National broadband strategy
Final report

MINISTRY OF TRANSPORT AND COMMUNICATIONS FINLAND

Abstract

The Finnish Government's national broadband strategy is to promote competition in and between all communications networks, to improve service and content provision in networks, to increase broadband demand and to continue and improve the special measures in fields with no adequate demand for commercial broadband supply.

On 29 January 2004 the Government adopted a resolution on the national broadband strategy that included a 50-point action plan. On 3 February 2005 it adopted a new resolution specifying the objectives of the strategy and complementing the original resolution with 9 new action points. These included the following: the development of wireless broadband will be promoted; new content and services will be promoted; and the yet existing obstacles to competition will be removed.

The broadband working group has monitored the implementation of the strategy and gives an account of it in this final report. The report also includes a summary of the measures taken under every action point. The aims of the original broadband strategy have been achieved. According to the strategy Finland should have 1,000,000 broadband subscriptions by the end of 2005. In January 2007 the number already amounted to 1,500,000. Broadband services through a fixed network, which were to be available to at least 95% of the population, were in January 2007 available to 96.1%. The third aim, which was to maintain Finland's position among the four European leaders in the number of subscriptions, has also been achieved as in January 2007 Finland ranked third.

The national broadband strategy has been successful in increasing the number of broadband subscriptions, lowering the prices and improving the regional availability of broadband services. The strategy's aim to promote competition in and between all communications networks has turned out to be a good guideline for communications networks policy. The implementation of the strategy has clearly proved competition to be a feasible method for ensuring affordable and high-quality services for end users.

TO THE GOVERNMENT

On December 2, 2003, with the preparation of Finland's National Broadband Strategy almost complete, the Ministry of Transport and Communications set up a working group to monitor implementation of the Strategy's measures and to report on this to the Government on a regular basis.

Director-General, later Permanent Secretary, Harri Pursiainen from the Ministry of Transport and Communications was appointed chair of the working group, and Antti Kohtala from the same Ministry was appointed deputy chair. Those invited as members of the working group were as follows: Pekka Urjanheimo, Director of Regional Development at the Ministry of the Interior; Olavi Köngäs, Director of Information Management at the Ministry of Finance; Arvo Jäppinen, Director-General in the Department for Education and Science Policy at the Ministry of Education; Antti Eskola, Commercial Counsellor at the Ministry of Trade and Industry; Rauni Hagman, Director-General at the Finnish Communications Regulatory Authority (FICORA); Maarika Joutsimo, Head of Research at the Finnish Competition Authority; Marita Wilska, Consumer Ombudsman and Director-General of the Consumer Agency; Hannele Pohjola, Chief Policy Advisor at the Confederation of Finnish Industries; Reijo Svento, Managing Director of the Finnish Federation for Communications and Teleinformatics (FiCom); Antti Mykkänen, Director of the Regional Council of Pohjois-Savo, and subsequently State Secretary at the Ministry of the Interior; and Leena Meisalo, Information Services Manager at the Association of Finnish Local and Regional Authorities. Following the departure of Olavi Köngäs, he was replaced in September 2004 by Ministerial Advisor Arja Terho until the appointment of Leena Honka, State IT Manager, as the Ministry of Finance's representative in September 2005. With Maarika Joutsimo departing to take up new duties, the Finnish Competition Authority named Martti Virtanen, a Director at the Authority, as its representative, and following Leena Meisalo's departure, the Association of Finnish Local and Regional Authorities named Senior Advisor Simo Tanner as her replacement. The Confederation of Finnish Industries named Veijo Turunen, an Advisor at the Confederation, as its new representative. In August 2006, the Ministry of Education appointed Sakari Karjalainen, Director-General of the Department of Education and Science Policy, to replace Arvo Jäppinen, who had retired. Tatu Tuominen, a Senior Research Officer and subsequently Ministerial Adviser at the Ministry of Transport and Communications, was designated as secretary of the working group. The working group's term will expire on February 28, 2007.

The Government approved the National Broadband Strategy on January 29, 2004, and on February 3, 2005, on the proposal of the working group, it issued a new Resolution revising the Strategy.

The working group submitted its first Interim Report to the Government on the implementation of the National Broadband Strategy in December 2004, its second in September 2005 and its third in October 2006. This final report is submitted as the term of the working group expires. It was compiled by Maria Magi of Finnet Focus Oy.

The National Broadband Strategy has focused on promoting competition within and between all communications networks, promoting the provision of electronic services and content, stimulating demand for broadband services, and continuing the special development measures in those areas in which there is insufficient demand for the commercial supply of broadband facilities.

In approving the National Broadband Strategy, the Government at the same time approved the set of 50 measures set out within it. The Government's adoption of the subsequent Resolution brought with it a further nine measures together with plans to increase the resources for developing mobile broadband solutions that will complement and be interoperable with fixed network broadband services. The Government also called for the accelerated development of content and service production and for the removal of barriers to competition.

The Strategy has been particularly successful in increasing the number of broadband connections, in decreasing prices and in improving regional access. The underlying basic assumption of the importance of competition incorporated in the Strategy has proved to be a sound principle for telecommunications network policy. The results of the Strategy clearly show that competition is good for ensuring end-user services that are affordable and of high quality.

The growth in the number of broadband connections in Finland was the fastest in the world in the first two years of the strategy period, and even in the third year it was the third fastest in Europe. The number of connections increased from about 300,000 at the start of the strategy period by well over a million, totalling 1,500,000 in January 2007. Finland's ranking has risen from sixth to third in Europe and from fifteenth to seventh worldwide.

The regional availability of broadband has improved due to efforts not only by telecom operators but principally by the municipalities and regional councils, whose regional broadband strategies are being put into effect in all parts of the country. Currently, access to fixed network broadband services is possible for more than 96% of Finnish households. This figure stood at 75% at the start of the strategy period. It should also be noted that over half of all Finnish households have acquired a broadband connection.

The provision of wireless connections complementing the fixed network will allow the remaining households to be brought within reach of broadband. A total of 29 permits for regional radio systems for wireless networks equivalent to fixed networks have been granted for various parts of the country, and processing of new permits at FICORA is in progress.

The Government's decision to use the frequency band freed up by the discontinuing of NMT 450 services for mobile broadband services, according to the recommendation of the broadband working group, will bring broadband connections within reach of everyone throughout the country, even holiday homes in remote areas and mobile locations such as campers and leisure boats. However, construction of the network has been slightly delayed from the original timetable due to complaints registered against the decision and to the undeveloped state of the technology. The network will, however, probably be in widespread use with the completion of the first phase by April 2007. The entire network will be completed in 2009.

During the strategy period, prices dropped by about 45 per cent in the first year and about 45 per cent again in the second year. There have been no further major price changes in 2006, and thus it may be considered that a well-functioning competitive environment has served to stabilize retail prices at an appropriate level.

The additional targets set by the Government – that 90% of all Internet connections should be broadband connections, and that Finland should become a world leader in the use of broadband services – will be attained during 2007. However, it will be a challenge to achieve the

target of 8 Mbit/s being the most common connection speed in broadband connections by the end of 2007.

Generating demand for faster connections requires affordable prices and interesting services and content that need faster connections. Achieving affordable prices requires continuous efforts to develop the competition situation in the telecommunications market. At the same time, telecommunications policy measures are needed to improve the capacity of telecom operators to invest in the development and construction of networks so that the provision of faster connection speeds will be possible.

To increase efficiency, everything that can be digitalized in administration and business must be digitalized. This is a global phenomenon. With the broad-based introduction of telecommunications connections, Finland is in a unique position to be a world leader in the development of the information society in the everyday lives of citizens. This requires systematic investments in e-commerce, web-based learning and particularly the improving of the competence of citizens and particularly of SMEs. Using online connections for person-to-person communication, a wide variety of entertainment, and interaction and content production in various online communities all serve to enhance competence and promote the development of the information society.

Helsinki, January 23, 2007

<p align="center">Harri Pursiainen
Permanent Secretary
Chair of working group</p>

Antti Kohtala Director of Unit for Networks and Competition	Rauni Hagman Director-General
Pekka Urjanheimo Director of Regional Development	Leena Honka State IT Manager
Reijo Svento Managing Director	Antti Eskola Commercial Counsellor
Simo Tanner Senior Advisor	Antti Mykkänen State Secretary
Sakari Karjalainen Director-General	Marita Wilska Director-General
Martti Virtanen Director	Veijo Turunen Advisor

<p align="center">Tatu Tuominen
Ministerial Adviser
Secretary</p>

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ABBREVIATIONS

ADSL	Asymmetric Digital Subscriber Line.
DSL	Digital Subscriber Line. This is a generic name, cf. ADSL and xDSL.
DSLAM	Digital Subscriber Line Access Multiplexer. A terminal device in a telephone exchange, shared by several digital subscriber lines.
DVB	Digital Video Broadcasting. The distribution technology for digital TV.
DVB-H	Digital Video Broadcasting – Handheld. The distribution technology for digital TV for mobile devices.
Ethernet	A local area network protocol. Enables transmission of data over a coaxial cable, a paired cable or fibre.
Flash-OFDM	Fast Low-latency Access with Seamless Handoff Orthogonal Frequency-Division Multiplexing (OFDM). OFDM is a modulation method (in this case a radio interface) whose Flash version is optimised for broadband data transmission together with IP architecture. Digita Oy is implementing a broadband network in the 450 MHz band using this technology.
FTTB	Fibre to the Building. Building a fibre-optic cable connection up to the building in question.
FTTC	Fibre to the Curb. Building a fibre-optic cable connection up to the city block in question.
FTTH	Fibre to the Home. Building a fibre-optic cable connection up to the user's residence.
GHz	Gigahertz (1,000 MHz)
HFC	Hybrid Fibre-Coaxial. A network with both fibre optic and coaxial cable. A cable TV network topology where the trunk network has fibre optic cables running to nodes, from which the signal is distributed through coaxial cables. Also known as a hybrid network and a cellular network.
HSDPA	High Speed Downlink Packet Access. An advanced version of UMTS to increase data transmission speeds.

HSUPA High Speed Uplink Packet Access. A UMTS return-channel development which enables speeds of 1 Mb/s in the return direction.

IP Internet Protocol. The basic protocol for packet-based data transfer over the Internet.

IPTV Internet Protocol Television. TV broadcasts conveyed using Internet Protocol over a large-capacity broadband network. Often includes other services such as VoIP and Internet access.

IPv6 Internet Protocol version 6. Expands the Internet address space many times over compared with IPv4.

ITU International Telecommunication Union. A UN organization which coordinates telecommunications networks and services internationally. The principal duties of the ITU are standardization, assignment of radio frequencies, and organizing connections between telephone networks in different countries.

kbit/s Kilobits per second.

Mbit/s Megabits per second.

MHP Multimedia Home Platform. International standard for interactive digital TV services, adopted in Finland too.

MMoIP Multi-Media Over Internet Protocol. A protocol for transferring multimedia content over the Internet.

NGN Next Generation Networks.

PLC Power Line Communications. Transmission of data (e.g. Internet connections) over power lines.

UMTS Universal Mobile Telecommunications System. A third-generation mobile phone system.

VDSL Very High Speed Digital Subscriber Line.

WiMAX Worldwide Interoperability for Microwave Access.

WLAN Wireless Local Area Network.

VoIP Voice over Internet Protocol.

xDSL Digital Subscriber Line. This is a generic name, cf. ADSL

FIGURES AND TABLES

PART I. BROADBAND TRENDS 2003-2006

1 Broadband trends in Finland

1.1 Number of connections

The purpose of the National Broadband Strategy was to increase the penetration and promote the introduction of broadband Internet connections in households, in the public sector and in businesses. During the strategy period, the number of broadband connections (households and companies) increased from about 300,000 connections to an estimated 1,500,000 connections. The one-million limit set as the goal for the National Broadband Strategy was exceeded in September 2005.

Figure 1. Number of broadband connections in Finland 2003-2007.
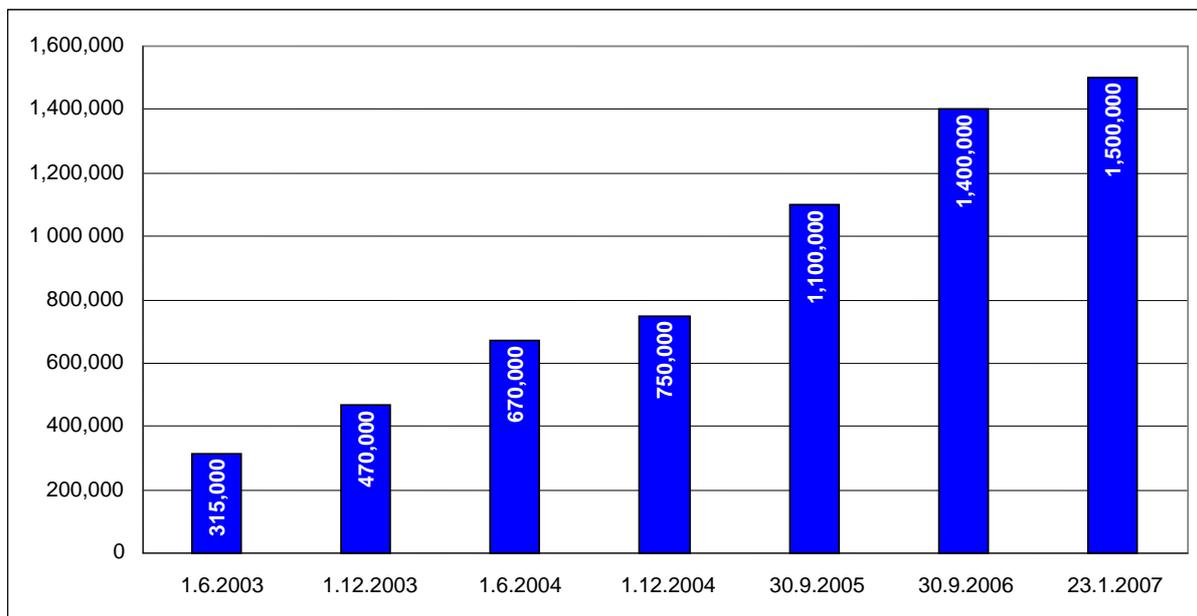
Sources: Ministry of Transport and Communications, Statistics Finland, FICORA

The penetration of broadband connections increased during the strategy period from 15% (spring 2003) to about 53% (autumn 2006). In 2005, a considerably larger percentage of households in Finland had a broadband connection than in the European Union on average (32%). The highest percentages of broadband connections in households in the EU Member States in 2006 were to be found in the Netherlands (66%) and Denmark (63%).[1]

The rapid proliferation of broadband connections is partly due to competition between operators and the consequent decrease in prices. The National Broadband Strategy has been used to promote competition within and between communications networks. Finland enjoyed the third highest rate of growth in Europe in the number of broadband connections in 2006, after the Netherlands and Denmark. The growth rate slowed down during the summer of 2006 but

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[1] Statistics Finland and Eurostat

picked up again in the autumn. The dip was caused by market saturation and decisions by operators to raise prices. Despite the increased competition in the broadband market, there are still obstacles to market development.

Broadband in business

The aim of the National Broadband Strategy in the business sector was to promote the potential of SMEs in particular to adopt information and communications technologies (ICT) and to introduce new ways of working which these technologies enable. The Strategy involved activities such as the Ministry of Trade and Industry running a project for improving the competitiveness of SMEs through ICT.

In spring 2006,[2] 83% of businesses employing five or more persons had a broadband connection; one year earlier, the figure had been 73%. During 2006, broadband connections became more widespread in businesses of all sizes. In 2006, nearly 90% of businesses employing 10 or more persons had a broadband connection; only in the group of businesses employing between five and nine persons was the figure somewhat lower (Figure 2).

Companies focusing on business-to-business services have been pioneers in the use of broadband in Finland as elsewhere in the EU. However, Finnish service companies use broadband connections to a considerably higher extent than service companies in EU Member States on average. This is particularly true in the hotel and restaurant sector.[3]

Figure 2. Number of broadband connections in Finnish businesses 2003-2006, percentage of businesses in the various size groups.
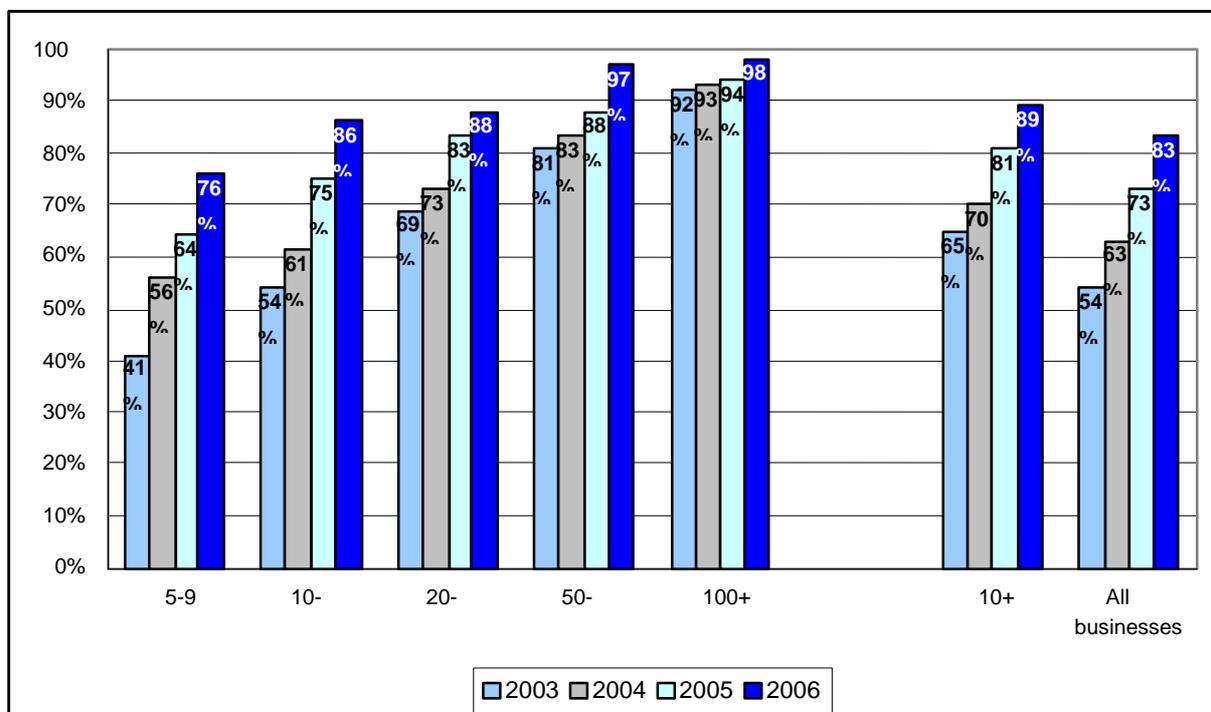
Source: Statistics Finland

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[2] Statistics Finland website. Internet and e-commerce in business 2006.
[3] Statistics Finland: Tieto and Trendit 9/2006

1.2 Availability

The aim of the National Broadband Strategy was to create rapid telecommunications services that are geographically comprehensive and available to all citizens at a reasonable price. Comprehensive provision of rapid telecommunications services is essential for ensuring regional equality. Technical and economic factors restrict the provision of commercial broadband connections in sparsely populated areas.

In spring 2003, regional availability of fixed broadband networks covered 75.7% of all households. By the end of the strategy period, in January 2007, this figure had increased to about 96.1%. In southern and western Finland, practically all households had access to a broadband network, but in certain sparsely populated areas the coverage was under 90%.

Wireless designs enable the extending of broadband connections to locations beyond the fixed network. The National Broadband Strategy has helped accelerate the introduction of technologies supplementing the fixed broadband network. In some areas, wireless regional networks have created a locally important broadband access channel.

The regional councils play a central role in ensuring broadband availability. The strategies that they have drawn up together with the municipalities have already accelerated the availability of connections. In the most successful regions, broadband coverage is very close to 100%.

Table 1. Coverage of fixed broadband network services.

Effectivity goal	ADSL or cable modem access, % of households						
	1.6.2003	1.12.2003	1.6.2004	1.12.2004	30.9.2005	30.9.2006	23.1.2007
Rapid and reasonably priced connections available to everyone by the end of 2005.	75.7	81.5	88.3	94.1	95.3	96	96.1

Sources: TeliaSonera Finland plc, Elisa plc, Finnet-liitto ry.

1.3 Price trends

Compared with other countries, Finland has rather many ADSL operators with their own dedicated networks. Elisa, TeliaSonera and the phone companies forming Finnet have each built their own subscriber networks; Saunalahti and MTV3/Song Networks rent network capacity from them. Fixed monthly rates with no volume-dependent component are in common use in Finland. Telecommunications operators mainly use zone pricing; in other words, prices differ from one region to another. The lowest prices are usually to be found in the largest cities, where the competition is toughest and the range of services the broadest.

The prices of connections dropped dramatically between 2003 and 2005, and stabilized in the basic connection speed categories during 2006. During the term of the Government of Prime Minister Matti Vanhanen, the prices of broadband connections in Finland have dropped by almost 70%. The National Broadband Strategy can be considered to have succeeded in open-

ing up competition and thereby lowering prices. Pursuing an active communications policy will help ensure that the consumer's interests will continue to be served in the broadband market.

The Ministry of Transport and Communications commissioned studies between 2003 and 2005 to monitor broadband trends in EU Member States by calculating country-specific price baskets for the various connection speeds.[4] In Finland in 2003, a 512 kbit/s connection cost the user about EUR 57 per month. This had dropped to about EUR 38 on average in 2004 and about EUR 21 on average in 2005. Correspondingly, the monthly cost of a 1 Mbit/s connection was about EUR 77 in 2003, about EUR 47 in 2004 and about EUR 26 in 2005; and that of a 2Mbit/s connection was about EUR 109 in 2003, about EUR 58 in 2004 and about EUR 35 in 2005.

In Finland, the price basket decrease in the 512 kbit/s category was 34% from 2003 to 2004 and 44% from 2004 to 2005. The corresponding figures for the 1 Mbit/s category were 38% from 2003 to 2004 and 45% from 2004 to 2005, and for the 2 Mbit/s category 47% from 2003 to 2004 and 39% from 2004 to 2005.

In 2006, there were no great changes in the prices of broadband connections in Finland. Prices remained largely at 2005 levels. In some categories, the telecom operators even raised their prices slightly. In 2006, a 512 kbit/s connection cost EUR 21 on average, just as in the previous year, and the prices of 1 Mbit/s and 2 Mbit/s connections remained stable too, at about EUR 27 and about EUR 35, respectively.[5] Generally, the monthly rates for broadband connections settled at level near the international average in 2006.

Figure 3. Average of price baskets in DSL connections in Finland 2003-2006 (EUR per month).
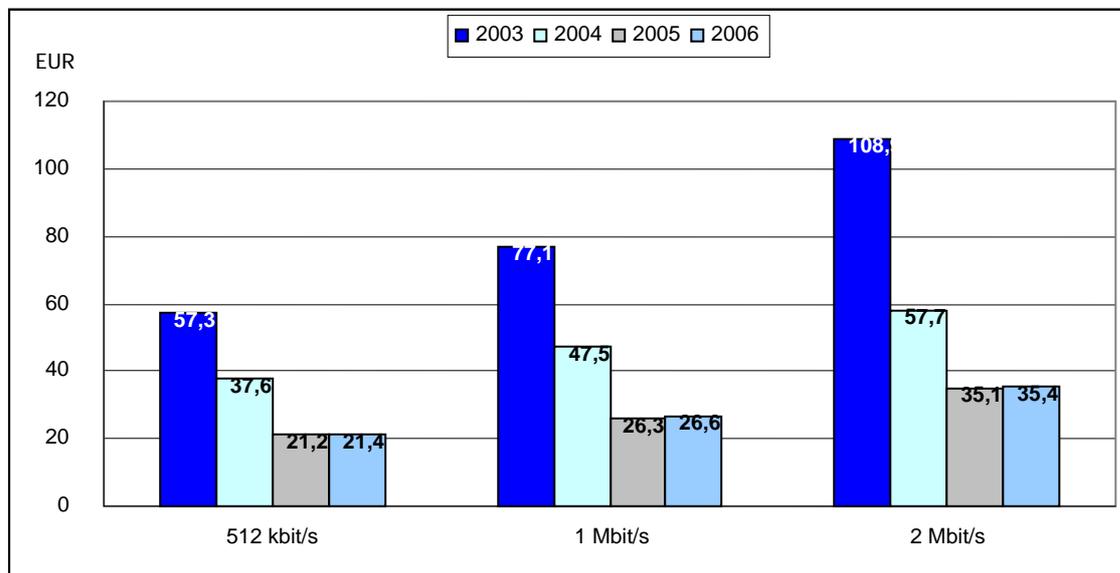
Sources: Ministry of Transport and Communications (2003-2005), and Finnet Focus Oy / Tikon Consulting Oy (2006)

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[4] Ministry of Transport and Communications 2003b, 2004b, 2005b and 2005c
[5] Source: Finnet Focus Oy

In addition to monthly rates, initial connection charges are a significant factor in the proliferation of broadband connections. Connection charges have fallen dramatically; in 2003, they were only 20% of what they had been in 1999. Between 2003 and 2006, connection charges continued to decrease slightly. In addition to the standard charges, there are often various packages on the market where a customer can sign up for a broadband connection with no connection charge.

1.4 Development of competition in the broadband market

There was no obvious market leader in the broadband market in Finland in 2003. TeliaSonera and Elisa were neck and neck, covering some 60% of the market between them. The third-ranking operator, Finnet Group, had a market share of 17%, and the fourth, HTV Welho, more than 10%.

This rather level playing field was due to the fact that Finland has never had a single national telephone operator. Regional operators have always been in charge of their own phone networks. Indeed, a regional breakdown shows that the market shares of the telecom operators are very different in different regions in Finland, as an operator traditionally strong in a particular region tends to hold sway there even today.

In 2005, Elisa became the market leader, with some 385,000 broadband connections. This was partly due to Elisa acquiring Saunalahti. At that point, Elisa had a market share of 32% as opposed to TeliaSonera's 31%. Finnet Group, a consortium of regional phone companies, remained number three with a market share of 24%.

During 2006, Elisa consolidated its leading position over TeliaSonera. In spring 2006, Elisa had almost 100,000 connections more than TeliaSonera. Finnet Group also increased its number of connections. In September 2006, Elisa had a market share of 35% of all broadband connections, while TeliaSonera and Finnet were at 29% and 24%, respectively. All other telecom operators together accounted for 12% of the market at that time.[6]

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[6] Source: FICORA market review 3/2006

Figure 4. Telecommunications operator market shares in the broadband market, September 2006
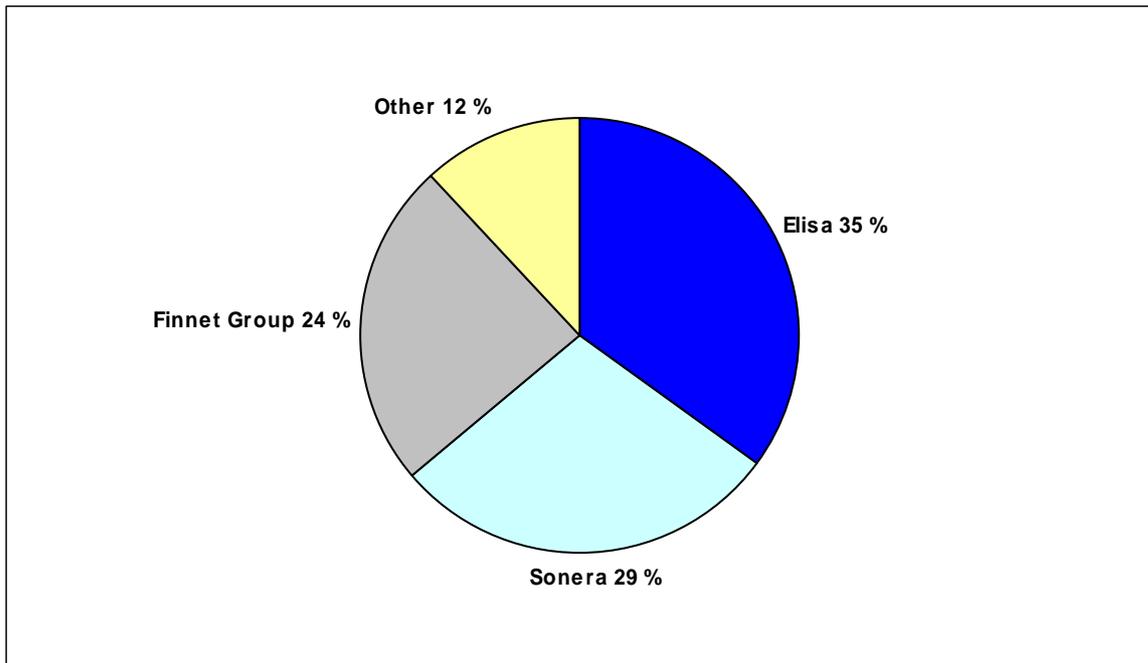
Source: FICORA

The three operators with the largest market shares have increased their lead over all other operators in terms of the number of connections (Figure 5). The number of connections of HTV and the other minor players has remained roughly the same since 2004.

Figure 5. Telecommunications operator broadband connections, 2003 to June 30, 2006.
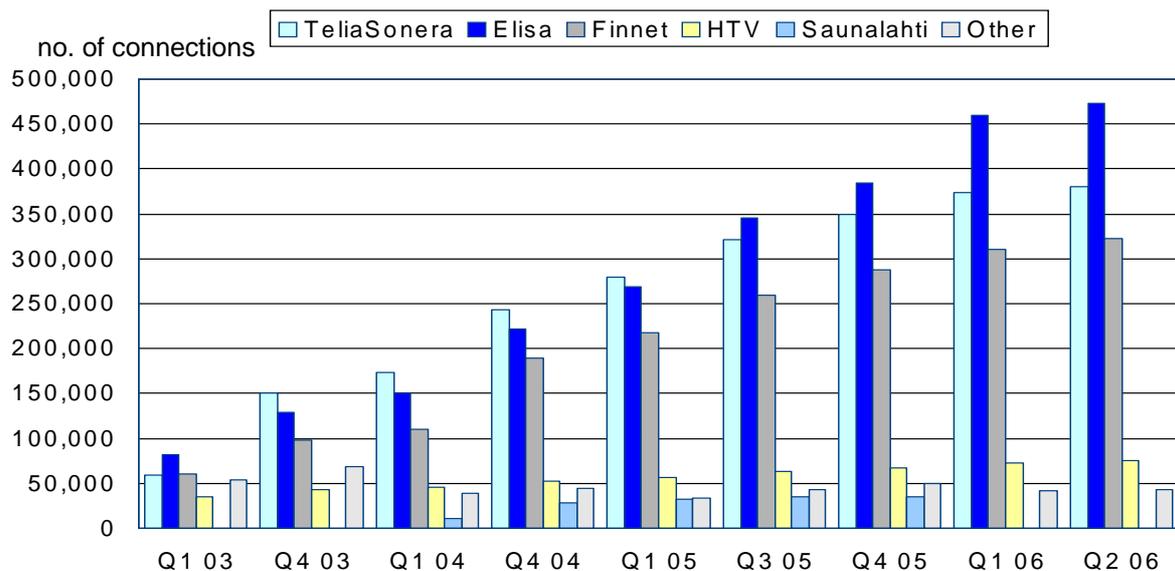
Sources: FICORA, interim reports of the operators, Finnet-liitto ry.

1.5 Broadband and Internet use

For households to procure a broadband connection, users must be interested in and capable of using the potential of IT and the Internet. Procuring a connection usually also requires financial resources for covering the costs of equipment purchase and maintenance costs. In 2003, the reasons most commonly cited for not procuring an Internet connection for the home were financial reasons; general fears regarding the use of IT; and not having sufficient skills (in the user's own evaluation).

Research shows that education is a significant contributing factor in the use of the Internet in general and broadband in particular. For example, in 2004 a broadband connection was much more likely to be found in the homes of people with a higher educational attainment. However, Internet use in the home largely consists of the basic services (e-mail, information searching, online banking). The range of content available on the Internet that specifically requires a broadband connection is not at all extensive.[7]

Broadband connections proliferated in 2005, at which time more than 70% of all households that had a computer also had a broadband connection. Finland and the other Nordic countries lead the world league tables in the use of the Internet. Still, the most common usages remained e-mail, information searching and online surfing (of an unspecified nature). An important reason cited for not procuring an Internet connection and broadband connection for the home was the availability of Internet access elsewhere.

During the strategy period, the number of broadband Internet connections has increased, and the range of usages has broadened. For example, e-commerce, Internet telephony and online public services have become much more common.

In 2006, nearly half of all Finns had bought something online at least once. Students and employees were the most frequent users of online shops. Very few pensioners shopped online. The products most commonly bought online were travel products, closely followed by clothes and footwear. E-commerce seems to continue growing. During spring 2006, the total value of private online purchases was about EUR 620 million; which works out at EUR 2.5 billion for the entire year.[8]

In 2005, two thirds of all Internet users had used public online services, mostly for information searching. The use of e-transactions became more common during the year. The most important and most frequently used public online services were information services, online forms and e-transactions. In 2006, one in four Internet users had transacted personal business with public officials online at least once. One in five users had filled in and submitted forms online.

The increasing range of online public services is promoting the proliferation of broadband services. Regarding public services, the aim of the National Broadband Strategy was to make Finland one of the world's leading countries in the area of e-transactions by the year 2007.

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[7] Ministry of Transport and Communications 2003c and 2004c
[8] Statistics Finland: Tieto and Trendit 9/2006

In 2006, about 67% of all public services were available online in such a manner that it was possible to carry out an entire transaction without leaving the Internet. Finland ranked at the top of the list among EU Member States in a comparison of Internet use for searching for official information.[9]

Important reasons cited for not using the Internet and online services continue to include lack of skills and insecurity about information security. Information security fears also inhibit consumer interest in e-commerce, for instance. Specifically, these fears involve the disclosure of credit card information and personal data over the Internet.[10] The cost of procuring and using an Internet connection as a reason for not using online services has been declining in importance since 2003. According to Statistics Finland, in 2006 only about one in ten people not using the Internet mentioned cost as a reason for their non-usage.

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[9] See Statistics Finland 2006c. Tietoyhteiskuntatilasto 2006

[10] Nurmela Juha et al. 2006. *Kansalaisesta e-kansalainen.* Statistics Finland; and Statistics Finland: Tieto and Trendit 9/2006

2 Development and change in the technological environment in Finland 2003-2007[11]

The following is a survey of broadband technologies, including both fixed-network technologies (DSL, cable modem, optic fibre and power line communications) and radio network technologies (WiMAX, 3G/UMTS, 450 MHz and WLAN).

2.1 Fixed-network technologies

2.1.1 DSL

DSL technology makes use of the normal existing paired cables in the telephone subscriber network but operates at higher frequencies than telephone communications. DSL technology is commonly referred to with the generic acronym xDSL, which subsumes the technologies discussed below —ADSL, ADSL2, ADSL2+ and VDSL2.

All ADSL technologies are characterized by their asymmetrical performance: their upload speeds are substantially lower than their download speeds. Over the past two years, ADSL2+ has emerged as the leading DSL technology; it can achieve connection speeds of up to 25 Mbit/s (Figure 6). The improvement of ADSL technologies has been possible particularly due to frequency range increases, which means that performance has only improved over short distances.

The most recent DSL standard is VDSL2, which was published in summer 2005. It introduced two significant performance improvements: higher data speeds and symmetricity. The standard includes alternative frequency areas, and consequently the target data speeds vary from asymmetrical 50/10 Mbit/s connections to fully symmetrical 100/100 Mbit/s connections. However, the physical length of the subscriber connection is here even more relevant: VDSL only gives an advantage in connections that are less than 1 km long (Figure 6).

Figure 6. DSL technology development requires physically shorter subscriber connections
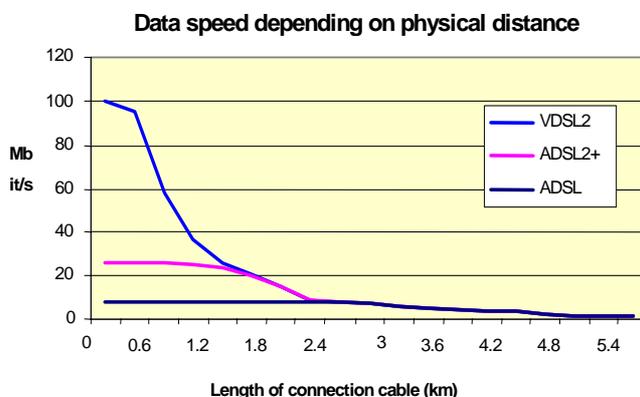
Source: Omnitele Oy

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[11] This figure is based on the report *Laajakaistateknologioiden kehitys 2003-2007* [Broadband technology development] produced by Omnitele.

At the moment, ADSL2+ is by far the most common DSL technology in use, and in practice all new equipment follow the ADSL2+ standard. VDSL2 is only just making its way onto the market, but it may be expected to become more popular for example in fibre applications.

2.1.2 Cable modem

Modern cable TV networks (Figure 7) are HFC networks, or fibre-coaxial networks. In the network, fibre optic cables run to nodes from which the signal is distributed through coaxial cables.

Figure 7. Schematic of cable TV network
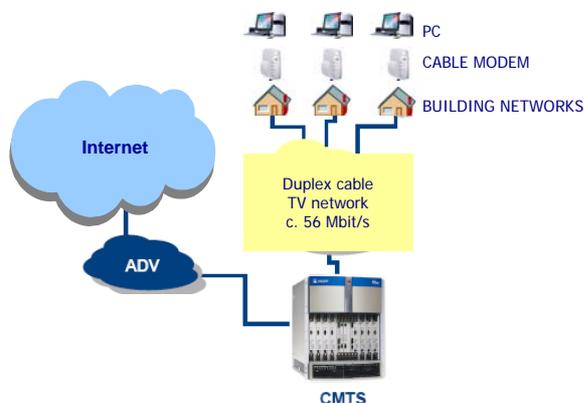
Source: Omnitele Oy

The principal cable TV network standard is Docsis, the European version of which is Euro-Docsis. Most Finnish cable TV networks are based on EuroDocsis 1.1, but there are newer standards too: EuroDicsis 2.0 was published in April 2004 and Docsis 3.0 in August 2006.

