information and Communication.

Concurrently, the Korean government established four master plans for the development of the information society. In 1995, the Informatization Promotion Act was enacted, and the first master plan for promoting informatization was formulated a year later. In 1998 in the second master plan, Cyber Korea 21 was established to cope with the changing environment that resulted from the Asian financial crisis. And in 2002, when most of the policy goals set up by Cyber Korea 21 had been achieved ahead of the original schedule, the third blueprint, e-Korea Vision 2006 was laid out. The blueprint was later modified to fit the policy directions of the "Participatory Government" and renamed to "Broadband IT Korea Vision 2007" (December, 2003).

Korea's informatization can be largely divided into 5 phases corresponding to the major policy directions at each stage.

- 1st Phase: National Basic Information System (late 1980's)
- 2nd Phase: Korea Information Infrastructure (KII) Initiative (mid 1990's)
- 3rd Phase: Cyber Korea 21 / e-government Initiatives (late 1990's – early 2000's)

■ 4th Phase: e-Korea Vision 2006 / Broadband IT Korea Vision 2007 (mid 2000's)

■ 5th Phase: u-Korea (2006 –)

1st Phase: National Basic Information System (late 1980's)

As the first national IT plan of Korea, the 10-year plan of the National Basic Information System (NBIS) aimed at building basic information systems in key areas such as public administration, defense, national security, finance, and education and research. These projects were funded with the "settlement after investment method".

The "settlement after investment method" was devised to solve problems with long-term investment inherent in a single year annual budget system. Under this method, the organization that was implementing an informatization project would first invest its own funds to carry out the project and at a later stage request settlement from relevant budget agency. In order to supply the required capital, large "informatization" funds were created.

One of the more important projects for enhancing public administration was the National Administrative Information System (NAIS), which set up major DBs for residents, lands, and vehicles. NAIS was aimed to create a smaller government that enhances citizens' wellbeing and the efficiency of the government. The National Administrative Information System, was composed of six subsystems; residents, real estates, vehicles, employment, customs and clearance, and economic statistics. The digitization of these basic administrative information formed the basis for providing more advanced services to the people.

One of the major achievements of this project was the enhancement of citizens' convenience. Typical services including the delivery of notices, issuance of certificates, announcements, reports and statistics ledger management are now processed online. This has simplified the delivery of the services, and reduced the response time incurred in general administrations.

Computerized one-stop civil administration also brings about a greater awareness of the benefits of information technology to the people and facilitates emergence from the knowledge-based society.

Implementation of the National Administrative Information System eliminated the digital divide between cities and provinces by providing equal access to services and information. Interagency information sharing enhances operational efficiency by promoting inter-governmental collaboration and also improves the speed and accuracy of information processing.

2ⁿᵈ Phase: Korea Information Infrastructure (KII) Initiative (mid 1990's)

While the NBIS project resulted in successful implementations, it also suffered from some weaknesses, including lack of strong industry capability, weakening of government support and failure to stimulate domestic demand. These weaknesses generated a widespread consensus for the need to put refreshed efforts on the NBIS project, and a second stage of the project was begun in 1992. Nevertheless, problems remained. In particular, inadequate funding led to shortfalls in benefits. This led to further reconsideration and a demand for new policy actions. The result was a new policy initiative for a national information infrastructure, the Korea Information Infrastructure (KII), which was in part a response to plans developed by the U.S. and Japan.

The KII arose from fear that a failure by Korea in building information infrastructure would hurt basic industries to the point that they might not be able to compete in the global marketplace, leaving the nation farther behind developed countries. This concern extended to production industries such as computers, telecoms, components, and semiconductors, which might be left behind by the global production system, with a subsequent loss of export and import substitution opportunities. In addition, there was concern that user service industries would not be able to gain quick access to the latest technologies and become less competitive. The KII initiatives provided tools for competitiveness, and thus economic development, in a globalized economy.

The KII project is composed of three parts; KII-Government, KII-Public and K11Testbed.

The KII-G (Korea Information Infrastructure-Government) project was aimed at constructing a backbone network with the investment made by the Government. This network would allow groups (government agencies, local governments, educational institutions, and research labs)

to use multimedia services at a low cost. From 1995 to 2000, a nationwide backbone and ATM switch networks were constructed. A high-speed and high-capacity optical transmission network of 155 Mbps-40 Gbps was established in 144 major cities. A commercial ATM network was constructed by installing 118 ATM switches and 188 subscribers access equipment to major cities across the nation. The government has also provided search and directory services for public agencies, and information location service and website hosting services for government ministries.

Under the KII-P (Korea Information Infrastructure-Public) project, telecommunication providers invested in the establishment of the Information Super Highway. These investments have enabled citizens to enjoy high-speed Internet services. And the open competition policy among telecom companies has led to cheap and affordable fixed rate broadband access for everyone.

KII-T called KOREN is KOrea's advanced REsearch Network. KOREN supports research environment for such next generation Internet technologies as IPv6, QoS, and Multicasting, to mention a few. KOREN has several international links to other countries' NGI research networks including Japan, Singapore and USA STAR-TAP. Recently we are trying to find ways to connect with China and Europe as well.

3rd Phase: Cyber Korea 21 / e-Government Initiatives (late 1990's – early 2000's)

From 1999 to 2002, the focus for informatization was transferred from the KII to the Internet. This was also a time when Korea faced a serious economic crisis. And ICT was viewed as a strategic tool that would enable Korea to overcome its economic crisis. Building an advanced information infrastructure, raising national competitiveness, and creating new businesses and jobs were the main activities in this phase.

In March 1999 the government formulated the "CYBER KOREA 21", which was an informatization master plan aimed at constructing a creative knowledge-based economy to overcome the economic difficulties and also establish new paradigms for the knowledge-based society. The main objectives of the project included increasing the GDP share of knowledge-based industries to the level of OECD member countries and

to develop the nation as one of the advanced knowledge-based society by 2002. The project also had the goal of improving the nation's overall productivity and fostering new industries utilizing IT.

Although the creation of an e-government has always been recognized as one of the foremost tasks, lack of concerted efforts by individual agencies slowed down further advancement, leaving islands of auto-mated systems. To address this issue, the Council of e-Government under presidential supervision was inaugurated in January 2001 to drive government-wide e-government efforts. Eleven key projects were selected and were subsequently completed in 2002. Among the eleven projects were Government e-Service Center, Government e-Procure-ment, Home Tax Service, Digital Signature and e-Seal.

4th Phase: e-Korea Vision 2006 / Broadband IT Korea Vision 2007 (mid 2000's)

While CYBER KOREA 21 was successful in improving public adminis-trative efficiency to create a solid foundation for e-government and also in promoting the IT industry, it was felt that the full potential of informatization was not being felt, especially increased productivity levels and transparency. This was attributed to the incomplete overhaul of social systems, outdated practices and incomplete implementation of business process reengineering. In addition, new challenges arose as global competition became intensified in the world economy making the well-being of Korean economy more and more dependent on its ability to compete at a global level.

In order to address these issues, in 2002, the government of Korea announced the third blueprint for national informatization, the "e-Korea Vision 2006" with the following goals:

- To reform legal and institutional systems and increase the capacity to utilize information technologies in all areas of society including the government, private companies and individuals in order to increase the positive effects of informatization,
- to strengthen the ability to respond rapidly to changes in the social environment caused by the rapid developments of information tech-nologies,

■ to stimulate national development through informatization efforts in order to resolve the national agenda such as strengthening our competitiveness in the global economy.

This plan would later be modified to fit the policy direction of the "Participatory Government" with added emphasis on transparency and citizen participation.

The fourth phase focused mainly on the utilization and advancement of infrastructure and technologies already developed. Broadband Internet service was launched and the number of subscribers rapidly increased. E-government services were offered to citizens and efforts to develop new technologies continued. This phase was characterized by the push for a knowledge-based society, was accompanied by a paradigm shift in 2005 to move forward to the next step.

5th Phase: u-Korea (2006 –)

So what is the next step for Korean society?

As was previously mentioned, the information revolution in the post-industrial era has made information and knowledge the most precious commodity and key enablers for social evolution. ICT has become an integral part of the Korean society and the trend is only going to accelerate in the future. Increasingly sophisticated mobile devices are blurring the borders between the online and offline world as pervasive networks allow us to be connected anywhere and anytime. And convergence in not only devices but technologies such as IT, BT(Bio-Technology) and NT(Nano-Technology) is also a factor in accelerating the pace of change.

The changing face of the ICT environment is leading towards a society where intelligent sensors and devices can network with each other and humans to create a "ubiquitous world" bringing with it new opportunities for human development.

5.2 Informatization status of Korea

5.2.1 Statistical status

Korea is one of the world's IT leaders with the world's most developed IT infrastructure. As of 2005, the penetration rate of broadband Internet subscription rate in Korea reached 25.4%, which is the 2nd ranking in the world just behind Iceland as surveyed by the OECD (Dec. 2005). 31.58 million people, which is 65.7% of the total population, were using the Internet, the world's 2nd highest rate as surveyed by ITU (2004). 76% of the total population, or 36.58 million people, were using mobile phones. In the area of e-government Korea ranked 5th in the world according top the e-Government Readiness Index (UN, 2005). Korea also ranks 3rd in National Informatization Index (NCA, 2005) following Sweden and the US.

5.2.2 Success factors

Korea's efforts in developing and adopting IT have in considerable part contributed to raising Korea to its standing as one of the world's most advanced countries in IT.

Strong government leadership

Strong government leadership has played a significant role in Korea's informatization promotion. Implementation of TDX, National Basic Information System, KII, and e-government projects were directed by the various Committees of the Prime Minister and the President.

Robust legal framework

Robust framework for legal institutions and organizational structure also contributed to the successful informatization of Korea since the early stages. Starting from the Computer Network Act of 1986, Framework on Informatization Promotion Act of 1996, Digital Signature Act of 1999, to Closing Digital Divide Act of 2001, the laws and regulations have facilitated the improvement of Korea in IT. Currently, Korea is developing a new national plan for the ubiquitous environment.