The aim in version 2.0 was to strengthen the return-link capacity in particular through more efficient modulation methods and increased bandwidth. Docsis 3.0 aims to make more efficient use of existing capacity in the cable TV network for data transmission by merging several channels. According to CableLabs, the consortium leading the standardization process, Docsis 3.0 can provide up to 160 Mbit/s and 120 Mbit/s data speeds per node for the forward link and return link, respectively (Table 2). The user-specific capacity would then depend on the size of the node and the number of users connected at any given time.

Table 2. Development of Docsis standards

Standard	Data speed, forward link / return link
Docsis 1.0	38/10 Mbit/s
Docsis 2.0	40/30 Mbit/s
Docsis 3.0	160/120 Mbit/s

Source: Omnitele Oy

In practice, cable modem services will probably remain significantly asymmetrical in the near future. This is because the frequency area reserved for the return link, 5-65 MHz, is narrow and prone to disruptions.

Mention should also be made of the EttH (Ethernet to the Home) system developed by Teleste over the past few years. EttH is a competitor to Docsis, which can achieve a data speed of 100 Mbit/s. User-specific data speeds of over 8 Mbit/s in a cable TV network will only be possible with Docsis 3.0 or EttH.

2.1.3 Fibre optic technologies

In the future, fixed-network broadband solutions are expected to be increasingly based on fibre technologies. Schemes where fibre optic cables extend up to subscribers' homes (FTTH, Fibre to the Home) are few and far between, and they exist either in new housing developments where they are built by the traditional operators, or in sparsely populated areas as projects built by various regional network associations. Current fibre optic solutions typically enable 100 Mbit/s Ethernet connections, but the capacity of the fibre as such could handle much higher speeds.

In recent years, operators have improved their broadband networks by taking fibre optic cables closer and closer to subscribers in what can be described as FTTC and FTTB schemes.[12]. This trend is particularly strong at the time of writing. TeliaSonera has just started building fibre optic networks (FTTB) in parallel with existing copper-cable networks in limited applications in the Helsinki Metropolitan Area and in eight other cities.

FTTH schemes require the construction of a completely new subscriber connection, which is very expensive particularly considering the excavation work required. Construction costs per user are particularly high in rural areas: it can be up to ten times more expensive to build a network in a sparsely populated rural area than in a high-rise housing development.

2.1.4 Power Line Communications

The electricity grid in Finland is even more comprehensive than the phone networks, which is part of the reason why power companies are seeking to exploit their networks for data services too. Broadband data transmission over the electricity grid is known as Power Line Communications (PLC). The data speeds are relatively low (256-512 kbit/s), and this technology has not come into widespread use.

The pioneer in PLC in Finland was Turku Energia, which launched the service in early 2003. It served 210 housing companies and 13,000 households in Turku at its peak, but in October 2006 the company announced that it was discontinuing this service completely. Another PLC company, Vattidata Oy in Pori, has also terminated its service. At the moment, Kuopion Energia is the only company offering a PLC service, which currently covers 13,000 households.

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[12] FTTC = Fibre to the curb; FTTB = Fibre to the building (also FTTP = Fibre to the premises).

2.2 Wireless network technologies

2.2.1 WiMAX

The standardization process leading to WiMAX was begun at the start of this decade, and the first WiMAX standard, 802.16, was approved in 2004. Current WiMAX solutions operate at a frequency of 3.5 GHz and can achieve a node-specific data speed of about 10 Mbit/s. Typically for radio technologies, the signal is distributed among all active users of a node. The strength of WiMAX is its great capacity, while its weakness is the rapid attenuation of its signal because of its high frequency, especially in densely built areas. Terminal devices are also still expensive, which makes introduction of the technology slow.

The first WiMAX applications involve fixed terminals, but a version of the standard enabling mobility, 802.16e, was approved in December 2005. WiMAX is expected to become a standard feature in laptops in the near future.

WiMAX is being increasingly used in Finland. The most significant WiMAX project is the network built by the Mikkelin Puhelin Oyj and Savonlinnan Puhelin Oy phone companies in the sub-region known as RaJuPuSu (the municipalities of Rantasalmi, Juva, Puumala and Sulkava), which was begun in 2004. The companies offer data speeds between 512 kbit/s and 2 Mbit/s. There are 35 WiMAX radio transmission licence holders in Finland, but WiMAX projects are local by nature, even those still on the drawing board. So far, there are no plans for a nationwide network.

2.2.2 UMTS/3G

Third-generation (3G) mobile communications technologies are advanced enough to be considered broadband technologies. In the basic version of UMTS, data speeds are still modest, but the High Speed Downlink Packet Access (HSDPA) development version should bring a substantial improvement to this.

HSDPA is being used by more than 60 operators in dozens of countries, but in Finland only Elisa has updated its UMTS network. Elisa opened its HSDPA network, covering 40 locations, last spring, and according to its publicity the network enables connection speeds of up to 1 Mbit/s. Technically, HSDPA applications already on the market can support connection speeds of at least 3.6 Mbit/s, and later improvements may attain 10 Mbit/s. There are already terminal devices on the market, and HSDPA phones can be expected to become more common quickly. The development version for the return link (HSUPA) is expected to be launched in the current year, and this will enable speeds of up to 1 Mbit/s in the return link.

2.2.3 450 MHz

The 450 MHz frequency band was freed up for wireless broadband when the NMT 450 mobile phone network was discontinued. There is one national network licence for this frequency band in Finland, granted by the Government to Digita Oy on June 22, 2005. Globally, using the 450 MHz frequency band for broadband is a new concept, and this is both technically and commercially virgin territory.

There are two alternative 450 MHz technologies: Flash-OFDM and CDMA 450; Digita has chosen Flash-OFDM. According to the original timetable, the network should already be in use, but due to a series of delays Digita will not be opening it until April 1, 2007. The network is intended to cover the entire country.

The benefits of the 450 MHz technology are its mobility and its relatively low frequency, which enables long connections. Flash-OFDM is a proprietary technology, which can cause a certain amount of technological risk and can become evident in the pricing of the devices.

2.2.4 WLAN

WLAN stands for Wireless Local Area Network. Modern WLAN devices mostly conform to the 802.11g standard published in 2003. This defines the node-specific data speed as 54 Mbit/s, but due to the high frequency (2.4 GHz) signal attenuation is rapid.

In recent years, three major applications for WLAN technology have emerged:
1. The original role, enabling a wireless network indoors.
2. HotSpots in public indoor or outdoor spaces.
3. Consumer electronics.

The use of WLAN in all these applications is increasing, and standardization of the technology to improve performance is continuing.

2.3 The status of broadband technologies in Finland

Figure 8 demonstrates the development of the relative status of broadband technologies in Finland from 2000 onwards. DSL and cable modem have dominated the market overwhelmingly, as all other technologies combined have accounted for less than one per cent. This is very similar to the situation worldwide.

Figure 8. Percentages of broadband technologies in Finland
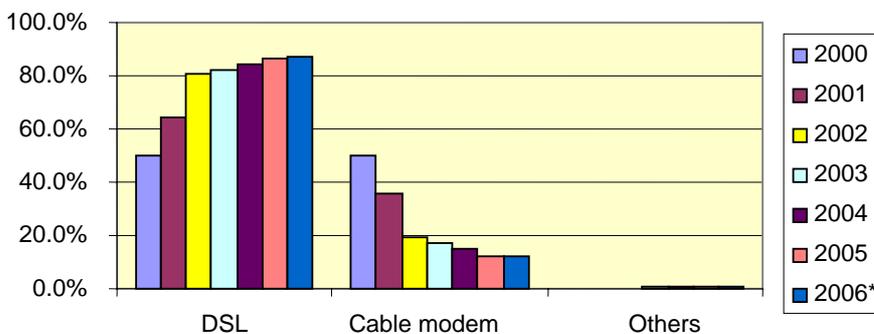
Source: Omnitele Oy

DSL and cable modem can be expected to dominate for the next few years at least. However, the distinction between DSL and optic fibre applications is becoming blurred, as the role of DSL in the production chain is decreasing with the increased use of optic fibre; operators are investing heavily in cutting back on the physical length of subscriber connections. FTTH can be expected to become more common, beginning in new housing areas and city centres.

The relative weakening of the status of cable TV networks can be explained by the fact that they have a considerably lower coverage than phone subscriber networks.

Radio technologies in particular can be expected to play a more significant role in the future of broadband, as with the proliferation of mobile terminal devices the importance of wireless networking will increase. 3G/HSPA will complement fixed-network connections in cities, and 450 MHz/Flash-OFDM will similarly become important in rural areas. WiMAX will probably fall somewhere between the too, both complementing and supplanting fixed-network connections as the case may be. WiMAX and 450 MHz offer the potential for a connection at summer cottages and similar locations where it would not be possible to offer a fixed-network connection at a reasonable cost.

3 Finland in international comparison

3.1 Broadband coverage

Households

In international comparison, the country with clearly the highest rate of broadband coverage in households in 2003 was Canada.[13] At that time, the percentage of households with a broadband connection was nearly twice as high in Canada as in the most advanced countries in Europe. The reasons cited for the rapid proliferation of broadband included early introduction of services and the good availability of services all over the country. The same year saw a considerable increase in broadband connections in the USA too. The perceived reasons were similar too: good availability of connections and services.

In Europe, the countries most advanced in terms of broadband coverage in households in 2003 were Belgium and Sweden. In Belgium, this was due to good availability of connections and their relatively low price compared with phone modem connections. In 2003, Finland was about one year behind Belgium and Sweden, but on the other hand about one year ahead of Germany, France and Britain, with about 15% of Finnish households having a broadband connection. The corresponding figure at the time was 34% in Canada, 22.2% in Belgium and 20.6% in Sweden, while Germany, France and Britain were at about 10% each.

In 2005, broadband coverage in households increased substantially in all the countries named above. At that time, Iceland topped the charts with 60% coverage in households. The figure was over 50% in the Netherlands and Denmark, and around 40% in Sweden, Belgium and Norway. Finland ranked sixth in this comparison, with 35%,[14] which was clearly above the EU average (approx. 22%). In spring 2006, broadband coverage in households in Finland rose to about 53% (Figure 9), being outranked only by the Netherlands (66%) and Denmark (63%) among the EU Member States. The figures for Sweden and Belgium at this time were 51% and 48%, respectively, and the EU average was 32% (EU 25).[15]

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[13] Ministry of Transport and Communications 2003a
[14] Sources: Statistics Finland and Eurostat
[15] Source: Eurostat

Figure 9. Broadband connections in households, spring 2006 (EU25)
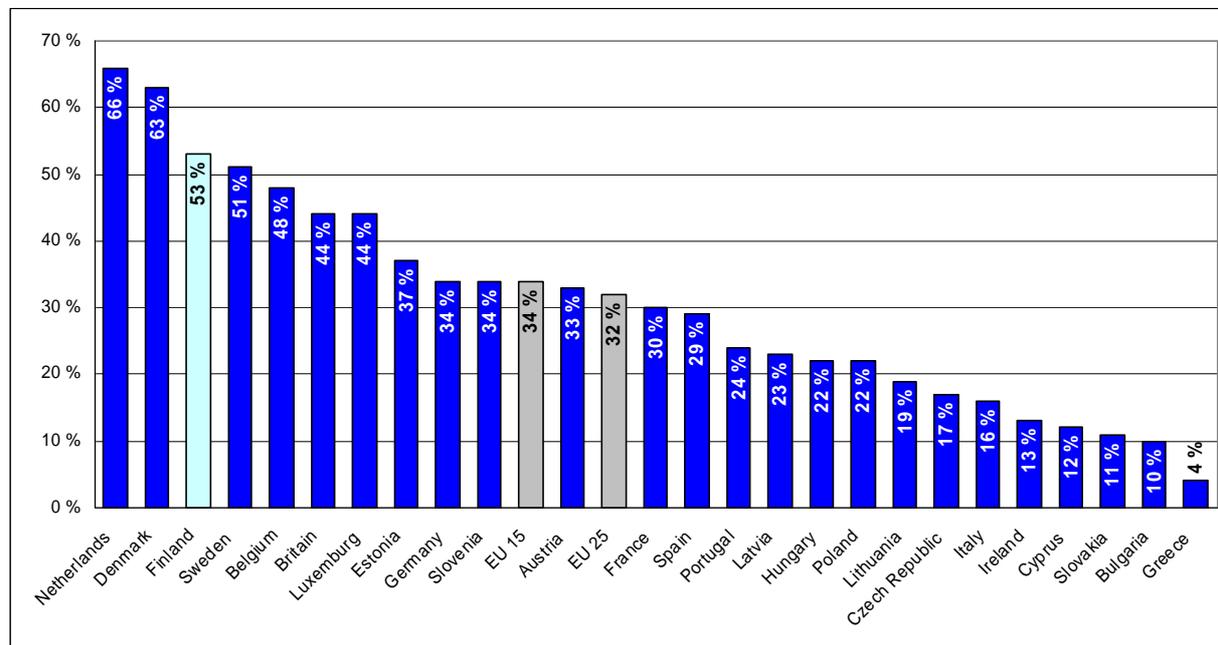
Number of connections

In a report commissioned as background material for the National Broadband Strategy (Ministry of Transport and Communications 2003b), a comparison was made of the number of broadband connections per 100 inhabitants in a number of countries: the EU Member States and other countries which are important references in broadband coverage. In a worldwide comparison of the relative number of broadband connections, Canada ranked third after South Korea and Hong Kong.[16] The best-ranking EU Member State was Denmark, in fifth place. Finland's ranking was 15, behind Sweden, Canada, Belgium, the USA, Japan and Austria, among others. In both 2002 and 2003, Finland ranked sixth among EU Member States.

By spring 2004, Finland had risen from sixth place to fifth, and towards the end of the year to fourth. This marked the attainment of one of the goals of the National Broadband Strategy: bringing Finland up to at least fourth place in the ranking by the relative number of broadband connections. Finland overtook Sweden and Austria in 2004, ranking fourth after Denmark, the Netherlands and Belgium. Also in 2004, Finland passed the USA in worldwide comparison. The number of broadband connections continued to grow in 2005, and Finland rose to third rank in the EU comparison, overtaking Belgium.

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[16] Source: *ITU Internet Reports, September 2003. Birth of broadband.* (Ministry of Transport and Communications 2003a)

Table 3. Finland's ranking in relative broadband coverage.

Effectiveness goal	Finland's ranking in the relative number of broadband connections among EU Member States (EU25)						
	1.6.2003	**1.12.2003**	**1.6.2004**	**1.12.2004**	**30.9.2005**	**30.9.2006**	**23.1.2007**
Finland to become a leading European country in the use and availability of rapid telecommuni-cations connec-tions.	*6*	*6*	*5*	*4*	*3*	*3*	*3*

Sources: Commission of the European Communities, eBird, Ministry of Transport and Communications

In July 2006, Finland ranked third among EU Member States in the relative number of broad-band connections.[17] Figure 10 shows the number of broadband connections per 100 inhabi-tants. Denmark and the Netherlands top the list with a coverage of almost 30%. In July 2006, broadband coverage in Finland was about 25% per 100 inhabitants, compared with about 23% in Sweden and slightly over 20% in Belgium. By comparison, the figures in 2002 were 8.6% for Denmark, 7.2% for the Netherlands and 5.3% for Finland, and Sweden and Belgium were ahead of Finland with 7.8% and 8.4%, respectively.[18]

In January 2007, Finland was still in third place in broadband coverage at 26% per 100 in-habitants.[19]

Figure 10. Broadband connections in EU Member States in July 2006 (per 100 inhabitants)
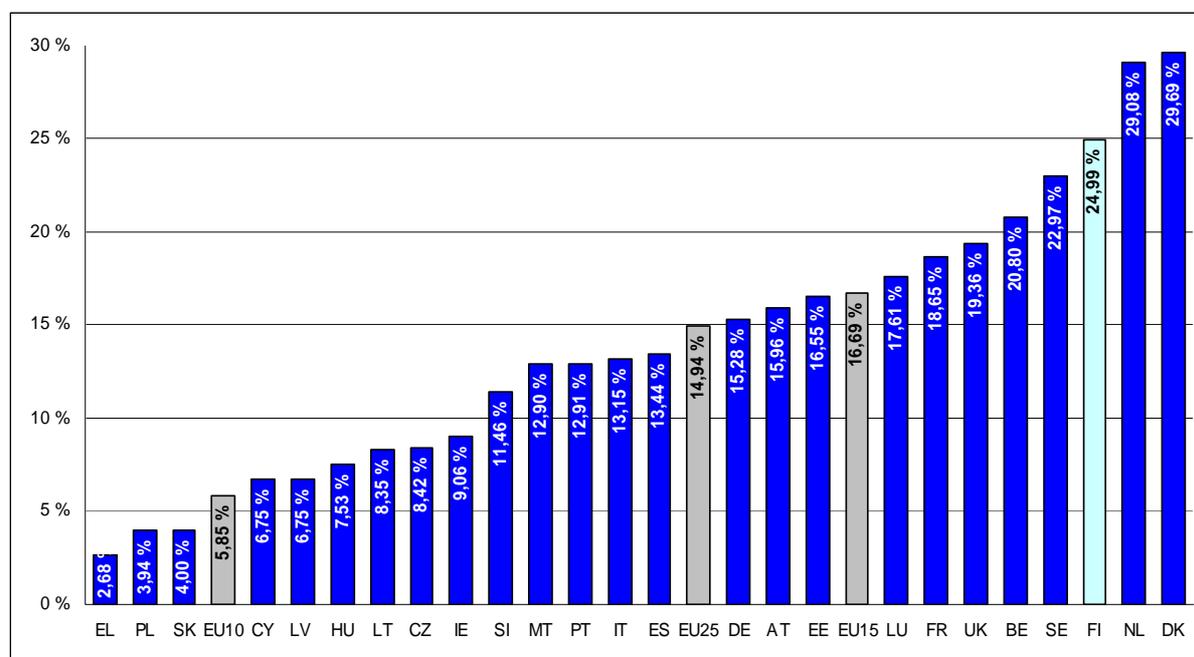
Source: Commission of the European Communities

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[17] COCOM06-29. *Broadband access in the EU: situation at 1 July 2006.* Working document
[18] Source: *ITU Internet Reports, September 2003. Birth of Broadband*
[19] Source: Commission of the European Communities

Among OECD countries, Finland ranked sixth in broadband coverage in June 2006 (Figure 11). Finland has attained the top rank internationally in this respect. The list in 2006 was topped by the EU leaders Denmark and the Netherlands, followed by Iceland, Korea and Switzerland. Finland ranked above such countries as Sweden, Canada, Belgium, the USA, Japan and Austria, all of which were ahead of Finland in broadband development as recently as 2002. It is noteworthy that Finland rose from 15th place to sixth place over the period 2002-2006.[20]

Figure 11. Broadband connections in OECD countries in June 2006 (per 100 inhabitants)
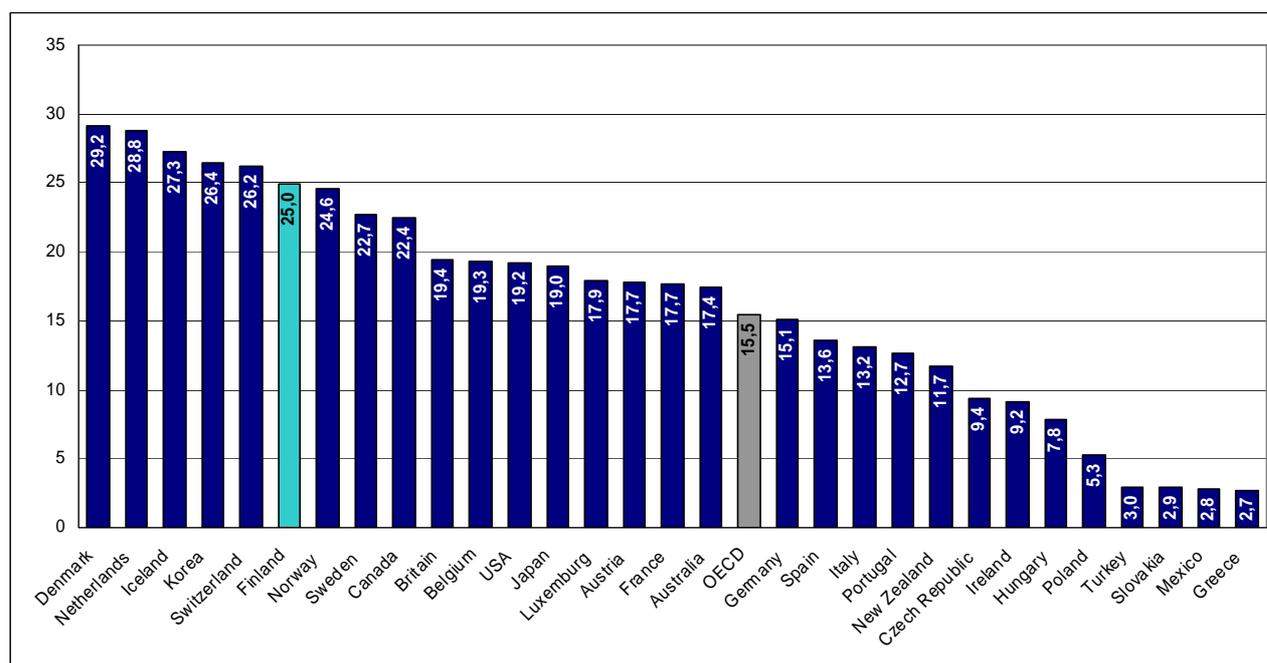
Source: OECD

Finland has had the highest growth rate in the number of broadband Internet connections of any EU Member State between 2002 and 2006. However, the growth rate has decreased in 2005 and 2006. Figure 12 shows broadband coverage and the growth rate for each EU Member State from 2005 to July 2006.[21] Denmark and the Netherlands show the greatest increase over the period examined. Although the growth rate in Finland flagged a bit during 2005, Finland still ranks third in this comparison.

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[20] OECD: *Broadband Preview*, June 2006
[21] COCOM06-29. *Broadband access in the EU: situation at 1 July 2006*

Figure 12. Broadband connection coverage and growth rate in EU Member States 2005-2006
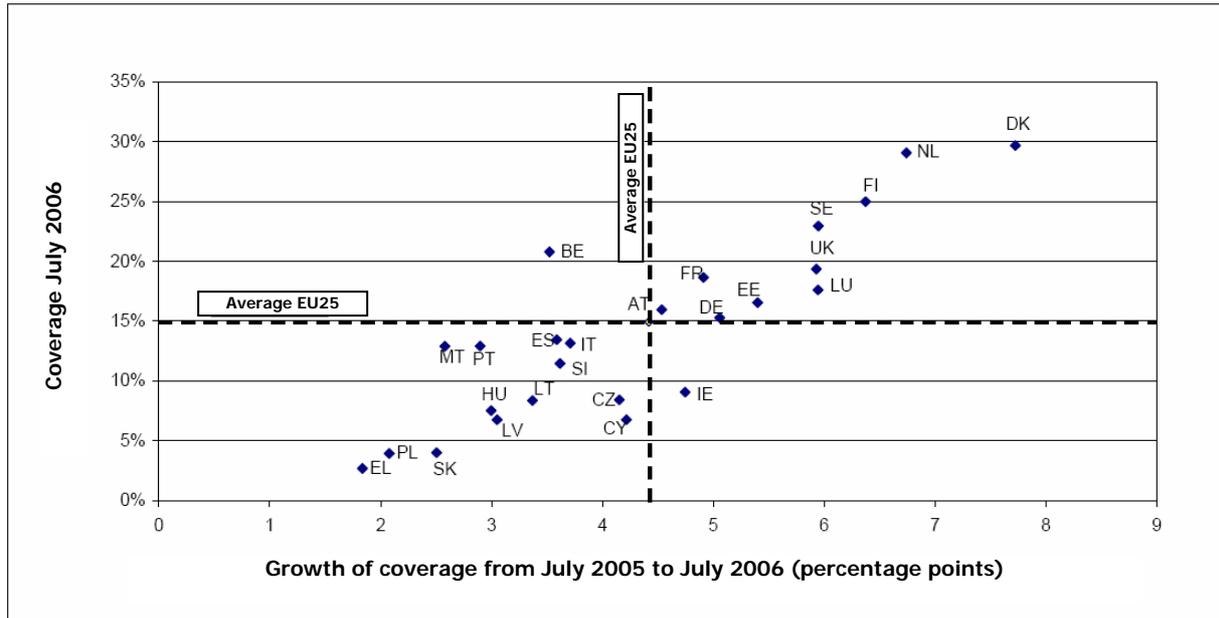
Source: Commission of the European Communities

Among OECD countries, Finland ranked fifth in the growth rate of the number of broadband connections in June 2006,[22] being outranked not only by Denmark and the Netherlands but also by Norway and Australia (Figure 13). The differences between ranks 2 to 5 are slight. Only Denmark was clearly better than the four following countries, increasing the number of connections by an average of seven new connections per 100 inhabitants during the period under review. Australia, Norway, the Netherlands and Finland had slightly over six new connections per 100 inhabitants in the same period.

Figure 13. Growth in number of broadband connections in OECD countries 2005-2006
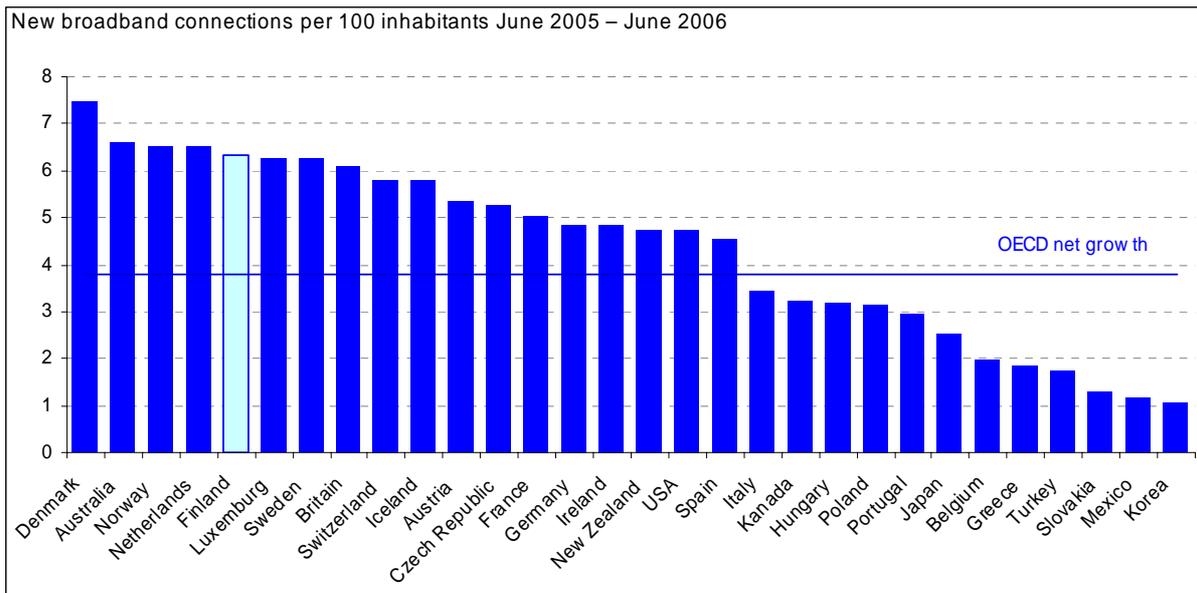
Source: OECD

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[22] OECD: *Broadband Preview,* June 2006

Many of the countries spearheading broadband development are small in area and have a high population density (Figure 14). In such countries, building a broadband networks is more affordable than in Finland, which is sparsely populated: distances are short, and a large number of users can be found in any given relatively small area. In many cases, building a broadband infrastructure is financially profitable for telecom operators, and public funding is not needed on anywhere near the same scale as in sparsely populated areas.

Figure 14. Broadband connections relative to population density in OECD countries June 2006
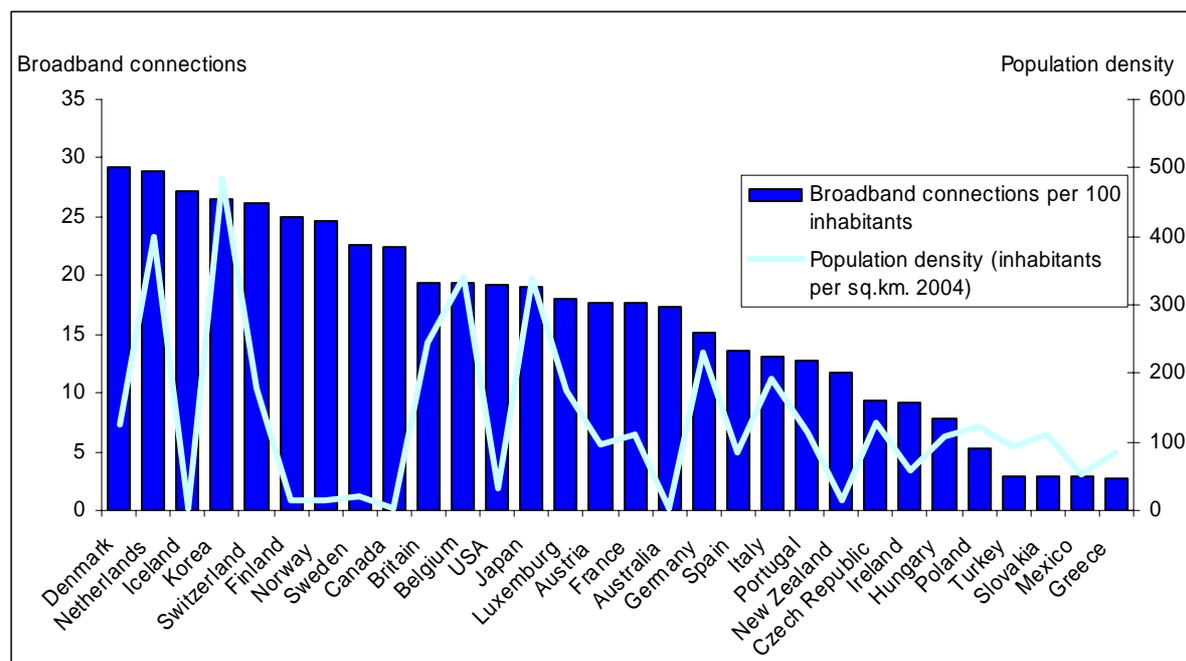
Source: OECD

3.2 Price level[23]

The prices of broadband connections decreased substantially in most EU Member States between 2003 and 2006. Comparisons of country-specific pricing of broadband connections in the EU in 2003 showed that the cost of an ADSL connection in Finland ranked 8th or 9th depending on the connection speed. The most affordable connections by far were available in Belgium, where the effective price for the connection speed of 2 Mbit/s was less than half what it was in the next most affordable country, Sweden. Prices were also low in Britain, while in Greece the price for the same connection speed was over ten times more than in Belgium.

In all, there were huge differences in pricing in EU Member States in 2003 not only between countries but between operators within countries. Price differences between countries can be explained by factors such as the ratio of area to population density, as it is far cheaper to build

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[23] This figure is based on publications of the Ministry of Transport and Communications: *EU-maiden ADSL- and cable modemyhteyksien kuluttajahinnat – Lokakuu 2003, EU-maiden laajakaistahinnat 2004* and *EU-maiden laajakaistahinnat 2005.*

connections in a densely populated country than in a sparsely populated one. Small central European countries such as Belgium, Luxemburg and the Netherlands are good examples of countries with a small size and a high population density. Finland, by contrast, is one of the most sparsely populated countries in the EU, and it is often far more expensive to build connections here than in the above-mentioned countries.

In 2004, the price of a broadband connection in Finland ranked 7th or 12th depending on the connection speed in the price basket comparison between EU Member States (Figures 15 and 16). At that time, the lowest prices for ADSL connections at speeds of less than 2 Mbit/s were to be found in Estonia, and at 2 Mbit/s in Belgium. The price for 512 kbit/s connections in Finland was the same as the average for 'old' EU Member States, about EUR 38. In 1 Mbit/s and 2 Mbit/s connections, the price in Finland was below the EU average.

By the time of the 2005 price basket comparison, Finland had improved its standing in relation to the other EU Member States. The lowest prices for 512 kbit/s connections were to be found in Italy (EUR 19.92 per month) and the highest in Greece (EUR 53.77 per month), with Finland ranking fourth. The price basket value for this connection speed was 54% higher in Sweden and 103% higher in Denmark than in Finland.

The lowest prices for 1 Mbit/s connections in 2005 were to be found in Lithuania (EUR 14.19 per month) and the highest in Greece (EUR 85.46 per month). Here, too, Finland ranked fourth. The value of the price basket in October 2005 was EUR 26.30, while the EU average was about EUR 37.

Figure 15. Country-specific prices for 1 Mbit/s broadband connections (EUR per month) October 2004 and 2005
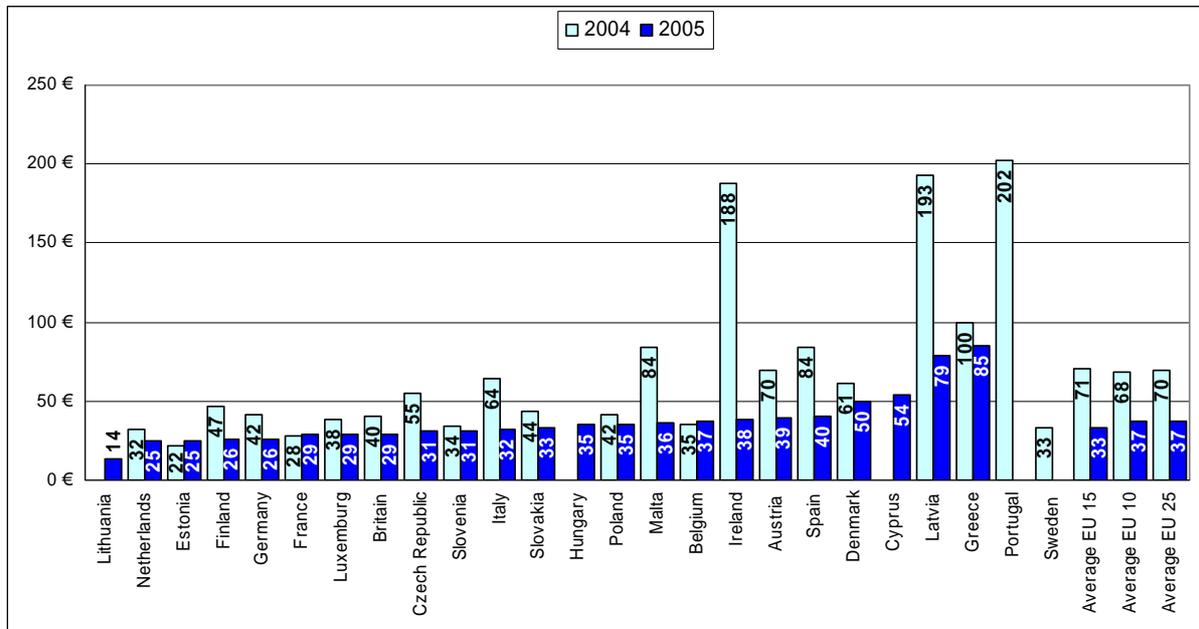
Source: Ministry of Transport and Communications: EU-maiden laajakaistahinnat 2005, publications 2/2006

The lowest prices for 2 Mbit/s connections were also to be found in Lithuania (EUR 22.88 per month) and the highest in Greece (EUR 157.91 per month). Finland ranked tenth. The price basket was EUR 35.07, clearly lower than the EU average of EUR 50.74. The price basket was almost the same in Sweden but 61% higher in Denmark.

Figure 16. Country-specific prices for 2 Mbit/s broadband connections (EUR per month) October 2004 and 2005
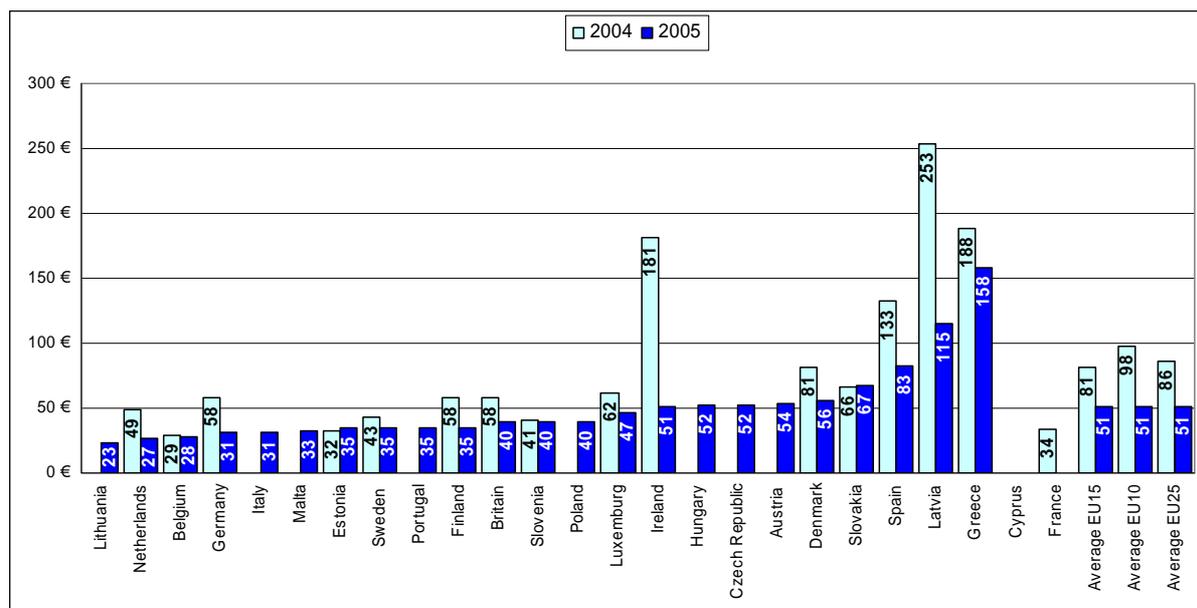
Source: Ministry of Transport and Communications: EU-maiden laajakaistahinnat 2005, publications 2/2006

Figures 17 and 18 show the price level index for broadband connections at connection speeds 1 Mbit/s and 2 Mbit/s in October 2005.[24] In 2005, Finland's DSL connection prices were among the lowest in the EU Member States (ranking 4th and 10th). The countries that overall had lower prices than Finland were Lithuania (1, 1), the Netherlands (2, 2) and Estonia (3, 7). It should be noted that in Denmark and Belgium, the price level was significantly higher than in Finland. In the large broadband countries – Germany, France and Britain – the price level was generally higher than in Finland, depending on the connection speed. The decrease in prices has been slower in these countries than it has been in Finland.

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[24] Portugal and Sweden had no 1 Mbit/s connections available in 2005, and Cyprus and France had no 2 Mbit/s connections available.

Figure 17. 1 Mbit/s broadband connection price level index October 2005 (Finland = 100)
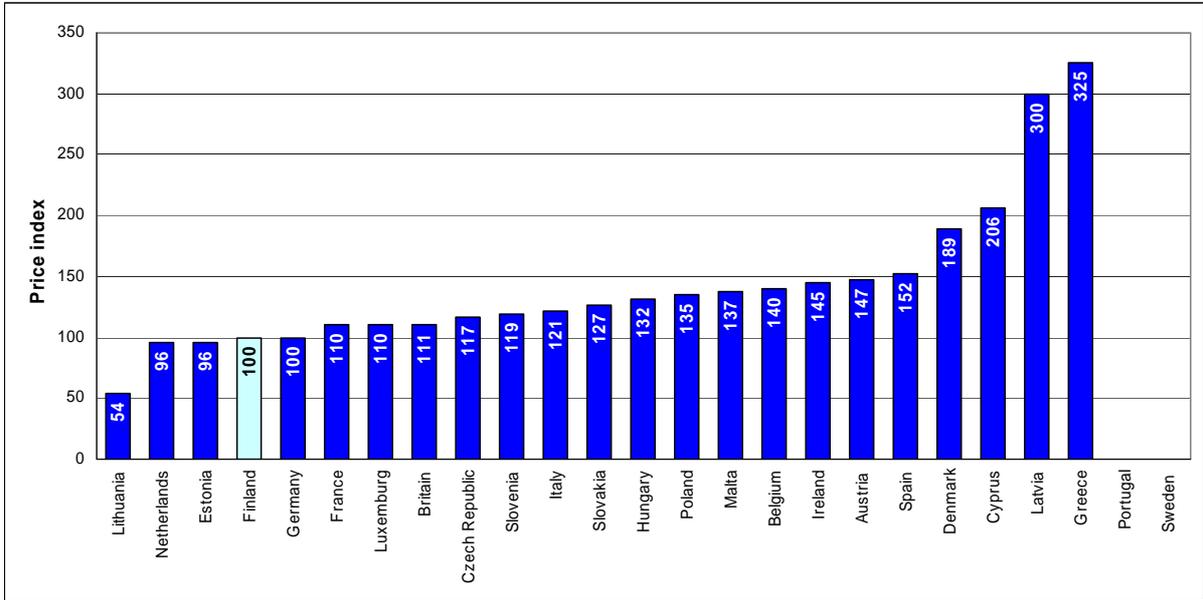
Source: Ministry of Transport and Communications: EU-maiden laajakaistahinnat 2005, publications 2/2006

Figure 18. 2 Mbit/s broadband connection price level index October 2005 (Finland = 100)
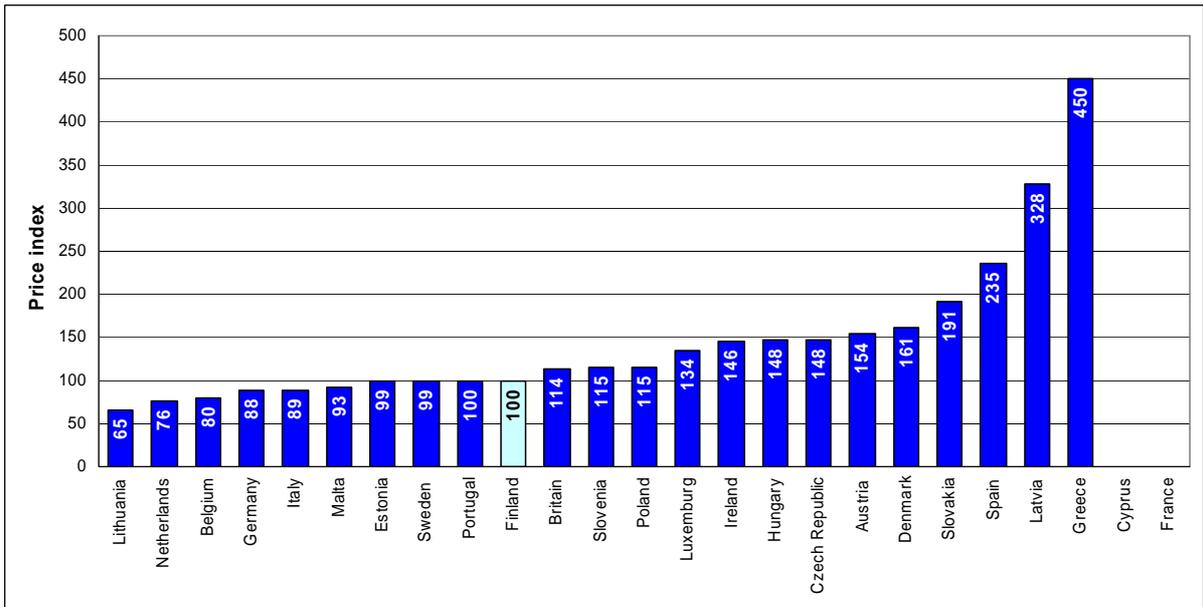
Source: Ministry of Transport and Communications: EU-maiden laajakaistahinnat 2005, publications 2/2006

In 2006, the prices of broadband connections in Finland remained largely at the 2005 level. In some European countries, prices decreased somewhat.[25]

For example, in Greece the price of a 512 kbit/s connection dropped from EUR 54 in the previous year to about EUR 20. In France, the decrease was more moderate, EUR 25 to EUR 20, and in Sweden it decreased from about EUR 33 to EUR 31. The average price for a 512 kbit/s connection in Finland in 2006 was about EUR 21, as in 2005.

The price of a 1 Mbit/s connection also dropped in Greece, from about EUR 86 in 2005 to EUR 26 in 2006, and in Spain, France and Germany, the price in these countries being about EUR 28, EUR 25 and EUR 17, respectively. In Finland, the average price of a 1 Mbit/s connection in 2006 was about EUR 26.

The price of a 2 Mbit/s connection dropped in Spain from EUR 83 in 2005 to EUR 36 in 2006. Another significant drop occurred in Britain, from EUR 40 to about EUR 22, and the price also decreased in Sweden and Germany, the price in these countries being about EUR 32 and EUR 21, respectively. In Finland, the average price of a 2 Mbit/s connection in 2006 was about EUR 35.

In comparing the price baskets for 8 Mbit/s connections and up, Finland clearly trailed a number of European countries in 2006: Sweden, Britain, France and Germany had significantly lower prices at these connection speeds than Finland (Figure 19).

Figure 19. Price baskets for 8 Mbit/s DSL connections 2006 (EUR per month)
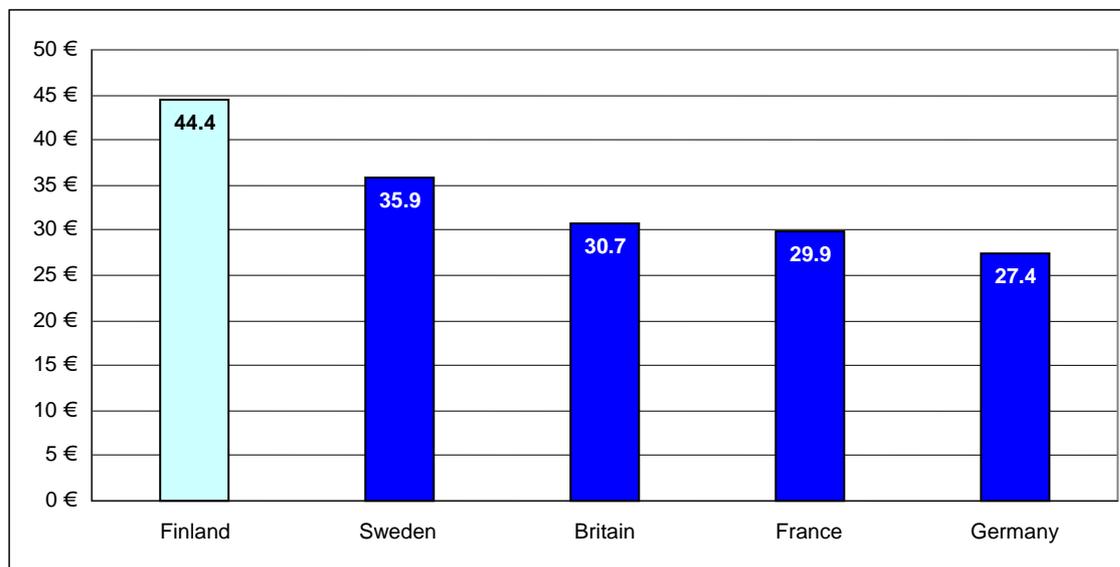
Source: Finnet Focus Oy / Tikon Consulting Oy

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[25] The prices for 2006 are based on a study conducted by Finnet Focus Oy.

3.3 Broadband technology market shares[26]

DSL and cable modem were by far the leading broadband technologies in Europe, the USA and Canada in 2002. Other broadband technologies had a negligible market share, except that satellite technology had attained a 2% market share in the USA.

In Germany, DSL technology had a particularly commanding presence in 2002, with about 98% of all broadband connections using DSL technology. Cable modem accounted for less than 2%, and Ethernet and other technologies combined for less than one per cent.

DSL technology was also in widespread use in Finland and France. In Finland, it accounted for over 70% of all broadband connections. Cable modem accounted for about 20%, and unlike other European countries, Ethernet had gained a notable market share of about 6% in Finland. The other broadband technologies available were PLC, WLAN and satellite, which together accounted for less than one per cent of all connections. In France, the market shares of DSL technology and cable modem in broadband connections were about 72% and about 28%, respectively, and other technologies were for all practical purposes non-existent.

In Britain, the USA and Canada, cable modem was more popular than DSL. Cable modem accounted for about 59% of broadband connections in Britain, as opposed to about 41% for DSL. Other technologies were virtually non-existent. The situation in the USA in 2002 was similar, with cable modem dominating DSL by 67% to 31%. Wireless technologies had gained a foothold in the USA by then, with WLAN and satellite accounting for 0.3% and 1.3%, respectively. In Canada, cable modem dominated DSL by 59% to 41%. Sweden had three competing broadband technologies in 2002, of which DSL was clearly superior with a market share of 60%.

In 2006, DSL technology continued to dominate the broadband market in Europe (Figure 20). In most EU Member States, DSL had a majority market share in broadband connections, and the rest were very close – Czech Republic (46%), Estonia (49%), Latvia (54%) and Lithuania (47%). The majority market share of DSL ranged from 60% to 99%, a market share of over 90% being recorded in Germany (96%), France (95%), Italy (96%), Cyprus (99%) and Greece (99%). In Finland, about 82% of all broadband connections used DSL technology.

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[26] Sources: OECD: *Broadband Preview, June 2006*; COCOM06-29: *Broadband access in the EU: situation at 1 July 2006*; and Ministry of Transport and Communications 2003a

Figure 20. Market share of DSL in broadband connections in EU Member States July 2006
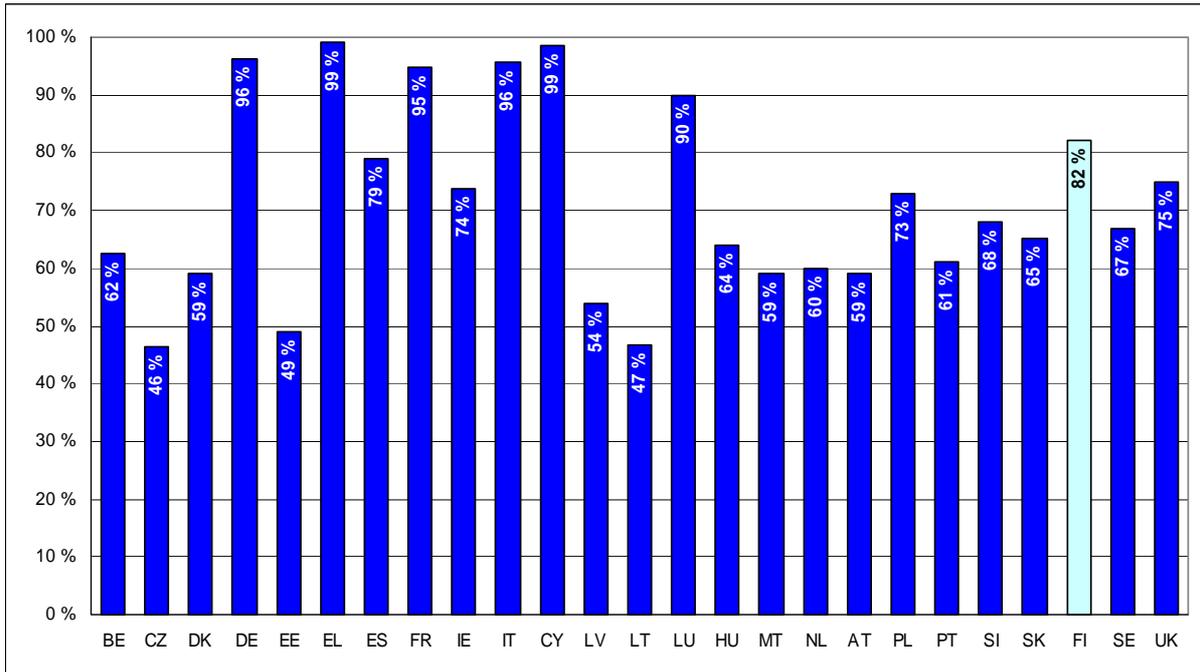
Source: Commission of the European Communities

In OECD countries too, DSL was the clear favourite (Figure 21). Cable modem had a higher market share only in the USA and Canada.

Figure 21. Broadband connections by technology in OECD countries per 100 inhabitants June 2006
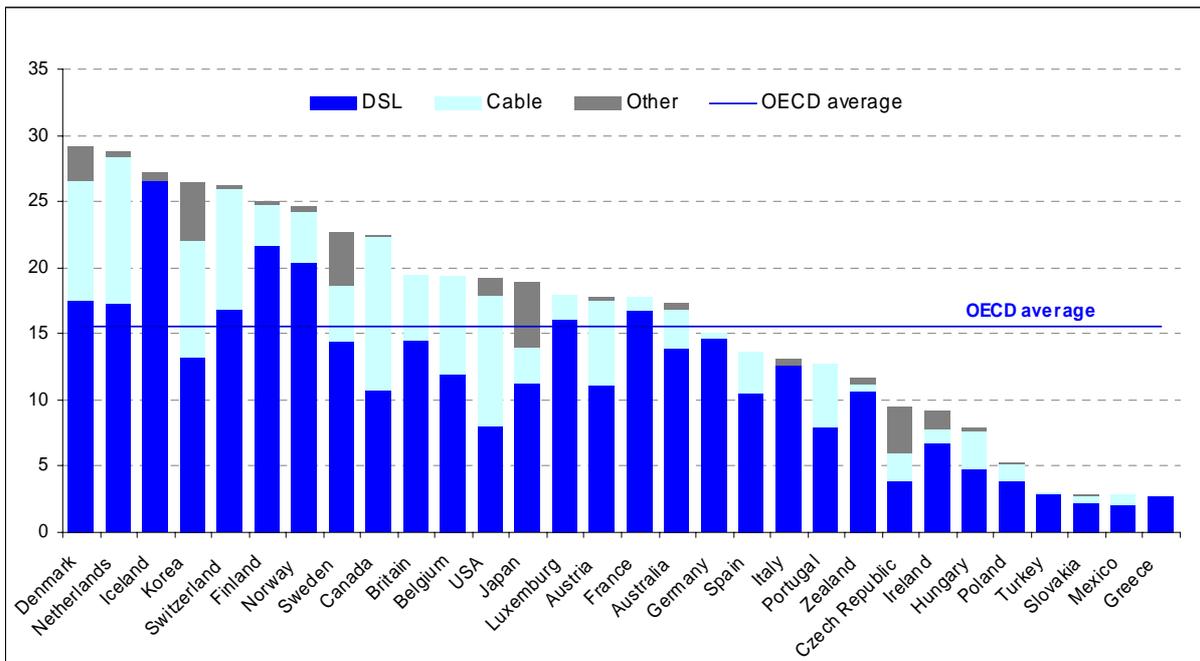
Source: OECD

In Germany, DSL was the dominant broadband technology during the period under review, 2002-2006. In 2006, DSL accounted for about 96% of all broadband connections. The market share of other technologies had increased from less than 2% to slightly under 4% (specifically, 3.8% in 2006). The most common of these other technologies was cable modem. In Finland, DSL has been consolidating its position, with over 80% of all broadband connections using DSL technology. Other technologies account for about 18%, the principal one being cable modem. However, the market share of cable modem has decreased slightly to about 12%. WLAN had a market share of 0.3% in 2006.

In France too, DSL has consolidated its position since 2002, with about 95% of all connections using DSL technology in 2006. Cable modem accounted for about 5%. The percentage of DSL connections rose steadily between 2002 and 2006, while the percentage of other technologies declined from 28% in 2002 to 5% in 2006. In Britain, DSL connections have become more popular at the expense of cable modem, with the percentage of DSL connections rising from about 41% in 2002 to about 75% in 2006. By contrast, the market share of cable modem dropped to 25%.

In the USA, the market share of cable modem declined steadily from 2002 to 2006, but despite this cable modem was still the most common type of connection in the USA in 2006, with a market share of about 51% compared with 42% for DSL technology. Other technologies only accounted for about 7% of all connections. In Canada too, DSL was catching up with cable modem: in 2006, DSL had a market share of about 49% and cable modem about 51%.

As in Finland and France, in Sweden the market share of DSL technology has increased slightly, going up from about 60% in 202 to about 65% in 2006. The cable modem market share was about 20%. Optic fibre or copper cable local networks accounted for about 15% of broadband connections.

Optic fibre is becoming increasingly important in broadband technology particularly in countries with widespread use of broadband (e.g. Denmark). Japan is deploying optic fibre technology extensively, and one in four broadband connections already uses it. The percentage of ADSL connections has decreased in Korea and Japan as subscribers have changed to optic fibre connections.

3.4 Competition in the broadband market[27]

In 2003, the Ministry of Transport and Communications commissioned a report on international broadband development and competition in the broadband market as background material to the National Broadband Strategy proposal. The report covered Germany, Belgium, Britain, France, Finland, Canada, Sweden and the USA.

Of the countries selected for this report, the USA and Canada showed the most even competition situation in the broadband market in terms of the combined market shares of the three largest players. The top three were on a fairly equal footing in both countries, and there was no single dominant player. The fragmented nature of the broadband market in the USA and

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[27] This section is essentially based on COCOM06-29: *Broadband access in the EU 2006*

Canada compared with Europe has been explained by the fact that the two countries are very large and are made up of federal states. However, in Finland and Britain too, competition between the top three players in the broadband market was very even.

By comparison, in Sweden the combined market share of the top three telecom operators in 2003 was about 67%. The broadband market leader was TeliaSonera, with a market share of 42%, followed by Bredbandsbolaget at 14% and Com Hem at 11%. Out of all broadband connections, 59.1% were DSL connections.[28]

Germany represented the other extreme, with one clear dominant player in the broadband market in 2003: the market share of T-Online, a subsidiary of Deutsche Telekom, was over 75%. This was due largely to the strong position of Deutsche Telekom as a national telephone operator and owner of the relevant infrastructure.

In France, the market leader in 2003 was France Telecom, one of the largest telecom operators in Europe, with a market share of over 63%. The rest of the market was fragmented among numerous small players. In Belgium too, the national telephone operator Belgacom dominated the broadband market with a market share of about 48%.

According to the Commission of the European Communities, in 2006 about 48% of all broadband connections in EU Member States were provided by traditional telecom operators. Their market share of all broadband connections in EU Member States has been steadily declining from 60.3% in January 2003 (Figure 22) to only 48.1% in July 2006.

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[28] Source: Prisma Research Oy

Figure 22. Broadband market share of traditional telecom operators in the EU (EU25)
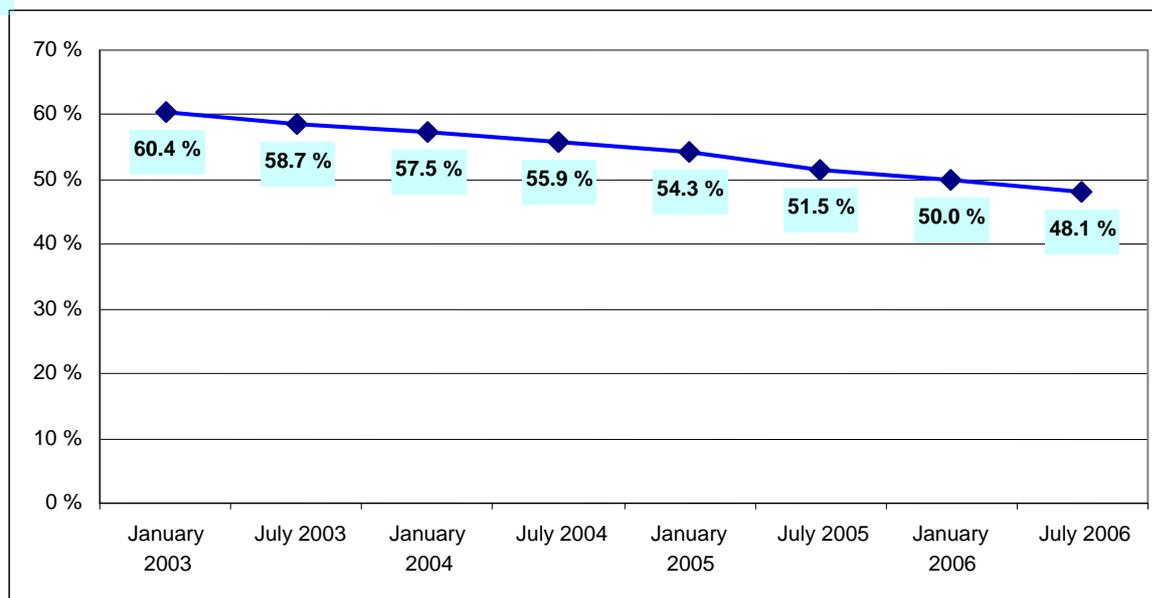
Source: Commission of the European Communities

The traditional telecom operators in Europe have a larger market share than their competitors particularly in DSL connections, even though this has been declining since 2003. In July 2006, traditional European telecom operators accounted for about 57% of all broadband connections, down from 81% in January 2003 (Figure 23).

Figure 23. Number of DSL connections provided by traditional telecom operators in the EU (% of all DSL connections)
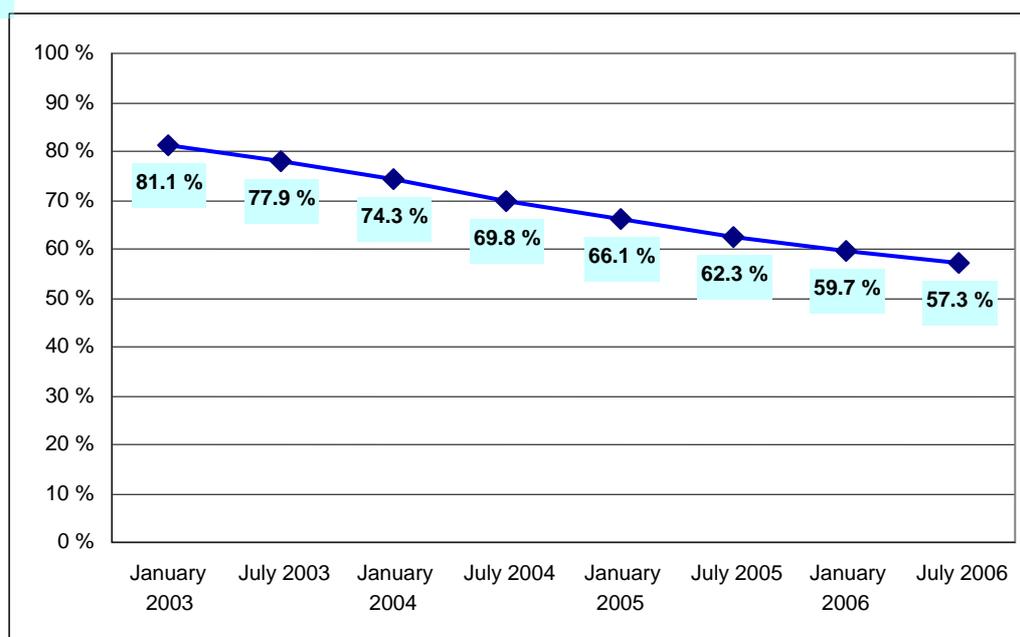
Source: Commission of the European Communities

New players in the market have typically dominated the market in technologies other than DSL.[29] In 2006, 92.6% of all non-DSL connections were provided by new telecom operators (Figure 24), and this has not substantially changed since 2003 (Figure 25).

Figure 24. Market share of non-DSL connections in the EU (traditional telecom operators and new players)
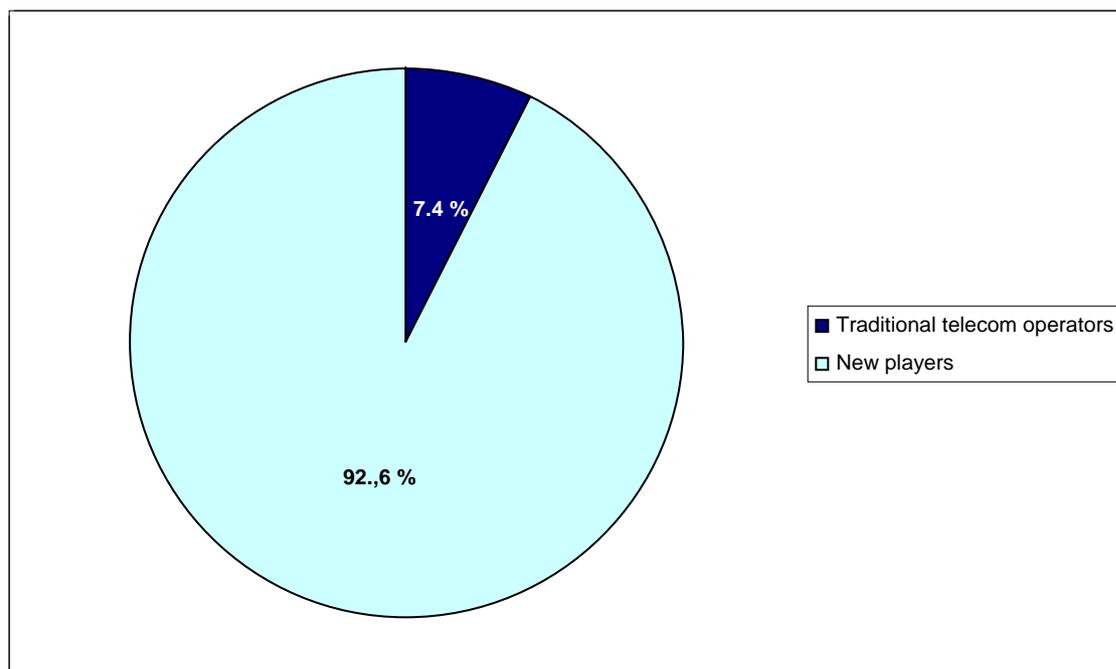
Source: Commission of the European Communities

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[29] In July 2006, there were a total of 68,658,781 broadband connections in the EU. Of these, about 81.6% (56,021,453) were DSL connections and about 18.4% (12,637,328) were non-DSL connections. Most of the latter were cable modem connections.

Figure 25. Market share of new telecom operators in non-DSL broadband connections in the EU (EU25)
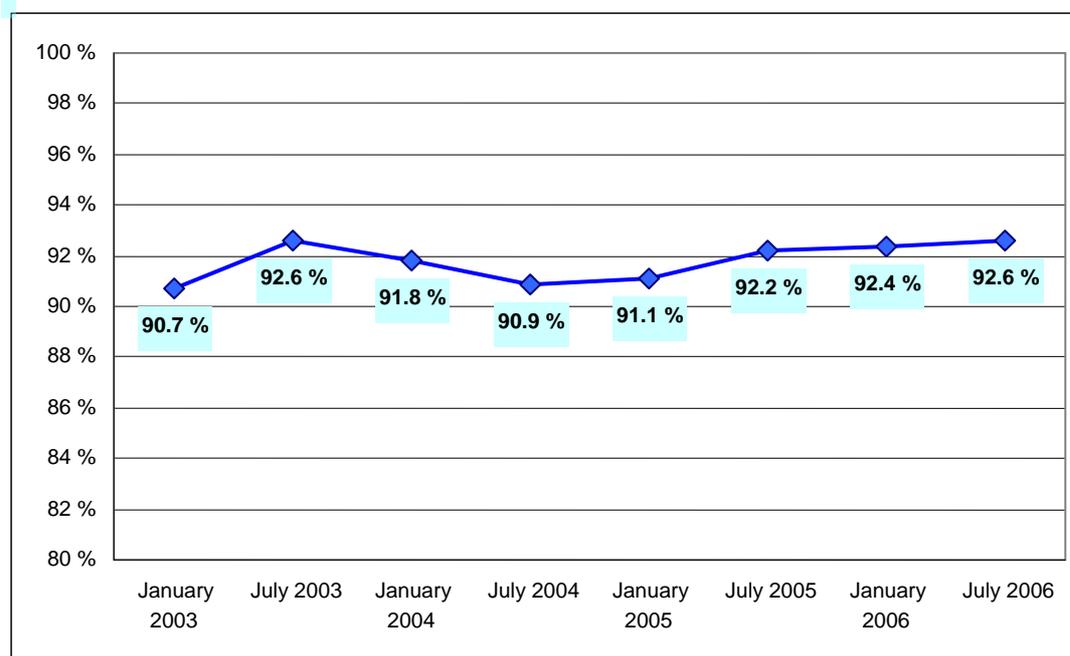
Source: Commission of the European Communities

Looking at individual Member States in 2006, in Belgium for example, new telecom operators held a 51.6% market share of all broadband connections, while traditional telecom operators stood at 48.4%. In practice, however, Belgacom still dominated the market as it had done since 2003. 62.4% of all broadband connections in Belgium were DSL connections.

In Germany, the market share of Deutsche Telekom declined noticeably from 2003 to only 51.2% in July 2006. The vast majority of broadband connections in Germany were DSL connections (96.2%). In France, the market share of France Telecom likewise declined, though not as sharply as in Germany, standing at 46.5% in 2006. In both countries, new telecom operators had consolidated their position as broadband connection providers. DSL connections were in a substantial majority in France too, at 94.7% of all broadband connections. New telecom operators had broken into the DSL connections market: about half of all DSL connections were provided by new telecom operators. In Germany too, new telecom operators had increased their market share in DSL connections.

In Finland, the playing field in the broadband market is more level nationally than in the countries referred to above. In September 2006, the broadband connection market shares of Elisa, Sonera and the Finnet Group were 35%, 29% and 24%, respectively. Other telecom operators had a combined market share of only about 12%.[30] Some 82% of all broadband connections in Finland were DSL connections.

In Sweden, the combined market share of the three largest telecom operators in 2006 was 76%, TeliaSonera being the market leader with 37% as in 2003. Bredbandsbolaget and Glo-

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[30] Source: FICORA market survey 3/2006

calnet were acquired by the same owner in spring 2006.[31] Their combined market share in the broadband market in 2006 was about 23%. UPC and Com Hem also merged as the result of ownership changes,[32] and their combined market share in 2006 was 16%.[33]

In Britain, traditional telecom operators have a relatively low market share compared with many other countries, 24.3% in 2006. This figure has remained fairly stable since 2003. In Britain too, the majority of broadband connections were DSL connections (75%), but in contrast to the other countries surveyed, new telecom operators had the edge in DSL connections too, with a market share of 67.6%.

In the Canadian broadband market, competition was fairly even in 2006 as it had been since the beginning of the decade. The major players in DSL connections were Bell Canada and TELUS, while the cable modem market was dominated by Shaw Communications and Rogers Communications. Like Canada, the USA also had a relatively level playing field. In late 2006, the broadband market in the USA was led by AT&T, which had merged with Bell South to gain a 23% market share, followed by Comcast at about 20% and Verizon at 12%.[34] In the case of the USA it should be noted that cable modem was by far the dominant broadband technology at the beginning of the decade. The market share of DSL has been steadily increasing, and at the end of 2005 DSL had become the leader in new connections (3.2 million new DSL connections as opposed to 1.6 million new cable modem connections). This trend seems to be continuing, as the market share of cable modem dropped to about 51% in 2006 while that of DSL went up to more than 40%. Other technologies have a market share of about 7% in the broadband market.[35]

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[31] Norwegian telecom operator Telenor increased its holding in Glocalnet in spring 2006 so that by the end of Q2 it owned more than 90% of Glocalnet shares. Telenor already owned Bredbandsbolaget. With the acquisition of Glocalnet, Telenor now holds about a quarter of the Swedish broadband market.

[32] The American investment companies Carlyle Group and Providence Equity Partners acquired the cable TV company Com Hem in January 2006 and further acquired the Swedish business of the cable TV company UPC in April 2006.

[33] Source: Prisma Research Oy

[34] AT&T (including Bell South) and Verizon held over 80% of the DSL market in early 2006, or about one third of the entire broadband market.

[35] Source: OECD and Telecon, January 10, 2007.

PART II IMPLEMENTING THE STRATEGY

1 Competition

The principal aim of the National Broadband Strategy was to promote competition in and between communications networks. The purpose of increasing competition was to improve services, the regional availability of broadband and the range of choices available to citizens. FICORA was given the task of ensuring effective competition in broadband supply, particularly in subscriber connections, in the enforcement of the Communications Market Act. The OFC, for its part, was to monitor effective competition on the market within the framework of competition legislation.

Competing telecom service companies can only offer broadband and other telecom services to end users by renting subscriber connections or high-band capacity from the company operating the local fixed network. Most of the broadband connections in Finland use DSL technology over fixed networks, and because of this the subscriber connection networks owned by local telecom operators and their pricing are of crucial importance to the development of the broadband market.

FICORA measures

The FICORA decisions on subscriber connections applying to companies with significant market power (SMP) came into force on March 1, 2004. During 2006, FICORA conducted a market analysis on the subscriber connection market and found that there were still significant competition problems in the market, and thus no alleviation was proposed for the SMP requirements placed on telecom operators. On the contrary, it was decided to tighten the SMP requirements in the case of some operators.

Even before the present SMP decisions came into force, FICORA sent a letter to telecom operators to encourage them to revise their high-band prices for subscriber connections to no more than half of the price for O quality in subscriber connections. Before this, most operators had priced the high band according to the more expensive SO quality or the even more expensive XO quality. At the time of this writing, all operators who have been issued with a cost-orientation requirement are pricing their high band in accordance with the FICORA statement. The statement had the effect of reducing high band prices by more than 17%.

Once the SMP decisions on subscriber connections had come into force in March 2004, FICORA sent all SMP operators a letter reminding them of the obligation to publish the prices and delivery terms for subscriber connections on their websites. FICORA also noted that connection charges for subscriber connections in particular are many times higher in Finland than in EU Member States on average. Therefore, operators were encouraged to ensure specifically that their pricing of subscriber connection products and their delivery terms conformed with the requirement of cost-orientation and non-discrimination.

Very few SMP operators revised their prices as a result of the FICORA letter, and thus FICORA began at its own initiative in May 2004 to investigate connection charges in a num-

ber of areas significant for competition. By the end of 2004, FICORA had investigated the connection charge pricing of six operators. In 2004, FICORA also took two decisions on the equitability of subscriber connection delivery times. Moreover, all SMP operators providing subscriber connections were requested to submit information on subscriber connection delivery times.

Investigations of the cost-orientation of connection charges were extended in 2005 to all SMP operators issued with a requirement for cost-oriented pricing. In 2005, a total of 24 decisions concerning the pricing of subscriber connections were taken; a maximum price for one or more regulated connection charge products was imposed on a total of 13 operators. Most of these operators appealed the decision, and some of these appeals were resolved in 2006. In every case so far resolved by the administrative courts, the telecom operator appeal has been overturned and the FICORA decision upheld.

FICORA regularly publishes information on SMP operator subscriber connection price trends on its website. The most recent comparison dates from October 1, 2006. At that time, the average connection charge (weighted by the number of connections per operator) was slightly under EUR 136, the highest being just under EUR 202 and the lowest EUR 95. Connection charges thus remain high by European standards.

In spring 2006, FICORA commissioned an external expert report to find out why connection charges for subscriber connections are so high in Finland. The report is based on comparative data from five EU Member States. The report showed that connection charges in Finland are two to three times higher than in the comparison countries. The difference in prices is mainly due to the clerical work, installation work and travelling time required. The report proposed that in order to improve evaluation of the charges, inspections should be made at telecom operators to establish the actual average times.