Well-timed national plans

Timely establishment of informatization plans incorporating visions and strategies successfully guided Korea to the better environment.

Aggressive investment

In the initial stages of Korea's informatization, an aggressive investment system, or "settlement after investment" was made to minimize restrictions and maximize the effects. The Informatization promotion fund was also established and contributed to the success.

Rapid adoption by the private sector

Under the changing environment, traditional industries eagerly adopted e-commerce and IT to create added value and cope with the trend. Individuals were also likely to be early-adopters of new technologies, further creating a virtuous cycle between the industries and individual users.

5.3   From e-society to u-society

5.3.1 Environmental changes

The information society is characterized by online services and the spread of the Internet. During the Kim Dae Jung's Administration, from 1998 to 2002, Korea mapped out a plan called "Cyber Korea" to achieve information society. The knowledge-based society or e-Society of the current Roh Moo Hyun Administration is now faced with the next paradigm shift: the ubiquitous society, or intelligence-based society, in which humans, objects, and computers are connected through a pervasive network in a ubiquitous way, meaning anywhere and anytime.

U-society is defined as a society in which all people can freely enjoy the benefits of IT anytime and anywhere with any objects made intelligent through electronic embedded chips and connected to each other via networks. As convergence technologies are currently being developed, Korea expects to see the u-society to be realized in the near future. There are several changes in informatization environment accompanying the transformation into a ubiquitous society.

Networked & intelligence-embedded objects

Computers once used as tools in e-society, become part of the surrounding environment in the u-society. Every object will be networked and even embedded with intelligence so that users can be provided with the type of information they want, anytime and anywhere at their convenience using the new "environment".

Increased demand for IT industries

IT industries in Korea have been instrumental in supporting the Korean economy during the economic crisis of the late 1990's. According to the OECD Outlook 2004, the economic contribution of IT in Korea was the highest among OECD countries and the role played by the IT industries in reinvigorating the national economy is expected to increase even more with the emergence of u-society.

Increased threat to information security

The convergence of technologies in communication, broadcasting, and the Internet may give rise to new kinds of threats that have the potential to be far more serious than in the past. Damage caused to the BcN (Broadband convergence Network) can affect a broader range of areas than just the Internet or the online world. With technologies embedded into every object of daily life, human lives and property can be threatened, whereas in the past the consequences were only simple information loss or localized system failure. Targets for attacks will also be expanded from PCs to include all electronic appliances, devices and mobile phones with embedded chips.

Increased concerns on negative effects of informatization

There are many problems considered as negative or side-effects brought by the expansion of informatization. Many issues are being raised including protection of personal information, control of illegal and obscene information, and prevention of online addiction.

Combined with the above environmental changes, certain social, political and economical issues affecting Korea also acted to encourage the formulation of a vision and strategy for the future u-society.

Government institutions in Korea are about to be relocated from the country's capital to other regions moving away from the metropolitan Seoul area, with the aim of promoting balanced growth throughout the country.

The economy having recovered from the IMF crisis of the late '90s is undergoing many changes with a slow-down of growth rate.

Low birthrate coupled with a fast aging population is expected to become a burden for Korea as well. There might not be an adequate working population that can keep a sustainable growth of the economy. It has been reported that the speed of aging in Korea has overtaken that of Japan, which once recorded the fastest aging in the world. On the other hand frequent natural disasters are threatening the world and measures to deal with them have to be implemented.

But these concerns have not acted to deter the people's enthusiasm for the future. People are demanding more diversity and convenience of life.

In order to solve such problems raised by social and environmental changes and take preventive measures, the Korea government have come up with a strategy for developing ubiquitous society.

From industrial society to knowledge-information society (e-society)

Knowledge informatization has brought great changes into social sectors of the industrial society. With its features of digitalization and networking, informatization has brought the economy a step closer toward a knowledge-based one, introduced "e-life" in the peoples' daily life, created new online cultures, and promoted public participation in politics via the Internet.

The existing industry has undergone heavy restructuring to accommodate the new concept of e-business or e-commerce. As of September 2005, 4 out of 10 Korean companies with the best market value are IT-related, which is an indication of the growing importance of IT in the industry. Building and operating Internet portals has emerged as a new business models with the spread of e-commerce.

In terms of cultural changes, just about anything cultural have been brought online, and new online cultures have emerged in which "netizens" display their writings, music, and visual images through their blogs or personal web pages and receive feedback. It is surveyed that 2 out of 3 "netizens" log onto online communities for daily average of 30 minutes to 2 hours and the monthly average number of visitors to community portals exceeds 5 million people. More organizations such as citizen, interest, and charity groups are now likely to organize cyber communities for strengthening unification in their activities.

As seen in the case of the US Presidential Election of 2004, the Internet has gained much more influence in politics by acting as a window for campaign fund raising and volunteers rally as well as for direct contact between candidates and voters. In Korea, joint election campaign rallies and supporters' associations were banned, increasing the importance of using the Internet as means of election campaign. In the 17th General Election of 2004, 81% of Korean lawmakers used web pages in their election campaigns.

5.3.2 u-Korea vision and strategy

Ubiquitous IT is expected to bring about innovations in government and social systems, establish intelligent national foundation, raise industrial competitiveness, and promote advanced welfare system. Each social sector, by utilizing and harnessing the potential of ubiquitous IT, will lay the groundwork for the transformation into a u-society.

The following tables show Korea's strategy for u-Korea. The strategy is divided into two parts – advancement and optimization.

Action items		
Advancement strategy	Friendly government	1. Improve government work methods with real time and intelligent administrative system. 2. Create site-oriented job processing environment with mobile administrative system. 3. Realize open administration by expanding participation channels for the public. 4. Prepare organic cooperation system by building network to connect government operations.
	Intelligent land	5. Build safe and convenient environment with intelligent and advanced transportation system. 6. Improve efficiency of immigration control using biometrics. 7. Create advanced logistics environment by building integrated and intelligent RFID-based logistics system. 8. Improve safety and security control on SoC by bringing intelligence to key public facilities. 9. Support efficient operation of u-city by building integrated regional control centers. 10. Create u-IT environment to improve inter Korean relations.
	Regenerative economy	11. Establish simplified and transparent financial transactions by adopting u-banking system. 12. Raise industrial competitiveness through ubiquitous informatization. 13. Raise industrial competitiveness by facilitating utilization of u-IT by SMEs. 14. Optimize cooperation between companies and industries through corporate information system based on common platform.
	Secure and safe social environment	15. Build sustainable environmental system through real-time monitoring. 16. Maintain safety control on food & drugs through traceability system. 17. Facilitate national defense reform by establishing u-IT-based integrated defense information system. 18. Strengthen anti-crime activities by building intelligent system on security maintenance and crime prevention. 19. Improve safety by building real-time response system for disasters.
	Tailored u-life services	20. Realize customized education with intelligent facilities and services. 21. Realize "participatory welfare" by building customized welfare system. 22. Promote convenient and affluent home life by realizing u-home. 23. Provide customized services by building living network for learning, welfare, and culture.

Table 1: Advancement strategy in five areas – "FIRST"

Action items		
Optimization strategy	**B**alanced global leadership (u-globalization engine)	1. Continue efforts to expand the market. 2. Establish the basis to become u-IT Leader by strengthening global cooperation. 3. Secure technological leadership by leading international standards development.
	Ecological industrial infrastructure (u-industry engine)	4. Promote industries by facilitating establishment of u-cluster. 5. Build test-beds to accelerate development of core technology and promote industries. 6. Establish the foundation for integrated u-service to ensure facilitated coordination of various services. 7. Develop strategic u-service industries to create new growth engines.
	Streamlining social infrastructure (u-social system engine)	8. Create nationwide consensus by expanding opportunities to use u-service. 9. Prepare ubiquitous social systems by improving applicable laws and regulations. 10. Build security and reliability systems for the ubiquitous society. 11. Strengthen privacy protection.
	Transparent technological infrastructure (u-technology engine)	12. Construct ubiquitous networks accessible from anywhere and anytime. 13. Develop application technologies to promote u-KOREA. 14. Secure source technologies to achieve surplus in technological products trade. 15. Lay the groundwork for standardization to strengthen market competitiveness. 16. Continue to implement IT839 as the key engine of u-KOREA.

Table 2: Optimization strategy in four engines – "BEST"

5.3.3 Realizing u-Korea

The goal of u-Korea is to secure a sustainable socio-economic environmental system with a balance between environmental conservation or restraint and economic development while at the same time still providing for increased standard of living.

In order to achieve these objectives a reliable and secure social infrastructure must be established to protect the citizens. Developments of new technologies along with improvements in social and legal institutions are also crucial in realizing a ubiquitous society.

The advent of a ubiquitous society will not only bring new comfort and conveniences to the people, but will also create new markets and industries by applying IT to traditional industries such as in home electronics and smart-ware.

In terms of the public sector, responsiveness to public needs can be improved by ensuring diverse participation channels while increasing satisfaction with administrative services, and real-time and on-site processing will significantly enhance efficiency, equity, and transparency of government work procedure.

5.4 References

Listed below are articles and publications that were referenced in some way in this paper. They are available in English versions unless otherwise noted.