Although FICORA measures have decreased the prices of subscriber connection products and promoted broadband competition, the expert report shows that there is still scope for improvement particularly in the methods used to analyse the legality of connection charges. Monitoring of the equality in delivery times and non-discrimination in pricing of subscriber connections should be continued, because subscriber connections will remain an important bottleneck in broadband competition for some years to come, regardless of technological advances in the telecom market.

FICORA has been monitoring delivery times of subscriber connections and broadband wholesale products to other telecom operators and intervened to ensure non-discrimination in delivery times as necessary. In decisions issued, FICORA has instructed operators to amend their order and delivery processes so that all telecom operators are treated equally. Moreover, the various stages of the process are allowed to generate a maximum of three days' difference in delivery times between deliveries to the telecom operator's own service company and to competing telecom operators, excluding exceptional cases. According to the most recent statistics compiled in 2006, there are no more significant problems in the delivery times of subscriber connections and broadband wholesale products.

OFC measures

The responsibility of the OFC in ensuring the functioning of the broadband market was to monitor competition through the means of competition legislation. The OFC first reminded telecom operators of the requirements of this legislation as early as 2002. The OFC investigated the prices and terms of the services on offer, and eventual limitations on competition in the wholesale market for broadband services were also studied.

In 2003-2004, the OFC investigated the rental rates of all telecom operators maintaining a local network concerning that portion of their local networks intended for broadband connections. As a result of this process, the local telecom operators significantly reduced the rates they charged competing service providers for network rental, which made market access easier and thus improved competition considerably.

The broadband market remains one of the major focus areas of the OFC. In recent years, the OFC has submitted one case to the Market Court (proposed sanction EUR 1,000,000) concerning the network rental terms and pricing of a local operator and has otherwise resolved a dozen cases involving the broadband market. In late 2006, a dozen or so appeals were still pending.

The OFC has been contacted several times concerning the delivery times of subscriber connections and DSL connections. According to information received, network operators have preferred orders from their own service operators over outside orders. FICORA has also addressed the issue of equality in delivery times for subscriber connections.

Cooperation

In order to boost the monitoring of broadband competition by FICORA and the OFC, FICORA invited all telecom operators to a meeting to agree on ground rules. This meeting took place at FICORA on March 22, 2004 and featured a discussion on broadband competition and procedures, on the pricing and delivery of subscriber connections, and FICORA decisions regarding complaints about the rental of subscriber connections.

Over 40 representatives of telecom operators attended the meeting. Most of them observed that the rental procedure should be developed and delivery times reduced. Many operators considered the subscriber connection prices to be high. FICORA presented its recommendation on subscriber connection delivery at the meeting, and published it on April 27, 2004 (FICORA 304/2002 S). This recommendation specified the obligations placed on telecom operators concerning the rental of subscriber connections and equipment facilities, which had earlier been imposed by FICORA SMP decisions and Regulation 2887/2000 of the European Council and Parliament.

Decisions regarding further action included a decision to set up a working group with telecom operator representatives and chaired by FICORA to study operator interfaces in broadband connections. The working group first met on May 24, 2004 and published its report, *Laajakaistayhteyksien tilaus- and toimitusprosessit* [Broadband connection ordering and delivery processes] on June 1, 2005.

The purpose of this was to enhance and standardize ordering and delivery processes between telecom operators and thus to make the processes faster and reduce the number of errors occurring in them. The working group continued its efforts towards standardizing processes and practices, and on September 26, 2006, it published a report on procedures to be followed in the ordering and delivery of wholesale products between telecom operators. The exchange order process introduced on December 1, 2006 was the most significant reform. An exchange order allows a customer to change broadband service providers as seamlessly as possible. The process as defined by the working group was also intended to make the operators operate more efficiently and to reduce the number of errors and resulting outages and long delays, which are disadvantageous to all parties concerned.

After publishing this report, FICORA continued to monitor the introduction of these processes. The working group was intended to continue working on process development as necessary. The telecom operators took the working group's recommendations on board very well. In late 2006, telecom operators updated their information systems and operating procedures to conform to the proposed procedures. The measures described above made broadband services run better and made processes faster. The number of complaints also decreased.

Cable TV network

The Ministry of Transport and Communications has been monitoring the increase of broadband supply in cable TV networks. No cable TV networks apart from one (in Tampere) had been opened up to competition as of late 2006. There were no legal obstacles to doing so, but neither was it legally required. The demand caused by the growth of the broadband market had improved and expanded the availability of broadband connections through cable TV networks. The problem both then and now is ownership. If the same owner has both a fixed phone network and a cable TV network, the telecom operator can choose which network to use for broadband services. The most common solution is to use the fixed phone network with ADSL technology. In late 2006, some 75% of cable TV connections had broadband services available.

2 New technologies

To speed up broadband development, a number of projects were launched during the strategy process to help introduce and proliferate new broadband technologies. These new technologies and services have added to the consumer's range of choice and have also boosted competition in the broadband market. However, despite the new alternatives, the traditional DSL and cable modem connections still dominate the broadband market in Finland.

2.1 Research and development

The legal and administrative obstacles to the spreading of new broadband technologies and services were surveyed in the reports *Uusien palvelujen hidasteet* [Hindrances to new services] and *Valokaapeli kotiin* [Fibre to the home].

According to the first of these reports, great expectations are vested in new services available over information networks. The report took the view that the rapid technological development of broadband in and of itself laid the foundation for the innovation and development of new services. However, it has often been noted that new services have not made a breakthrough in quite the manner expected, for a variety of reasons.

There are many different factors that hinder the spreading of new broadband services, and they are very often cumulative. These factors can roughly be divided into technical, legal, commercial and business hindrances, and factors that impact on the consumer directly.

The Ministry of Transport and Communications also studied broadband development from the point of view of the proliferation and use of optic fibre connections. All broadband technologies are advancing rapidly, and optic fibre technology justifies itself not only technically but economically and from the business viewpoint too. It was observed in the report that a more rapid increase in the use of optic fibre is hindered by the fact that there is still a lot to be done about the openness, connectability and interface standardization of optic fibre networks.

The development of new broadband data transfer solutions was boosted with public R&D funding. In summer 2005, the Finnish Funding Agency for Technology and Innovation (TEKES) launched a new telecommunications technology programme, *GIGA – Converging networks*, together with businesses and research institutions. The programme was scheduled to run from July 1, 2005 to December 31, 2010. The programme is being implemented by a wide range of actors from different sectors, and it focuses on broadband telecommunications technology and product development in the field. Focus areas include connection technologies, broadband networks, system support products and testing, and new business models.

Finnish telecommunications technology expertise has been and continues to be of a very high international standard, and the industry accounts for a significant proportion of Finland's exports. The aim of the TEKES technology programme is to further strengthen, renew and diversify Finland's telecommunications technology expertise and its strengths in global cooperation and competition, and to create strategic expertise essential for the innovation environment in new technologies.

Long-term investments are needed particularly in research in network, radio channel, air inter-face and terminal device technologies in broadband systems so that Finland will continue to have the expertise necessary in applying new technologies. Results will mainly be applied in the ICT sector and in sectors that use component technology.

TEKES commissioned a number of studies as background material to the Giga technology programme. The reports prepared by VTT Technical Research Centre of Finland describe probable trends and critical paths in telecommunications as determined by international stud-ies, and present estimates by visionaries of how broadband technology is likely to develop. Separate reports were prepared on the situation and development in Japan and South Korea.

In 2005-2006, TEKES funded 49 projects under the Giga technology programme with a total of EUR 21 million. The scope of the programme matched its planning. The programme in-volved the major telecommunications companies and research institutions, most of which ran a project of their own under the programme. Preparation of a road map to chart developments in the telecommunications business was launched under the programme in 2006, likewise the setting up of subject groups which brought together actors in the field to outline a shared vi-sion and development prospects for the sector. TEKES will continue supporting the pro-gramme until the end of 2010 as planned.

2.2 Mobile communications networks and digital TV[36]

On March 18, 1999, Finland became the first country in the world to grant third-generation mobile communications licences. Over the years, the ownership base of the companies that were originally granted the licences has changed for a number of reasons. The licence of Son-era Oy is actually controlled by TeliaSonera, that of the Finnish branch of Telia Mobile AB is held by Finnet Verkot Oy, and that of Suomen Kolmegee Oy is held by Tele 2. The licence of Oy Radiolinja Ab is now held by Elisa Oyj.

Construction plans have changed from those outlined at the time when the licences were granted, partly because of ownership changes, partly because of changes in the European market situation, and partly because of the introduction of third-generation technology pro-ceeding more slowly than anticipated.

The introduction of commercial third-generation mobile communications networks has been delayed throughout Europe due to the market situation and to the poor availability and inade-quate functioning of devices.

When licences were applied for and granted in 1999, there was no discussion in the sector about joint use schemes. The poor financial situation of the communications market following the UMTS auction introduced the issue of seeking potential for alleviating the terms of li-cences with regard to joint use at the EU level.

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[36] When the National Broadband Strategy was launched, the digital TV network was taken into account as a potential channel and a possible means for augmenting the coverage of broadband in remote areas where broad-band services would otherwise be difficult to provide. However, this technology would only enable broadband speeds for the forward link. Of the digital TV developments discussed in this section, the promotion of mobile TV in particular is connected to the promotion of broadband.

Competition between network operators to achieve sufficient coverage in mobile communications networks through construction and expansion has been seen as a significant factor in competing for the favour of end users. This competition has resulted in Finland having very comprehensive GSM network coverage. Such coverage would probably never have been achieved by government orders. On the other hand, it was considered that sensible joint use of networks would enable the building of networks even outside the large conurbations, as operators would then be able to pool resources in sparsely populated areas.

The Ministry of Transport and Communications organized a hearing for telecom operators regarding the building of third-generation mobile communications networks and their licence terms and provided an opportunity for submitting written additions to their comments.

The Government eventually decided to alleviate the terms of UMTS licences for continental Finland. Licensees were allowed to build a part of their networks jointly. However, the separate networks of the licensees must each cover at least 35% of the population.

Digital TV

On March 4, 2004, the Government made a resolution concerning the transfer to wholly digital TV and related measures. According to this resolution, Finland will move over to digital TV completely on August 31, 2007.

In late 2006, the terrestrial digital TV network covered the entire country (99.9% of the population). The actors in the field achieved their goal before the deadline, which was the end of 2005. At the end of 2006, it seemed that the required coverage for terrestrial TV households would be achieved without special measures, while the digitalization of cable TV households seemed to be needing significant investments.

ArviD

The ArviD digital TV cluster programme was launched on February 24, 2004 and concluded at the end of 2005. This programme was based on the Government Resolution of March 4, 2004 whereby analogue TV broadcasting will be completely discontinued on August 31, 2007.

The principal aims of the programme were to develop additional digital TV services that are easy to use and innovative, to improve the environment for service production, and to create an extensive cooperation network. When the programme was launched, there was more confidence in interactive services getting off the ground than there is now. Despite expectations, devices suitable for using these services have not appeared on the Finnish market.

The programme consisted of seminars, service development projects and digital TV studies (horizontal projects). The programme generated guides and reports in various areas of digital TV services, and descriptions of service development projects. All the development projects undertaken under the programme and their results were public. The programme involved nearly 600 registered participants from businesses, the public sector and various background organizations.

The means employed to attain the aims of the programme included increasing digital TV expertise and knowledge of market development among the players in the field, and providing funding for cooperation and the development of joint services. One of the major criteria for service development was fostering cooperation between the actors in the digital TV value chain. The ArviD programme aimed at a broad-based operating model bringing together a variety of parties, offering a wide range of information and contacts to everyone involved in digital TV. The programme domain did not include the actual producing of TV programmes, the distribution of information to citizens, or terminal devices and other technical matters.

Digital TV return link solutions

The development of return link solutions for digital TV was entrusted to the DVB/iTV (formerly DVB/MHP) standardization group of FICORA, which according to its mandate deals with interactive multimedia services in digital TV networks. The group has met three or four times a year to discuss developments in the sector in general and in the EBU DVB project in particular, and the impact of these developments on the technical steering performed by FICORA.

During 2004, the DVB/iTV group prepared a report on the potential for implementing an interactive channel in the digital TV system (FICORA working group report 4/2005). The report gave a standard-based review of the technical options available for creating a channel between subscribers and service providers under a variety of network technologies. The solutions estimated to attain widespread use were selected for further development.

When this work was begun, the technical implementation of interactivity was to have been based on the MHP system, but soon after 2004, MHP was joined by solutions based on IP technology. Accordingly, the working group prepared a new version of its report (FICORA working group report 2/2006), taking into account not only IP technology but also DVB-H, a new technology for mobile receivers. Moreover, the scenarios and investigations selected for further work were specified, and the domain of the project was extended to cover not just the technical design of the return link but interactivity in general.

The reports prepared in accordance with the goals set were intended to promote the development of return link solutions for digital TV and the solving of technical problems, for instance by modelling typical future applications and bringing up technical issues crucial for ensuring compatibility in a field where multiple parties operate. Representatives from organizations in the sector participated extensively in the work.

The DVB/iTV standardization group intends to prepare yet another version of its report during 2007. This updated version is to contain augmented implementation scenarios as planned and also to take into account the recent interest in implementing IPTV with NGN technology as traditional telecommunications networks are upgraded. It is intended that developments in the sector be discussed nationally in the DVB/iTV group after the completion of the measures in the current National Broadband Strategy (2004-2007).

Mobile TV

With technological advances, new opportunities and new distribution channels emerge for TV and radio broadcasting. Mobile reception on a mobile phone or other portable device is becoming an important distribution channel.

At the television frequency meeting of the Regional Radiocommunication Conference organized by the International Telecommunications Union (ITU) in 2006, it was agreed that frequencies could be used for IP-datacast, i.e. the broadcasting of video content to mobile devices (e.g. mobile phones) or other mass media applications using TV frequencies that may be developed in the future.

The Government granted Digita Oy a licence for providing mobile TV services in the new, fourth digital channel bundle. This involves TV and radio broadcasting for mobile reception, using a digital terrestrial mass media network reserved for this purpose. Commercial operations were launched on December 1, 2006.

In December 2006, Parliament passed an amendment to the Act on Television and Radio Operations whereby the licensing procedure for the DVB-H network was made less complicated. The amended Act came into force on January 1, 2007. After this, programming licences for the mobile TV network will be granted by FICORA, which is not allowed to exercise discretion in doing so.

The capacity required by one TV programme in the channel bundle reserved for DVB-H technology is negligible compared with the overall capacity of the broadcasting network. The available capacity is thus not as limited as it is in the three existing digital TV networks, and thus it is not feasible to require broadcasters to have a discretionary programming licence from the Government. Indeed, services that do not include programming can be provided even without an operating licence.

Under the Act as amended, national digital TV or radio broadcasters do not need a separate programming licence for the mobile TV network when they broadcast with the same coverage, at the same time and with unchanged content. This applies to both commercial operators and the Finnish Broadcasting Company.

The amendment brought no new regulations related to copyright in mobile TV, copyright issues being left to be agreed separately. However, copyright issues are addressed in the preamble to the amendment, whereby mobile TV broadcasting can be considered parallel broadcasting in that it involves broadcasting the same content at the same time with the same geographical coverage in the terrestrial digital TV network and in the mobile TV network. The preamble observes that there is a case to be made for the copyright royalties agreed upon to cover both the original broadcast and the parallel broadcast. This is the default situation when the business model for the parallel broadcasting does not differ from the business model for other broadcasts that can be freely received by the general public.

The introduction of mobile multimedia was also promoted through an amendment that enabled tie-in sales of UMTS mobile phones. This was the single most effective measure to enhance the introduction of multimedia services, apart from joint construction.

2.3 Other development measures

Environmental legislation

An amendment (547/2005) to the Act on the Maintenance, Cleaning and Clearing of Public Areas came into force on November 1, 2005. Under the Act, notification must be given beforehand to the local authority of excavation work in the street, e.g. in connection with cabling or wiring work. This makes it easier for local authorities to supervise and monitor the work in question and thus to ensure that the inconvenience to traffic is minimized and that existing cables and structures are not damaged.

Work can be begun immediately when the local authority has given its agreement, or after 21 days from submitting the notification if the local authority has not yet processed it. Urgent repairs can always be carried out immediately, the local authority being notified after the fact.

The local authority is entitled to give any orders regarding the work that are necessary for ensuring traffic flow, safety or unobstructed access. Such orders may also be intended to prevent or minimize damage to existing cables and devices.

The local authority can levy a charge on the basis of costs incurred in processing the notification and monitoring the work. The local authority can also demand reasonable compensation for the use of the area in question for the work, based on the time used, the extent of the building site and how central the location is.

In autumn 2006, the Association of Finnish Local and Regional Authorities published instructions on the controlling of work carried out in streets and public areas. This publication includes instructions for setting the tariff for charges levied on the processing of notifications. The publication was drawn up by WSP LT Consultants, supervised by a working group appointed by the Association of Finnish Local and Regional Authorities. Hearings for players in the field were organized in connection with this process.

The Ministry of the Environment and the Association of Finnish Local and Regional Authorities are monitoring which municipalities have introduced such charges and how high those charges are. There is little practical experience so far of levying such charges, but as and when more experience is acquired, the Ministry of the Environment will conduct a meeting with interest groups in the sector to assess what a reasonable level for these charges might be and to discuss other experiences related to them.

Compatibility of networks and technologies

Under the National Broadband Strategy, standardization and ensuring the compatibility of broadband technologies and networks lies mainly in the domain of FICORA. This is a continuing activity, and FICORA will continue to manage it after the strategy process has ended.

In connection with this, FICORA published a working group report entitled *Laajakaistayhteyksien operaattorirajapinnat* [Broadband connection operator interfaces] in November 2004. The purpose of the report was to promote the linking of the broadband connections of different operators and the functionality of broadband services. The report defined a joint practice for the technical implementation of interfaces, describing options for bitstream ser-

vices in ATM-based and Ethernet-based DSL services, in cable TV networks and in WLAN. After publishing this report, FICORA continued to work together with broadband operators and observed that the telecom operators had largely followed the operating models recommended in the report. These operating models will be updated by joint working groups as and when technological advances so require.

National standardization groups appointed by FICORA have been monitoring the work of organizations drawing up broadband standards (ETSI, ITU-T, IETF, 3GPP). The aim is on the one hand to ensure that national interest groups are aware of what is happening in standardization in order to take developments into account in their own projects and on the other to ensure that nationally important matters are brought up in an international context, in the form of joint statements if necessary.

A more efficient Internet

One of the projects under the National Broadband Strategy was to promote the rapid introduction of the IPv6 standard in international cooperation. FICORA was a key player in the implementation of this project. An IPv6 standardization working group was set up at FICORA to act as the national group of the EU IPv6 Task Force. The working group met regularly to hear from experts in R&D and the business world.

In 2004, FICORA organized a seminar on the benefits brought and the measures required by the introduction of the IPv6 protocol. It was observed that the current version of the Internet protocol (IPv4) had its restrictions, and that version 6 (IPv6) had been developed to eliminate those restrictions. The IPv6 protocol has been under development by the Internet Engineering Task Force (IETF) since 1995. Standardization and productization were well advanced in 2006, but the commercial launch had not been decided yet.

The working group produced a variety of reports and documents related to standardization. In its 2005 report, the working group surveyed the IPv6 situation in Finland. The first IETF specification for the IPv6 protocol (RFC 1752) was completed in 1993. The basic specifications required for IPv6 implementation had been in existence for several years, and by 2006 IPv6 support was available for all major network components. Despite all this, it was observed in the report that regardless of the new features offered by the IPv6 protocol, the majority of networks still used the IPv4 protocol. It was also noted that no operators were at that time engaged in major efforts to introduce the IPv6 protocol rapidly, because there were no compelling commercial or other reasons to do so. However, many operators did offer IPv6, and some used it too, but volumes were very low. It was noted that the potential for rapid expansion did exist, should it be necessary to pursue it.

The best means for promoting the introduction of IPv6 were found to be increasing awareness of the benefits of IPv6 and further improving basic capabilities. The working group considered that this would ensure the rapid and efficient deployment of IPv6 as and when it becomes necessary.

During 2006, the working group has been monitoring the progress of IPv6 standardization and its introduction and updating the document on IPv6 special issues related to the introduction of IPv6. The IETF has essentially completed the basic IPv6 standardization. IPv6 is now included in the Next Generation Networks (NGN) standardization at both the ETSI and the

ITU-T, albeit ITU-T has been considerably more active in this respect so far than the ETSI. Asian countries (China, Japan, South Korea) are considerably more advanced in the introduction of IPv6 than Europe or the USA. However, the USA has set itself the target of adopting the IPv6 protocol within a few years. The working group has observed that the information systems of the public administration could play a key role in promoting IPv6. The working group has been in contact with central government IT planners, and this contact will be further maintained. IPv6 has not made notable commercial progress in Finland, though this might change with the introduction of the Windows Vista operating system, which will have the IPv6 protocol as default.

Internet telephony

A study commissioned by the Ministry of Transport and Communications on the future of fixed networks identified Internet telephony (VoIP) as the most important speech-based application in the near future.

With the rapidly increasing popularity of Internet telephony, the authorities have had to address how it is related to current legislation. The Commission of the European Communities intended to publish a statement in 2006 on the need for regulation of VoIP phone calls that connect to the general telephone network. In February 2006, FICORA published a memorandum on the application of telecommunications market legislation to VoIP services. The memorandum covers general principles of how national regulation is to be applied to various VoIP services and gives service providers a concise list of the requirements prescribed by law. FICORA also published separate decisions in 2006 for instance on the use of phone numbers in VoIP services.

3 E-transactions and e-commerce

The aim in developing e-transactions and e-commerce was to increase the demand for broadband services by expanding the range of services available online. The measures under the National Broadband Strategy involved both public and commercial services.

3.1 E-transactions in the public administration

The central government administration has been developing information exchange and process reform between the authorities and other organizations for a long time. A comprehensive system of basic registers and national unique identifiers such as the personal identity number and the business identity number (from 2001) enable integrated information collecting and shared use of information by the whole of the public administration. As a result, the number of traditional face-to-face transactions with citizens has been reduced, and the administration has become more productive. When the requirement for producing an official certificate in connection with applying for a job or conducting transactions with the authorities was eliminated, citizens were spared a lot of bother and unnecessary visits to the authorities. Under the tax proposal system, taxpayers need not submit a tax return but simply have to check whether the information supplied by the relevant authority is correct. The unified business identity code introduced at the beginning of April 2001 (National Board of Taxes and National Board of Patents and Registration) has enabled efficient joint use of data on businesses.

Huge progress has been made in e-transactions over the past four years. All government agencies and municipalities now have their own website, or they are involved in the portal of their administrative branch or of some other authority. The number of online services offered by government agencies has increased considerably every year. With the introduction of the online banking identification system (TUPAS), the number of citizens' services requiring identification has increased; these include the labour administration's jobseeker services, the joint service of the employment pension companies for checking pension benefits (tyoelake.fi) and a service for minor employers and households for calculating and paying employer contributions (palkka.fi).

During the strategy period, the Ministry of Finance implemented measures under the Information Society Programme of the Government intended to develop e-transactions in the public administration. Some of these are strategic projects and others are concrete development and construction projects involving e-transactions.

Of the latter, ones which had been completed or were nearing completion at the end of 2006 were the JUPA project (public services online), the development of e-transactions in legal processes and customer service, the development of e-transactions in employment services, enabling e-transactions in tax matters, online services for the Social Insurance Institution, the further development of TYVI services (a system for information transfer between businesses and the authorities) and marketing them to businesses, the implementation of the palkka.fi service, the further development of and publicity for the suomi.fi portal as a shared service for the entire public administration, the development of the yrityssuomi.fi enterprise portal towards interactive services, and the expansion of the lomake.fi service for online forms particularly in the municipal sector. VETUMA is an online identification and payment service

jointly implemented by local and central government; this service enables identification and online payment by citizens to be linked to any local or central government e-transactions service.

The public administration e-transactions strategy was drawn up jointly by central and local government in 2004-2005 and appended to the national IT strategy, which in turn formed the core of the Government Resolution on the development of IT in the central government administration (June 2006). Reforming the steering of information management in central government according to the principles of corporate steering was one of the major tasks included in the information society programme. The TEHO-TIVI project aimed at finding efficiency benefits achieved with ICT in the public administration and also produced a plan of action for implementing the proposals produced in the investigation.

Under the National Broadband Strategy, it was principally the task of the Ministry of Finance to ensure equitable terms for the commercial exploitation of public-sector information. Directive 2003/98/EC of the European Parliament and of the Council on the re-use of public sector information entered into force on December 31, 2003 and was to be implemented in national law by July 1, 2005. The working group preparing the matter came to the conclusion that existing national legislation in Finland, specifically the Act on the Openness of Government Activities (612/1999) and the Act on Criteria for Charges Payable to the State (150/1992) as amended, conform to the requirements and obligations of the above-mentioned Directive. The amendment of the Act on the Openness of Government Activities that entered into force in October 2005 (495/2005) clarified the provisions on the disclosure of documents and the fees that may be charged for information in certain cases.

3.2 Municipalities and online services

On October 30, 2003, the Ministry of the Interior launched the JUPA project to attain essential targets in securing the availability and quality of services. The project was intended to develop and enhance production of public services and to ensure the availability and quality of public services, to support cooperation between municipalities and between municipalities and other public and private parties and actors, and to promote the use of online public services.

The JUPA project period ran from January 1, 2004 to December 31, 2005. This was divided into two main phases: the definition phase, where service production process descriptions were collated and the services selected for the project were modelled; and the introduction phase, where the services were implemented and introduced. The postponement of the introduction sub-projects to 2006 caused the steering of the project to be transferred within the Ministry of the Interior to the KuntaIT project, which was launched on February 1, 2006, and its successor, the KuntaIT unit.

In accordance with the targets set in the definition phase, the target states of thirteen different service processes in nine regional sub-projects were determined, and the related process descriptions were drawn up. The eight sub-projects in the introduction phase all produced an operational online service for customers during 2006. The change in operations required by the new service model and the implementation of the information system and telecommunications solutions required to support it was achieved almost exactly as planned.

Evaluation of the project has highlighted the importance of agreement practices in project management methods as a steering tool particularly in umbrella projects consisting of several separate regional component projects. The JUPA project financing model (regional development funds distributed through the Regional Councils) and agreement practice (the agreements were in part too vague as to the obligations of the various parties, and too complicated) did not in all cases satisfy the steering and monitoring requirements imposed on the project administrator.

In future, the aim is for the KuntaIT unit to exploit and disseminate the results of the JUPA project. The descriptions produced in the definition phase were published as examples of how the service processes could be implemented. The models will also be used for further development measures related to these services. As for the introduction phase, it is intended that the transferability of the universally applicable components of the Oulu area daycare model be tested by KuntaIT by introducing the same service model in another area and another environment, enabling the description and evaluation of the results of this implementation in accordance with the targets set before the model is more widely disseminated. KuntaIT will also use experiences gained in the project to develop methods and tools for service providers in the public administration to evaluate their service processes, the implementation and introduction of their development, and the exploitation of their results.

3.3 Consumer rights in telecommunications services

On October 21, 2004, the Ministry of Transport and Communications appointed a working group to survey consumer policy problems in the provision of information society services and to review the potential need for legislative amendments. The working group submitted its report in October 2005. It was written in the form of a draft Government bill, and an actual bill based on it was submitted to Parliament in January 2006.

In spring 2006, Parliament approved the bill as law, and the resulting amendments to the Communications Market Act substantially improved consumer protection in the telecommunications market. Provisions regarding the responsibilities of the telecom operator in cases of errors and delays in the telecommunications service were added to the Act. In the future, service users will be entitled to a standard compensation for delays in service delivery and, in certain cases, to compensation for damage exceeding the standard compensation, if such damage occurs. The Act also defines what constitutes an error in the telecommunications service and what the consequences of such an error are.

A provision was also added to the Act concerning the division of responsibilities between the telecom operator and the consumer in cases of unlawful use of the telecommunications service. Under this provision, the consumer will only be held responsible for such unlawful use if he has been unduly careless or has neglected his obligation to notify.

Moreover, the scope of application of certain existing provisions was extended so that they now cover not only the connection agreements of the fixed phone network but all other telecommunications service agreements too, including broadband connections. An example of this is the provision that limits the right of a telecom operator to change the terms of an agreement to the detriment of the consumer in the middle of the agreement period; this provi-

sion was extended to cover other agreements besides those concerning the fixed phone network. The Act will enter into force in March 2007.

The impact and effectiveness of the Act will be evaluated in a separate study to be conducted about one year after the Act has entered into force.

3.4 Culture in the Information Society 2010 strategy

The Culture in the Information Society 2010 strategy of the Ministry of Education and the launching of its plan of action were included in the National Broadband Strategy. The major measures here were preparing for the launch of a radio and TV archive, launching the *Lapset ja media* [Children and the media] programme, and certain projects related to the digitisation of cultural heritage and supporting domestic content production.

Under the Culture in the Information Society 2010 strategy, the Ministry of Education aims to ensure a wide and diverse range of cultural content and to promote the innovative use of ICT in cultural institutions and in the production and dissemination of the cultural industry and cultural services.

A plan for extending the purview of the Finnish Film Archive to include archiving of radio and TV material was completed in 2006. Legislation reform issues were further studied on the basis of the memorandum produced in the Mass media archiving project in 2003.

In late 2005, the Ministry of Education set up a working group to evaluate the use of filtering and blocking devices to prevent the accessing of unwanted content on the Internet. The report *Turvallisten sisältöjen valikointi ja arviointi* [Selection and evaluation of safe content] was completed in February 2006, providing municipalities, schools, libraries and homes with information on the technical functions and limitations of filtering and blocking systems and on other matters to be considered when acquiring such systems.

The Ministry of Education also launched an extensive project entitled *Mediakasvatus varhaiskasvatuksessa* [Media education in early childhood education], which involved producing and distributing media education materials for daycare and preschool and for morning and afternoon activities in schools. Media education in schools was also addressed jointly with the Finnish Broadcasting Company and the National Board of Education.

The *Mediamuffinssi* [Media muffin] project launched at the beginning of 2006 is intended to influence how children use the media and to improve children's media skills. The project involved developing material for giving hands-on guidance to children in daycare centres, in primary school and in morning and afternoon activities in schools.

Digitization of the cultural heritage was promoted according to the target programme and the strategy of the Ministry of Education under the Government Information Society Programme. The National Board of Antiquities initiated a joint application procedure for museums, implemented mainly with funding from the Ministry of Education. The artwork register project of the Finnish National Gallery (Muus@net) and the implementation of the extranet of professional museums were also supported. EUR 270,000 annually was given in 'Myytti' grants for

digitization of resources at museums. Innovative digitization projects at museums were also supported.

The provision of a diverse range of digital cultural content and the innovative use of ICT in cultural institutions was promoted. The development of digital image, sound and multimedia products and production pilot projects and training projects were also supported.

The purpose of the Film distribution digitization project was both to develop legal services for online distribution of feature films and to protect Finnish films, principally mainstream feature films, from illegal copying. The project also serves to support the piloting of digital screenings in cinemas.

3.5 E-transactions and legislation

Electronic identification

To attain the aims of the National Broadband Strategy, the Ministry of Transport and Communications implemented several measures related to the legislation on electronic identification during the period under review, 2004-2006. The supply and use of certificates for signatures and identification as addressed in the Act on Electronic Signatures (14/2003) was investigated with a view to establishing the impact and development needs of the Act. No such immediate needs were found. In the area of biometric identification, i.e. electronic identification based on a physical feature or the behaviour of a person, a project on the information security requirements in biometric identification and the need for regulation from the viewpoint of privacy protection was launched under the National Information Security Strategy. This project involved drawing up instructions for service developers on how to ensure information security in biometric applications. Following this, a separate project for evaluating and drawing up the regulations required for biometric identification was launched. Also, the VAHTI guidelines on identification on public administration online services were under preparation.

Act on the Protection of Privacy in Electronic Communications

The Act on the Protection of Privacy in Electronic Communications (516/2004) entered into force on September 1, 2004. Section 10 of the Act (Processing for billing purposes) states that an information society service provider as defined in the Act on the Provision of Information Society Services (458/2002) may process identification data received from a telecommunications operator which is necessary for the billing of image recordings, sound recordings and other fee-based services offered over a communications network administered by that telecommunications operator, and any other data necessary for billing, if the subscriber or user to whom the data applies has given his or her consent thereto. Information society service providers are entitled to obtain such data from telecommunications operators.

A monitoring group was appointed for implementing and monitoring the Act on the Protection of Privacy in Electronic Communications for the period April 1, 2004 to December 31, 2006. The purpose of the monitoring group was to monitor and evaluate how the provisions were working (and, if necessary, make proposals for their amendment), to publicize the requirements of the Act and to increase awareness among players in the field on the essential

provisions of the Act, to increase interaction and cooperation between actors, particularly the authorities enforcing the Act, and to report to the Government on how the provisions are working and what their effects are. The monitoring group has reported of no problems concerning the data referred to above and their disclosure to information society service providers by telecom operators. The aims set for this measure in the National Broadband Strategy have thus been attained.

Copyright

Copyright legislation was developed between 2004 and 2006 with special reference to information society issues and special issues in digital technology. The Act amending the Copyright Act (821/2005) and the Act amending Chapter 49 of the Penal Code (822/2005) entered into force on January 1, 2006. The Government bill for these Acts (28/2004 vp) was given on March 19, 2004. This extensive legislative reform was largely based on what is known as the Information Society Directive (2001/29/EC), which in turn is based on international copyright treaties signed in 1996, the WIPO Copyright Treaty (WCT) and the WIPO Performances and Phonograms Treaty (WPPT).

The legislative amendments essential for information society development were:
- specification of the right to communicate to the public (communication right) as part of the reorganization of economic rights
- specifying the right to make copies
- reformulating the provisions restricting copyright so that they are better suited to digital environments and information networks
- licensing regulations making it easier to acquire rights to use resources in digital form (e.g. teaching, research, archives, libraries and museums)
- special limitation provision concerning temporary copies created in connection with the conveying of material over an information network and viewing or listening to it
- legal protection for technical measures and electronic data on rights administration
- procedural provisions prohibiting the receiving of material violating copyright in transmission over an information network
- removing the 'for profit' requirement from chapter 49 section 1 of the Penal Code insofar as violations in an information network or an information system are concerned.

In copyright legislation, the amendments required by the Directive on the enforcement of intellectual property rights (2004/48/EC) were made (Government bill HE 26/2006 vp) to the Copyright Act (679/2006) and the Act on Securing the Evidence in Civil Matters concerning Industrial Property Rights and Copyrights (678/2006). These entered into force on September 1, 2006. The amendments were jointly prepared by the Ministry of Justice, the Ministry of Trade and Industry and the Ministry of Education.

3.6 Broadband service cluster programme

In order to establish the need for a broadband service cluster programme, the Ministry of Transport and Communications commissioned a preliminary report on the need to launch a broadband service cluster project. This report was prepared through an interview study in autumn 2004, exploring trends in society, the ICT industry and the broadband business. The

strongest factors identified were social transitions; demands for productivity enhancement, ageing and ICT advancements; and the expansion of the ICT sector to sectors applying ICT, content digitization, open standards, and the convergence of terminal devices and networks.

The Finnish broadband market was principally seen as a market for connections. Opportunities identified for broadband services in the interviews included supporting social processes, e.g. health care, social welfare and education services. The problem with these is that there is no national vision on service development. Another path was seen in video-based entertainment services. This was seen to be hindered by copyright issues, which are considered complicated, and the lack of a functional revenue logic. The interviews revealed that regulation of the broadband business was considered feasible and could perhaps even be slightly increased if that would ensure uniform and integrated development.

It was observed in the report that if a broadband cluster project were to be launched, it should be business-driven and tightly focused, aiming at concrete results and taking all connection technologies into account. A media company or telecom operator was considered the best for leading such a project. The report outlined that broadband service development should switch from a technology-oriented approach to the development of sector-specific services, either services for individual specific sectors or the design of context-bound service clusters. Another option for the content of the cluster programme that was named in the report was innovation development, meaning innovations aimed at the general improvement of broadband services. It was considered that along with these two potential approaches, the cluster programme should also have a higher-level vision to govern and coordinate the information society efforts of the public administration.

The interviews and the report led to the conclusion that it was not worthwhile launching a separate broadband service cluster programme. However, it was observed that broadband service development can be incorporated in the Government Information Society Programme, the central government information management development project and TEKES technology programmes. Launching a new cluster programme would further complicate the development of public services, which was heterogeneous enough to begin with. On the basis of these conclusions, the Ministry of Transport and Communications decided not to launch a broadband service cluster programme.

4 Information society competence of businesses and citizens

Improvement in the information society competence of businesses and citizens will increase the demand for broadband services, which in turn will enable a broader range of commercial services to be provided. The aim of the National Broadband Strategy was to improve the e-commerce competence of SMEs in particular and the competence of citizens in using information society services.

4.1 ICT in teaching

In 2004-2006, the Ministry of Education ran the Information Society Programme for Education, Training and Research. This was a continuation of the Information Society Strategies for Education, Training and Research, which had been in place in the administrative branch of the Ministry of Education since 1995. The concrete projects in the programme were aimed at increasing the use of ICT in all educational institutions, with particular reference to promoting the use of ICT in teaching, to electronic content production and to improving the operating environment.

To enhance basic teacher training, a plan for the use of ICT in teaching was drawn up at every teacher training institution in Finland. The purpose of these plans was to ensure that future teachers gain a basic competence in the use of ICT in teaching as part of their basic training.

A plan entitled 'Organization of continuing education for personnel in the education and training sector on the use of ICT in teaching and the special competence required' was prepared in spring 2005 for the benefit of education and training personnel. The plan was implemented by the National Board of Education. Focus areas in 2006 included the pedagogical skills of education and training personnel in web-based learning. Electronic training and support material was produced during 2006.