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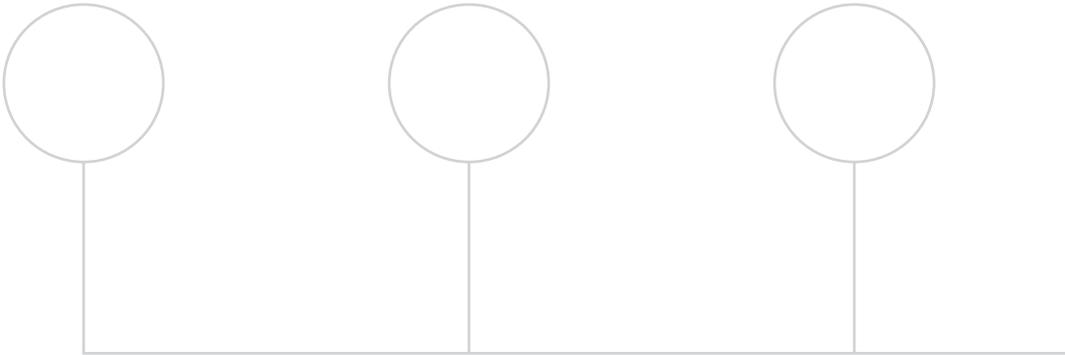
Sweden

Peter Strömbäck
Director and head of division for Information Technology,
Research and Development within the Ministry of Industry,
Employment and Communication in Sweden

Peter Strömbäck is Director for the Division for Information Technology, Research and Development within the Ministry of Industry, Employment and Communication in Sweden. The Division lays the groundwork for government decisions in two policy areas. ICT-infrastructure and coordination on issues relating to the use of information technology and research and development, including space-related activities. He has previously been Manager for business development and sales at Teracom AB (Sweden's largest radio and tv-operator) and responsible for marketing, sales and development of core products to present and future customers. He has also a background at the Research Institute for Media Technology in Sweden as manager for Business Unit Digital Communications, where he was responsible for applied and strategic research in the area of digital media.

Ministry of Industry, Employment and Communications
The overall aim of the Ministry of Industry, Employment and Communications is to create conditions for improved welfare and increased employment. Sweden is to have satisfactory and lasting economic growth that is compatible with ecological, social and cultural development. This growth is to be based upon more and expanding companies with a high level of know-how, an efficiently functioning labour market and an effective system for communications. The focus is to be on the interests of both companies and individuals.

The Division for Information Technology, Research and Development lays the groundwork for government decisions in two policy areas. ICT-infrastructure and coordination on issues relating to the use of information technology and research and development, including space-related activities.

6 From an IT policy for society to a policy for the information society

6.1 Introduction

Society changes continuously and modern information technology is at the heart of change. The new technology affects and changes our way of working, our contacts with public authorities and agencies, our schools and education, indeed, every part of our lives. It gives us welfare gains and revolutionizes opportunities for a happy and healthy life. A policy for the information society is a policy that welcomes this development.

The Swedish Government delivered a Government Bill on the new ICT Policy to the Swedish Parliament and the Parliament decided on the Bill in the beginning of 2006. The title of the Government Bill is From an ICT policy for society to a policy for the information society. This illustrates that ICT is something that concerns all policy areas and all sectors of society. The new technology shrinks distances both within our own country and between countries. Information that was previously the privilege of a few is now an asset more and more people can share in. But new opportunities also bring new challenges and threats. Everyone must have access to ICT. Both infrastructure and the opportunity to use the technology are important factors in managing to achieve this.

Sweden is already at the forefront in terms of access to modern tech-nology and as ICT becomes more important in society, interest in the new technology is also increasing. The Government considers it both right and natural that policy for the information society should support continued development for both individual people and for the business sector as a whole.

In the ICT Policy Bill the Government have the following goal for ICT policy: Sweden must be a sustainable information society for all.

This implies an accessible information society with a modern infra-structure and ICT services of public benefit, so as to simplify everyday life and give women and men, young people and old in every part of the country a better quality of life. One important change from the goal

adopted by the Swedish Parliament in 2000 is that the concept of sustainability has been added. This underlines that the information society can contribute to a development of society that takes equal account of economic, social and environmental dimensions.

To define the main goal more precisely, there are three subgoals:

- ICT must contribute to a better quality of life and help improve and simplify everyday life for people and companies.
- ICT must be used to promote sustainable growth.
- An effective and secure physical infrastructure for ICT, with high transmission capacity, must be available in all parts of the country so as to give people access to, among other things, interactive public e-services.

There are also two essential conditions for achieving these goals:

- Public confidence in ICT
- Coordination

In this Swedish contribution to the RTR publication on information and communication technologies (ICT) best practices we will use the ICT policy goal and subgoals as the framework for describing initiatives in this field. The initiatives in this text are to be seen as good examples of efforts in Sweden to bring ICT forward.

6.2 Quality

The first sub-goal focuses on the value of ICT in everyday life. Through private and public e-services, ICT is now making a substantial con-tribution to quality, utility and pleasure in most people's private and pro-fessional lives and has a natural place in most businesses. The Government wants to support this by stimulating and facilitating the development and introduction of ICT in public sector activities and public services targeting both individual people and companies. Another aspect of quality involves enabling specific groups, such as people with disabilities and elderly people, to use and benefit from ICT. Quality also means people having confidence in the technology and daring to use it, while being aware of the risks involved.

6.2.1 National strategy for e-health

ICT offer numerous potential benefits in terms of improvements for patients, health and elderly care professionals and decision-makers. Citizens, patients and relatives must have quick, trouble-free access to quality-assured information on health care provision and health concerns, as well as personal data on their own care, treatment and health status. Health and elderly care professionals must have access to efficient, interoperable e-health solutions that make it easier for them to perform their day-to-day work while guaranteeing patient safety. A range of issues relating to ICT use must be solved at national level, based on the collaboration of all actors in the health care sector. These concerns must be dealt with on the basis of a common approach and nationally established guidelines and solutions.

The Swedish government released in March 2006 a national e-health strategy to ensure efficient and effective use of ICT. A range of measures will be required from government at various levels and from other actors in the health and elderly care sector. The work to be jointly undertaken is grouped into six action areas. Education, training and research initiatives are crucial to all six areas. They are:

1. Bringing laws and regulations into line with extended use of ICT.
2. Creating a common information structure.
3. Creating a common technical infrastructure.
4. Facilitating interoperable, supportive ICT systems.
5. Facilitating access to information across organizational boundaries.
6. Making information and services easily accessible to citizens.

The development of a national e-health strategy constitutes the first stage of a long-term undertaking aimed at achieving a higher degree of collaboration at national level on these issues. The second phase, to be launched in 2006, will involve gaining support for the strategy among the country's county councils, municipal councils and other actors and stakeholders in the sector. In the Swedish health care system, responsibility for investment in new e-health solutions rests with the principals, i.e. the county and municipal councils and the private care providers they engage. A strategic operational perspective on ICT use in health care therefore presupposes broad collaboration among all actors and stakeholders in the sector. It is essential that principals and the government adopt a common approach to strategic ICT issues.

6.2.2 Strategy for a national information structure for health care

As a part of the national strategy for e-health the national Board of Health and Welfare was directed by the Swedish Government to prepare for an overall national and strategic responsibility in making individual patient information more unambiguous, available and possible to follow up. The work should during 2006 be focused on creating conditions for a common national information structure and standardize terms and concepts. The national Board of Health and Welfare should also contribute to the European coordination of the information structure in health care services within the frame of European Society for Quality in Health Care (ESQH). The overall goal is that the national information structure will be used by all health care principals and to create benefits and contribute to an effective development of the sector. The national information structure is a prerequisite for a qualitative and safe health and social care in Sweden. A health and social care where full use is made of ICT in collaboration for the patient in the health and social care process.

6.2.3 Broadband trials for people with disability

During the years 2002 to 2004 the Swedish National Post and Telecom Agency (PTS) conducted seven different trial projects with broadband for people with disability. Reports on the trials were presented to the Swedish Government in September 2004 and in April 2005. Two of the trial projects are now established as regular services. Distribution of digital talking books for people with visual impairment and others with reading disability has since the trial ended in 2004 grown rapidly. When the trial ended 17 libraries could access approximately 13.000 different books. Today 228 libraries have access to more than 30.000 books. Digital distribution has several advantages compared with postal conveyance. Accessibility increases as talking books are never out on loan. The book can be downloaded 24 hours per day and can be downloaded and burned onto a CD within a few minutes. Digital distribution also means more rapid and environmentally friendly management. The trial with mobile video communications for people who are deaf was successful and followed by a development project called "The pocket interpreter". The main objective with the pocket interpreter was to develop methodology and technology for distance interpreting and mediation of mobile video calls (3G) to the video relay

service IP platform. The project ended in August 2006 and it is now possible to call to and from the video relay service using a 3G phone. This service is unique and fulfils an important function. It creates flexibility, extends accessibility to interpretation and increases the opportunity for spontaneous communications between deaf and hearing people that did not exist before.

6.2.4 Strategy for e-government

The Swedish Government has in 2006 decided on a new strategy for continued development of the digital public administration. The purpose of this strategy is to streamline the central public administration and to improve its service to citizens and enterprises by:

- a public administration where development in ICT is based on mutual goals and is harmonized with the work on the European level,
- creating incentives and conditions for the public administration to jointly drive the development forward,
- a development work run in an efficient way, to make the best use of the citizens´ paid taxes.

The Government has decided on three goals that the public administration jointly shall attain by the year 2010. The first goal is that the public administration shall have a digitized and structured information management that makes the information easy accessible and useful. Thereby will the flow of information within and between authorities be more efficient, which creates possibilities for an improved service to citizens and enterprises. The second goal is that the public administration shall have increased elements of electronic and automatized handling of public documents. A fulfillment of this goal will lead to quicker handling of these public documents and make it easier for citizens and enterprises to use different services, like registration of an enterprise or application of permits. The third goal is that the public administration shall have capacity to handle their purchasing and procurement processes electronically. The Government intends as a first step to make it mandatory for all authorities to handle all incoming and outgoing invoices electronically on June 1, 2009 at the latest. An efficient implementation in the public administration presupposes increased management and coordination. The Swedish Government will for that reason initiate a number of actions concerning coordinated information gathering, specifications for e-ID/e-document, coordinated management

and financing of mutual development projects and improved follow up/evaluation.

6.2.5 Annual conference on public e-services

The conference "Offentliga Rummet" is arranged annually by a national committee with representatives from the Swedish Association of Local Authorities and Regions (SKL), the Government Offices, the Swedish Administration Development Agency (Verva) and Swedish Governmental Agency for Innovation Systems (VINNOVA). The conference is held in different cities each year and a local committee with representatives from the local authority, county council and region are responsible for the "regional touch" and practical arrangements. The purpose of the conference is to offer a meeting point for politicians, development managers, information officers and web masters who are engaged in the development of new e-services for the public sector. The conference highlights new and, innovative local, regional and central e-government initiatives in Sweden and in other EU-countries. The conference gathers about 500 participants from national agencies and regional and local governments.

6.2.6 Swedish national award for best public e-service

The Golden Link ("Guldlänken" in Swedish) is a special award sti-mulating the Swedish public sector to develop Internet-based services to the citizens. The prize is awarded to the governmental authority or similar public organization, e.g. municipalities, county councils etc., that uses Internet and other e-media in the most innovative way to facilitate the contact and dialogue with the citizens. The Golden Link Award, unlike most other awards, does not judge content. Instead it highlights innovation in tools and methods that utilizes the unique possibilities offered by the Internet medium. The goal is to spread concrete, useful inspiration for the public sector agencies that want to exploit the Internet and other e-media in cost-effective ways that also offers better services for the citizens. The first Golden Link Award was presented in 1999 and has since then become a yearly, much anticipated event. Since January 2006 this award is run by Verva – the Swedish Administrative Development Agency together with six other organizations. The Swedish National Tax Board was the winner of the award in 2006 due to their e-service for income tax via Internet, sms and telephone. This e-service is

a good example of a public service that creates great efficiency for both the Tax Board ant the rest of the society. It contributes to a simplified tax procedure and leads to great value for citizens and corporations.

6.3 Sustainable growth

ICT must be used to promote sustainable growth. Sub-goal 2 has reference to all the opportunities that ICT provides for more effective and efficient production methods and new, growth-promoting ways of working in both the private and public sectors. The public sector stimulates growth by means of electronic services that aim to simplify contacts between businesses and the authorities. Other examples of growth promotion include measures to enhance ICT skills in Small and medium sized enterprises and increase their confidence in ICT, as well as steps to encourage greater gender equality in the ICT industry. The growth impact of ICT, in turn, is stimulated by a forward-looking policy for research and development.

6.3.1 Strategy program for the Swedish ICT and telecoms industry

On the question of how Sweden is to deal with international competition in the years to come, the Government's view is clear. Sweden will compete on the strength of its expertise and capacity for innovation and renewal. The Government's role is to help create conditions that will enable Sweden to maintain the best institutions of research and education in the world and to maintain a stable economy, a first-class business climate and efficient innovation systems. In the 2004 Statement of Government Policy, the Prime Minister invited business representatives to a series of discussions at industry level, and work subsequently began on drawing up strategy programs for these industries. The present strategy program for the Swedish ICT and telecommunications industry is part of a series that also comprise the Aviation and Space Strategy, the Vehicle Strategy, the Metallurgy Strategy, the Pharmaceutical, Biotechnology and Medical Technology Strategy and the Forest/wood Strategy.

The Swedish ICT and telecoms industry is one of Sweden's most important industries. The ICT and telecoms industry provides Sweden with high technology, ICT-systems and important infrastructure, which

help to counterbalance problems attributable to distances in Swedens elongated geography. The strategy program has been designed with focus on the following areas:

- Strategy for a stronger IT and Telecom Industry,
- strategy for an increased and more efficient use of ICT,
- strategy to meet the challenges of globalization and the sustainable society.

By encouraging dialogue and cooperation between the Government and business sector, agencies and organizations, we can strengthen the competitive power of the industry and thereby promote Swedish welfare and prosperity.

6.3.2 National campaign "Choose ICT"

In order to promote the long-term availability of skills in the ICT area, the national campaign "Choose ICT" was initiated by ICT and technical universities, industry organizations and union organizations. The campaign is targeting upper secondary students and aimed at stimulating interest in ICT-related educational programs. An important base for this initiative has been to create meetings between young people and the industry. Young people that are about to choose their future educational direction must be given the opportunity to understand and learn more of ICT and its importance in creating tomorrows working life. With theater, movies, written information and hands on discussions the campaign has reached about 50 000 students at upper secondary school level.

6.3.3 Competence development in ICT for SME

The Swedish Agency for Economic and Regional Growth has during the years 2001 – 2004 worked with the ICT-program IT.SME.se to create possibilities for development and improved competitiveness for small and medium sized enterprises (SMEs). The aim of this program was to make smaller companies aware of the strategic benefits of ICT. The program was evaluated in 2005 and the conclusion was that SMEs with lower ICT-maturity values ICT importance for competitiveness lower than other companies. The focus group is nevertheless now more active in the use of ICT for e-mail, marketing and the development of new areas for the use of ICT. The critical factors and experiences of the program

were, regarding the entrepreneur, their initial attitude towards ICT, if they could see the benefits of ICT and what the driving force was to use ICT within the company. Based on the evaluation a new initiative was launched in 2006, a four year program to financially support the ICT skills development in SMEs. The goal is to increase their use of e-commerce, with a view to enhancing the competitiveness of innovations and boosting growth. This program is aimed for companies that have understood the importance of e-commerce and have a relevant competence level regarding their application of ICT.

6.3.4 Project to promote women as ICT leaders

On assignment from the Government the Swedish National Post & Telecom Agency is running a project to support the industry to make use of women's competence as future leaders, contribute to the industries future need of leaders and the industries competitiveness.

This is a program for women leaders within the ICT and telecom industry that wants to move forward in their carrier. The program is nine months long and will take place during August 2006 to May 2007. In total 30 small, medium-sized and large ICT and telecom companies are taking part as adepts and mentors. All participant companies have set their own concrete goals on how they shall make use of womens competence to fill their needs of future leadership.

6.3.5 ICT and a sustainable development

In 2001 the Swedish Government appointed a Forum for ICT and Environmental issues with representatives from national agencies, ministries and environmental organizations. The aim was to create a dialogue on ICT and environmental sustainable development and to map how ICT can be used to promote a sustainable growth. The result of the Forum has since been integrated into the Swedish Government IT-policy Strategy Group, which is currently proposing a national strategy for ICT and a sustainable development. The focus of the strategy is to reduce the environmental effects, caused by the economic growth, by using ICT-solutions. The strategy aims at promoting the use of cost effective, energy efficient and CO_2 reducing ICT-solutions in all parts of society and to encourage further progress in reducing the technology's environmental cost throughout its lifecycle. The strategy also aims at

stimulating public and private policy development to promote a more sustainable information society.

6.4   Accessibility and security

Sub-goal 3 is an enabling goal. An effective and secure physical infrastructure for ICT, with high transmission capacity, must be available in all parts of the country so as to increase opportunities for people to access to, among other things, interactive public e-services. A case in point might be the ability to follow matters of business as they are being processed and get in touch with the official involved if necessary. An operational and secure infrastructure enhances the quality of the service and generates growth.

6.4.1 Correct and robust time as support to the information society

The availability of correct and robust time is of vital importance in a modern society. Economical transferring systems, handling and storage of documents, systems for security monitoring, telecommunication and TV broadcasts are examples of applications where correct time is necessary. The most frequently used method to distribute time in an electronic communication system is by using the NTP (Network Time Protocol) over the Internet. Numerous NTP-servers exist distributed over the world. However, their quality and robustness is self-declared which may cause problems for a user if the quality is not on the same level as what is declared.

In Sweden a decentralized system of clocks and servers have been built up since 2001, which now is a part of the infrastructure of Internet in the country. At present there are clock systems in the national nodes of Internet in Stockholm, Gothenburg and Malmö (east, west and in south of Sweden). The benefit with distributing the servers geographically is that if the Internet would be segmented there should always be time available in the different segments. Today, the Internet nodes are operated by the Netnod Internet Exchange AB and the clock systems have been designed and constructed by SP, The Swedish National Testing and Research Institute. The time provided by the national servers is traceable to Coordinated Universal Time, UTC and its national representation at SP being a National Metrology Institute. A web-based

service showing clock stability for all national clock systems is also available. The clock systems have been designed to be robust. At present time comparisons are carried out by common view measurements using GPS. This method is not totally dependent on GPS time but only using the satellite signal to achieve geographic separated comparisons. In the coming years the comparisons will also utilize Galileo but as all radio based methods it can be subject to interference or jamming. In order to reduce the dependence on radio based methods for accurate time transfer and hence the vulnerability of the society depending on accurate time, SP is developing a time transfer system, which uses optical fiber networks. Such a system is very difficult to obstruct as the network itself has a built in redundancy.

6.4.2 Program for stimulating the use of eID

The Swedish Government has during 2006 initiated a limited three year program for the benefit and stimulation of an increased use of electronic identity-cards (eID) among citizens. The general policy is based on a market solution for the demand and supply of eID:s. By financial support and via public procurement, the Government enables public agencies the free of charge citizens´ use of eID. Agencies may in turn develop electronic services including free-of-charge eID:s to citizens. This initiative has the goal of contributing to the establishment of a fully developed market for eID. While the demand for eID:s in e-commerce processes so far is limited, the issue of eID:s remains an issue for public sector and electronic government. A number of future applications may contribute to the market of eID:s. The use of e-signatures in electronic government has already reached a significant volume in eGov-services in Sweden, and will probably also be an important driver for the eID-market in the future. The strategic importance for use of eIDs is also well established in the European initiative of i2010. The need to establish secure methods of electronic identification for the use of public services by citizens and companies is essential.

6.4.3 The Swedish PC reform

Sweden already has a high PC rate per household, and it is rising. A study made by Statistics Sweden in 2004 showed that more than 80 percent of the Swedish population had access to a computer in the home. An important reason for this high rate is the Swedish PC reform

launched on January 1, 1998. Introduced to encourage people to acquire a computer, its ultimate objective is to offer everyone in Sweden access to the opportunities afforded by the information society. Under the PC reform, businesses are granted tax relief for computers that employees can then rent taxfree to use at home. The offer must be extended to all permanent staff at the workplace, whatever their job, not just to those considered by the employer to be in need of a home computer. This reform gives employees the opportunity to rent computers at a lower price than they would otherwise have paid. They pay for their computers via a deduction in their gross salary, normally over a period of three years. The reform has been a major success and has helped the Swedish population to achieve the degree of ICT and computer maturity it enjoys today.