Between 2004 and 2006 the focus was on support for and development of multi-method teaching (including web-based learning). In April 2005, plans were published for improving the use of ICT in teaching and the basic ICT skills of pupils, and for developing and establishing web-based learning in upper secondary schools, adult education and liberal education.

The *Quality criteria for web-based learning materials* for basic education and secondary education, and another set of quality criteria for universities, were published in January 2006.

A variety of web-based learning material for use at educational institutions was produced at all levels of education, for example by the Virtual School, the Virtual Polytechnic and the Finnish Virtual University.

Education providers and educational institutions already have sufficient expertise for improving their information society competence. There are no extensive, nationwide challenges in sight. On the other hand, it is still a challenge to disseminate the results achieved and the best practices established.

4.2 ICT in businesses

The Ministry of Trade and Industry and the Ministry of Labour implemented a project under the National Broadband Strategy to improve the competence of SMEs to adopt the new business models and work organization procedures enabled by new telecommunications technologies.

The aim of the Ministry of Trade and Industry project (*Pk-yritysten kilpailukyvyn edistäminen tieto- and viestintäteknologiaa hyödyntämällä* [Promoting the competitiveness of SMEs through ICT]) was to improve the capacity of SMEs and of Employment and Economic Development Centres to employ ICT. The project contained a variety of measures, some aimed directly at SMEs and some at the management and experts of the Employment and Economic Development Centres operating in the administrative branch of the Ministry of Trade and Industry.

The potential of ICT in enhancing business operations was brought up for instance at the *Tietotekniikka Menestystekijäksi* [IT as a success factor] (TiMe) seminars (2003-2005), where the use of IT to promote success was discussed. The TiMe seminar tour continued in 2005-2006 with an information security theme (see measure 36 in the National Broadband Strategy). The final TiMe event, in November 2006, was a seminar for SME consultants, focusing on both viewpoints: the potential of IT in business development and the importance of information security in business.

To improve the competence of the personnel of Employment and Economic Development Centres, a training course on the potential of ICT in SME business development was organized for the management and experts of Employment and Economic Development Centres in spring 2006. In addition to the above measures, a study was conducted in spring 2005 to find out how the potential of ICT had been taken into account in the various productized expert services provided by Employment and Economic Development Centres for SMEs.

Getting SMEs interested in ICT and its potential was seen as a challenge. Some managers and employees in these businesses had clear shortcomings in basic IT competence. What was seen as particularly problematic was the capacity and competence of the management of SMEs to plan an IT project for their business on the basis of their business activities and their strategic objectives. IT projects are often disassociated from the business itself, and competitive benefits and advantages can thereby be lost.

The use of IT in SMEs varies according to the size of the business and the sector it is in. The smallest businesses generally make the least use of IT. It would be important for the bigger picture to get all businesses to make innovative use of IT so as to generate not just competitiveness but a competitive advantage.

The Ministry of Labour is coordinating a cross-sector eWork joint committee, which in spring 2006 submitted its proposals for measures to promote eWork. In autumn 2005, the Ministry of Labour published a telecommuting guide for employers. The objective of the eWork projects was to promote the use of ICT particularly in SMEs. Successful telecommuting was considered to require good telecommunications connections and information security, but above all work reorganization and good management.

Telecommuting was also seen to contribute to productivity and to improve the quality of working life – factors such as coping at work, retiring later, and reconciling work and family life – and also to contribute to sustainable development, for instance by decreasing traffic volume. Moreover, ICT-enabled telecommuting was seen as a tool for improving the employment situation in remote areas.

In 2006, telecommuting was relatively uncommon. A study conducted by the Ministry of Labour showed that only 1% to 4% of all wage earners were engaged in contractual telecommuting. The challenges and opportunities of eWork and telecommuting are not fully exploited, since the study also demonstrated that as many as 14% to 19% of all wage earners could conceivably telecommute.

Knowledge of the benefits of telecommuting has been slow to spread. Also, according to an eWork questionnaire among SMEs, the management and supervision of telecommuting on the one hand and traditional attitudes towards work and the workplace on the other were identified as the major obstacles. In the future, it will be important to evaluate and to distribute information on how telecommuting could help enhance the business of SMEs and cut their costs.

The Government Resolution of October 5, 2006 on the implementation of eWork and telecommuting was a significant step towards and basis for further promotion of telecommuting. In this Resolution, the aim was to generate more such work through a national campaign.

Future challenges include promoting telecommuting by taking it into account in the design and building of construction technology and ICT. It was also observed that the public sector could take the lead in offering telecommuting as an option to its employees.

4.3 Convenient telecommunications services

TEKES has for its part contributed to the ease of use of telecommunications services. TEKES invested in interactive IT and user interfaces in the FENIX Interactive Computing Technology Programme. This four-year programme (2003-2007) has been focusing on the management of the interaction between man and IT. The programme is developing software technologies and applications where the management of the interaction between the end user and the information system on the one hand, and the user-friendliness of the services on the other, play a major role.

The principal aim has been to develop user-friendly application technologies and products and services based on them for the needs of private consumers, businesses and the public administration. The main focus of the programme is on applications, not basic technologies. The aim was to create projects that could generate products and add to the competence and competitiveness of businesses in the long term.

Between 2003 and 2006, TEKES provided a total of EUR 45 million in funding for 207 R&D projects under the FENIX programme.

When the programme concludes in 2007, TEKES will initiate an evaluation of the results and effectiveness of the programme, followed by a decision on how R&D in this area will be funded after the FENIX programme.

The Ministry of Transport and Communications has also contributed to the ease of use of telecommunications services, particularly from the viewpoint of groups with special needs. In 2004, the Ministry of Transport and Communications drafted a plan of action entitled *Kohti esteetöntä viestintää* [Towards obstacle-free communications]. Its purpose was to increase awareness of the problems encountered by the elderly, the disabled and other groups with special needs, and to remove barriers to the equality of citizens in the telecommunications sector. Another purpose was to increase interaction between relevant parties such as authorities, organizations of the disabled, telecommunications service providers and consumers. Information was also collected on current problems in obstacle-free access to telecommunications services.

The plan of action listed 16 concrete targets and measures intended to promote obstacle-free telecommunications services. The bodies responsible for implementing these measures included various ministries, the Emergency Response Centre Administration, FICORA, the Finnish Consumer Agency, STAKES and organizations of the disabled.

The Ministry of Transport and Communications appointed a working group on April 15, 2005 to monitor the implementation of the plan of action on obstacle-free telecommunications. Representatives of the authorities, of businesses, and of organizations of consumers and of the disabled were invited to join the working group, which submitted its final report to the Ministry in January 2006. The members observed in the final report that work in the group had improved access to information by the parties and their potential for influence particularly in EU matters and other international cooperation. At the national level too, the monitoring group had efficiently brought together the various parties involved in addressing issues of obstacle-free access to telecommunications services. This interaction should be maintained and enhanced, according to the group.

As expected, the plan of action increased the importance and visibility of the elderly and the disabled in the telecommunications sector. However, ensuring obstacle-free access to telecommunications services is a continuous process. As the sector is one in which technological advancements are rapid, issues of the usability of and obstacle-free access to services must be monitored continuously, in the group's opinion.

5 Information security and privacy protection

Promoting information security and privacy protection online supports demand for broadband connections and information society services. A safe environment for users prompts confidence in e-transactions.

5.1 Legislative measures

The Act on the Protection of Privacy in Electronic Communications (516/2004) entered into force on September 1, 2004. A monitoring group was appointed for implementing and monitoring the Act on the Protection of Privacy in Electronic Communications for the period April 1, 2004 to December 31, 2006. The purpose of the monitoring group was to monitor and evaluate how the provisions were working (and, if necessary, make proposals for their amendment), to publicize the requirements of the Act and to increase awareness among players in the field on the essential provisions of the Act, to increase interaction and cooperation between actors, particularly the authorities enforcing the Act, and to report to the Government on how the provisions are working and what their effects are.

In order to enhance the enforcement of the Act on the Protection of Privacy in Electronic Communications, FICORA was given more authority to issue instructions. Both FICORA and the Data Protection Ombudsman's Office have issued both general and specific instructions on the application and interpretation of the Act. A division of authority between the two bodies was also agreed. A trainer pool was set up and training sessions organized for a variety of players even before the Act entered into force.

The Act was explicated to telecom operators section by section in a separate working group. This working group will continue to monitor the application of the Act and needs for amending it. Hearings were organized for corporate subscribers, and further hearings are planned. Also, the authorities established channels for information exchange to help resolve issues of interpretation.

Enforcement was efficient once the Act had entered into force. The enforcement of any new amendments to the Act must be similarly managed. This can be done under project no. 32.

The Ministry of Transport and Communications set up a monitoring group in March 2004 to evaluate the impact of the Act on the Protection of Privacy in Electronic Communications. The monitoring group was active throughout its period of existence. The Act and its effectiveness were evaluated, and proposals for amendments were submitted as necessary. An amendment was made to the Act concerning mass text messages; this amendment entered into force on April 1, 2006. At the end of 2006, Parliament was debating an amendment concerning the information security charge. A more extensive amendment involving several provisions was in preparation. The monitoring group aimed to increase awareness among the players in the field by organizing training events and distributing information. An investigation of directory and inquiry services was launched in October 2006.

The Ministry of Labour was charged with implementing the legislation on privacy protection in working life efficiently. The revised Act on the Protection of Privacy in Working Life

(759/2004) entered into force on October 1, 2004. The purpose of its revision was to incorporate amendments regarding the handling of information on employee drug use, CCTV surveillance and e-mail protection. The amendments had been prepared in a tripartite working group appointed by the Ministry of Labour; the group's proposals were unanimous.

The Ministry of Labour prepared a brochure on the Act in Finnish, Swedish and English immediately after the Act entered into force. The brochure was also published on the Ministry of Labour website (www.mol.fi). In autumn 2004 and during 2005, a representative of the Ministry of Labour was present at nearly 50 occasions where the content of the new Act was discussed. It was also extensively written up in the press.

By the end of 2006, the Act had been in force for two years, and it was already possible to evaluate its impact reliably, particularly that of the new provisions. Thus, in late 2006 the Ministry of Labour launched a study of how employers handle the information they collect on their employees and possibly also of job applicants. The study aimed to chart the impact of the Act on the Protection of Privacy in Working Life and other legislation in the private and public sectors and in workplaces of different sizes. The study is paying particular attention to the practical application of the provisions of CCTV surveillance and e-mail protection. The study is estimated to take about one year.

5.2 National Information Security Strategy

The Government made a Resolution on the National Information Security Strategy on September 4, 2003. Its purpose is to make Finland an information-secure society. Several ministries have participated in its implementation. The aims of the strategy are:

1. Promotion of national and international information security cooperation
2. Promotion of national competitiveness and the operating potential of Finnish information and communications operators
3. Improving information security risk management
4. Safeguarding fundamental rights and protecting the nation's knowledge capital
5. Increasing information security awareness and competence

A considerable number of projects was set up to implement the strategy, following the above objectives thus:

1.1. National Information Security Advisory Board
1.2. International cooperation
1.3. The importance of trust and information security in the New Economy
1.4. Operating conditions needed for the different actors at national level
2.1. Programme on trust and information security in electronic services
2.2. Corporate information security awareness
2.3. Convenient and compatible products and innovative areas for development
2.4. Harmonizing public-sector information security procedures
2.5. Impact assessment of legislation
2.6. Information security and privacy protection in biometric identification
3.1. Assessing and more effectively combating information security risks
3.2. Analysis of national information security risks

3.3. Methods for analysing vulnerability to information security risks

3.4. Committee on Information Security in Critical Infrastructure

4.1. Ensuring fundamental rights

4.2. Protection of national knowledge capital

4.3. Cybercrime as an information security problem

5.1. Charting and developing information security awareness and competence

5.2. Improving people's information security awareness

5.3. Information security awareness in public administration

5.4. Certificates

5.5. National Information Security Day 2005

A separate secretariat was set up to manage these projects. In spring 2004, the National Information Security Advisory Board was set up to support the coordination of the measures required for implementation of the National Information Security Strategy and to monitor the implementation of the Strategy until the end of its term in May 2007. The Advisory Board was and is required to submit an annual report to the Government about how the Strategy is being implemented and how it should be updated. The Advisory Board has representatives of key information security players in the public administration and the private sector.

Focus areas were clearly defined for the Strategy in 2005. At the same time, some of the original projects merged with others or were discontinued because their objectives had been attained.

Figure 26. Focus areas of the National Information Security Strategy
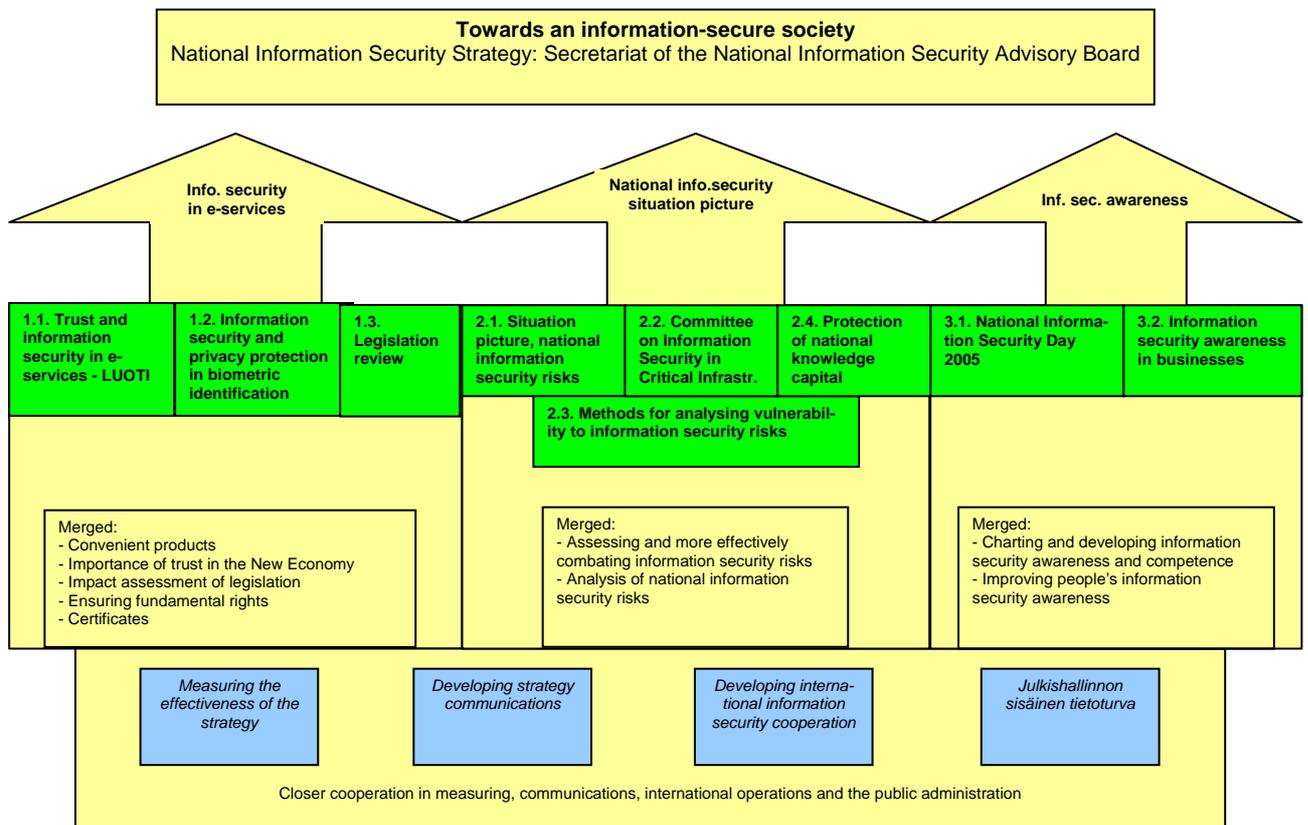
In 2006, the focus areas were: information-secure e-services, the national information security situation picture, and information security awareness. The strategy period will end on May 31, 2007. An overall evaluation of the strategy and of eventual further measures was begun towards the end of 2006.

5.3 Trust and information security in electronic services

The *Development Programme on Trust and Information Security in Electronic Services (LUOTI)* was run by the Ministry of Transport and Communications in 2005-2006. The purpose of the LUOTI programme was to promote information security in new, multi-channel electronic services. This involved developing a new operating model where information security is taken into account at all stages of service development. The major players in the programme were ICT companies, research institutions, universities and their personnel.

Under the programme, information security was developed through practical services and user contexts with five pilot projects each consisting of the commercialization of a new, innovative electronic service where information security played an important role. The pilot projects involved developing a multi-channel distribution platform for digital content; telecommunications services for daycare centres; an interactive TV drama series; a real-time traffic information platform; and an online community gaming environment. The LUOTI programme provided the services of information security experts for the projects, and a public final report was published on each of them. Also, legislative issues in the pilot projects were discussed by a separate legislation group.

The LUOTI programme generated views on information security risks in the future and their possible solutions, and also on the new information security challenges created for product and service development through digital convergence. The products of the programme included an Information Security Guide for Electronic Service Providers. Also, separate studies on the information security of mobile networks, digital TV and wireless networks and possible solutions for these were conducted.

Development needs regarding legislation, research and training in the area of information security of electronic services were investigated in the LUOTI programme, for example through a comparative study of Finland's information security legislation and the corresponding legislation in certain other EU Member States. A discussion on information security research, teaching and training was organized for representatives of universities, research institutions and telecommunications companies. Also, a minor study was conducted of research cooperation and funding opportunities in the area of information security offered by the Seventh Framework Programme of the EU.

The programme promoted consumer awareness of the information security threats and requirements of electronic services. The Finnish Consumer Agency and the LUOTI programme jointly produced a consumer guide on the security of electronic services.

The LUOTI programme attained the targets set for it, and no continuation programme was planned.

5.4 Information security awareness

Efforts have been made to increase awareness of computer virus security among SMEs and private citizens by organizing a National Information Security Day annually since 2004.

The first National Information Security Day was February 11, 2004. Its aim was to ensure that all home computers connected to the Internet are fitted with an operating system update, updated virus protection software and a firewall. The second Day was February 8, 2005 and was aimed mainly at comprehensive school pupils and their teachers and parents. During the spring term, the Day's themes – secure yourself, secure your computer and remember the ground rules – were discussed at schools. Information Security Day was celebrated on the same day in about 20 EU Member States.

In 2006, National Information Security Day was February 7, as in other EU Member States. The main target groups this time were SMEs and, as earlier, comprehensive school pupils and their teachers and parents. A diverse information security toolkit accessible online was produced for the SME target group, and web-based learning material was made available for schools at tietoturvakoulu.fi. The online information security guide for Internet home users, tietoturvaopas.fi, was completely revised.

National Information Security Day will again be held in February 2007, with the same target groups as in 2006. Publicity will be used to further improve information security awareness among Internet home users.

A survey conducted in April 2006 showed that teachers wanted the topic to be revisited on the next National Information Security Day. Research has shown that there is a real need in schools for information and materials generated in projects, and that these are actively used when available. The 2007 project will seek new ways of motivating teachers to continue giving information security education at school.

Extensive and diverse online materials were produced for the SME target group in the National Information Security Day project for 2006. In the 2007 project, this material will be publicized to SMEs more actively, in cooperation with business organizations. Methods for pursuing this include briefings held by various partners all over the country.

A broad national publicity campaign will be aimed at all citizens who use the Internet at home. This will introduce a consumer viewpoint. Public events will be organized around the country on National Information Security Day in 2007.

The Ministry of Trade and Industry contributed to information security awareness in SMEs by participating in an extensive TiMe training tour in 2005-2006, focusing on the potential of information security legislation to improve information security in various ways. The purpose of the seminar tour *Tietotekniikka Menestystekijäksi – Tietoturvaa pk-yrityksille* [IT as a success factor – Information security for SMEs] was to provide SMEs with practical knowledge of information security. The tour was organized jointly by the Ministry of Trade and Industry, the Employment and Economic Development Centres, the Ministry of Transport and Communications, and FICORA. Talks at the seminars focused on information security from the point of view of legislation, technical and human solutions, and experiences in businesses.

The SME Foundation, the Confederation of Finnish Industries, Ficom, TIEKE, local bodies and Finnish businesses in the sector also contributed.

It was a challenge to get SMEs to attend information security events, always requiring a local partner and investments in publicity and marketing to be successful. Regional business organizations were interested in organizing events for promoting IT and information security, but experts in these areas either did not exist in the regions or were not identified, and thus putting seminars together was difficult. The information security tour had the effect of enabling the identifying of experts and the offering of expertise in regions.

5.5 Spam

In 2004-2006, the Ministry of Transport and Communications conducted a project to reduce the problems caused by unsolicited e-mail, or spam. The National Information Security Strategy outlined the measures and procedures that should be implemented to alleviate the adverse effects of spam. The Act on the Protection of Privacy in Electronic Communications contained provisions on direct marketing procedures and improved the potential for telecom operators and corporate subscribers to take action against spam and other disruptive communications. FICORA issued an order on the information security and functionality of e-mail services, based on the Act on the Protection of Privacy in Electronic Communications (11/2004 M), specifying means available for e-mail service providers for combating spam and other disruptive communications.

In order to increase awareness of this, an information package on spam was published under the National Information Security Strategy on a dedicated website (www.roskapostipaketti.fi). This material is meant for consumers, businesses, direct marketing practitioners, telecom operators and the public administration. Needs for amending and developing the Act on the Protection of Privacy in Electronic Communications to help prevent spam and other disruptive communications were evaluated during 2005 and 2006, and a bill amending the Act on the Protection of Privacy in Electronic Communications was prepared with a view to submitting it to Parliament in autumn 2007.

As a result of the above measures, the volume of spam received – i.e. the amount of spam that causes the most disruption and costs to the end users of telecommunications networks – decreased significantly in Finland during the period in review, even though the total amount of spam in the networks probably increased. On the whole, the goals set for this in the National Broadband Strategy were attained extremely well. The goal is a continuing one and needs continuing efforts.

5.6 Children and harmful content on the Internet

Cooperation between actors is vital in the development of an Internet safe for children. The Ministry of Transport and Communications has made efforts to promote such cooperation, involving key players such as telecom operators and other Internet service providers, content producers, authorities and child protection organizations.

The Ministry of Transport and Communications has emphasized the importance of self-control on the part of players in the field to screen illegal and harmful content on the Internet. A well-running self-control system has been found to be an efficient and flexible means for responding to the problems and challenges that arise in this area.

In 2005, public debate focused on actions taken by telecom operators in Norway and Sweden to prevent access to foreign websites containing child porn. In Finland too, action was launched to protect children against harmful content on the Internet. At the initiative of Leena Luhtanen, Minister of Transport and Communications, representatives of the Ministry of Transport and Communications, the Ministry of Justice, the Ministry of the Interior and the Office of the Prosecutor General began to investigate the preventive actions taken in Norway and Sweden. The question of what legislative potential Finland had for limiting the import of child porn to Finland over the Internet was also investigated.

The report, published in August, sparked a lively public debate with opinions voiced both for and against. In order to identify the problem issues, the Ministry of Transport and Communications decided to continue investigating the technical and practical prevention measures on the one hand and legislative issues on the other. In October, the Ministry launched two studies outside the administrative branches: the first was intended to find out what the current situation was regarding the various technical and practical preventive measures if action was taken on a voluntary basis; and the second focused on the legal issues that should be taken into account and resolved before implementing measures binding upon private individuals or authorities.

These studies were submitted to the Ministry of Transport and Communications in December 2005. The legal issues survey confirmed the Ministry's view that the principle of voluntary restriction was legal in Finland under current legislation. Indeed, telecom operators declared that they were ready to begin filtering once they had received a list of child porn sites from the police. The police, however, considered that in the absence of a legislative provision specifically ordering it, they did not have the right to disclose such a list.

To surmount this practical problem, the Ministry of Transport and Communications drafted an Act on the prevention of the dissemination of child pornography. The purpose of this Act would be to ensure that there would be no legal hindrance to the police disclosing a list of Internet sites maintained abroad which contain child pornography to telecom operators so that the latter can take voluntary measures to block child pornography imported to Finland over the Internet.

Apart from actions in Finland, the Ministry of Transport and Communications participated actively in the preparation of the Safer Internet Plus programme of the EU (2005-2008), concerning safe use of the Internet and new online technology. This programme is a continuation of the Safer Internet Action Plan (1999-2004), intended to promote safe use of the Internet and new online technology particularly for children, and to prevent illegal and unwanted online content.

Because of the unlimited nature of the Internet and its constant development, the protection of minors from harmful content requires not only national action but international joint efforts too. While some results have been achieved in recent years, continuous development and monitoring are required. The Ministry of Transport and Communications will continue to in-

vest in both national and international cooperation and to support projects to promote the protection of children and adolescents against harmful content on the Internet.

6 Special measures to improve regional broadband supply

The goal of regional broadband development measures was to make the construction of networks and the provision of services financially viable even in areas where it is not commercially profitable. For this purpose, comprehensive and better coordinated regional plans for expanding broadband networks were prepared. According to the instructions, public funding can continue to be allocated to regions where broadband would not otherwise be made available. The measures involved channelling of central government grants and subsidies to help schools and libraries subscribe to broadband services even in regions where commercial availability was not reasonably priced.

6.1 Strategic efforts by the Regional Councils

Bringing the National Broadband Strategy home to the regional and municipal level was considered important for attaining its goals. For this purpose, it was essential to issue instructions to the regions on how to prepare and implement regional broadband strategies. These strategies were to be based on municipality-specific estimates on the development of demand and the market situation. The strategies were to survey user segments relevant for service provision. Under the National Broadband Strategy, the focus in regional broadband strategies was to be on access by citizens (households) to broadband connections. Other important user segments identified in regional broadband strategies included SMEs, municipal services (including Citizens' Services, schools and libraries). Under the National Broadband Strategy, telecommunications needs between actors in the public sector (i.e. the public administration network) should be seen as one possible enabling factor in the provision of broadband connections, but the strategy did not actually involve the construction of broadband networks for communication between authorities.

To enable regions and municipalities to attain the goals set, the National Broadband Strategy included a measure for guiding and training the Regional Councils in the drafting of regional broadband strategies and for distributing information efficiently on the various options and possibilities regarding broadband connections, particularly to Regional Councils, municipalities, SMEs and housing companies. In 2004, the Ministry of Transport and Communications negotiated with the directors of the Regional Councils to establish what the training needs and topics for ensuring the smooth running of the strategy process might be. The Ministry of Transport and Communications organized broadband seminars for key personnel nominated by the Regional Councils.

As material for these seminars, and to support strategy efforts, the Ministry of Transport and Communications prepared instructions for drawing up a strategy and for the use of public funding. The purpose of the strategy model was to ensure uniformity in content between regional broadband strategies while keeping in mind that every region has its own special characteristics and needs which the regions themselves had to take into account.

The broadband seminars were held on April 6 and May 18, 2004. The training involved the stages of drawing up a regional broadband strategy and its implementation, technologies, competitive tendering, and so on. This resulted in the preparation of detailed written instructions for regional implementation. The Regional Councils then drew up the actual strategies in cooperation with the municipalities. The strategies were implemented during 2004-2005. In spring 2006, the Ministry of Transport and Communications organized a series of hearings to review the strategy implementation and its success and to share experiences of best practices.

FICORA instructions

Local authorities and other public bodies have increasingly been constructing or commissioning networks that fall in the sphere of public telecommunications, particularly wireless and fibre optic networks. In February 2006, FICORA published the report of the working group on optic fibre access networks. The report gave recommendations on the cabling, structure and leasing of networks and provided information on legal requirements for the benefit of village projects and regional projects in particular.

WLAN began to become more widespread in 2006, and in June 2006 FICORA published a memorandum on the application of telecommunications market legislation to the provision of wireless broadband connections. The purpose of the memorandum was to clarify the regulatory situation and to present general principles of its interpretation amid the rapid and diverse development in the field of wireless networks. FICORA also issued more detailed instructions and interpretations to local authorities and builders of municipal networks in certain individual cases.

FICORA continues to specify its position on WLAN further and to issue interpretations on individual cases.

(Reports on the regional strategies and their implementation are appended.)

6.2 Telecommunications solution complementing the fixed-network broadband supply

On June 22, 2005, the Government granted Digita Oy a licence for a digital mobile telecommunications network in the 450 MHz frequency band. The licensee was authorized to offer network services in a digital broadband mobile telecommunications network built on Flash-OFDM technology.

The licensee was required to build the network in accordance with the schedule, coverage map and list of municipalities entered in the construction plan, unless the Ministry of Transport and Communications, on application from the licensee, specified otherwise. The first phase of the network was to be completed in September 2006, the second phase in December 2007, and the third phase in September 2009.

The beginning of construction was delayed by seven months, because the Government's decision to grant Digita Oy the licence was appealed to the Supreme Administrative Court, which overturned the appeal in February 2006.

Digita Oy submitted an application to specify the construction requirement in more detail to the Ministry of Transport and Communications. The application contained an updated network construction plan, according to which the first phase was to be completed in April 2007, the second phase in June 2008, and the third phase in December 2009.

After the matter had been discussed by the ministerial working group on communications policy, the Ministry of Transport and Communications altered the terms of the licence granted to Digita Oy according to the company's application. It was taken into consideration in deliberating this change to the licence that the licensee's potential for engaging in the operations covered by the licence had changed substantially because construction had been delayed.

The Government also granted a licence for a UMTS data transfer network on September 29, 2005. This licence enables the provision of regional data services nationwide.

6.3 Broadband in schools and libraries

The Ministry of Education has been granting subsidies for equipment purchase and networking projects at educational institutions since 1996. The overall goal is to have all schools and libraries connected to the Internet. The use of information networks in the scientific community has enjoyed public support over an even longer period, since 1984. Under the Information Society Programme for Education, Training and Research (2004-2006), there was a separate appropriation in the central government budget for supporting computer and network systems in educational institutions and related support services. This appropriation is also available in 2007.

Between 2000 and 2005, computer and networks systems in schools and educational institutions has developed as follows:
- more workstations for use in studies
- continuously improving telecommunications connections at educational institutions
- Internet connections increasingly common in workstations and classrooms
- TV/video equipment increasingly available in classrooms
- technical support in educational institutions remains low apart from universities
- provision of pedagogical support for ICT use has not been equitable.

According to information supplied by educational institutions themselves, the coverage of fixed external connections in comprehensive schools rose from 54% to 90% between 2000 and 2005, and in upper secondary schools from 97% to 100% in the same period.

In a survey conducted in 2005, educational institutions were for the first time asked what the speeds of their external network connections were. According to responses received, 51% of comprehensive schools, and 37% of upper secondary schools and vocational education institutions, had connection speeds of less than 8 Mbit/s; 20% of comprehensive schools did not know what their connection speed was.

The availability of network connections at educational institutions and their speeds have improved remarkably in the 2000s, but at the end of 2006 it was still the case that about half of all educational institutions had connection speeds of less than 8 Mbit/s, and about one in five fell below 2 Mbit/s.

Between 2004 and 2006, the Ministry of Education had a special appropriation available for improving telecommunications connections at general educational institutions. Grants from this appropriation were available to cover 50% of accepted costs, or 70% in the case of municipalities in serious financial difficulties. Applications for grants were to be submitted in January each year. Because not enough applications were received with regard to the appropriation available, a second round of applications was organized in the autumn. There were great differences between municipalities in the sums applied for. It was evident that many municipalities had difficulty raising the matched funding required. The Ministry of Education considered that network connection speeds were still not sufficiently high in any group of educational institutions in 2006, and that grants for supporting the improvement of connections should continue to be provided.

The Ministry of Education also ran a project to increase broadband connections in libraries, the goal being to ensure that all libraries have access to efficient telecommunications connections at reasonable connection charges and user charges. In 2004, the customer terminal working group under the Government Information Society Programme surveyed the number of customer terminals and telecommunications connections in libraries, among other places. The report showed that only about one half of all libraries have attained the goal of 1 customer terminal per 1,000 inhabitants, the recommendation being 1-2 customer terminals per 1,000 inhabitants. Evaluations of the basic services of State Provincial Offices included a survey of the number and quality of customer terminals and telecommunications connections at public libraries.

In 2005, EUR 460,000 was used to support procurement of High-speed telecommunications connections and up-to-date customer terminals for mobile libraries, libraries in small municipalities, rural areas and sparsely populated areas, and Citizens' Service Offices; the comparable figure in 2006 was EUR 500,000. Regional cooperation and cooperation with other administrative branches and Citizens' Services was also supported.

The Ministry of Education allocated an appropriation for discretionary distribution by heads of Departments of Education and Cultural Affairs at State Provincial Offices. This proved to be a good practical solution, as the municipalities applied for twice the amount of the appropriation available.

The project got off to a good start with regard to its goals and the evaluations and reports supporting those goals. Nevertheless, the goals were not quite attained. The appropriation for customer terminals and telecommunications connections in libraries, proposed by the ministerial working group, has not been realized (as at autumn 2006).

The projects demonstrated that libraries are excellent locations for customer terminals. In most rural municipalities, libraries are the only places where citizens can conduct public administration e-transactions. E-transactions conducted through or with the help of libraries can draw on the core competence of libraries: the acquisition of information needed for e-transactions.

The Ministry of Education considers that continuing support for the purchase of up-to-date computer and mobile telecommunications equipment for libraries and mobile libraries is necessary. Also, library personnel is seen to have an increasing need for continuing education in

network services so that they are able to advise the increasing number of users. This training need was seen as a continuous need.

6.4 Telecommunications connections in health care

To survey the availability of telecommunications connections required by the health care sector and hospitals, the Ministry of Transport and Communications prepared a report on broadband connections in hospitals with special reference to the transfer of digital X-rays. The aim of this project was to establish availability of broadband services to hospitals particularly considering imaging (the processing of digital X-rays). Archiving and remote viewing of digital X-rays is the most bandwidth-intensive telecommunications application used in hospitals. There are 21 hospital districts in Finland. For this report, imaging telecommunications experts (heads of information management, computer managers or imaging professionals) were interviewed in all hospital districts to chart the needs and availability of telecommunications connections for imaging within the hospital districts, within municipal health centres, and in cooperation between health centres.

The interviews showed that the current situation in the availability of telecommunications or connections posed no obstacle to the introduction of imaging in the various hospital districts. Connection costs were not a particularly great hindrance either. Competitive tendering had succeeded in achieving a reasonable price level.

The conclusions of the report were that the availability of telecommunications services was not an obstacle to the introduction of imaging services. These services were also seen as being linked to the more extensive introduction of electronic patient data systems and further to the reorganization of basic medical care and specialist medical care. The report noted that the bandwidth requirement for imaging services depends on how they are implemented. It was also noted that more attention should be paid to the reliability of telecommunications connections, connection backups and alternative connection arrangements.

7 International influence

Finland has continued to pursue a frequency policy in accordance with the policies of the Government and of Parliament, particularly in the EU. Finland's aim has been to prevent legal obstacles or tax-like charges from being imposed on the provision or use of telecommunications services. Finland also supports the introduction of open standards in international cooperation. Finland has a pioneering role in the promotion of information security in Europe and has actively monitored activities in competing countries in the area of broadband while participating in the exchange of best practices.

The Radio Spectrum Policy Group (RSPG) is intended to prepare an opinion to the Commission of the European Communities regarding the transition to digital TV and the reselling of radio frequency user rights. A sub-working group was formed on September 19, 2003 for the purpose of drafting this opinion. The remit of the working group noted that the opinion should focus on potential needs for cooperation and coordination.

The working group draft turned out to be moderate in its wording, and ultimately contained no points that Finland was unable to accept. The opinion notes that trading in frequencies may be useful in certain frequency bands, as long as sufficient attention is paid to preventing adverse effects. Member States can decide for themselves whether to accept frequency trading or not, and if they do, how and when to do it. There is currently no need for European-level harmonization or peremptory instructions. However, some kind of shared approach is necessary, and such an approach can be outlined by promoting discussion and exchanging experiences. Advance control of individual cases must be a requirement for changing user rights. Frequency trading involves considerable risks in the case of certain frequency bands, such as those used by the defence forces or the public authorities.

The Ministry of Transport and Communications has continued to maintain close relations with the governments of Japan and South Korea, among others, for instance in the form of communications policy cooperation agreements.

The National Information Security Advisory Board appointed an international cooperation project working group to discuss international cooperation in the sector. The purpose of the project was to improve cooperation between Finns in international forums in the area of information security, and to establish which information security actors are active in which forums.

The working group commissioned a survey of current international cooperation and interaction in the area of information security and of the cooperation needs of persons participating in international information security cooperation. The survey further covered the structure and coverage of the existing cooperation network, the roles of various parties in international cooperation, the views of information security actors on the need for exercising influence internationally, and experiences of international cooperation. The survey also explored problems and challenges in this cooperation.

The working group organized an international cooperation seminar, intended to give people who represent Finland at international forums the opportunity to discuss the current situation in international cooperation. This exchange of thoughts was conducive to establishing networking between these people and further enabling discussion about how international cooperation could be developed.

Also in this project, a comparative study was conducted on international information security legislation.

The European Network and Information Security Agency (ENISA) opened in 2005. The Ministry of Transport and Communications has participated in its work for instance by publicizing current affairs and by submitting information to the Agency on a variety of surveys. The chairman of the board of the Agency is Finnish.

Finland has also participated actively in the shaping of the European Information Security Strategy.

8 Strategy monitoring

The National Broadband Strategy monitoring group was set up in December 2003. The group reported regularly to the Government on the implementation of the Strategy. During its term, the group produced three interim reports and the present final report.

In 2004, the Ministry of Transport and Communications set up an online information point on broadband matters (www.laajakaistainfo.fi). This website was updated by posting the interim reports of the strategy working group (1, 2 and 3), fresh statistics, studies and investigations, and the strategies of the Regional Councils. The website is a key portal for interested persons and for parties involved in the strategy process. During the term of the working group, the website has registered about 50,000 hits. Queries and feedback concerning the website and the Strategy itself have also been received.