6.4.4 Program for promoting expansion of broadband in rural areas

The Swedish Government considers that households and businesses in all Sweden should have access to a high-capacity IT infrastructure (broadband) within the next few years. Although expansion of broadband network will mainly be market driven, overall responsibility for ensuring that the infrastructure can be accessed from all parts of Sweden rests with the state. In rural areas, including thinly populated localities, the market will be unable to sustain this expansion unaided. Rural areas, defined as areas outside urban centers with at least 3,000 inhabitants, account for approximately 30 per cent of the total population. The Government has proposed a number of support measures – mainly in the form of funds earmarked primarily for this purpose – aimed at stimulating and facilitating expansion. Funds are also extended as part of a general support program in individual cases where the cost of connection is high. A total of SEK 5250 million was earmarked for the period 2000 – 2005.

6.4.5 Internet security

Awareness raising and training contributes to the ability and willingness of citizens to use the Internet. This is important to keep the momentum in the technology development and the introduction of new services.

The National Post and Telecom Agency (PTS) launched a web service in 2005, which gives consumers an opportunity to test computer security.

Through this web service, which is available on a consumer who is connected to the Internet from home can obtain a grade relating to whether their computer is at risk when they use the Internet. After a few minutes, this computer test gives the consumer a red, orange or green light depending on whether the test has problems in the security of the computer. If the test uncovers so-called vulnerabilities, the consumer can get more technically detailed information about these. In order to gain better access to information and to be able to enhance their knowledge about security on the Internet, the consumer can now also put questions to an interactive web assistant. The Agency also offers online education and information on information security. Another web service teaches good password practice interactively.

The National Post and Telecom Agency hosts the Swedish IT Incident Centre (Sitic). Sitic is an independent organization that supports the society against threats within the IT security area. The centre assesses and informs continuously about threats against the IT security that involve risks against public authorities, county councils, municipalities and companies. Sitic provides a function for information exchange about IT-incidents among society's organizations and disseminates information in the society about new problems that can disturb IT systems. Sitic informs and advises on preventive measures and publishes statistics on security issues. Sitic is active in the international community. A recent addition to Sitic's services is a health check on the Swedish part of the Internet. The service measures traffic interchange between Internet service providers which gives and indication on how well the network traffic flows.

6.4.6 The Internet Infrastructure Foundation

The Internet Infrastructure Foundation (.SE), is responsible for the Internet top-level domain for Sweden. One of the purposes of the Foundation for Internet Infrastructure is to promote the stability within the Swedish Internet Infrastructure as well as to promote research and education within the data- and telecommunications area, especially with an alignment towards the Internet. The Foundation has allocated some of its revenues to a fund for scholarships for different projects sup-porting the Internet infrastructure in Sweden. 2006 the Foundation has received 77 different applications to the Internet Fund. The direct dia-logue with different actors in the environment is a very important part

of their work and is an essential part of the Foundation's role in its relation to others. The possibilities to get influence on the Swedish Internet Society grows with the width of the dialogue with the political management on the national as well as the regional or municipal level and with decision makers and organizations that take part in the overall supervision and management of the Internet infrastructure in Sweden.

6.4.7 Nordic dialogue on "The Future of mobile gaming"

One of the fastest growing markets today is the interactive entertainment industry. In some countries it has already exceeded well-established industries such as film and television. During two days in 2006, the project Nordic Playground created a neutral meeting ground in Stockholm between game developers, game researchers and culture workers. Co-partners were the Swedish IT Policy Strategy Group, Interactive Institute and Swedish institute of computer science. The topics for the workshop were mobile gaming and what is needed to make the Nordic countries and especially Sweden, a leading force within game development. The result of this workshop was a number of conclusions and insights on the possibilities and challenges for the collaboration between the industry and research community.

6.4.8 Triple helix cooperation on educational games and simulations

The use of educational games and simulation is an area of great interest. On the development side, the Government, business and research institutions have come together in both practical development of new pedagogical productions using games and simulations, as well as in networking together to exchange development tools, theories and know-how. Implementation and distribution have been facilitated for both commercial and government bodies, thereby increasing both knowledge and usage of educational simulations and games. Leading research actors in the area in Sweden are The Interactive Institute (II) and The Swedish Institute of Computer Science (SICS). Driving commercial actors in the area are Fabel AB, The Story Lab, and Muskedunder Interactive. Amongst government bodies GR Experiencal Learning (GRUL) can be mentioned, as well as The Swedish National Agency for School Improvement. Several projects have been successfully implemented by one or several of the above mentioned actors.

6.5   Public confidence in ICT

Public confidence in ICT should be improved by countering threats to integrity and material on the Internet that is harmful to children. ICT use is contingent on confidence among users that the technology and the systems work. However, confidence in ICT depends not only on the reliability of the technology (a robust ICT infrastructure with broad coverage) but also on more subjective opinions and values on the part of the user.

6.5.1 Awareness Node Sweden "The young Internet"

In a project at the Media Council and the Swedish National Agency for School Improvement, measures are being taken to protect children from harmful Internet content. The project "The young Internet" is a Swedish campaign to promote safer Internet-use among children and young people. The campaign is co-financed by the EU program "Safer Internet Program", an initiative for fighting illegal and harmful content on the web. The project is working with an open dialog with players on national level and with the European network Insafe. The focus of the project during 2005 was to develop a comprehensive toolbox for a safer Internet and to plan and perform a tour of regional discussions around Sweden. The campaign has been useful for parents, teachers and other groups in giving them resources and knowledge to create a dialog with the children and the young around these issues.

6.5.2 National campaign for safe use of Internet

Surf Calmly "Surfa Lugnt" is a major public-private partnership initiative with the aim of creating a more secure and pleasant web browsing experience for the general public. The campaign is primarily targeting individuals who are active on the web, tweens and small businesses, and the purpose is to provide Internet users with valuable guidelines for safe surfing. Partners in this campaign is National Post & Telecom Agency, Swedish Emergency Management Agency, Swedish Banker's Association, Swedish Confederation of Enterprises, The Foundation for Internet Infrastructure, Swedish ICT & Telecom Industry Association and many others.

6.5.3 Independent information and advice to telecom and Internet consumers

The Swedish Consumer Bureau for Telecom and Internet, that was starting its activities in the autumn of 2006, is going to provide information, advice and help, free of charge to telecom and Internet consumers. Nine telecom and Internet operators have together started the Bureau together with IT-Företagen, the Swedish business organization for the ICT and telecom industry and the Swedish National Post and Telecom Agency. By receiving complaints from consumers the Bureau will also obtain an oversight about the problems that telecom and Internet consumers have in the market. Part of the Bureau's work is to analyze the consumer problems and report the knowledge to constituents and investors. Also, the Bureau will in some cases act as an informal mediator to solve consumer disputes outside court. In Sweden many consumers have not before had the possibility to get help with solving disputes outside court. The Swedish Consumer Bureau for Telecom and Internet can also propose self-regulation for the ICT and telecom industry for problems of a larger extent. In that way it is possible to solve problems in the market without need for detailed new laws and regulations.

6.6   Coordination

Procedures for coordination and follow-up of policy for the information society should be further developed. To some extent, new joint organisational, logical and technical structures are required if the information society is to live up to its potential and communication across borders is to be possible. There is often a risk that the construction of such infrastructure will be neglected in the course of technical development that is mainly controlled by market forces or businesses. Consequently, the State needs to take responsibility for coordination and other broad issues. The Government also wants to look into ways of developing the system of public administration for coordination and follow-up of the information society policy.

6.6.1 Specifications for common basic functions and standards

In society as a whole or for certain parts there is the need for specifications for common basic functions and standards. These functions (ie specifications) can be independent, for instance identification, or be a component in a system, like the interface in a procurement system. These functions are not technical solutions, they are functional specifications that different suppliers can find different solutions and applications for. Verva – the Swedish Administrative Development Agency, is assigned by the government to coordinate the work with these basic functions. Verva is planning a survey of the need for national specifications for common basic functions, to examine existing specifications and to identify possible needs for competence development.

Some important areas where national specifications probably are needed and should be re- or new developed are:

- secure information exchange (including transport, structure, terminology),
- e-ID (for individuals and organizations),
- e-Signatures,
- e-Purchasing (e-procurement, e-commerce, e-invoice),
- functions for receiving or sending out information from public authorities,
- personal information service (citizens own portal),
- design of web-dialogues,
- secure storage of information.

The occurrence and general knowledge of these basic common functions is important for all authorities, municipalities, county council or SME. The organization that is first to implement or use a new basic function will not have to carry the total cost of the development by itself. The risks with proprietary solutions and isolated technical "islands" will diminish and that will also increase the re-use and the pay off of an ICT investment.

6.6.2 Swedish overview of international standardization work

A study was initiated by the Government in April 2006 concerning improved coordination of the development of standards and specifications within the ICT-area. The aim is to improve development and the use of ICT-standards in general. As a base for this study a survey will be done of levels and processes within the ICT-standardization field.

6.6.3 The Government Strategy Group on ICT policy

An IT Policy Strategy Group was appointed by the government for the period 2003 to 2006. The group will present a final report in the beginning of November 2006. The groups role is to be advisory to the Government and an ongoing force to achieve the ICT-policy goals. The Strategy Group has supported and encouraged processes that proceed from vision to area of operation, and results in specific projects and follow-up studies capable of promoting learning ICT policy. The Government Strategy Group on ICT policy has played an important role by presenting proposals and other input from their working groups, roundtable discussions etc, and by its secretariat taking an active role in dialogue with the various ministries concerning the development of a sustainable information society for all. A recent evaluation of the group (august 2006), show that the group has fulfilled a number of needs, for instance:

■ think tank to the ICT Minister,
■ a channel between the industry, public sector and the government ministries,
■ overall view of the development of ICT in Sweden, current status and the road ahead,
■ information gathering of international experience and significant technological progress.

### 6.6.4 The first World Exhibition on Internet

After an initiative and suggestion from Sweden, BIE (The International Exhibitions Bureau) decided in June 2005 to prepare for the first virtual world exhibition. The project is now up and running and the work is done in close cooperation between BIE and the Swedish Government.

BIE and the Swedish Government have contributed financially to the project, but the main part of the cost will carried by a number of sponsors and partners. The project is divided in two parallel parts, one that is aimed to creating the overall virtual exhibition area and one that is aimed to creating the swedish pavilion. The intention is that the Swedish pavilion will function as a modell for other countries and their national pavilions. The project is a non-profit project and its purpose is to:

■ improve the knowledge about our world, increase the interest and commitment for issues regarding the future and our mutual under-standing of the conditions for a sustainable society,
■ function as an inspiration regarding new technology,
■ become an interesting and popular channel for entertainment from an multicultural perspective,
■ encourage international meetings, contacts, information exchange, and the creation and maintaining of communities,
■ become a natural channel for knowledge and entertainment to be used continuously during a long period of time and
■ become an important and central place for education on the Internet.

The World Exhibition on Internet will open during the first half of 2008 and will be open for everyone that has access to Internet, open 24-7 and to minimal cost for the user. A World Exhibition open for all.
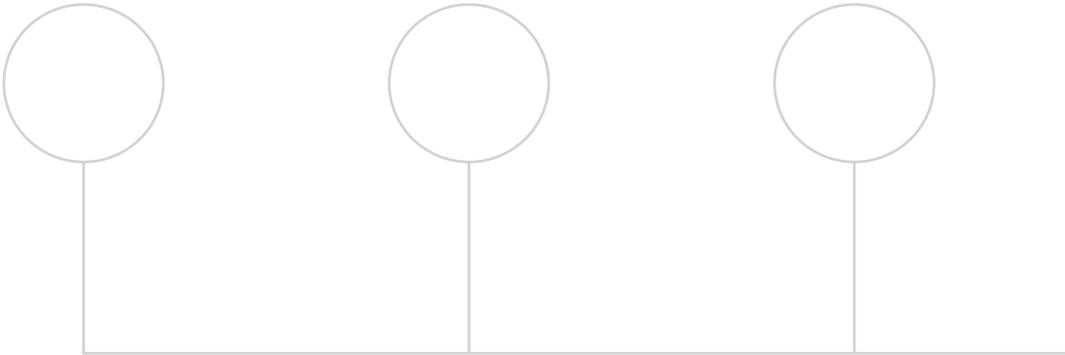
Switzerland

Peter Fischer
Deputy General Director of the Federal Office of Communications and Chairman of the Interdepartmental Committee for the Information Society in Switzerland

Peter Fischer, born in 1961, has a bachelor's degree in Law from the University of Geneva. He was working for the administrative court in Geneva and the district court Bienne as well as in a law firm in Bern. Peter Fischer passed his bar exam in 1986. Between 1987 and 1992 he was at the Federal Ministry of Transport, Communications and Energy, focusing mainly on post- and telecommunications policy, surveillance of Swiss PTT, telecommunication law as well as being responsible of negotiations concerning audiovisual and telecommunications services within WTO and European Economical Area. He became Vice-Director of the Federal Office of Communications and Head of the Telecom division in 1992. Since 1995 he is the Deputy General Director of the Federal Office of Communications and Head of the Telecom Services division. He prepared and implemented the liberalisation of the Swiss telecommunications market and took an important part in setting up the Swiss regulatory authority for broadcasting and telecommunications.

Federal Office of Communications (OFCOM)

At its creation in 1992, OFCOM was assigned two major tasks: to regulate the radio and television sectors, and to establish the conditions needed to open up the telecommunications market. Today OFCOM oversees radio and television, radiocommunications, and telecommunications services and telecommunications installations. It enables efficient competition to take place and guarantees that market forces will have full play. Situated within the Federal Department of Environment, Transport, Energy and Communications, OFCOM attends to these matters for the Federal Council and the Federal Communications Commission while fulfilling an advisory and co-ordinating function for the public and policymakers. For more detailed information regarding the duties and obligations of the Federal Office of Communications, please also see: http://www.bakom.ch

7 The information society is already here

7.1 The topic

The information society is a society in which information plays a central role in social and economic life. This applies to our society today, thanks to the widely available resources for processing and conveying information. The term information society is therefore closely associated with technology; it has its origins in the application of information and communication technologies in business and society. It is positioned in succession to an agrarian and industrial society and shows that in our times information has become a key means of production. In a similar context, we also speak of a communication or knowledge society; here the focus or viewpoint is changed slightly, but in the final analysis we are referring to the same development. In Switzerland, a very broadly-based group of experts commissioned by the government started out from the following definition of the information society:

"(…) the form of economy and society applying in the "information age", which is therefore based principally on the increasingly interactive acquisition, storage, processing, transmission, dissemination and utilisation of information and knowledge and in which productive handling of the information resource and knowledge-intensive production play a prominent role. It is characterised in particular by the interaction of three sectors: information technology, telecommunications and content."[1]

The creation of the information society poses the question of what exactly policy aims should be: should the state try to control the development process? Should it simply observe the process and then complement it or (try) to correct it by political measures? Is it necessary to take supporting measures and (re)define general conditions? Does the state see itself playing a formative, or a complementary, corrective role? How is the state itself affected in the way it operates? etc.

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[1] Für eine Informationsgesellschaft in der Schweiz, Report of the Reflecton Group for the attention of the Swiss Federal Council, Biel June 1997, http://www.infosociety.ch

Traditions concerning how changes are handled, political and personal convictions and existing institutional and financial resources have a major effect on the answers to these questions. This also applies in Switzerland, where the issue of an information society strategy for the Confederation was raised as early as 1996 and subsequently concretised. An attempt is made below to show how the issue was approached in Switzerland and what the main themes, stages, challenges and measures are for handling the change from the viewpoint of the Confederation. In any event, it quickly became clear that the topic of the information society is not self-contained but permeates the entire social and political environment. One indication of this is that in Switzerland, for example, the topic has never been approached institutionally, with the establishment of a corresponding organisational unit (an office or ministry for the information society), but always in a trans-sectoral way. Furthermore, in a federally structured country, the various predominantly autonomous bodies (in Switzerland the Confederation, cantons and municipalities) each have their own responsibility in relation to the information society. The focus of the federal strategy accordingly lies within the competencies of the Confederation but also addresses several areas which lie within the remit of the cantons. In these areas the federal government cannot and must not try to act over and above the cantons but should provide an impetus for coordinated action between the cantons and the Confederation. This is where two key features of the information society become apparent: the way it permeates almost all areas of policy and the need for integration.

The following sections are intended to provide an overview of Swiss federal policy relating to the information society. It is primarily a brief presentation of individual measures. The implementation of the strategy for an information society is based on a far greater number of activities, but presenting these would go beyond the bounds of the present exposition.

7.2   The federal strategy: 1998 and 2006

7.2.1 **The process**

On February 28, 1996, the Swiss government, the Federal Council, commissioned a group of experts to analyse the development of the information society in Switzerland and to submit the foundations for decisions and ideas for drawing up and implementing a Swiss strategy along with an action plan. The group had to get to grips with the opportunities and risks of the information society, come up with ideas about the social and economic effects and consequences of the multimedia age and make concrete proposals to the Federal Council. Among other things, the discussion was inspired by the endeavours of the G7, which at the time was initiating projects in the area of the information society, although hardly anything was heard of these subsequently. The group of experts consisted of many prominent representatives from the worlds of science, business and culture. It delivered its report in June 19971 and, unusually for those times, published it simultaneously on the Internet.

On the basis of the report and other work within the administration, the Federal Council adopted its "strategy for an information society in Switzerland"[2] on February 18, 1998. The strategy included four principles and eight areas for action, in which the principles were to be applied in the form of concrete projects. It served as a basis for the activities of the Confederation and the cantons in promoting the information society.

On the basis of a report regarding implementation, the strategy was revised in 2004/5 in an open, participatory process involving all interested parties. On the basis of this work, the Federal Council was able to adopt a revised strategy[3] on January 18, 2006. In the process, it tightened up the areas for action contained in the earlier strategy and added new, more topical areas. It confirmed the goal of implementing

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[2]   Strategie des Bundesrates für eine Informationsgesellschaft in der Schweiz, February 18, 1998, Berne, BBI 1998 2387ff., http://www.infosociety.ch

[3]   Strategie des Bundesrats für eine Informationsgesellschaft in der Schweiz, January 2006, http://www.infosociety.ch

information and communication technologies in Switzerland quickly, in a coordinated fashion and for the benefit of all, thereby increasing prosperity and ensuring sustainability.

7.2.2 Organisation

The information society affects practically all the areas in which the state is active. As a topic, it is therefore difficult to contain within the bounds of a single structured organisational entity. Consequently, but also to some extent because of possible conflicts of competencies, the Swiss Federal Council decided that its strategy would be implemented in a decentralised manner by the agencies responsible for specific areas. It commissioned the government agencies in different ministries to elaborate partial strategies harmonised with or derived from its overall strategy and to submit action plans. Thus, for example, the Federal Office of Public Health plays a leading role in e-health, the Federal Office for Education a leading role in the education sector and the Federal Chancellery a leading role in e-democracy. The work is coordinated by an interministerial committee, the Interdepartmental Committee for the Information Society, with a chairman and secretariat from the Federal Office of Communications (OFCOM). As part of its original remit, OFCOM, as the regulatory authority, is responsible for the outlines of broadcasting and telecommunications policy and their implementation. In the initial years of the strategy, the committee was complemented by a "plenary meeting" of the more than 50 official government agencies involved. Its goal was a broader exchange of information, but also to raise awareness of the numerous problems associated with the information society. This organisation has since been slimmed down. The budget for the projects and applications submitted to the government are the responsibility of the various competent offices but they are coordinated by the committee. Many minor and major initiatives in connection with the information society are also being harmonised with the federal strategy or coordinated with it but they are also being implemented by private organisations and companies.