FICORA and Statistics Finland have both developed broadband statistics and regional monitoring of supply. As the broadband market grows, regular monitoring of market developments and the reliability of collected data are important considerations. FICORA has been collecting data on broadband connections for years, and continues to publish them on its website.

The coverage and reliability of broadband statistics was improved by circulating a new questionnaire, the questions on which were formulated in cooperation with telecom operators and Statistics Finland. FICORA also set up a market information working group, which brought interest groups together twice a year to discuss the collecting of information on the communications market. Improving broadband statistics was an important issue for the working group.

The broadband questionnaire is circulated four times a year. New questions include the number of VoIP connections delivered by telecom operators to households and business clients. Also, since the beginning of 2006 businesses have been invited to estimate how large a percentage of the broadband connections they supply have a connection speed of 2 Mbit/s or more.

Since June 2006, FICORA has been publishing its broadband statistics as part of its quarterly market review, which features the key indicators charting the development of the communications market. The review covers developments in broadband, mobile and fixed-network connections and shows market shares by operator group for connections. The percentage of broadband connections with a connection speed of 2 Mbit/s or more is also given.

In addition to these national statistics on broadband connections, FICORA has been monitoring the retail prices of broadband connections, updating the comparison about once every three months. The price data are gathered directly from the websites of the telecom operators. Because there are regional differences in pricing, the broadband connection price comparison includes information on the geographical area in which any given price was valid during the comparison period.

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FICORA

APPENDIX I IMPLEMENTING REGIONAL STRATEGIES

For this final report, the broadband working group asked the Regional Councils to submit a short description of the implementation of each of the regional broadband strategies between 2004 and 2006. The summaries prepared by the Regional Councils are given below in their Finnish alphabetical order.

Regional Council of South Karelia

The aims of the South Karelia regional broadband strategy were:

1. To give all residents of the region, including holiday residents, equal opportunity for connecting to an ADSL-standard broadband network
2. To enable the use of regional information networks and the Internet for both households and SMEs
3. To enable telecommuting and e-transactions in villages in the region
4. To involve all municipalities in the region in a joint project
5. To make use of the regional information society services developed in the *Tietomaakunta Sähköiset tietoverkkopalvelut* [Information region, Electronic information network services] project and now maintained and developed by Tietomaakunta eKarjala Oy as regional services in village broadband networks
6. To make use of the eKarjala NettiPointti network and the Nettibussi for information network service training for households and SMEs and to expand the NettiPointti network with Internet café service points. A separate joint project is to be launched for setting up Internet cafés.

Over 98% of the people in South Karelia have access to broadband

By March 2005, all telephone exchanges in South Karelia were ADSL-compatible. In the case of 84 exchanges in sparsely populated areas, this upgrade was carried out by Tietomaakunta eKarjala Oy under the South Karelia village broadband project (ERDF funding). This would not have been commercially viable because of the small population and long distances in the sparsely populated areas.

After the ADSL upgrade, about 98% of the permanent residents of the region have access to broadband; the remaining 2% equals some 1,200 households. Moreover, the majority of the more than 21,000 leisure residences in the region do not have access to ADSL broadband connections, because they have no fixed phone line.

For the 2% non-coverage area, solutions were sought in wireless connections, among others. In spring 2006, Tietomaakunta eKarjala Oy conducted a tendering process for building a wireless WiMAX network in the non-coverage area. During autumn 2006, six WiMAX base stations were built in the northern areas of South Karelia – Suomenniemi, Parikkala, Rautjärvi and Ruokolahti. This gave the majority of the earlier non-coverage area and a large proportion of the region's leisure residences access to wireless broadband connections.

1.3% of the population still without access to broadband

In the southern parts of the region – in Savitaipale, Luumäki, Lemi, Taipalsaari, Ylämaa and also in Lappeenranta and Joutseno – there are some two dozen villages where broadband connections cannot be provided because of the long distances involved.

It was estimated in November 2006 that some 1.3% of households in South Karelia (about 800 households) do not have access to a broadband connection. There are also at least 14,000 leisure dwellings in these areas that likewise do not have access to broadband.

Rapid Internet connections in urban areas

In addition to cable modem and ADSL connections, the urban areas of South Karelia also have wireless network access through the Sainet network.

Number of broadband connections and use of online services

The number of broadband connections in South Karelia is just above the national average (50% of households in Finland have a broadband connection). In sparsely populated rural areas where the population is ageing, South Karelia leads the field in Finland in broadband use: in the South Karelia village broadband project, more than 40% of households in the villages involved subscribed to broadband, and in the most active villages more than 65% of households have a broadband connection.

The competence of residents in using online services was improved through 225 training sessions organized in 2004-2006; 420 students participated in these. The training will be continued in 2007 (ICT-Center broadband training and introduction project).

Online competence is also being promoted through the NettiPointti network. In autumn 2006, there were 50 NettiPointti network service points, where residents of South Karelia could use the Internet for free. These service points are located in public areas such as youth centres, veterans' centres, cafés, village centres and tourist information centres. The NettiPointti network is maintained by Tietomaakunta eKarjala Oy.

High-speed telecommunications connections for all residents is the goal for the future

The focus on information network development in the near future is the development of wireless network connections. Wireless networks should be extended to cover the entire region, which would enable the provision of high-speed connections for all residents of the region, including residents of sparsely populated areas, entrepreneurs and holiday residents.

The short-term goal is to provide all households in South Karelia access to a broadband connection. The most cost-effective and easiest way to enable fast Internet connections in current non-coverage areas (approx. 800 households and a large portion of all holiday residents) is the Digita @450 broadband network. Tietomaakunta eKarjala Oy is promoting rapid construction of this network together with the municipalities in the area and the Regional Council.

Developments in other wireless technologies (e.g. WiMAX) should also be monitored. In the long term, the aim is to extend optic fibre cable connections to as large a part of the region as possible and to guarantee all residents equal access to fast Internet connections. Updated telecommunications connections are a crucial factor in maintaining the viability of the region.

Further information: www.ekarjala.fi and www.ekarjalaoy.com

Regional Council of Etelä-Pohjanmaa

The Regional Council of Etelä-Pohjanmaa approved the regional broadband strategy of Etelä-Pohjanmaa at its meeting on September 13, 2004.

The Regional Council noted that the strategy is based on the regional network principle. The regional broadband network is to consist of various modules that must be flexibly interconnectable. Some of these may be connections and combinations provided by traditional telecom operators, while others may be sub-regional networks administered by sub-regions, and yet others may be access networks for villages or town districts.

Different functional and technical designs may be applicable to different parts of the region.

The strategy calls for connection speeds conforming to that required in the Etelä-Pohjanmaa Regional Strategic Programme 2003-2006, at least 5 Mbit/s. This will help improve regional content production, the attractiveness of the region and external competitiveness while boosting information society development and international interaction. The Open Access principle will help the availability of high-quality services in the regional networks.

The aim of the strategy is to create an efficient telecommunications network of sufficiently high quality throughout the region.

Principal measures

Sub-regional trunk networks managed by sub-regions have been built in the Kuusiokunnat sub-region (Alavus, Lehtimäki, Kuortane, Soini, Töysä and Ähtäri) and the Suupohja sub-region (Isojoki, Jurva, Karijoki, Kauhajoki and Teuva). An optic fibre cable pair has been leased for intermunicipal communications in the Järviseutu sub-region (Alajärvi, Evijärvi, Kortesjärvi, Lappajärvi and Vimpeli).

Sub-regional networks operate on the Open Access principle, which enables independent networking by villages and offers potential for local content production.

One municipality has signed an agreement with a commercial operator to improve broadband access.

Inter-regional cooperation has been entered into with the regions of Ostrobothnia and Central Ostrobothnia, for example in the Regional digital online services project.

Commercial operators have sought to increase connection speeds, and there are a number of Fibre to the Home (FTTH) pilot projects in progress.

Under the regional broadband strategy, EUR 1.094 million in public funding has been used for trunk network construction and operator agreements between 2004 and 2006, inclusive of EU, government and municipal funding, and EUR 2.6 million in matched funding from the municipalities.

Results

Commercial operators provide relatively good coverage in the region apart from marginal areas. More than 42,000 households in the region (54%) subscribed to a broadband connection provided by a telecom operator (January 2006). Of these, 30% have a connection speed of 2 Mbit/s or more.

The number of subscribers in local and regional network cooperatives (the Kuuskaista, Valokaista and Hakukaista cooperatives) totals about 1,300. The cooperatives offer optic fibre connections (FTTH) with connection speeds between 10 Mbit/s and 100 Mbit/s. These networks also enable VoIP telephony.

Further action required

Linking the telecommunications networks in the region is a necessary further measure. This would enable the emergence of a new kind of content production based on moving images and would also attract new services and service providers.

Linking regional networks across regional boundaries to other regional networks planned or already in operation is also seen as necessary.

It is hoped that private service providers would get involved in Open Access networks. This would reduce overlapping investments, boost competition and enhance online services even in sparsely populated areas. The sensible use, sufficiency and reliability of network capacity would also be ensured.

Linked networks would make it possible to enhance the operations of local authorities and other bodies through joint applications and joint services. Also, high-speed connections offer the potential for completely new e-services.

The National Broadband Strategy and the regional broadband strategies should be updated to conform to the goals of the Government Information Society Strategy 2007-2015 for example with regard to connection speeds. The goal in the Government Information Society Strategy is 100 Mbit/s, whereas in the Etelä-Pohjanmaa Regional Strategic Programme it is 40 Mbit/s. Also, a plan of action under the Government Information Society Strategy should be drawn up for the regions.

Regional Council of Southern Savo

Defining the area covered by public support in the regional broadband strategy and calls for tender

In Southern Savo, broadband services are being implemented in three phases: firstly, a broadband project implemented in four municipalities (Juva, Puumala, Rantasalmi, Sulkava) partly with EU funding (wireless network); secondly, a municipal broadband project implemented by the municipality of Joroinen (existing fixed network); and thirdly, the currently ongoing joint broadband project involving the remaining 15 municipalities in the region, coordinated by the Regional Council.

In both the strategy and in the calls for tender, the area covered by public support is defined as the rural areas of the region (village areas outside urban and community centres). This area has a population of about 51,000 (about 30% of the entire population of the region). The call for tender also highlighted the importance of holiday residents in the regions (there are about 45,000 holiday dwellings).

How the competition works

The call for tender was carried out in two phases. In the first round, the aim was simply to survey which parties might be interested in building a broadband network in 15 municipalities in Southern Savo. This phase yielded no additional information. Two acceptable tenders were received. To manage and evaluate the tendering proper, the Regional Council engaged an independent expert who drafted the call for tender and worked out the point scores awarded to tenders together with the steering group set up for this project.

The operator was selected on the basis of the point score. An important point was the requirement for public funding in the project implementation; another one was the solution presented, taking into account the needs of both permanent and holiday residents in the long term. The tender selected involved a wireless network concept offered by local telephone operators. The requirement for public funding was 30% of the overall costs (EUR 1.7 million), and the plan specified a 96% broadband coverage of both permanent and holiday residents. In the competing offer, the requirement for public funding was about 70% of the overall costs (EUR 1.8 million), and the coverage specified was 96% of the permanent residents.

No appeals were lodged against the decision taken by the Regional Council, and the project was implemented so that the broadband network was in place in summer 2006.

The project was completed by July 30, 2006, on schedule and on budget and having attained its goals. Continuation of the project, i.e. complementing the network, is yet to be discussed with the operators. The local authorities and the region have the potential for increasing the coverage even further, with a maximum public funding requirement of EUR 154,000.

Funding

The first project involving four municipalities was funded with the municipalities contributing 50% of the public funding requirement (EUR 210,000) and 50% being received in EU funding through the Regional Council (EUR 210,000). No regional development funds were used.

In the project involving 15 municipalities and managed by the Regional Council, the total public funding requirement for network construction is EUR 560,000, which is divided equally between EU funding and municipal matched funding. No regional development funds were used in this project either.

The table below lists the costs of the three broadband projects: that involving the municipalities of the Juva sub-region (RaJuPuSu), the preparation and tendering process of the second broadband project and its implementation.

Southern Savo broadband project funding breakdown by contributor and by decisions made in the region each year

	2004	2005	2006	Total
EU	210,000	127,924	191,877	529,801
Central government	38,500	-	-	38,500
Local government	226,500	129,924	191,877	546,301
Total public funding	475,000	255,848	383,754	1,114,602
Private funding	420,000	424,152	636,246	1,480,398
Total	875,000	680,000	1,020,000	2,595,000

Public funding accounts for EUR 1,114,602, or 43%, of the overall costs of preparation and construction in Southern Savo.

Increase in the number of broadband connections (estimate)

When the broadband projects began, it was estimated that about 30% of the permanent residences in the region, and all of the holiday residences, would not have access to broadband.

The solutions now implemented will result in practically 100% coverage in Southern Savo.

No estimate has yet been made regarding non-coverage areas. The largest project has only just been launched, and new technology is being introduced, so there are no estimates yet. The feeling is, however, that there will be very few blind areas: non-coverage is estimated at a maximum of 2%, and this will be decreased even further.

Projects implemented to provide broadband access

RaJuPuSu municipalities broadband project 2003-2004
Public funding EUR 420,000, equally divided between EU funding and matched funding from the municipalities.

Project preparing for provision of broadband connections in sparsely populated areas
Implementation of call for tender and selection process.

Costs EUR 55,000, of which municipalities paid EUR 16,500 and EUR 38,500 was taken out of regional development funds.

Building broadband connections in the region (15 municipalities)
Contains not only the building work itself but also project coordination and possibly some marginal training costs. Public funding EUR 639,622, of which the building (operators) accounts for EUR 560,000. Public funding is equally divided between EU funding received through the Regional Council and matched funding from the municipalities.

Regional Council of Häme

Implementing the National Broadband Strategy in the region of Kanta-Häme

1. First phase: investigating access

The development of telecommunications connections and services in Häme is divided into three main phases. First, the Regional Council of Häme investigated broadband access in the region. According to the report, broadband access was already very high in 2004, 99%. Non-coverage involved mainly residences which had 'over-long' wire connections. The largest such area was found in Loppi, where substantial improvement was achieved in 2006 when the hubs were updated with ADSL technology. This measure was funded by the municipality of Loppi and by regional development funds allocated to the project by the Regional Council of Häme. The project was put to competitive tender and was eventually implemented by TeliaSonera Finland Oyj. The overall costs were about EUR 65,000, of which regional development funds covered one half. The project was completed in autumn 2006, and as a result access to broadband connections in the region is now as good as it can possibly get using conventional copper-wire technology.

Access to broadband connections (September 2004 – December 2004)
Investigation of broadband access in Kanta-Häme, Regional Council of Häme, report December 13, 2004 (updated January 2006).
Result: Broadband access and coverage in the region
Telecom operators involved: Elisa Oyj /Riihimäen Puhelin Oy, Forssan Seudun Puhelin Oy, Hämeen Puhelin Oy, TeliaSonera Finland Oyj

Broadband connection access was considered high but broadband usage low, and as a result development efforts were aimed at content issues, service availability and how users can hook up to service networks.

2. Second phase: development

The second phase was further divided into two parts.

A preliminary investigation of what would be the most feasible way of implementing and developing telecommunications connections and provision of e-services in the region. Such developments have largely been sub-regional in Kanta-Häme so far, the sub-regional networks offering users joint access to services. Integration of the sub-regional networks and joint production of services between sub-regions were seen as essential development points in

the improvement of regional telecommunications connections and services. Another important goal identified was to improve the potential of the local authorities for acquiring and introducing economic and efficient connections and services.

Preliminary investigation (December 2004 – April 2005)

A preliminary investigation of what would be the most feasible way of implementing and developing telecommunications connections and provision of e-services in the region. Integrating sub-regional networks into a regional Häme Network and using sub-regional interfaces as user interfaces were the principal proposals resulting from this investigation.

Result: Guidelines and proposals for launching the necessary measures to improve telecommunications connections and e-services in the region.

Report: *Nopeiden tietoliikenneyhteyksien ja sähköisten serviceiden tuottamisen edistäminen Kanta-Hämeessä* [Promoting the production of High-speed telecommunications connections and e-services in Kanta-Häme]

Actors: Hämeen tietotekniikkakeskus Oy, RHL-Data Oy, Forssan seudun puhelin Oy, Regional Council of Häme

Funding: EUR 13,000 total, of which EUR 9,100 regional development funds and EUR 3,900 matched funding from municipalities.

Implementation plan (September 2005 – April 2006)

In the second phase, the model outlined in the preliminary investigation of a joint sub-regional multi-service network based on user-specific routing was developed: a cooperation concept intended to integrate the sub-regional networks into a single Häme Network.

Based on the preliminary investigation, an implementation plan for regional High-speed telecommunications connections was prepared. The aim was to produce a model and proposals for putting the functions outlined in the preliminary investigation into practice, such as the Häme Network and the sub-regional multi-service network.

Actors: Hämeen tietotekniikkakeskus Oy, RHL-Data Oy, Regional Council of Häme, sub-regions.

Funding: Slightly under EUR 44,000 total, of which about EUR 31,000 in regional development funds, EUR 6,600 contributed by sub-regional development centres, and EUR 6,500 as the calculated value of work contributed by RHL-Data and HTK combined.

3. Third phase: Creating the Häme Network and consolidating operations

The municipalities in the region were in favour of putting the outlined Häme Network into practice, and a project to this end was launched in October 2006.

Creating the Häme Network and consolidating operations

On October 23, 2006, the Managing Board of the Regional Council of Häme granted EUR 150,000 out of regional development funds for the creating of the Häme Network and the consolidating of its operations. The total costs of this project, which will last about two years, are EUR 300,000. Half of this will be covered with regional development funds, and the rest of the costs will be met by the municipalities. The project is being run by Seutukeskus Oy Häme, a development company owned by the municipalities.

Regional Council of Itä-Uusimaa

The regional broadband strategy is the region's shared view of how broadband telecommunications should be developed within the region. The preparation of the regional broadband strategy and its implementation was managed by an 'information region' working group with Visiopaja Oy as expert consultants.

In part, the regional broadband strategy was based on the earlier information region strategy, whose vision includes this point: "Itä-Uusimaa has a high-quality living environment, offering its residents, businesses and organizations a modern telecommunications infrastructure."

At the starting point, there were similar problems with access and lack of competition as in other regions in Finland. The archipelago area of the region is particularly challenging in terms of telecommunications technology.

The goals were grouped into immediate goals (to be achieved by the end of 2005) and development goals (to be achieved by the end of 2010). A considerable number of the goals involving broadband access was left for the municipalities to specify further for themselves.

Immediate goals (to be achieved by the end of 2005):
- achieving comprehensive coverage in broadband service access
- defining the local government service information network
- describing the current range of content services available.

The comprehensive coverage goal involves all households, businesses and municipal offices having access to broadband with connection speeds initially of at least 1 Mbit/s / 512 kbit/s.

Development goals (to be achieved by the end of 2010):
- attaining a new level in broadband technology
- introducing the local government service information network
- increasing online content services

The new broadband technology should have connection speeds of at least 2 Mbit/s for basis applications and should be available to all households, businesses and municipal offices by the end of 2010.

The development of e-transactions was added to the plan of action of the information region working group for 2006.

Principal measures

The plan of action in the regional broadband strategy consisted of nine measures. Immediate measures: surveying demand in areas with no access; promoting construction of broadband services; investments in broadband services; drawing up specifications for a service information network; and preparing a report on the supply of content services. Development measures: promoting and using new broadband technologies; monitoring of and publicity on broadband services; creating a service information network; and joint technical implementation of content services in local government.

Revisions to the National Broadband Strategy and essential changes to legislation, etc., affecting broadband services have been taken into account in the course of the work.

The broadband service supply situation was investigated through operator interviews and plotted on a geographical map. The number of inhabitants outside the area of coverage was estimated separately in each municipality (total: about 1,400). Developments in supply and prices were monitored over the entire reporting period.

The demand for broadband was eventually surveyed at the municipality level. Surveys were conducted in Lapinjärvi and Ruotsinpyhtää. Investments were made at the municipal level in increasing broadband services, particularly in Lapinjärvi: this involved building a municipal trunk network, which in turn led a telecom operator to offer ADSL connections (Lindkoski, Kimonkylä). The municipality of Myrskylä subsidized telecom operator ADSL investments in its area, following earlier similar funding decisions by Askola, Pukkila and Pernaja. The information region working group provided telecom operators with information on the needs of areas outside the area of coverage.

The service information network was defined at a general level. Its purpose is to link the offices of the municipal sector. The definition does not specify telecommunications technology solutions; the connections can be implemented with a variety of technologies and using the services of different telecom operators as necessary. The definition included a description of the current information network situation and trends in municipalities and intermunicipal authorities (network applications, servers, network connections). Cooperation through information networks in the Lahti area and in the Mikkeli/Pieksämäki area was studied (guest speakers). A plan for geographic information cooperation was drawn up, a pilot project for its implementation (geographic information distribution service for end users, GIS portal / map service) was drafted, and an expert group was set up to carry the matter forward.

A briefing and seminar on e-transactions was organized for local government actors in October 2006. A questionnaire was circulated to the municipalities concerning their current situation and development needs in e-transactions.

It was decided to move the investigation of online content supply from the broadband development project to the regional portal project.

Results

The availability of basic broadband connections has improved in the region, thanks both to spontaneous investments by telecom operators and to municipal efforts. There is no precise

estimate of the number of households without broadband access, but the percentage of non-coverage is now only a fraction of what it used to be. The geographically largest non-coverage areas are in the archipelago, particularly in Ruotsinpyhtää. ADSL technology has developed so that a connection can now extend to properties further away from a hub, which improves coverage. The first phase of the 450 network being built by Digita will cover the entire region; this network will probably go live during 2007. There is as yet no information on what service products it will offer or what their prices will be.

The range of broadband technologies has expanded, though ADSL remains the single most important broadband technology. Not all households yet have access to the kind of basic broadband connections specified in the development goals (2 Mbit/s / 2 Mbit/s by 2010).

Linking municipal offices using a uniformly defined set of practices, also known as the service information network, has not yet been achieved. This project is running concurrently with the regional phase of the municipal and service structure reform and the preparation of the framework Act, and there has been no attempt at achieving significant policy decisions in telecommunications schemes in the meantime. However, cooperation drawing on telecommunications connections between municipalities has increased in individual projects.

Notes on required further action

Achieving a new level of broadband technology: New technologies and related service products are often introduced to the regions in phases – how to ensure that Itä-Uusimaa will be among the first regions? What is a sufficient transmission capacity? The development of the supply and demand of broadband services must continue to be monitored.

Introducing the local government service information network: In the investigations on cooperation between urban areas being prepared under the framework Act on municipal and service structures, the potential of information networks should be noted, as they support the production of local services regardless of administrative structures.

Increasing online content services: Development of e-transactions must continue. The plan for a geographic information portal is a good example of a public e-service that impacts individual citizens.

Joint Authority of Kainuu Region

Background

In spring 2004, the Joint Authority of Kainuu Region launched the preparation of a regional broadband strategy through the eKainuu project, which it was managing. The joint regional working group responsible for outlining the Kainuu Objective 1 programme and for allocating funding required more detailed reports on the need for broadband connections and the current availability situation as background information for seeking public funding.

The Joint Authority of Kainuu Region received funding for conducting individual studies in summer 2004 through the 'Innovative action in eastern Finland' programme. This study project resulted in reports produced by the Kajaani University Consortium on the current state of

broadband supply and possible schemes, and by the Kainuun Nuotta association on the demand for broadband outside municipal centres. The producers of both reports were selected through competitive tendering.

Next, the strategy itself was written up on the basis of the reports. This was the first phase of the Kainuu broadband strategy. The strategy document was approved by the Regional Board on December 1, 2004. (See the Kainuu broadband strategy at www.kainuu.fi)

Goals of the strategy

The working group preparing the Kainuu broadband strategy began with the assumption that it should be possible to offer people living in sparsely populated areas a broadband solution in such a way as not to discriminate by geographical location. The reports showed that in autumn 2004, 80% of households had no broadband access. The broadband coverage goal in the strategy was set at 100% of all households and businesses in the region, and as many of the holiday residences in the region as possible.

The connection speed goal was set at 2 Mbit/s immediately, with an upgradeable solution envisaged so that by the end of 2008 all customers regardless of where they live have the opportunity to increase their connection speed to 8 Mbit/s.

Implementing the strategy

There were now decisions taken by the Regional Board and the joint working group in favour of extending broadband coverage to sparsely populated areas in the region. The documents for the call for tenders were prepared during spring 2005, and at the same time preliminary negotiations were conducted on the potential for funding from the municipalities and the Joint Authority of Kainuu Region, and on whether telecom operators were interested in offering solutions.

The competitive tendering for the broadband solution was launched in summer 2005, and the call for tenders was publicly announced for May 23 to July 29, 2005. Particular attention was paid in the call for tenders to the instructions of the Ministry of the Interior regarding the construction of broadband networks on public funding and on the open interface recommendations of the Ministry of Transport and Communications.

After the deadline for submitting tenders had expired, the working group preparing the tender processed the tenders received (2), performed a comparison and submitted a proposal to the Regional Board. All documentation related to the call for tenders and the tenders themselves were available to all members of the Regional Board before the decision was made. This documentation has been published at www.kainuu.fi apart from the actual tenders, which were classified as confidential by the parties submitting them.

At its meeting on September 12, 2005, the Regional Board selected the tender of Kajaanin Puhelinosuuskunta [a telephone service cooperative] and approved the broadband implementation project for sparsely populated areas in Kainuu, where the matched public funding was to be released to the network builder as the project progressed. The agreement on the construction of the network between the Joint Authority of Kainuu Region and Kajaanin Puhelinosuuskunta was signed on December 8, 2005.

The accepted total network construction costs are EUR 896,647, of which EUR 269,994 (30%) is covered by public funding. Half of this (15% of the total) comes from the ERDF (Kainuu Objective 1 funding) and the other half (15% of the total) from the municipalities' contributions through the Joint Authority of Kainuu Region. The builder, Kajaanin Puhelinosuuskunta, pays for 70% of the project costs.

Attaining the goals of the strategy

A tender conforming to the goals of the Kainuu broadband strategy having been received, implementation of the project was begun, and construction was nearing completion in late 2006. The network is being built using wireless technology on the WiMAX standard (802.16d), which has proved to be the appropriate choice for sparsely populated areas in Kainuu. In addition to providing good coverage, this technology allows significantly higher connection speeds than, for example, the national @450 network which is to be completed in the near future.

End user prices compare well with other broadband solutions (e.g. xDSL), while the terminal devices are more expensive. The telecom operator is subsidizing the prices of terminal devices to lower the threshold for subscribing to a broadband connection.

The 100% coverage goal was met with the coverage calculations in the scheme and the telecom operator's promise to deliver a broadband connection to any location where even one household is willing to sign a subscription agreement. At the end of 2006, the coverage of households and businesses was probably 98% to 99%.

Construction did not proceed without problems, and the connections have proved to be not entirely reliable. Initially, obtaining frequency licences from FICORA threatened to become a bottleneck, but fortunately the matter was resolved quickly and did not substantially delay the construction schedule. A greater problem is that in some locations (in both households and businesses) the connections have proven to be of poor quality or non-existent. Geographical obstacles and to some extent weather conditions have in some cases disrupted the network signal.

These obvious problems will be addressed by the telecom operator on a case-by-case basis with the aim of finding the appropriate solution for each case by building more WiMAX coverage, using the @450 network or employing a satellite link. Once these issues have been settled, 100% broadband coverage can be claimed.

Required further action

Ensuring the functioning of the network is the main priority in 2007 in all cases where connections have been found to be of poor quality. Using the WiMAX network as a WLAN in certain locations in sparsely populated areas, integration of the solutions in the WiMAX mobile standard (802.16e) and increasing connection speeds to at least 8 Mbit/s as necessary are measures which can be taken in the near future and which will be addressed in talks with the telecom operators.

The amalgamation and interoperability of networks and various technologies (xDSL, cable modem, optic fibre, wireless solutions) is an area where many challenges and application opportunities will continue to arise in the near future.

Regional Council of Central Ostrobothnia

Central Ostrobothnia broadband strategy vision 2010

"Central Ostrobothnia is the leading region in Finland in the availability of real broadband connections. Village networks have been built on the principles of 'fibre to the home' and 'Open Access'. Broadband connections have been available to all residents of Central Ostrobothnia since 2006. The service level of sub-regional networks, the services operating in them and information safety are available to everyone."

Central Ostrobothnia broadband strategy goals
- Real broadband connection in every household – Open Access
- A broadband connection in every household by the end of 2006
- Balanced regional development
- Improved availability of municipal services
- Improved availability of health care services, medical care and social welfare services online through online access

Measures implemented in Central Ostrobothnia in 2004-2006

Telecom operators in the Kokkola sub-region have added DSLAM hubs to all their telephone exchanges. Also, Kokkolan Puhelin is building optic fibre networks in all new residential areas, which eliminates the need for installing DSLAM hubs.

In municipalities in the sub-region of Kaustinen where there were areas without DSLAM hubs, choices were made between FTTH applications and ADSL connections. Eight villages opted for a village network (covering a total of about 200 households) built with optic fibre cables partly on public funding. In other villages without broadband access, TeliaSonera ADSL connections were built with support from public funding.

Projects implementing the Central Ostrobothnia broadband strategy in 2004-2006

Project	Budget EUR	Public funding %
Kyläkaista	66,650	100
Severi	31,500	100
Giga	218,000	100
Multicast	48,662	100
Multicast investment	172,883	100
Multicast II	110,038	100
Multicast continuation	41,800	100
Kokkola village network preliminary study	40,631	100
Kaustinen village networks	792,934	71
TOTAL	**1,523,098**	**1,356,778**

The trunk networks in the Kokkola and Kaustinen sub-regional networks were upgraded to 1 Gbit/s Ethernet in the Multicast project (Kaustinen) and the Giga project (Kokkola).

The Kokkola village network preliminary study and the Severi project were about surveying the willingness and potential of villages in the Kokkola sub-region for building Open Access FTTH networks.

Results

In Central Ostrobothnia, nearly 100% of households have access to 512 kbit/s broadband connections; only a few remote properties are excluded. Several project plans were drawn up and several projects conducted in order to reach the primary goal, bringing real broadband connections to all households. As required in the strategy, residents of the region can now be considered to have equal access to existing network services.

Municipal and regional online services have been developed in the sub-regions under the leadership of RegiOnline and KaseNet. Integration of IT systems has been launched, and concrete proposals for removing the most obvious overlaps and inefficiencies are at the decision-making stage. In the *Verkko ja media* (Network and media) preliminary study project, regional actors discussed future online services and how to implement them.

There are some technical issues in integrating the online services of the health care and social welfare sectors, but the legal issues involved are much more difficult to resolve.

So far, true interactive duplex public online services have not been produced or introduced apart from isolated experiments. Technical problems and problems of use have hindered service development. There is little supply, but very little demand too: citizens do not know what kind of public services could be made available online.

Further action

With the introduction of new online services, the need for real broadband connections will grow. The concept of a Central Ostrobothnian regional network based on real broadband and the benefits it would bring is being marketed within the region to businesses, local authorities and private citizens. At the same time, resources must be allocated to the development and marketing of regional online services. New business models must be developed in accordance with the Open Access principles.

Regional Council of Central Finland

Background and goals

The short-term goal was to provide all households and businesses in Central Finland with equal access to e-services by the end of 2006. The long-term goal is to make Central Finland a leading actor in the use of e-services and converging telecommunications networks by the end of 2010.

As a rule, support for broadband in sparsely populated areas is granted through the European Agricultural Guidance and Guarantee Fund: through the Objective 1 programme in the Saari-

järvi and Viitasaari sub-regions and through ALMA funding in the rest of Central Finland. The funding needs entered in the strategy document were about EUR 2.2 million in the ALMA area and EUR 1.3 million in the Objective 1 area.

Work on the broadband strategy was organized by the Regional Council of Central Finland, and it formed part of the regional ICT strategy. The strategy was drawn up by an expert group chosen from the steering group appointed by the Regional Board and an external consultant. The strategy was prepared in August and September in 2004, and the Regional Board approved it at its meeting on October 20, 2004.

Measures implemented in 2004-2006

Responsibilities in the process were shared, with the Regional Council conducting the tendering on behalf of the municipalities, which then each made their own decisions independently. This arrangement was because organizing competitive tendering successfully called for expertise, and the Regional Council was employing an ICT expert at the time.

The Rural Department of the Central Finland Employment and Economic Development Centre funded a total of 14 broadband projects with ALMA funding and one project with Objective 1 funding for the northern part of Central Finland. ALMA funding totalled EUR 1.69 million, and Objective 1 funding totalled EUR 0.89 million. These included matched funding from the EU and the Finnish Government totalling EUR 1.68 million, municipal funding totalling EUR 0.26 million, and private funding (telecom operators) totalling EUR 0.65 million. The projects covered the entire region comprehensively.

Results

The following is a list of the broadband projects funded by the Rural Department of the Employment and Economic Development Centre and the number of households provided with broadband access in the project.

Sparsely populated area broadband project in Toivakka, households: 270
Hankasalmi broadband project, households: 800
Joutsa broadband, households: 333
Jämsä sparsely populated area broadband project, households: 1000
Konnevesi broadband project, households: 170
Broadband project Laukaa, households: 190
Broadband connections Humalamäki, households: 58
Broadband connection construction in Korpilahti, households: 76
Broadband connection construction in Äänekoski, households: 500
Leivonmäki broadband project, households: 95
Luhanka broadband project, households: 30
Multipoint – Wireless broadband pilot project Multia-Petäjävesi, households: 150
Sumiainen broadband project, households: 267
Uurainen broadband, households: 218

Total households covered by projects in the ALMA area: 4,157.

Results for the Objective 1 programme in northern Central Finland (the number of households covered) are not available but can be obtained directly from the funding provider, i.e. the Central Finland Employment and Economic Development Centre.

Notes on required further action

Even after the broadband investments made, the potential of the information society is not yet available to all. However, new broadband technologies are likely to bring a solution. In any case, connecting individual households kilometres away from the trunk network will be very expensive. Piloting very fast broadband connections in certain rural areas, municipalities or villages would yield empirical data on the local mechanisms of the information society and how they impact jobs, the business structure and expertise requirements.

The potential for joining regional broadband networks into supra-regional networks must be investigated.

Public content production online is a significant factor affecting the effectiveness of broadband efforts. Commercial services reach households easily, but public online services (including customer-oriented innovative services; customer service and appointment booking in the social welfare and health care sectors; new potential in web-based learning and online teaching; comprehensive availability of municipal services; etc.) are still largely undeveloped.

Regional Council of Kymenlaakso

Information society vision

Bring access to information society services to as wide an area as possible. Promote a wider range of e-services between businesses and customers. When successfully carried out, the broadband strategy will enable business development.

The best approach to building the connections required in the broadband strategy is a combination of copper cable (ADSL), radio link (WLAN, WiMAX) and optic fibre. Different needs dictate how connections need to be built. However, the best option for allowing for future growth potential is optic fibre.

More important than the technology used is the question of customer connection administration. Both Open Access networks and commercial networks must function independently of service operators.

Description of goals

The goal was set of bringing broadband access to 95% of the households in Kymenlaakso that have a telephone, using the fixed telephone network, by the end of 2005; for the remaining households, broadband access would be built using wireless technology. Local activities have emerged and networked. E-transactions have increased, and online services have improved.

Existing ADSL and other connections are fixed-line telephone modem connections, and development is continuing. The need for data transfer will increase dramatically (voice service,

videoconferencing, videophone, digital content such as Internet TV, films, music, entertainment). The various network technologies (optic fibre, fixed copper cable network, wireless technologies) complement one another.

An open information network independent of service operators will guarantee a diverse range of competition-based services and content.

Principal measures

The first measure was to extend broadband access to those villages in sparsely populated areas where building such access would not be commercially viable. This meant granting public funding to the building of broadband access in these areas. In northern Kymenlaakso, broadband connections were built with the aid of funding from the regional rural area programme (ALMA). In the sparsely populated areas, archipelago and small communities of southern Kymenlaakso it would also not be commercially viable to build broadband access. For these areas, a study on the building of broadband connections with the aid of public funding, as in northern Kymenlaakso, was conducted with support from the Objective 2 programme.

Public funding was also allocated to purchases and training. There is an active project named *eLiiketoiminta Kymenlaaksossa* [eBusiness in Kymenlaakso] whose purpose is to enhance the competitiveness of SMEs in the region by improving their competence in eBusiness. The project promotes the subscription by SMEs to broadband connections by offering a 80% subsidy to cover the costs of subscription, and a 50% subsidy to cover the costs of training and consultation involved in the use or introduction of the connection. The Open Office training project in the Kotka-Hamina area supported all training involving office and production IT in SMEs by offering a 50% subsidy. The project collected information on the needs of businesses and organized the training requested. Training involved issues such as managing telecommunications connections, information security and Internet applications. The project concluded at the end of 2006. Broadband connections were marketed in connection with sub-regional projects.

Results

The number of Internet and broadband connections grew rapidly in 2004 and 2005. The most important contributing factors were active campaigning by telecom operators, reductions in prices and publicity on the projects in northern and southern Kymenlaakso (village briefings and bulletins). The Statistics Finland consumer barometer shows that currently 44% of all households in Kymenlaakso have a broadband connection (2004: 34%). 60% of all households in Kymenlaakso have an Internet connection.

Northern Kymenlaakso had comprehensive ADSL coverage. In sparsely populated areas, broadband connections were built with the aid of ALMA funding. The number of subscribers in subsidized locations was between 10 and 15, and the subsidy amounted to about EUR 160 per subscriber. Because TeliaSonera Finland Oy was able to extend the maximum length of an ADSL connection cable to 6.5 km, only about 2% of the households in the area have no broadband access.

In southern Kymenlaakso, 96% of the population live in areas where telephone companies offer broadband services. According to a preliminary study conducted in 2005, there were plans to implement broadband access in telephone exchanges that did not yet have broadband

capacity. Public actors have not progressed in this, because the Ministry froze all funding for these projects after having agreed with Digita Oyj on the building of a nationwide wireless broadband network.