Since 1999, the development of the information society in Switzerland has been accompanied by a report drawn up every year by the coordination committee within OFCOM and the interdepartmental committee. The public reports highlight specific indicators, describe progress on the projects which have been launched, explain the environment and

identify the need for action. Up to 2006, the reports have been submitted to the government for information and as an aid to decision-making regarding new tasks, and then published.

7.2.3 Principles

Highly trained, innovative and motivated human beings are a key resource for Switzerland. They produce goods and services with significant added value. The use of ICT underlines this strength and contributes to improving the position of the Swiss knowledge society in international economic competition. For the information society has as yet unrealised potential to increase the country's productivity and innovative capabilities, its economic growth and employment, particularly in more remote regions. Through its contribution to growth, which conserves resources qualitatively, ICT are making a contribution to sustainable development. ICT can extend people's capacity to act and communicate and promote cultural exchange across borders. They produce positive developments in an open and democratic society in terms of cultural independence and diversity. In order to grasp these opportunities, but also to minimise the risks inherent in the use of ICT, the Federal Council pursues the following principles:

- **Universal service:** the general conditions for a low-cost, reliable infrastructure and an open offering in terms of content.
- **Confidence:** transparency and competency in the use of ICT, protection from abuse, technical security.
- **Access for all:** equal-opportunity access, without barriers, for all segments of the population.
- **Empowerment for all:** using ICT, their content and technology, as a basic skill.
- **Federalism:** new models of cooperation beyond the federal frontiers.
- **Cooperation:** effective partnerships and cooperation of all players from business, government, politics, science and civil society.
- **International exchange:** cross-border cooperation in accordance with the Declaration and Action Plan adopted by the 2003/2005 UNO World Summit on the Information Society.

7.2.4 Indicators

In order to observe and analyse the development of the information society, indicators are useful if not essential. Consequently, an initial step within the Federal Council's strategy involved compiling a series of indicators by means of which infrastructure, utilisation and production in connection with ICT can be recorded in different social areas (households and population, enterprises, education, the information sector, government). The leading role was played by the Federal Office for Statistics in cooperation with the coordination office[4].

A comparison of the indicators reveals in particular that internationally Switzerland has a very good infrastructure, has high ICT expenditure, but does not make sufficient use of ICT resources in all areas. The measures to implement the strategy tie in very well here.
Here are some key figures:
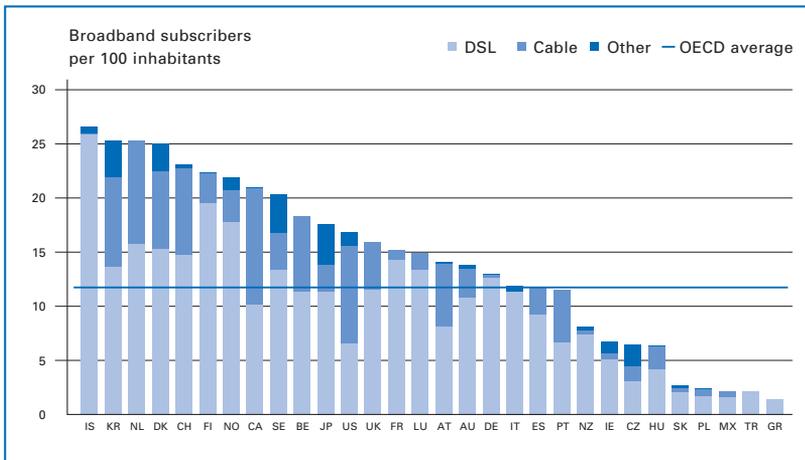
Source: OECD

Figure 1: Broadband subscribers per 100 inhabitants, by technology,
           Dec. 2005

[4]   http://www.bfs.admin.ch; http://www.infosociety.ch

	IT spending/GDP in %	IT spending per capita in EURO	Number of PCs per 100 inhabitants
Europe	**3.04**	**606**	**31**
EU 15	3.05	719	35
Austria (AT)	2.96	791	38
Belgium/Lux. (BE/LU)	2.90	784	33
Denmark (DK)	3.46	1226	60
Finland (FI)	3.63	950	44
France (FR)	3.31	843	36
Germany (DE)	3.06	776	40
Greece (GR)	1.25	182	14
Portugal (PT)	2.13	252	19
Norway (NO)	3.27	1199	63
Netherlands (NL)	3.82	988	51
Spain (ES)	1.71	303	21
Sweden (SE)	4.39	1211	61
Switzerland (CH)	**4.20**	**1464**	**56**
UK (UK)	4.22	1023	44
US (US)	4.02	1058	81
Japan (JP)	3.40	986	47

Source: EITO 2006

Table 1: ICT penetration – international comparison, 2004
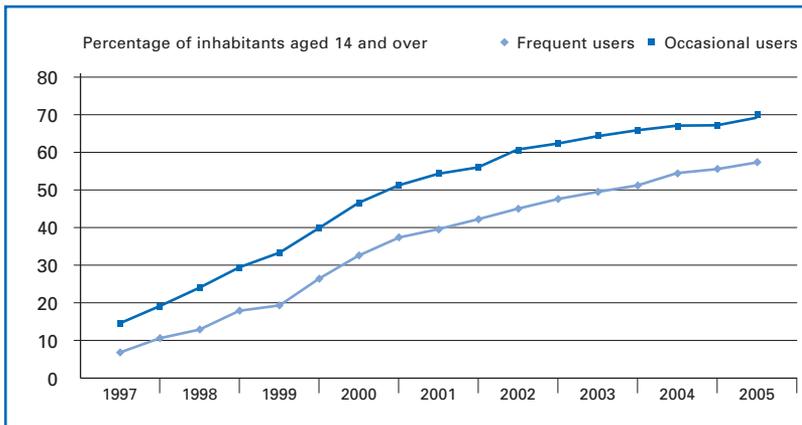
Source: WEMF / OFS

Figure 2: Internet users in Switzerland 1997 – 2005; Half-yearly data (average from April to September and from October to March).

7.2.5 Education

Education policy is a key element of every information society. Acquaintance with the technology and especially the content of ICT must be considered as a core skill at all stages of education and training. In the education sector, competencies are split between the Confederation and the cantons. Whilst the Confederation has responsibilities in the areas of vocational training and in some cases the universities, the cantons are primarily responsible for the primary and secondary stages. Cooperation is therefore essential. This is why the Swiss Conference on ICT and Education was established; within its framework, the cantons and the federal government coordinate their strategies with teachers' and educational organisations.

Under the aegis of "Schools on the Net"[5] and in conjunction with the private sector in a public-private partnership, the Confederation and cantons have implemented a project which is equipping all Swiss schools with infrastructure (PC, LAN), and providing them with a broadband connection to the Internet, training teachers in the use and above all the pedagogical application of ICT in a teaching environment and providing teaching content on a common Internet platform.[6] In the university sector, a "Swiss Virtual Campus" project has been launched within which a virtual teaching environment has been created on the net for universities and students.[7] In order to address those segments of the population which otherwise have little contact with PCs and the Internet, the Federal Office of Communications carried out an awareness-raising campaign in several towns and municipalities under the name "Tour-de-Clic.ch". A bus equipped with PCs connected to the Internet was used to introduce interested individuals to the uses and benefits of the Internet. In cooperation with relevant local organisations, senior citizens, migrants, unemployed women, etc. were addressed directly. In addition, the annual competition entitled "Knights of Communication"[8] awards prizes in recognition or support of projects which promote digital inclusion in the information society.

[5] http://www.schulenimnetz.ch

[6] http://www.educa.ch

[7] http://www.virtualcampus.ch

[8] http://www.comknight.ch

7.2.6 Security and confidence

In order to guarantee the security and availability of information infra-structures, a concept has been elaborated and implemented in which the aspects of prevention, early detection, damage limitation and combating the causes of faults are covered. Within the framework of an Infosurance[97] foundation, which has since been converted into an association, companies from the private sector and the administration are working together to implement active prevention, particularly in the case of SMEs. By using MELANI[10], a permanent networking and early detection organisation and a reporting and analysis centre to which attacks, risks and hazards can be reported, these can be assessed and appropriate warnings or recovery methods can be disseminated. A crisis staff which can be mobilised easily and in which representatives of the public sector and business are present has been established in the form of SONIA in order to cope with national ICT-related crises. In several sectors of the economy (especially finance, energy, communications and the transport sector), comprehensive sectoral risk analyses in connection with threats in the ICT environment have been carried out and measures have been taken, in some cases on the basis of sectoral agreements.

The necessary attention has been paid to data protection with a view to promoting confidence. The general conditions for qualified electronic identities have been established by the law on the electronic signature. Numerous projects, such as an initiative on "road safety in schools for the data superhighway", security4kids[11], supported by numerous pri-vate-sector companies as well as public and private educational organisations, are helping to build confidence in the use of ICT.

[9]   http://www.infosurance.ch
[10]   http://www.melani.admin.ch
[11]   http://security4kids.ch

7.2.7 Business and commerce

For business, the availability of a modern and competitive information and communication infrastructure is an important economic factor. This is why the Federal Council's strategy places great emphasis on this infrastructure. To this end, the legal framework for telecommunications and broadcasting has been revised, on the one hand to strengthen competition (particularly in the area of access networks) and on the other to take account of convergence and at the same time guarantee the universal service in a changing environment. In terms of Swiss economic policy, the state largely limits its role to establishing a conducive general framework. This "hands-off" policy has proved its value in the "offline" world and must also be a principle in the "online" world. Via the general conditions (open market access, efficient competition and a tax regime which promotes competition), the state must promote the dissemination and use of ICT in businesses. The law on the electronic signature can also be placed in this context. Draft laws and reports on consumer protection in e-commerce and on cybercrime have been mooted, but in some cases these have led to the (political) conclusion that the need for action is insufficient or that appropriate regulation is too complex for the time being. However, they have at least been able to make a contribution to legal security, a key requirement for economic action. Additional adaptations to the legal framework have related to intellectual property rights, among other things. In order to support small and medium-sized enterprises (SMEs) in particular in the integration of ICT into their business processes, a dedicated information and transaction portal has been set up.[12] The www.simap.ch portal is used for electronic processing of transactions in public procurement.

7.2.8 Health

The integration of ICT in the health system (e-health) is intended to guarantee the Swiss population's access to health care which is affordable, of high quality, efficient and secure. This goal was first formulated in the revised strategy of 2006. In a coordinated approach, the Confederation and the cantons, together with target groups in the health sector, are drawing up a nationwide e-health strategy. The focus is on

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[12]   http://www.kmu.admin.ch/

rationalising administrative processes with the introduction of a health insurance card, improving the availability and transparency of information with regard to the provision of health services under patient control with the introduction of electronic patient files and better, reliable access to public health-related information. In addition, the theme of ICT in healthcare is being covered; however, the principle of organisational freedom for economical health provision again requires the state to act as a guarantor for stable general conditions. The corresponding strategy will be adopted by the Federal Council in early 2007, although some aspects are already being implemented (e.g. the health insurance card).

7.2.9 e-government

The state exploits the optimisation potential of ICT in order to provide its services transparently, efficiently, cheaply and at high quality. Principles, procedures and priorities are being agreed in a coordinated manner, in a strategy which initially related only to the federal administration but which will now be nationwide (including the cantons) after the 2006 revision. In this respect, particular weight is being given to ensuring that the economy can process its transactions with the administration electronically as far as possible, that processes within the administration can be optimised using ICT and that the availability of government services to the population is independent of time and place, as far as possible. To this end, on the one hand a national access portal for official information has been set up (http://www.ch.ch) and on the other hand numerous applications for production processes with transaction interfaces on the Internet and between authorities have been initiated or already implemented. Nevertheless, in terms of an international comparison, Switzerland comes off badly with regard to e-government. Additional effort is therefore essential and this has been acknowledged by politicians. An agreement between the Confederation and the cantons, a catalogue of prioritised projects[13], common standards (e-government standards)[14] and constant monitoring are intended to fill the gaps.

[13]   http://www.evanti.ch
[14]   http://www.ech.ch

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7.2.10   Democracy

Switzerland has a long tradition of direct democracy. This immediately poses the question of the use of ICT in the exercising of political rights. Even if only relatively small gains in efficiency can be made, electronic voting still has a high symbolic significance and makes a notable contribution to raising the awareness of the population and politicians. From this angle, it is therefore not surprising that various trials with electronic voting have been carried out in several cantons, with the support of the Confederation. In particular, the trials in Geneva, Neuchâtel and Zurich, in which different systems have been used, including mobile telephone SMS messages, have demonstrated their technical and organisational feasibility as well as citizens' interest in participating. Analyses of the problems relating to the effects of e-voting on democratic processes and on its definitive introduction have been produced[15].

7.2.11   Culture

ICT allow new artistic forms of expression. They can additionally contribute to the promotion of cultural diversity and identity, linguistic diversity and the creation of local and regional content. Moreover, digitisation of existing artistic works allows broader access to them. As part of a national "Memopolitik" project, the technical and financial possibilities and the prerequisites for opening up cultural inventories on a long-term basis are being clarified. The Sitemapping project[16] was launched as early as 1999 to promote cultural forms of expression. Further projects have followed. Specific population groups have been targeted by a number of socio-cultural projects. Particular attention is being paid to integration and partnerships of artists, businesses, training institutions and research. In view of limited public financial resources, however, many of the planned initiatives and projects have been curtailed or not implemented at all.

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[15]   http://www.bk.admin.ch/themen/pore/evoting

[16]   http://www.bak.admin.ch/bak/themen/kulturfoerderung/00476/index.html

7.3   The UNO World Summit on the Information Society

Switzerland demonstrated very great commitment to the UNO World Summit on the Information Society. It hosted the first phase from December 10 to 12, 2003 in Geneva. The Swiss delegation made a substantial contribution to ensuring that the participating states were able to agree on a joint declaration and a joint action plan. For the first time on such a scale it was possible to initiate and conduct a discussion between governments, civil society and business on a common vision of the future development of the information society, in order ultimately to promote the appropriate utilisation of ICT for social and economic development.   In all, more than 11,000 participants met in Geneva. In the areas of cultural diversity and local content, regulatory and institutional conditions and ICT as a means of combating poverty, a good start was made on achieving solutions. From the Swiss viewpoint, more progress could have been made on e-commerce and e-business. The politically highly sensitive topic of human rights and the media were able to be tackled successfully in Geneva. The conclusions on financing ICT infrastructure in developing countries and the question of Internet governance were deferred until the second part of the Summit in Tunis from November 16 to 18, 2005. On the latter point, the question of control over the Internet root system is being particularly addressed. However, content is also a relevant theme. Internet governance is to be pursued in a UNO forum.

7.4   Private initiatives

7.4.1 CH21

The CH21 incentive programme[17] was a private-sector initiative to group together and promote activities and programmes which take Switzerland a step further in information and communication technologies. The programme, under the leadership of IBM Switzerland, was limited to 24 months and ended with the final CH21 event on February 6, 2003. The programme members, personalities from business, politics and

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[17]   http://www.ch21.ch

government signed a common charter, in which they committed themselves to contribute actively to promoting the use of ICT in society, business, politics and education. The success of the initiative was monitored by a barometer. The awareness of various target groups was raised by several national and regional events. The government took an active part and chipped in with a number of concrete projects.

7.4.2 ePower

In 2005, two members of the Swiss parliament, together with representatives of sectoral associations, founded the ePower[18] programme, an initiative by businesses and politicians to promote and exploit the potential of ICT in Switzerland. Among other things, it involves increasing the visibility of the country's ICT sector, which saw itself as taking a back seat in comparison, for example, with agriculture in the eyes of the public and in particular in the world of politics. The ePower initiative wishes to generate a feeling for the urgency of the sector's concerns and formulate concrete, achievable goals. In the future, in terms of ICT, Switzerland must take the lead in the areas of e-government, e-health, research and development, education and as an attractive location for businesses. With this in mind, the group has launched several parliamentary initiatives on the topics addressed and holds regular meetings between business and politicians. It is working to ensure that:

■ every citizen has a "digital identity", which operates in both the real and virtual worlds;
■ users in Switzerland have the world's best broadband Internet infrastructure at their disposal, as a technical prerequisite;
■ from 2008 school leavers are sufficiently computer- and Internet-literate than they can hold their own with the best in Europe;
■ the legal framework in Switzerland is such that the use of venture capital for ICT investments in infrastructure and services in Switzerland is the most attractive in Europe.

The concrete projects to achieve these objectives are still being elaborated.

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[18]   http://www.epower-initiative.ch

7.5 Conclusion

The information society, knowledge society or communication society has many facets. They extend to practically all policy areas. In this regard, and also given the federal structure and culture of the country, the Swiss approach of a coordinated, decentralised programme with common principles is undoubtedly the right one. However, it is becoming more and more apparent that there is a lack of a central over-all budget with a central project management system. This means that the various initiatives and projects are largely dependent on the awareness, commitment and prioritisation of those responsible in the individual sectors. The advantage of this, though, is that where ini-tiatives are launched they are handled by experts and business managers in accordance with the sectoral policy. Finally, it is the very essence of the information society that each sector takes the initiative itself, in conjunction with the other sectors. This is also apparent using the example of e-government: in the final analysis it is the managers responsible for process organisation with the use of ICT who must and can ensure that their department and the services it provides are optimised and are more broadly available. This involves reorganisation projects and above all projects requiring a change in culture; these must be "owned" by the managers who are responsible for them. In the information society too, or rather precisely in the information society, everyone is primarily responsible for themselves and their areas of competence.

The Interdepartmental Committee for the Information Society and the coordinating office within OFCOM, which raises awareness, integrates, stimulates and implements individual projects itself, have stood the test of time. This structure, for a low overall cost, guarantees that an idea for a programme does not go astray and that even areas which have been "left out", as the health sector was in Switzerland until recently, get to grips with the information society from their own perspective. Continuous observation also involves indicators which are evaluated. The annual overview provided by the reports of the Coordination Office provides the public with a form of monitoring instrument.

Again and again, interesting projects have fallen victim to political prioritisation; this relates to the fact that politics are the key factor for a federal programme. The pressure on public authorities to economise has

consistently acted as a brake, but occasionally has generated enthusiasm for good initiatives. Generally speaking, the subject of the information society is not an independent political topic in Switzerland. Very few politicians have chosen it as a topic in their electoral campaigns. Accordingly, the topic has not been "personalised", and in today's media environment this immediately gives it a lower priority.

The Swiss strategy for an information society is organised on a national basis. It is based, so to speak, on the principle that each person has to sweep their doorstep themselves. Nonetheless, Switzerland was quick to argue for an international discussion and has shown a high level of generally effective commitment. Thus, by hosting the UNO Summit on the Information Society in Geneva, Switzerland has contributed considerably to the adoption of common principles and an international plan of action. ICT also play an important role in Swiss development aid.

If one compares Switzerland's status with other countries in terms of the "maturity" of the information society, one can state that our country is among the leaders in terms of ICT expenditure and equipment (PCs, broadband access, etc.) and also, to some extent, in their use (e.g. the Internet, online shopping). In certain areas, such as e-government, the country does lag behind somewhat. This is where we still need to catch up, which has been acknowledged and, along with e-health, it is one of the current priorities of federal policy. So the information society is already here, but it still has a long way to develop.
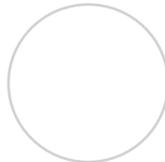
Obwohl aus Gründen der besseren Lesbarkeit im Bericht zur Bezeichnung
von Personen die maskuline Form gewählt wurde, beziehen sich die
Angaben selbstverständlich auf Angehörige beider Geschlechter.

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