The range of services available has also increased, and a service company catering to rural areas in particular was founded in northern Kymenlaakso.

Required further action

Overlong connections and the archipelago are still problems in Kymenlaakso. In northern Kymenlaakso, the isolated areas that still do not have coverage will be pinpointed. In the archipelago in southern Kymenlaakso, a partial WiMAX network has been introduced, and several new WiMAX base stations will be built during 2007. The Digita @450 network will also go live in spring 2007, and at that point the whole of the southernmost part of Kymenlaakso will have wireless broadband access. The nationwide @450 network will be completed in 2009.

The availability of WLAN connections even in cheaper phones will increase rapidly in the near future as services become more common. The information society trend is towards fast, immediate services and solutions. The telecommunications infrastructure will be used more efficiently than now. Networking between actors will become more common. Sustainable development models will generate new operating environments relying strongly on information services.

Applications will include commercial WLAN service areas (e.g. in municipal centres), open urban networks, Campus WLAN, and traffic node services. Network access may be allowed to predetermined user groups such as the students and staff at a school, or a service can be freely available to anyone who is interested.

Future efforts will include supporting the proliferation of mobile broadband services and the evaluation and implementation of technologies, systems and business models with a view to enable the entry of innovative mobile services into the market and their spreading in Kymenlaakso.

Regional Council of Lapland

Broadband strategy – goals and their attainment

The Lapland broadband strategy was completed in September 2004. The access goal in the strategy was 90% to 95% coverage by the end of 2005 in regional projects, the remaining 5% to 10% coverage being provided through central government measures.

The capacity goal set was 512 kbit/s duplex scalable connections, with no upper limit.

The strategy is technology-neutral and is based on open competition: both telecom operators and the technologies used were to be selected through competitive tendering.

The broadband strategy has not been updated since 2004. However, work on the new Lapland information society strategy 2007-2010 is currently in progress, with further goals being set for the development of broadband connections in Lapland. According to the new goals (which at the time of this writing have not yet been officially approved), broadband coverage will be increased to 99% of all households in Lapland by the end of 2010, and ubiquitous telecommunications connections will be provide in the region using 450 MHz technology, 3G technology and wireless Open Access networks (corresponding to 'city networks'). Means for introducing a new generation of basic broadband technology and for increasing capacity will also be devised. This may lead to replacing ADSL technology with something else or updating it to a new generation of the same technology. At the moment, the maximum broadband capacity in Lapland outside urban centres is 4 Mbit/s, which falls short of the goals of the National Broadband Strategy.

By the end of 2006, the goals of the strategy drawn up in 2004 had been attained and greatly exceeded. Whereas the strategy specified building broadband access to a coverage of 90% to 95% of households in Lapland through regional measures, the actual coverage at the end of 2006 was 97%-98%. The remaining 2%-3% coverage would have been covered by central government measures under the strategy, but so far this has not happened. The Digita 450 MHz network will not extend to these non-coverage areas either, at least not initially. There are still farms, reindeer farms and tourist businesses in these areas. It is difficult to find a suitable technology for providing these with broadband access, since the 450 MHz network has quite a limited capacity, ADSL is very expensive in such areas and also limited in capacity, and WiMAX is not available because the telecom operators offering WiMAX connections do not have a trunk network in these areas. The only existing trunk network is operated by TeliaSonera, which does not itself support WiMAX connections, and it would not make sense for competing operators to build WiMAX connections on network capacity leased from a competitor.

Principal measures

In autumn 2004, the Regional Council of Lapland prepared the Lapland broadband strategy and launched a Europe-wide call for tenders for the construction of broadband connections in the whole of Lapland apart from the smallest villages in December 2004. The tenders were received in February 2005.

Only one tender, submitted by TeliaSonera, covered the whole of Lapland. One tender was received from Telepohja Oy for a number of villages in three municipalities, and one further cooperative-based tender was received but subsequently rejected. The TeliaSonera tender was based on ADSL technology, and the Telepohja Oy tender on WiMAX. The TeliaSonera tender was awarded the contract for the whole of Lapland except for the municipality of Tervola. In May 2005, Osuuskunta Laaka Innovaatio, the cooperative rejected from the tendering process, initiated a complicated cycle of appeals regarding the tendering process; as a result, the entire Lapland broadband project was tied up in various courts of law until August 2006, when the Supreme Administrative Court finally overturned the remaining appeals, some appeals having already been overturned in lower courts.

Because of the appeals process, the building of broadband in Lapland was delayed from May 2005 to January 2006, and construction had not even begun by the end of 2005, when the connections should already have been up and running according to the original strategy. The

project will probably be completed by the end of 2006. There will probably also be some additional construction, since the Rural Department of the Lapland Employment and Economic Development Centre is prepared to support construction in individual villages with funding from the current programme period. Construction was further delayed between May and October by delayed Nokia deliveries from India.

Results

By the end of 2006, broadband coverage in Lapland households was 97%-98%, achieved through regional projects. This exceeded the original goals.

Required further action

The construction schedule for the 450 MHz network beyond the coverage area that is to go live on April 1, 2007 should be brought forward in Lapland, because some villages are continuously excluded from construction. There are farms, reindeer farms and tourist businesses in these areas that are in sore need of broadband connections. Private citizens are also very angry that access is not yet being provided.

The coverage of the 3G network should also be extended to match the GSM network in Lapland. In turn, the coverage of the GSM network should be extended, since there are considerable tracts of Lapland where mobile phones do not work at all. Tourist businesses in particular complain about their customers not being able to use their phones in Lapland. There are significant dead zones in Enontekiö, Utsjoki and Inari, including for instance the whole of the Lemmenjoki area, which attracts thousands of tourists every year. Moreover, in building new base stations the coverage of digital TV should also be extended, since with the digital switchover in autumn 2007 there will be some households in Lapland that will not be able to watch TV at all. It is conceivable that the digital TV, 450 MHz, GSM and 3G networks in these areas could be built around shared base stations. In October and November 2006, the Regional Council of Lapland circulated a questionnaire on telecommunications and media connections to citizens all around Lapland; 634 persons responded, representing all municipalities in the region. Those who did not have the connections addressed in the questionnaire explained that the main reason was that broadband, digital TV and/or mobile phones are not usable where they live. A detailed study of dead zones should be conducted, and a plan drawn up for building access in such areas.

Provision should also be made in Lapland for increasing capacity in basic broadband connections and possibly for changing to a new technology. This requires changes in the legislation regarding the trunk network or in its ownership, since a single private network that has an effective monopoly is an obvious anomaly regarding the further development of broadband connections in Lapland and the increasing of connection speeds to more than 4 Mbit/s or, in some places, to more than 256-512 kbit/s. An independent investigator should be engaged for this purpose, or an investigation should be conducted on central government funds. The Regional Council of Lapland has conducted an international survey in Finland, Sweden, Iceland and Scotland on funding from the EU Northern Periphery Programme and is offering to conduct the study proposed above as an independent investigator on separate central government funding in 2007-2008. This study should be urgently pursued, since extra user charges have already been proposed for the provision of broadband connections to municipalities and residents in those areas of Lapland that still do not have broadband coverage, since at current

standard rates it is not commercially viable for the telecom operator to build access to remote villages with small numbers of subscribers. Once public control of the existing connections ends within five years as per EU regulations, Lapland will be in a very vulnerable state. A long-term operating model with shared responsibility must be in place well beforehand, and work on that model must start immediately.

In addition to the above, central government should draw up terms and procedures for providing broadband connections to those households that fall beyond all public construction projects because of the unreasonably high price of a household connection in their circumstances. Such cases emerge for instance in areas with ADSL technology when a household is more than 6 km away from an ADSL hub, or when the building does not have a copper-cable phone line and is more than 200 m away from an ADSL hub. With WiMAX and 450 MHz networks, broadband access is effectively prevented by uneven terrain or the signal inhibition that is in place along the national border; these require users to undertake special measures to gain broadband access, and thus to incur unreasonable costs. Such costs should be met by the government, since the Regional Council and particularly the municipalities in Lapland have already made considerable investments in broadband access, and the general terms of EU funding do not allow the payment of broadband subsidies directly to households. Creating the procedures outlined here is necessary to ensure the equitable treatment of the population in rural areas.

Council of Tampere Region

The Board of the Council of Tampere Region approved the Pirkanmaa [Tampere Region] broadband strategy on January 24, 2005. The strategy described the current access situation and estimated needs for investment for each municipality. The total investment need was estimated at EUR 1.2 million. At that time, 95.4% of residential buildings and 97.8% of the population had broadband access, with 4,300 buildings and 10,600 residents excluded. The coverage varied between 43% and 100%, depending on the municipality.

The main goals of the Tampere Region broadband strategy are:
- 256 kbit/s basic speed for all within a reasonable time
- connection speed needs increase as content develops, fuelled by market demand
- always use efficient technology, take a technology-neutral approach and use competition to ensure affordable connection prices
- regional competitiveness, regional equality
- areas outside conurbations
- business environment, living environment, citizens' needs
- telecommunications connections / information society functions
- first comprehensive coverage, then higher speeds

The implementation of the Tampere Region broadband strategy is based on:
- market-driven implementation – public funding need determined separately for each municipality
- an oligopoly in competition must not prevent attainment of efficiency goals or increase construction costs

- a case-by-case approach based on individual agreements between a telecom operator and a local authority or an actor designated by same, the timetable depending on how the municipalities and other funding providers can allocate funding to the project.

The municipalities have undertaken measures to implement the strategy. They have estimated shortcomings in commercial services on offer, addressed the issue of the coverage goal and the construction timetable in their respective areas. Projects are run on a case-by-case approach based on individual agreements between a telecom operator and a local authority or an actor designated by same, the timetable depending on how the municipality and other funding providers can allocate funding to the project. The Council of Tampere Region has assisted in identifying sources of public funding and the timetables related to their use, but the Council has not engaged in competitive tendering.

Free regional development funds have not been available for investments. The Ylä-Pirkanmaa and Etelä-Pirkanmaa parts of the region are covered by the Western Finland Objective 2 programme, where no funds have been available for building broadband connections. Some municipalities have used subsidies from the Ministry of Education to build broadband connections to schools.

At the end of 2006, fewer than 5,000 residents are estimated not to have broadband access in the Tampere Region. About EUR 300,000 has so far been granted from public funds for network investments (and investigations related thereto).

Principal measures in 2004-2006 and funding used by area

Principal measures have involved investments in building connections supported from public funds. In Etelä-Pirkanmaa, Kaakkois-Pirkanmaa and Ylä-Pirkanmaa, public investment has totalled EUR 262,000. In Etelä-Pirkanmaa, about 99.7% of all residents who have access to a fixed telephone network also have ADSL access. Projects extended coverage to some 1,500 residential buildings and 3,800 residents, at a cost of some EUR 200,000 in public funding. In Pälkäne in Kaakkois-Pirkanmaa, connections were built to two schools on joint funding from the National Board of Education and the municipality totalling about EUR 22,000. In Kaakkois-Pirkanmaa, a broadband situation and needs analysis was conducted at a cost of EUR 36,500, covered from public funds.

In Ylä-Pirkanmaa, there was a project partly funded from Objective 2 funding which is considered to have increased demand for broadband connections, even though no direct networks investments were made under the project apart from a broadband WiMAX pilot in Vilppula. In the course of the project, broadband coverage in the sub-region has risen from 75% to 95% of all households. Total funding for the project was EUR 277,000.

In Lounais-Pirkanmaa and Luoteis-Pirkanmaa, no publicly funded projects are known.

The Ministry of Transport and Communications has approved the construction timetable for the 450 MHz digital mobile communications network. In the Tampere Region, the first phase of construction will include the centre of Tampere, the south-eastern and southern parts of the region and portions of the north-eastern and western parts of the region. @450 broadband will go live on April 1, 2007.

Observations and notes for further action

Despite the fact that there are several telecom operators active in the Tampere Region, the situation in the region is an oligopoly and in certain locations even a monopoly. In sparsely populated areas in particular, the predominant operator has a de facto monopoly, as there is not enough demand to motivate a genuine market. In competitive tendering, it is always the predominant operator that submits a tender. Before a broad-based effort to implement the broadband strategy, a telecom operator required a subscriber base of about 15 to motivate installation of a broadband hub. In the course of implementing the strategy, it was found that in some cases the number of subscribers might exceed this minimum many times over, yet the operator still did not consider it enough to be commercially viable. This is partly a result of the fact that public funding for building connections has been made available.

The situation is particularly unfair for those areas that do not have access to funding for instance from ESF programmes. National regional development funds cannot be used for investments, and their level is so low that they would not be sufficient for investments anyway. Local authorities come under a lot of pressure from the citizens in their municipalities, and the challenge is all the greater if the goal is to multiply broadband connection capacity and raise it to the level specified in the National Broadband Strategy in the near future. The need for investments will increase sharply if new technologies, e.g. wireless networks, do not yield solutions.

In the future, players in the field should be kept up to date on the potential of digital TV.

Regional Council of Ostrobothnia

In 2001, the Regional Council of Ostrobothnia launched the IT-Pohjanmaa [IT-Ostrobothnia] project to promote IT infrastructure on a variety of levels. The results of this project were channelled into the regional broadband strategy which was approved by the Board of the Regional Council on December 12, 2005.

The broadband strategy vision is formulated in terms of what an Ostrobothnian home will be like in 2010 and is based on "a fixed network that is always online and that has a symmetrical capacity of between 100 Mbit/s and 1 Gb/s". The strategy assumes that more than 90% had access to ADSL in 2005 and that this would not require further action. Thus, the goals were set as follows:

A. Telecommunications infrastructure: An advanced, dynamic, competition-neutral network mainly built in optic fibre, covering all municipalities in the region and evolving gradually – through municipal networks – into a complete FTTH or comparable network.

B. Promoting service production: Developing existing content services, creating new ones, and promoting a wide range of services both public and commercial so that services can be offered locally, nationally and internationally.

The IT-Pohjanmaa project has also contributed to enhancing the Ostrobothnia e-service portal (http://www.osterbotten.fi). The purpose of this portal is to bring together services available in the region and display it in a one-stop shop.

Principal measures

The regional broadband strategy is being used as a basis for further work at the Regional Council of Ostrobothnia. The strategy has been implemented in 2006 in talks with and seminars organized for the local authorities. These have focused on the environment for a network linking all the municipalities in the region.

Putting this network into practice is continuing at the local, regional, supra-regional and international level. The IT-Pohjanmaa project offers its expertise in network development to individual municipalities. The Regional Council of Ostrobothnia is participating with the Regional Councils of Etelä-Pohjanmaa and Central Ostrobothnia in the *Digitaaliset verkkopalvelut* [Digital online services] project, intended to generate proposals on how the competition-neutral networks to be built in various parts of the participating regions could be integrated, and to provide examples of content solutions for certain public services that could be offered online. In international cooperation, the focus has been on Västerbotten in Sweden, and on Helgeland in Norway, through the IT3 joint project. The purpose of the this project is to create a digital bridge between the three countries.

Service production has been promoted through project-based piloting. The Regional Council, the local authorities, educational institutions at various levels, the third sector and businesses have all been involved. Business development has been pursued through the Business Department of the Employment and Economic Development Centre and its ICTnet.fi programme, which was set up to support content innovations with commercial potential. The operators active in the region are updating their networks and their range of services as necessary.

Results

In November 2006, the Regional Council of Ostrobothnia sent its municipality a questionnaire regarding their interest in participating in the building of a uniform telecommunications network linking the municipalities of the region. The municipalities were asked to indicate whether they are interested in joining a procurement organization whose job it would be to propose how to implement the procurement and/or competitive tendering.

At a lower level, individual municipalities and cities – Maalahti and Närpiö, and to some extent Vaasa and Laihia – have built networks linking public institutions. In Närpiö, the network is a competition-neutral fibre optic network to which households can connect directly or over a wireless connection. In Maalahti, Malax Broadband and DynamoNet have established a joint practice as a result of which they lease transmission capacity together at the node in Vaasa. Kristiinankaupunki is running a project to design a comprehensive open fibre optic network named *Kuitua kodista* [Fibre from the home] and known by the acronym POMO+. Both Pedersöre and Kristiinankaupunki have received funds from the Ministry of Education to link their schools to the fibre optic network.

Some 30 villages have submitted a proposal for designing village-based fibre optic networks. This proposal focuses mainly on the coastal area of Suupohja, but there are also individual village plans in Maalahti, Mustasaari and Kruunupyy. Some villages already have fibre optic networks in place. Telecom operators build the fibre optic networks up to buildings as they update their cable TV networks or build infrastructure in new residential areas.

In promoting service production, certain projects have produced results:

Virtuaaliset Areenat Närpiö [Närpiö virtual arenas]: Testing of videoconferencing, video-phones, IP telephony and IP TV, among other things.

Digitaaliset verkkopalvelut [Digital online services]: A joint project of the Regional Councils of Ostrobothnia, Etelä-Pohjanmaa and Central Ostrobothnia to develop private and public online services.

Ostrobothnia e-service portal: A platform for public and private services in the region.

Open IT-Lab Vaasa: Open source code solutions in the private and public sectors.

I-Health Botnia: Electronic patient records.

Telelääketiedettä Merenkurkun yli [Telemedicine across the Quark]: Cooperation in jaw surgery.

Required further action

The regional broadband strategy constitutes the basis for further work. Measures required to take the strategy forward involve infrastructure, promotion of service production, continued strategic planning and cooperation at the inter-regional, national and international levels.

Telecommunications infrastructure

The responses to the questionnaire referred to above concerning a network to link all the municipalities in the region will be discussed at the regional level in 2007, and the drafting of ground rules for building a fibre optic network on the FTTH principle will be continued.

Promoting service production

At the regional level, efforts are being pursued to publicize network products and online services (e.g. shared IP-TV systems) and to find actors capable of further developing these products and services and bring such actors together. In the future, the e-service portal will be developed in content to make it a tool and a platform for cooperation between various actors in the region. Project-specific investments to boost and improve content production are going on. Linking R&D to businesses and to society is particularly important.

Regional ICT programme

Putting the regional broadband strategy into practice requires coordination of regional efforts, and addressing this over a broad range calls for an ICT programme. The regional programme

applies the ideas presented in the Government Information Society Strategy 2007-2015 (published as a policy programme in September 2006). The ICT programme analyses the broadband strategy into more concrete groups of measures and proposes a division of duties between funding providers and actors.

Networking beyond the region

Coordination of the competition-neutral networks to be built in various parts of the regions of Ostrobothnia, Etelä-Pohjanmaa and Central Ostrobothnia must continue. At the national level, it is important to participate in and influence programmes devised to support the information society. It is highly relevant to continue expanding cooperation with Sweden and above all with Norway too, across the Quark. International cooperation is becoming increasingly important for the purpose of bringing new ideas and new information into the region. The focus here is on bringing together actors in different countries to create stable partner networks.

Regional Council of North Karelia

On the basis of the broadband study commissioned by the Regional Council of North Karelia and approved by the Regional Board, entitled *Nopeat tietoliikenneyhteydet kylille ja haja-asutusalueille* [High-speed telecommunications connections for villages and sparsely populated areas], the Regional Board decided on March 15, 2004: 1) to support with campaigns the spreading of market-driven broadband; 2) to prepare to provide public funding to help villages build broadband access; 3) to have municipalities prioritize and select the villages to be included; and 4) to ensure that broadband projects implemented with public funding are based on open and technology-neutral competitive tendering.

An allocation of EUR 714,000 was reserved on the basis of the broadband study. In this study, villages had been classified in terms of implementation as 'easy', 'moderately difficult', 'difficult' or 'no hub'. The public funding provided was intended to help bring broadband access to the villages classified as 'easy' and to some classified as 'moderately difficult'. The 'difficult' and 'no hub' villages were excluded from the funding for the time being, since it was considered that building broadband access would be too expensive there.

The competitive tendering was prepared and launched in autumn 2004, with municipalities prioritizing the villages where broadband access was to be built. A joint briefing for telecom operators was organized in connection with the tendering for operators to ask questions. The tender approval process was managed and the decisions taken by the municipalities independently in early 2005. Most of them selected Savonlinnan Puhelin Oy with wireless WDSL / WiMAX technology; this scheme looked promising with its synergy benefits and a regional structure over municipal borders. Public funding would enable broadband access to be built even in areas where villages had been classified as 'no hub'. TeliaSonera Finland Oyj took the purchase decisions made by the municipalities to the Market Court (except in the case of the two municipalities that had selected TeliaSonera Finland Oyj). Having received legal advice, the municipalities reversed their decisions, and the Market Court case was dismissed when TeliaSonera Finland Oyj withdrew its complaint. The municipalities agreed among themselves that in the future they would manage competitive tendering independently. Some local authorities threw in the towel, disgusted with the bickering of telecom operators, and even gave up the public funding that had already been granted.

Some of the municipalities in North Karelia has subsequently conducted a new tendering process for broadband connections, and with one exception the result was exactly the same as the first time: the majority selected wireless WDSL / WiMAX technology provided by Savonlinnan Puhelin Oy. Lieksa opted for wireless technology provided by Kajaanin Puhelinosuuskunta.

In November 2006, it looked like about EUR 582,721 of the funding allocated to broadband construction would actually be used. Some of the municipalities that had given up the funding have become interested again and may yet apply for the funding. It may even happen that the public funding will remain under the 50% maximum for the remaining municipalities, meaning that the allocation will be used up completely after all.

According to the preliminary study (2004), broadband coverage reached 74% of households. Thanks partly to market activities and partly to public funding, broadband promotion and measures decided on by local authorities, this coverage has gone up to about 94%. What this means is that since 2004, 33,720 people have been provided broadband access in North Karelia. The public funding contribution thus amounts to about EUR 17.3 per resident (the total being EUR 582,721). If the municipalities that are still hesitating decide to go ahead with broadband funding, it is possible (depending on the villages and the technology involved) that broadband coverage will increase to 97% by the end of 2007. The total public funding provided would then be EUR 651,150 (assuming no extra funding is granted), and a further 5,058 residents would be provided with access, so the public funding contribution would be EUR 16.8 per resident overall.

However, local authorities are contemplating none but the most minimal further action. The municipalities of North Karelia are financially in dire straits, and some face mergers. They are not very likely to invest in building broadband connections in sparsely populated areas. Thus, for residents of those areas the only option is to wait for what relief the Digita @450 network can provide. Indeed, the Ministry of Transport and Communications should now make every effort to attract (or even coerce) a telecom operator to become a service operator in the Digita @450 network. The Ministry should also ensure that there will be a service operator providing a nationwide service. This would enable people who travel a lot within Finland to subscribe to an @450 connection and have broadband available everywhere in the country. Service operators in separate regions are hardly likely to agree on roaming arrangements for people travelling around Finland. If nationwide coverage were achieved, the @450 network could redeem itself in the eyes of the population, even if the speed of the network is not sufficient for providing a modern range of services.

To conclude, it should be noted that the tiny telecom operator Telekarelia Oy in Kontiolahti and Eno has managed to build broadband coverage in its own geographical area commendably, with no public funding at all. Telekarelia has even encroached into traditional TeliaSonera territory where TeliaSonera Finland Oyj had specifically demanded public support. In the view of the present author, the Ministry of Transport and Communications should acknowledge Telekarelia Oy in some modest manner for their selfless efforts in bringing broadband to sparsely populated areas.

Regional Council of Northern Ostrobothnia

On January 24, 2004, the Government made a Resolution on the National Broadband Strategy. This Strategy is an important part of the Government's information society policy, which lays the groundwork for advanced information society services.

Preparation of the regional broadband strategy was begun in spring 2004 as part of the freshly launched Northern Ostrobothnia information society programme. The broadband strategy was drawn up by the Regional Council of Northern Ostrobothnia itself, under the direction of the Northern Ostrobothnia information society programme steering group.

The Regional Board discussed the broadband strategy on two occasions and approved it on October 8, 2004, after which it was put into practice.

Principal goals of the strategy

    A. Creating environments of an international standard
    B. Technology piloting
    C. E-service development and usability
    D. Broadband access for everyone
    E. Reasonable pricing
    F. Recommendations for planning and building

The strategy highlighted six main goals and a preliminary action plan for attaining them. By now, the goals have largely been attained, partly due to measures implemented in the region and partly due to general trends. A regional strategy for e-services was prepared in 2005. However, there are as yet no regional recommendations for planning and building.

Initially, the goal was to ensure broadband access for everyone, so that anyone wishing to subscribe to a broadband connection could do so. In a study conducted under the strategy, it emerged that the majority of the broadband coverage to be built in the region could be implemented on market terms. On the other hand, it became clear that this would not be commercially viable in the sub-regions of Oulunkaari and Koillismaa, and there are practical problems in the sub-region of Siikalatva too. The problems have to do with outdated telecommunications infrastructures; telecom operators have no interest in upgrading these without public support.

Putting the strategy into practice

In preparing the strategy it became clear that region-wide competitive tendering would not be necessary. Thus, responsibility for procurement was delegated to the sub-regions. At the first stage, the Regional Council of Northern Ostrobothnia allocated no funds to the implementation of the broadband strategy; applications for support for broadband projects were processed on a case-by-case basis. In 2005, the 'index funding' of the Objective programmes became available; part of this funding was earmarked for good information society projects.

The Regional Council of Northern Ostrobothnia granted the first broadband strategy funding for a technology study in the sub-regions of Oulunkaari and Koillismaa, covering all the vil-

lages in the municipalities involved to investigate potential subscribers and applicable technologies and to prepare the municipalities' calls for tender.

In autumn 2005, following the technology study, the sub-region of Oulunkaari applied for funding to build connections in villages in the municipalities of Kuivaniemi, Pudasjärvi, Utajärvi, Yli-Ii and Yli-Kiiminki. After the municipalities had invited and received tenders, WiMAX technology was selected for all applications. The telecom operator's basic infrastructure construction was completed in October 2006. Before marketing in municipalities had been launched, there were already about 500 new connections.

The broadband strategy emphasized the importance of alternative technologies, and this was taken into account in the Oulunkaari and Koillismaa technology study and the resulting calls for tender. WiMAX technology, which was eventually selected, is highly cost-efficient to build, even if the terminal device which the end user needs to purchase is fairly pricey.

The sub-region of Koillismaa began preparing its own broadband connections project in spring 2006, applying for funding from the Leader action group. The tenders were processed in autumn 2006, and construction was begun. The technology selected for Taivalkoski and Kuusamo is different from that selected in Oulunkaari. Separate broadband projects have also been implemented in Hailuoto and Kestilä.

Results

The broadband construction projects funded to date have resulted in 1,000 to 1,300 new connections. Publicity on the new access has only just begun, so it is entirely possible that the number of connections will multiply.

The Regional Council of Northern Ostrobothnia has committed a total of EUR 357,000 to the implementation of the Northern Ostrobothnia broadband strategy to date. In addition, the National Board of Education has supported the building of broadband connections to village schools with EUR 274,000. The total costs of the projects supported by the National Board of Education are EUR 415,000 at the time of writing; the final figures are not yet available. As a result of these projects, dozens of households in the proximity of village schools have also gained broadband access.

Regional situation

Broadband coverage in Northern Ostrobothnia is now fairly good. Estimates show that about 97% of the population have broadband access. This is slightly lower than in the rest of the country, since there are many isolated households in the fringe areas of the region where broadband building is technically difficult and expensive. The estimate is that the number of broadband connections in the region is close to or somewhat below the national average.

Notes on further action

The need for building broadband connections will not have been satisfied even when this strategy is fully implemented; continuous investment is needed. It is particularly important to ensure access in those areas where building is not commercially viable.

There will probably be a need for a regional strategy round in the future too, but preparation of the strategy should be covered with an appropriation in the central government budget. In discussing broadband, we should remember that broadband is not an end in itself; it is a tool for providing citizens with connections and for enabling citizens to conduct transactions and use services. Broadband connection operators and service producers should be in closer contact.

Regional Council of Northern Savo

Background

The European Union set the goal of providing all citizens with high-level and affordable computer connections by the end of 2005. In practice, this means an ADSL-standard broadband connection with a minimum connection speed of 256 kbit/s. In spring 2003, the situation in Northern Savo was that commercial operators provided access in cities and central municipal communities, in areas around Kuopio and in some villages in municipalities bordering Kuopio; but in the majority of the municipalities in the region, broadband access did not exist in villages or in sparsely populated areas.

Project description and implementation

The *Laajakaista kaikille Pohjois-Savossa* [Broadband for everyone in Northern Savo] project covers all of the 25 municipalities belonging to the Regional Council of Northern Savo. The first phase of the project involved soliciting for suggestions with announcements in newspapers: in Savon Sanomat on April 24, 2003, in Helsingin Sanomat and Kauppalehti on April 25, 2004, and in the Official Journal of the EU. This announcement requested suggestions for providing broadband access to all residences, businesses and school premises in the rural areas of Northern Savo. These were to be submitted to the Regional Council by June 2, 2003. Five suggestions were received: from Kuopion Puhelin Oyj, Iisalmen Puhelin Oy, Nordic LAN & WAN Communication Oy, TeliaSonera and Song Networks.

A managing group was appointed for the project, with representatives from the sub-regions and the Regional Council of Northern Savo. The managing group was chaired by Executive Director Antti Mykkänen. The managing group sat from March 27, 2003 to December 31, 2003.

Senior teacher Matti Kuosmanen Lic.Sc.(Tech.) was appointed project manager. This was a part-time fixed-term appointment running from June 3 to December 31, 2003. Kuosmanen analysed the suggestions, and a more detailed invitation to tender was sent to the parties that had submitted the best suggestions.

The detailed invitation to tender was sent out on August 14, 2004. Three responses were received by the deadline (October 31, 2004 at 15.00). These responses were from Kuopion Puhelin Oyj, TeliaSonera and Iisalmen Puhelin Oy; the last of these said it did not want to be involved in the project. Matti Kuosmanen prepared a summary of the tenders and engaged in clarifying negotiations with the telecom operators.

At the same time, he negotiated with all municipalities concerning their participation on the implementation and funding of the project.

Kuopion Puhelin Oyj and TeliaSonera were selected as joint implementers of the project, acting in their 'traditional' areas.

Northern Savo model and funding

The municipalities of Northern Savo agreed on the broadband building project separately with the telecom operator. The Regional Council allocated ERDF funding to the municipalities for the project. The municipalities committed the EU funding and their own funding directly to the operator on condition that the operator maintains the network and the connections for a period of at least five years. The requirement for public funding in Northern Savo, calculated on the basis of the operators' tenders, was about EUR 3 million.

Each municipality signed a contract on broadband construction with the selected telecom operator. The technical procedure was for the operator to build an optic fibre or similar connection to each village hub, from which connections to buildings are created through the existing fixed telephone network. The subscriber can choose the connection speed between 256 kbit/s and 2 Mbit/s. The user charge per month is the same as the operator charges in the urban areas of Northern Savo. The completed telecommunications network is owned by the operator.

It was agreed in negotiations with local authorities that they will submit a T1 funding application for their broadband projects to the Regional Council of Northern Savo. The Regional Council made a commitment to grant ERDF funds. By decision of the Regional Management Committee, EUR 1.2 million in ERDF funding was earmarked for this purpose.

The funding structure in municipal sub-projects differed greatly. The total costs of the project came to EUR 3,047,418, of which 38.4% or EUR 1,127,636 was ERDF funding. The rest was covered by the municipalities themselves.

There is a clause in the contract signed by the municipalities and the operators whereby the operator was obliged to refund the contractual payment in proportion to the number of new connections subscribed to during the first year of operation. If this resulted in the ERDF contribution amounting to more than 50% of the overall costs, the municipality had to refund the excess to the Regional Council of Northern Savo. As of now, EUR 120,465 has been received in such refunds.

Construction is now complete, and 95% of the population in sparsely populated areas have broadband access. In practice, this means people who live no more than 6 km away from a hub.

Further action

Because coverage is not 100% of all buildings with the present technology, attention should be focused on developing solutions to bring broadband access to the 'dead zones' too.

Regional Council of Päijät-Häme

The Päijät-Häme broadband strategy was drawn up as part of the National Information Society Programme implementation plan project funded by the municipalities in the region and the Regional Council of Päijät-Häme.

The general observation drawn from the project is that broadband access can be commercially provided almost everywhere in Päijät-Häme and that competition is reasonably functional. Therefore, the focus in Päijät-Häme has been on the development of e-services.

Characteristics of Päijät-Häme

Päijät-Häme is a region consisting of 12 municipalities. It has a population of 200,000, of which 70% live in and around the city of Lahti and 14% (about 27,000 people and some 13,000 households) in sparsely populated areas. Broadband service demand in the sparsely populated areas is affected heavily by the 21,000 holiday residences in Päijät-Häme, of which probably more than 40% are owned by people who live outside the region, mainly in the Helsinki area.

Broadband operators in the region and access to connections

There are three principal telecom operators in Päijät-Häme offering ADSL connections: Päijät-Hämeen Puhelin Oyj (PHP), TeliaSonera Oy and Elisa Oyj, all of which offer connections throughout the entire region. PHP and TeliaSonera have physical subscriber cables of their own, while Elisa (and TeliaSonera too in part) leases capacity in the PHP network for their broadband services. Päijät Visio Oy provides broadband connections with cable modem technology. PHP has, by its own estimate, a 60% market share in broadband, the rest being mainly divided up by TeliaSonera and Elisa.

In November 2006, 99% of the population had broadband access at connection speeds of more than 2 Mbit/s, and more than 90% had broadband access at connection speeds of more than 16 Mbit/s. Broadband coverage has mainly been built commercially except in the municipality of Padasjoki, where TeliaSonera has extended its broadband network in cooperation with the local authority and partly with public funding.

Broadband penetration and connection speeds

Operator questionnaires show that as at November 15, 2006 there were no more than 61,500 broadband subscribers in Päijät-Häme, which factored over the number of households means that about 65% of all households have a broadband connection. Data on connection speeds is only available from one operator, and according to this data some 25% of the connections have connection speeds of more than 2 Mbit/s (compared with about 35% on January 1, 2006). It would seem that broadband subscribers continue to favour slower connections because they are available and because so far there are not many services that actually require a higher speed.

Measures implemented

The only publicly funded broadband connection building project involved extending coverage in the municipality of Padasjoki. The City of Lahti has developed an open and free-of-charge WLAN called MastoNet at its own expense. E-services have been developed in the private sector, but principally in the public sector under the *Langaton Lahti* [Wireless Lahti] development programme run by the Regional Council of Päijät-Häme. The following projects since 2004 have had public funding:

Wireless Wellamo, *Kylä Kännykkään* [Mobile phone village], Obtaining a fishing licence by mobile phone (several tourism mobile service projects)	Completed
Mobile applications in dental care (several pilot projects)	Completed, applications also in use elsewhere in Finland
Time management solutions in day surgery at Päijät-Häme Central Hospital (PHKS)	Completed, applications in use at PHKS
Wireless time management for holiday substitutes in agriculture	Completed
Mobiilimuksu [Mobile kid] (daycare applications, JUPA project)	Completed, application in use
Developing an e-service platform for municipalities	To be completed in 2007, continuation planned
Salama [Lightning] project (PHKS)	Ongoing
Lahden Elli (technology applications in the care of the elderly and dementia patients)	Ongoing
NETRO project, information network procedures in shop routines and marketing in businesses in Lahti city centre	Completed
DigiArt, achieving broadband coverage in the municipality of Artjärvi through marketing measures.	Completed
Päijät-Häme museum network and the Lahti database	To be completed in 2007

In the future, focus will continue to be on the development of e-services, with two main strands emerging: solutions for customer interfaces in the social welfare and health care sectors on the one hand, and developing e-transactions in other public services on the other.

In the social welfare and health care sectors, e-transactions development will be spearheaded by a project which is to be launched by the Päijät-Häme hospital district and will be of national significance.

The municipal e-transactions service platform project which is starting up can be used as a pilot project for e-transactions development in other municipal services. The administration of the Lahti sub-region has set up a sub-regional information management unit, which will be an important help to these efforts. The unit is enhancing municipal cooperation in planning related to telecommunications solutions, networks, computer systems and e-transactions.

Required further action

Although reasonable broadband coverage has been achieved commercially, there is still a need for public funding support for optic fibre and wireless technologies and for village or local network projects to boost service development with ambitious goals. Such projects are already on the drawing board.

New regional network projects are often linked to other new construction projects (roads, civil engineering, water supply, etc.), and therefore it is important to consider the potential for laying optic fibre cables and installing cable ducts whenever excavation work is being done. The building code can help promote optic fibre installations in town planning areas and Ethernet paired cable installations in buildings.

Regional Council of Satakunta

In 2002, the Pori unit of the Turku School of Economics carried out a preliminary investigation project to establish telecom operator plans, technological options and pilot municipalities. A broadband pilot project (training and investment) was carried out in the municipality of Lavia in 2003, and further broadband projects in sparsely populated areas in nine municipalities were carried out in 2004-2005.

The Satakunta Employment and Economic Development Centre contributed about EUR 274,000 in funding to these projects, while municipalities contributed about EUR 274,000 and private funding was about EUR 193,000.

The goal of the project was to provide ADSL access to more than 2,600 households.

After these projects, broadband access in Satakunta in 2006 was almost 100% of households (with the exception of certain households that were more than 6 km away from a telephone exchange). There were about 250,000 households in Satakunta at the time.

Regional Council of Uusimaa

In spring 2004, the Regional Council of Uusimaa and its member municipalities, at the request of the Ministry of Transport and Communications, conducted a survey of broadband availability in the region. On the basis of this survey, the Regional Council prepared a regional development plan. The Regional Management Committee discussed the Uusimaa broadband strategy on October 21, 2004, and the Regional Council approved the Uusimaa information society strategy on November 13, 2004.

The preparation process of the broadband strategy showed that broadband access in Uusimaa was comprehensive but that the background information available was inadequate for drawing up a detailed building plan. A request was made to improve the availability of background information through cooperation between authorities in order to improve the planning for increasing broadband coverage.

The conclusions of the survey were that the focus in the future should be on:

- developing *e-services* in the region
- *enhancing cooperation* between sub-regions in order to improve information management.

Building a wireless broadband network in the Helsinki area was considered important, but it was also considered that this should be undertaken by the private sector.

Physical optic fibre network

Because public funding is not available for building telecommunications connections in Uusimaa, telecom operators have managed the construction and updating of the network. Municipalities have undertaken local optic fibre cable construction on a small scale for their own needs in connection with maintaining their physical infrastructures.

Although there are isolated dead zones (mainly individual buildings) in areas such as the archipelago, no significant new construction needs have been brought up between 2004 and 2006. The assumption is that the @450 will satisfy any remaining needs.

Wireless connections

There has been a clear trend towards wireless connections in the whole region.

There has been public debate on the introduction of a wireless and partly free-of-charge broadband network as a service that a modern national capital should provide. The City of Helsinki is currently providing wireless broadband access in a number of central locations in the city centre.

There is already a large number of WLAN networks owned and operated by private individuals and companies in Helsinki. Because there is no comprehensive citywide network yet, it has been proposed that ground rules for the shared use of WLAN in the Helsinki area be drawn up in such a manner that the resulting network would be free of charge and transparent for the end user. This is currently being investigated in the HOTSPOT II project (Helia University of Applied Sciences).

Sub-regional cooperation

The service production reform highlighted potential for savings in IT costs by enhancing cooperation in a variety of sectors such as financial management, the library service, schools, health care services, and so on. The KuntaIT unit, which is to start in 2007, is expected to provide the standards, guidelines and initiatives required for this.

Results

The Regional Council of Uusimaa has committed no funding to construction of the physical network in Uusimaa. Instead, under the strategy the Regional Council has funded projects to test high-speed connections and to explore potential for cooperation. It is not *capacity* which seems to be the bottleneck currently, and in recent years prices have dropped by half, which has served to keep costs in check too.

The Regional Council has granted regional development funds to the following projects:

Raseborg.fi
Investigating and piloting a local network (100 Mb/s local network).

Hiiden alueen telestrategia
Telecommunications services strategy for the Hiisi area.

HOTSPOT II
Ground rules for shared use of WLAN in the Helsinki area.

Further action

As sub-regional cooperation increases, the need for high-speed local networks (100 Mbit/s) will increase too. As long as there are no vehicles for public funding, the Regional Council cannot support the construction of local networks.

The Regional Council focuses on the region-wide development of e-services and seeks to co-operate with the KuntaIT unit.

Regional Council of South-West Finland

The commercially non-viable areas as referred to in the National Broadband Strategy were determined using certain assumptions, with grid data on the housing structure, since telecom operators refused to disclose hub traffic data for the purposes of determining this area.

- There are about 4,300 households in the area where providing broadband access is not commercially viable. This amounts to 2.1% of all households in the region, and they are located in a geographical area about 1,650 sq.km. in size
- Broadband access in the archipelago requires wireless technologies.
- Holiday residents bring increasing demand for broadband connections in the archipelago. Wireless solutions in the archipelago improve the potential for using holiday residences for telecommuting.

The South-West Finland broadband strategy also outlined measures whereby the region can reach and maintain the top of the league nationally in broadband access and its affordability, in all user groups.

The sub-regions of South-West Finland will build sub-regional public-sector networks, which will then be linked: Saaristoverkko [Archipelago net], Turku Area Net, etc. Another goal is to join networks across regional boundaries. The approach is broad-based cooperation, including telecom operators too. The usability of broadband networks 'everywhere' will be promoted by ensuring that the public sector networks are available as widely as possible.

Principal measures for public sector networks:

Vakka-Suomi:	Network ordered from Vakka-Suomen Puhelin in 2002, 100-10 Mbit/s, 3 years + 1
Turunmaa:	Saaristoverkot Oy, a company founded at the start of 2003 and owned by the Turunmaa sub-region owns an optic fibre trunk network. Verification of the trunk network has been commissioned and will be completed by the end of 2006. A WiMAX network has been built in the archipelago in Iniö, Houtskari, Korppoo (Televuori, Korpoström), Norrskata and Länsi-Nauvo. A transmission mast in Rumarbergen in Korppoo is planned.
	The very few areas on the mainland in South-West Finland without broadband access, and the dead zones in the archipelago, will be covered once the Digita 450 project is completed. http://sgnet.fi/fndex.htm
Salo sub-region:	Network ordered from Auria Oy on January 1, 2006, 1 Gbit/s, 100-10 Mbit/s, contract for 3 years +.
Loimaa sub-region:	Network ordered from Salon Seudun Puhelin, almost completely built although the decision has been appealed, 1 Gbit/s – 100 Mbit/s.
Turku sub-region:	Tendering process ongoing.

Broadband for everyone everywhere

For broadband connections to be universally available, they must be available:
- everywhere: broadband connections to every point and wireless extensions to cover all locations
- to everyone: guest networks available everywhere
- affordably: the network does not need to be free of charge, but affordable enough that people will actually use it

Broadband connections are available almost everywhere in South-West Finland. Ensuring this is the job of the telecom operators.

The guest network implemented through SparkNetin and OpenSpark is now in use in about 20 municipalities, about 200 businesses and about 1,000 households. SparkNet has about 200,000 registered users and more than 2,000 hot spots. SparkNet is the most extensive public wireless network in the Nordic countries by any standards.

SparkNet is affordable to use: members of its founder organizations (University of Turku, Åbo Akademi University, Turku School of Economics, Turku University of Applied Sciences, City of Turku, City of Raision, City of Naantali, City of Kaarina and Municipality of Lieto) can use the network free of charge (the total number of such users is about 50,000). Also, all parties in the information society project (members of OpenSpark) can use the network free of charge. A host can always offer guests access to the network free of charge, and anyone can purchase permanent or temporary user rights to the network.

The volume of use in SparkNet is many times larger than that of any network that is free of charge – it is "better than free". SparkNet has also expanded out of the Turku area and is now available in Rovaniemi and in the sub-regional network of Suupohja. Use of the network is continuing to increase with the provision of VoIP, which makes it possible to make cheap VoIP calls even using a mobile phone.

City-WiMAX

In November 2005, ICT Turku Oy commissioned a WiMAX test network at Turku Science Park, built by Paraisten Puhelin Oy. The purpose was to test the applicability of WiMAX technology to an urban environment, where buildings block signals but also reflect them. Measurements (which included measurements from a moving vehicle) showed that WiMAX is very well suited to an urban environment. In November 2006, Paraisten Puhelin Oy opened a commercial WiMAX network in Turku, with the intention of extending it later to other parts of South-West Finland.

Optic fibre broadband introduced in all construction

The laying of optic fibre cable and the installation of cable ducts will be taken into account every time cabling trenches are dug. The building code will be amended so as to promote optic fibre schemes in town planning areas and Ethernet paired cable designs inside buildings.

Attaining this goal has been patchy. It would require a national campaign with a target group which includes those who plan and implement excavation projects, so that installing cable ducts can be established as a permanent design feature the omitting of which would be an exception that must be specially justified.

APPENDIX II. PROGRESS REPORT ON IMPLEMENTATION 2007

National Broadband Strategy 2004-2007

More competition within and between the different communications networks

The measures outlined will improve the level of service, the geographical availability of broadband, and customer choice. They will also reduce prices and stimulate demand for broadband services. The increase in demand due to the lower prices will allow broadband connections to be offered more widely and to be extended to sparsely populated areas.

Measure	Responsibility	Timetable	Details of progress	Contact person	Completion stage
1. Efficient competition in broadband provision (especially subscriber connections) will be secured when the Communications Market Act is put into effect.	**FICORA,** Office of Free Competition (OFC)	Continuing	Connection charges in Finland remain considerably higher than the EU average, still limiting broadband competition. In 2005 and 2006, FICORA has continued to investigate connection fees and set maximum charges as necessary. In the first half of 2006, FICORA focused on developing the evaluation of non-discrimination in connection fees. Monitoring of the equitability of delivery times in subscriber connections was also continued. FICORA has also begun to update the significant market power (SMP) decisions taken in 2004 concerning subscriber connections and wholesale broadband products so that SMP requirements placed on companies can be revised as necessary according to changes in the competition situation on the broadband market. Cooperation with the OFC has been continued in the interests of increasing competition on the broadband market.	FICORA: Juusela Johanna OFC: Virtanen Martti	2

2. The efficiency of competition in broadband provision will be supervised using the means provided in the competition legislation in cooperation with FICORA.	**OFC**, FICORA	Continuing	The OFC has intervened in the competition problems it has observed in the broadband market. As a consequence of the action taken, local telecommunications operators have significantly reduced the network rental fees charged to service-provider competitors, which has eased market entry for competitors and thus increased competition considerably. The OFC is monitoring the competitive situation in the broadband market and will, if necessary, propose to the market court that it order any business operator who acts contrary to the Act on Competition Restrictions to pay a penalty fee. Over the past few years, the OFC has made one such market court proposal (proposed penalty fee of EUR 1,000,000) and otherwise resolved about 10 broadband market cases. A further 10 or so cases are pending.	OFC: Virtanen Martti, Mattila Timo FICORA: Andersson Martin	2
3. Technical modernization of cable TV networks will be promoted to ensure that broadband provision is technically feasible in all the main cable TV networks by the end of 2004.	**Ministry of Transport and Communications**, FICORA	2004	- Assessment of the need to develop the legislation was begun in March 2004 together with commercial actors. - Progress has been made in broadband provision even without further legislative measures	Ministry of Transport and Communications: Kohtala Antti FICORA: Andersson Martin	3
4. The necessary legislative amendment proposals will be made for promoting competition in Internet connections and broadband provision in cable TV networks on the basis of investigations.	**Ministry of Transport and Communications**	October 30, 2004	- First cable TV network opened to competition. Solution presented to the Communications Committee (COCOM). - No need for legislative amendments. Cannot use legislative measures to demand that networks (non-SMP) open up to competition.	Kohtala Antti	3
5. Telecommunications companies will be brought together to agree a unified code of conduct for encouraging network and service operators to supply broadband facilities and services.	**FICORA**	March 31, 2004	- Operators met at FICORA premises on March 22, 2004, 9.30-12.00. - Further action: working group on broadband connection operator interfaces was set up on May 24, 2004, comprising telecommunications company representatives and under the direction of FICORA.	Andersson Martin	3

Completion stages: 1 = Planning stage, 2 = In progress, 3 = Completed

Speeding up the introduction and spread of new broadband technologies

The measures outlined will encourage the introduction of new technologies on the market. New services will increase the choice available to users and improve the level of service. The measures are intended to increase the provision of broadband services and promote competition, including competition between the different technologies. This will reduce prices, which will, in turn, stimulate demand and thus allow telecommunications companies to expand the commercial supply of broadband services to encompass sparsely populated areas as well. The measures will improve the operating conditions for communications companies and establish the right environment for the development of new communications services that can find success in international markets too.

Measure	Responsibility	Timetable	Details of progress	Contact person	Completion stage
6. The legislative and administrative obstacles impeding the wider adoption of new broadband technologies and services will be investigated.	**Ministry of Transport and Communications**, other ministries	September 30, 2004	The following reports have been produced: a) *Restraints on communications services,* and b) *Fibre to the home.*	Ojala Kari	3
7. The development of new data transmission solutions will be encouraged through public funding for research and development.	**Ministry of Trade and Industry**, TEKES, companies, higher education establishments, research institutions	Continuing	In summer 2005, TEKES launched the 'GIGA – Converging Networks' (2005-2010) telecommunications programme with companies and research institutions. Pursued in collaboration with actors in various fields, the programme focuses on the development of broadband communications technology and related products. Main focus is on connection technologies, broadband networks, system support products, testing and new business models. In 2005-2006, TEKES has provided a total of EUR 21 million in funding for 49 projects in the programme.	Ministry of Trade and Industry: Kuitunen Tero TEKES: Tilli Kari, Markus Kari	2
8. Any necessary amendments to mobile network licences (UMTS) for the purpose of promoting the development of broadband will be made with due consideration to the potential for promoting network provision in sparsely populated areas through joint use of networks.	**Ministry of Transport and Communications**	March 31, 2004	- Operating licences amended on April 15, 2004.	Kohtala Antti	3
9. A decision will be made, based on the recommendations of a working group, on the timetable for discontinuing analogue TV broadcasts, taking into account the effects of transition-period duration on broadcasting costs and the public's view of what is reasonable.	**Ministry of Transport and Communications**	February 29, 2004	- Government Resolution issued on March 4, 2004: analogue TV networks to be discontinued on August 31, 2007.	Kosonen Ismo	3

10. Investigations will be made and the necessary proposals then drafted on amending the TV and radio legislation to take account of the convergence of mobile communications and digital TV, and the operating licence process will be set up.	**Ministry of Transport and Communications**	December 31, .2004	Government bill on Act amending the Act on Television and Radio Operations (simplified licence procedure) submitted in June 2006 and passed by Parliament in December 2006. The amendment came into force on January 1, 2007.	Kosonen Ismo	3
11. A cluster programme for promoting digital TV network services will be introduced.	**Ministry of Transport and Communications**, companies	2004 - 2005	The ArviD digital TV cluster programme ended on December 31, 2005; more information from www.arvid.tv	Saarijärvi Marjukka	3
12. The development of digital TV return-channel solutions and the resolution of other technical problems will be promoted in collaboration with actors in the sector.	**Companies**, Ministry of Transport and Communications, FICORA	2004 - 2007	- FICORA is involved in the return-channel DVB-MHP standardization working group. - The national DVB/iTV (formerly DVB/MHP) standardization group drafted a new version of the return-channel report and published it in June 2006 under the title *Report on implementing interaction in the digital TV system.* The report (February 2006) is available on the FICORA website [only in Finnish]: http://www.ficora.fi/suomi/tele/raportit.htm - The ArviD return-channel project was completed (ArviD publications January 2005).	Ministry of Transport and Communications: Saarijärvi Marjukka FICORA: Väinämö Risto	3
13. Radio frequencies that become available will be allotted for use by new broadband services within the framework of international agreements.	**Ministry of Transport and Communications**, FICORA	Continuing	- EU / RSPG (Radio Spectrum Policy Group) - It has been agreed internationally that general broadcast frequencies can also be used for mobile TV networks. - A possible reallocation of the use of frequencies will be agreed at the World Radio Conference (WRC) in 2007. - As per the decision of the Regional Radio Conference (RRC) in 2006, TV frequencies can also be used for mobile TV networks. - The Government granted an operating licence for two new mobile communications networks providing broadband connections (June 2005).	Ministry of Transport and Communications: Kohtala Antti FICORA: Andersson Martin	2

14. The scope for promoting use of fibre-optic cables in house-hold broadband connections will be investigated, and their use in the public telecommunications network will be monitored.	**Ministry of Transport and Communications**	June 30, 2004	- Preliminary investigation completed in June 2004. - Further investigation completed in April 2005 (Ministry of Transport and Communications publication 33/2005). - IPTV present state and development in the near future (23/2006).	Kohtala Antti	3
15. The future of the fixed telecommunications network in providing broadband services and the potential for promoting fixed-price ISDN use in areas where broadband connections are not yet available will be investigated.	**Ministry of Transport and Communications**	May 31, 2004	- Project launched. - Completed in June 2004. Report: *The future of fixed networks*.	Ojala Kari	3
16. Care will be given to ensuring that the environmental legis-lation does not permit unreasonable charges for the use of public areas in the construction of broadband connections.	**Ministry of the Environment**	Continuing	The amended Act on Maintenance and Cleaning of Streets and Certain Public Areas entered into force on November 1, 2005. It provides for reasonable charges to be paid to municipalities for the tempo-rary use of a street as a work site, and for an inspection charge based on the notification costs. The reasonable nature of the charges will be moni-tored with the Association of Finnish Local and Regional Authorities, in accordance with the statement of the Government. In autumn 2006, the Association of Finnish Local and Regional Authorities published a manual for guiding work in streets, with input from the Minis-try of the Environment and organizations in the energy and telecommunications sectors.	Hurmeranta Jyrki	2
17. The compatibility of broadband networks will be secured in accordance with the communications market legislation, and standardization will be kept up to date to ensure that broadband technologies are interoperable.	**FICORA**, companies	Continuing	This is constantly brought up in standardization and other cooperation at national and international level. Working groups led by FICORA have drawn up common procedures for the provision and combination of broadband networks and ser-vices based on different technologies.	FICORA: Koskenheimo Pekka	2

Completion stages: 1 = Planning stage, 2 = In progress, 3 = Completed

Development of electronic transactions and online business

The aim of the measures outlined is to increase the demand for broadband services by encouraging the provision of online services. The measures are aimed at the provision of both public and commercial services. Growing demand will allow telecommunications companies to extend the supply of commercial broadband services to cover sparsely populated areas as well.

Measure	Responsibility	Timetable	Details of progress	Contact person	Completion stage
18. The use of electronic transactions in public administration will be developed by implementing measures contained in the Government's Information Society Programme.	**Ministry of Finance**, Ministry of the Interior, Prime Minister's Office, other ministries	Continuing	The development of electronic transactions is being supported, and new measures in the Information Society Programme are being launched. The Ministry of Finance began drawing up a national strategy on electronic transactions in collaboration with municipalities and central government institutions in August 2004. The electronic transactions strategy was completed in 2005. Its principal measures have been incorporated in the National IT Strategy, which was completed in June 2006. Spearhead projects will include preparation for a platform for electronic transactions and continuing the introduction of company identification..	Ministry of Finance: Kurkinen Seppo Ministry of the Interior: Hosia Eino Prime Minister's Office: Olander Marit, Harjuhahto-Madetoja Katrina	2

| 19. Fair terms and conditions will be secured for the commercial utilization of public sector information. | **Ministry of Finance**, Ministry of Transport and Communications, Ministry of Education, Ministry of Justice, Ministry of Agriculture and Forestry | December 31, .2004 | The deadline for implementation of the Directive was July 1, 2005. The working group preparing the matter declared that the existing Finnish national legislation, especially the Act on the Openness of Government Activities (621/1999) and the Act on Criteria for Charges Payable to the State (150/1992, as amended), corresponds with the requirements and obligations of the Directive. An amendment to the Act on the Openness of Government Activities which came into force in October 2005 (495/2005) clarified the provisions on fees charged for the delivery of documents and information in certain cases. | Ministry of Finance: Korhonen Juhani

Ministry of Transport and Communications: Perttula Juha

Ministry of Education: Waldén Jorma

Ministry of Justice: Wallin Anna-Riitta

Ministry of Agriculture and Forestry: Yrjönen Risto | 3 |

20. Municipal on-line services will be expanded substantially in line with the Government's Information Society Programme; a considerable proportion of municipal procurement will be handled online; all the main municipal service processes will be charted; and joint services in public administration will be expanded substantially.	**Ministry of the Interior,** Ministry of Education, Ministry of Finance, Prime Minister's Office, municipalities	December 31, 2005	Ministry of the Interior: The JUPA project for online public services. Process models for seven service entities were defined in ten sub-projects in 2004. New electronic services were introduced in eight different regional sub-projects across the country during 2005: - Oulu area daycare - Oulu area consumer advice - Hämeenlinna area services for the elderly - Lieksa services for the elderly - Lahti area daycare - Jämsä area land and home exchange - South Karelia tourism, culture and leisure services - Transport licence service of the State Provincial Office of Southern Finland The services implemented went online during 2006. More information at www.jupa.fi Ministry of Finance: The *lomake.fi* website contains a range of online forms for municipal e-services and is a cost-effective way of implementing public-sector electronic services. Recommendations on electronic purchasing and transactions are being prepared together with the municipalities. The Ministry of Trade and Industry and the Association of Finnish Local and Regional Authorities set up a public purchasing consultancy unit in 2004. The KuntaTIME working group report has been completed. The KuntaIT unit has been set up at the Ministry of the Interior to promote the provision of e-services by municipalities.	Ministry of the Interior: Oikarinen Tommi Ministry of Finance: Kurkinen Seppo Prime Minister's Office: Harjuhahto-Madetoja Katrina	3

| 21. The need to develop consumer rights for broadband and other communications services will be investigated. | **Ministry of Transport and Communications**, Finnish Consumer Agency | May 31, 2004 | - Report completed on May 15, 2004.

- A working group set up separately by the Ministry of Transport and Communications submitted its proposals on amending the consumer provisions of the Communications Market Act in the form of a Government bill in autumn 2005.

- Government bill submitted to Parliament in February 2006.

- Parliament approved the bill in May 2006.

- Act to come into force on March 15, 2007. | Ministry of Transport and Communications: Ero Liisa, Ahola Riku, Vilkkonen Laura

Ministry of Justice: Lahelma Marjo

Finnish Consumer Agency: Kokko-Herrala Riitta, Peltonen Anja, Seppälä Päivi

FICORA: Koskenheimo Pekka, Hughes Sanna | 3 |

22. The Ministry of Education's 2010 strategy concerning culture in the information society and the measures in its action programme will be implemented.	**Ministry of Education**	Continuing	Launch of the strategy entitled *Culture in the information society 2010* and the action plan contained therein. 1. Completed: Plan for expanding the remit of the Finnish Film Archive to include a radio and TV archive (Publications of the Ministry of Education 2006:34). Requires revision of the archiving legislation (including the Legal Deposit Act), preparation for which has begun. 2. Completed: Draft Government plan of action on children and violence in the media (Ministry of Education handouts 2004:10). Working group set up to evaluate the use of filtering and blocking devices to combat harmful material in the Internet. An extensive project entitled *Media education in early education* was begun to produce and distribute media education material for daycare, preschool and the morning and afternoon activities of schools. 3. Continuing: Support for cultural heritage digitization in accordance with the targets of the Government Information Society Programme. In May 2006, support was granted to 16 projects (total EUR 270,000). A total of EUR 270,000 in 'Myytti' subsidies was granted for digitization projects in museums (50 museums). Support was given to the development of information management and retrieval systems common to all museums, and IT and content production training for museum personnel (total EUR 180,000).	Laaksonen Leena 1.Kunnas Veikko 2.Hautala-Kajos Kristina 3. Salonen Päivi	1 and 2 1. 2 2. 2 3. 2
23. The legislation on electronic identification will be kept up to date in the manner demonstrated necessary by an assessment of the effects.	**Ministry of Transport and Communications**	Continuing	- An assessment has been made of the impact of the Act on Electronic Signatures (14/2003). - A project has been launched on the information security requirements of biometric identification and the need for regulation from the privacy protection viewpoint. - A project has been launched to evaluate and draw up the legislation and rules required for biometric identification.	Perttula Juha	3 3 2

24. The provision on the right of an added-value service supplier to obtain invoicing data on one of its customers from a telecommunications company will be effectively introduced as soon as the Act on data protection in electronic communications (Government bill HE 125/2003) is put into effect.	**Ministry of Transport and Communications**	July 1, 2004	- Monitoring group was set up May 2004.	Pietikäinen Kristiina	3
25. The legislation on immaterial rights will be kept up to date and will take account of developments in the information society.	**Ministry of Education**, Ministry of Trade and Industry	Continuing	- Copyright Act: Government bill pending - Government bill HE 28/2004 issued on March 18, 2004. - Changes to copyright legislation (including changes required in Directive 2001/29/EC). Acts 821/2005 and 822/2005 came into force on January 1, 2006.	Ministry of Education: Waldén Jorma	3
26. The need for a cluster programme on broadband services will be investigated.	**Ministry of Transport and Communications**, Ministry of Trade and Industry	August 30, 2004	- Preliminary investigation was launched. - Tender invitations sent out March 15, 2004. - Supplier chosen and preliminary investigation under way. - Interim report produced June 29, 2004. - Decision taken not to launch a cluster programme.	Ministry of Transport and Communications: Tuominen Tatu Ministry of Trade and Industry: Kuitunen Tero Uusimaa Employment and Economic Development Centre: Tarjanne Petra	3

Completion stages: 1 = Planning stage, 2 = In progress, 3 = Completed

Effective participation of businesses and individuals in the information society

The aim is to improve the skills of companies, and especially SMEs, in the use of electronic business and to make it easier for people to use information society services. As information society skills improve, demand will increase, which will allow more extensive provision of commercial services.

Measure	Responsibility	Timetable	Details of progress	Contact person	Completion stage
27. Information technology teaching and information provision in NGOs, schools and other educational establishments will be increased by implementing the measures in the Government's Information Society Programme. Special attention will be given to the teaching of information and communications technologies.	**Ministry of Education**	Continuing	1. Basic and in-service training for teachers and other employees in the education system. 2. In-service training for support and advisory staff. 3. Making use of information and communication technologies in teaching. Measures will be implemented and monitored in accordance with the Ministry of Education's *Information Society Programme for Education, Training and Research 2004-2006.* a) Plans for establishing web-based learning and the use of ICT in teaching (including the definition of ICT skill levels in basic education) from basic education to adult education were completed in April 2005; b) Development plan for continuing education for teachers was completed in April 2005; c) Quality criteria for digital teaching materials were completed in January 2006; d) Investigation on free software was started in April 2006; e) New kinds of digital learning material have been produced on line; f) Production of ICT continuing education material for teachers on line has been started.	1. Ministry of Education: Kylämä Marja, Mikkola Armi National Board of Education: Haavisto Kristiina 2. Kangasniemi Jouni 3. Ministry of Education: Kylämä Marja National Board of Education: Kiesi Ella	1. 2 and 3 2. 2 and 3 3. 2 and 3 3 3 3 2 1,2,3 2

28. The readiness to adopt new business models and work organization methods made possible as a result of information and communications technologies will be increased, especially for SMEs.	**Ministry of Trade and Industry**, Ministry of Labour	Continuing	Ministry of Trade and Industry: relevant measures/project from the Information Society Programme, namely promotion of SME competitiveness through the use of ICT. The purpose of the project is to improve the potential of SMEs and Employment and Economic Development Centres for using ICT.	Ministry of Trade and Industry: Lappi Jaana (Ministry of Labour: Maija-Leena Uimonen)	2
			Ministry of Labour: joint working group on e-work concerning all branches of government and coordinated by the Ministry of Labour has published its recommendations on action to support the wider use of e-work. E-work projects primarily with the aim of promoting ICT use in the SME sector have been coordinated using ESF support. The Ministry of Labour has published a *Telecommuting guide for employers.* Successful telecommuting requires good telecommunications and information security, but also a reorganization of work and good management. The working life section of the information society council of the Government agrees with this, noting that the workplace community, particularly its competence capital, is the key factor in information-oriented growth.	Ministry of Labour: Salmenperä Matti	2
			SMEs form one of the priority areas of the TYKES workplace development programme, which was started on January 1, 2004.		

29. Efforts will be made to ensure that communications services are easy and convenient to use.	**Tekes**, Ministry of Trade and Industry, Ministry of Transport and Communications, companies	Continuing	The Tekes technology programme *FENIX Interactive Computing* is focusing on interactive information technology and user interfaces. The four-year FENIX Interactive Computing programme (2003-2007) focuses on the management of the interaction between people and computers. The programme is intended to explore software technologies and applications where the management of the interaction of the end user and the IT system and the user-friendliness of services play an important part. Between 2003 and 2006, Tekes has supported 207 R&D projects in the programme with a total of EUR 45 million.	Tekes: Tilli Kari, Heikkinen Marko Ministry of Trade and Industry: Kuitunen Tero	2
30. A strategy for barrier-free communications services for disabled and special groups will be drawn up, which will take into account the opportunities offered by broadband services.	**Ministry of Transport and Communications**	August 30, 2004	- Strategy process ongoing - Consultation session held in August 2004 - Action plan *Towards obstacle-free communications* completed in January 2005 - A monitoring group was appointed to supervise the implementation of the action plan in April 2005. The group reported on the implementation during 2005. The plan has been augmented with five new projects. - The Ministry of Transport and Communications made the group a permanent appointment as of the beginning of 2007. The group is continuing its work on obstacle-free communications for the time being.	Vilkkonen Laura	3 Strategy / action plan 2 Monitoring

Completion stages: 1 = Planning stage, 2 = In progress, 3 = Completed

Promoting information security and privacy protection

The measures outlined will stimulate the demand for broadband connections and information society services by establishing a secure environment for users.

Measure	Responsibility	Timetable	Details of progress	Contact person	Completion stage
31. The Act on data protection in electronic communications (Government bill HE 125/2003) will be actively enforced.	**Ministry of Transport and Communications**, FICORA, Data Protection Ombudsman	April 30, 2004	- FICORA guidance resources have been increased. - Precise division of powers agreed between the authorities. - Instructor pool formed and training sessions organized. - A detailed section by section account of the Act was given to telecommunications companies by a separate working group. The working group is continuing its work on a permanent basis as a law-interpreting forum. In the case of corporate subscribers, consultation sessions have been arranged and sessions are also planned for the future. - Information-exchange channels have been formed among the authorities for the purposes of resolving issues of interpretation.	Ministry of Transport and Communications: Ristola Juhapekka FICORA: Lehtimäki Timo Data Protection Ombudsman: Aarnio Reijo	3
32. The effects of the legislation on data protection in electronic communications will be assessed and it will be continuously updated on the basis of monitoring and review.	**Ministry of Transport and Communications**	Continuing	- An impact assessment project launched. - A monitoring group was appointed in March 2004. - An amendment concerning mass text messages came into force on April 1, 2006. - A Government bill for an amendment concerning the information security fee was debated by Parliament in autumn 2006. The Act came into force on January 1, 2007. - A Government bill concerning the handling and disclosure of identification data was submitted to Parliament in autumn 2006.	Ristola Juhapekka, Helopuro Sanna	2

33. The legislation on data protection in the workplace will be actively enforced once it has been enacted.	**Ministry of Labour**	Continuing	The Act on the Protection of Privacy in Working Life (759/2004) entered into force on October 1, 2004. A guide has been prepared on the application of the Act (in Finnish, Swedish and English), and a large amount of training given and information provided.	Kangasperko Raila	3
34. The National Information Security Strategy approved by the Government on September 4, 2003 will be implemented, thus improving confidence in the secure use of networks.	**Ministry of Transport and Communications**	Continuing, from 2004	- A steering group assembled. - Projects launched. - Implementation begun initially with 22 projects. - Reorganization of the strategy has been completed, ensuring that the implementation will be more effective. - Spearhead projects crystallized during the term with the specification of focus areas. - A case study exercise related to various areas of information security was conducted to specify important sub-areas. - Prepare for the end of the term and the relationship to an eventual new consultative committee.	Ristola Juhapekka	2
35. A data protection cluster programme will be introduced on the basis of a preliminary study.	**Ministry of Transport and Communications**, companies	2005 – 2006	The LUOTI development programme on trust and information security in electronic services (2005-2006) was completed. The aim of the programme was to develop information security for new multi-channel electronic services.	Ministry of Transport and Communications: Antikainen Päivi	3
36. A programme to raise the virus protection awareness of small and medium-sized businesses and the general public will be launched.	**Ministry of Transport and Communications**, Ministry of Trade and Industry, companies	2004	- Projects 2.2, 5.1, 5.2 and 5.5 of the National Information Security Strategy have been started. - The target group for the 2006 National Information Security Day consisted of SMEs and schoolchildren plus their parents. - Information security awareness in SMEs has been increased through participation in the extensive *Time* training tour in 2005-2006, focusing on the potential of legislation in improving the various areas of information security.	Ministry of Transport and Communications: Pietikäinen Kristiina Ministry of Trade and Industry: Lappi Jaana	3

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Measure	Responsibility	Timetable	Details of progress	Contact person	Completion stage
37. A programme aimed at reducing problems caused by unsolicited e-mail will be developed.	**Ministry of Transport and Communications**	Continuing	- A spam information pack on unsolicited e-mail published on its own dedicated website (www.roskapostipaketti.fi). The material is intended primarily for consumers, companies, direct marketing establishments, communications companies and public administration.	Perttula Juha	3
			- Evaluation conducted of needs to change and improve legislation to combat unsolicited e-mail and malware. A Government bill has been prepared for amending the Act on the Protection of Privacy in Electronic Communications, with a view for submission in autumn 2007.		2
38. Actions to protect children from harmful Internet content will be made more effective.	**Ministry of Transport and Communications**, companies, organizations	Continuing	- Preparation began in March 2004. - Access to child pornography sites has been obstructed in cooperation with operators in the sector and with the police. - Government bill on measures to prevent the distribution of child pornography submitted to Parliament in July 2006 and approved in December 2006. The Act came into force on January 1, 2007.	Ministry of Transport and Communications: Kosonen Ismo Prime Minister's Office: Ahonen Ville-Veikko	2

Completion stages: 1 = Planning stage, 2 = In progress, 3 = Completed

Special measures for regional development

The aim of the measures outlined is that the construction of networks and provision of subscriber connections will be financially viable even in areas where it is not commercially profitable at present. For this purpose, comprehensive and more effectively coordinated regional plans will be drawn up for expanding the provision of broadband networks. On the basis of guidelines to be drafted, public funding could continue to be targeted at regions where broadband provision would not otherwise be established. The measures also include allocation of state subsidies and grants that would allow broadband services to be acquired for schools and libraries, for example, even in regions where they would not be offered commercially at affordable prices.

Measure	Responsibility	Timetable	Details of progress	Contact person	Completion stage

39. Regional councils and municipalities will jointly prepare a broadband strategy for their region and promote its implementation. The strategy will be based on estimates of the future demand and market conditions in each municipality. These strategies will act as a tool to assist decision-making on public funding and other matters requiring public sector measures. The strategies must also identify the main user segments in relation to service provisions.	**Regional councils**, municipalities	September 30, 2004	- Preparation of regional strategies.	Regional council directors	3
40. National guidelines will be drawn up for regional councils and municipalities on the use of public funding for projects to build telecommunications infrastructure where the provision of connections does not otherwise occur for commercial reasons. In relation to the use of public funds, the guidelines must follow the principles that accord with European Commission guidance. Public funding will entail competitive tendering and will target network provision and the pricing of network operator services (not prices to the final customer). The funding conditions will guarantee that any operator receiving a subsidy has a duty to make his network available to a competitor under moderate and equitable terms.	**Ministry of the Interior**, Ministry of Trade and Industry, Ministry of Transport and Communications, OFC, FICORA, Association of Finnish Local and Regional Authorities	Continuing	- The guidelines on public funding issued by the Ministry of the Interior have been applied in financing decisions made by regions and municipalities. In individual problem cases, the funding authorities have provided detailed advice on the use of public funding.	Ministry of the Interior: Urjanheimo Pekka (chair), Martikainen Harri (secretary), Manelius Tuula Ministry of Trade and Industry: Korhonen Auli Ministry of Transport and Communications: Ojala Kari OFC: Lundelin-Nuortio Liisa FICORA: Leinonen Liisa Association of Finnish Local and Regional Authorities: Tanner Simo	3

41. More broadband connections will be provided for schools. The aim is to ensure that in terms of connection and operating costs all schools have access to reasonably priced and efficient telecommunications connections.	**Ministry of Education**	2004 - 2008	Support is being given for the acquisition of broadband connections. The aim is that all educational establishments will have broadband connections, and the recommended speed for these is at least 8 Mbit/s. Applications for broadband grants were invited in both spring and autumn 2004 and 2005. Two further application rounds will be organized in 2006 for broadband grants for general education institutions.	National Board of Education: Kivi Ritva, Kiesi Ella	3
42. More broadband connections will be provided for libraries. The aim is to ensure that in terms of connection and operating costs all libraries have access to reasonably priced and efficient telecommunications connections.	**Ministry of Education**	2004 - 2008	Support is being given for the acquisition of high-speed telecommunications connections and customer terminals for libraries in rural and sparsely populated areas. The aim is to support 'grouped libraries'. All the libraries in an area should have up-to-date customer terminals, high-speed telecommunications connections and high-quality information systems. The customer terminal working group investigated the number of customer terminals and telecommunications links at libraries and other locations. Their report [in Finnish] can be found at http://www.tietoyhteiskuntaohjelma.fi/esittely/fi_FI/raportit_ja_selvitykset/#a_element_74937596791294209. According to the report, about half of all libraries achieved the target of one customer terminal per 1,000 inhabitants. The level recommended by the working group is 1-2 terminals per 1,000 inhabitants.	Kekki Kirsti	3
43. Publicly available, regional broadband service points will be equipped in stages with customer terminals (schools, libraries, Citizens' Offices, municipal and government agencies), and their use will be free of charge.	**Ministry of Education**, Ministry of the Interior, municipalities	December 31, 2005 (libraries) December 31, 2007	In most rural municipalities, libraries are the only places where public services electronic transactions can be made. In making such transactions, use can be made of a core area of library competence: information acquisition. Voluntary 'group libraries' will be supported. Grants for customer terminal acquisition for mobile libraries and libraries in sparsely populated municipalities totalled EUR 460,000 in 2005 and EUR 500,000 in 2006. The number of applications has been double the number of grants awarded each year.	Ministry of Education: Kekki Kirsti Ministry of the Interior: Urjanheimo Pekka	3

Completion stages: 1 = Planning stage, 2 = In progress, 3 = Completed

Contributing to and monitoring international developments

The aim of the measures outlined is to develop a favourable environment for supply and demand of broadband and information society services on the international market. This will help promote the supply of services and the demand for them in Finland, too. The supply of broadband connections in competitor countries will be monitored, with the aim of adopting the best practices for use in Finland.

Measures	Responsibility	Timetable	Details of progress	Contact person	Comple-tion stage
44. International developments will be monitored. In the European Union in particular, efforts will be made to ensure that the supply and use of communications services are not affected by legislative obstacles or added taxes and charges, and that Community regulations do not require radio frequencies to be auctioned.	**Ministry of Transport and Communications**	Continuing	EU/COCOM (Communication Committee), RSPG (Radio Spectrum Policy Group) ITU OECD	Kohtala Antti	2
45. The use of open standards in the supply of communications and information society services will be promoted in the international community.	**Ministry of Transport and Communications**, Ministry of Trade and Industry, FICORA, companies	Continuing	EU OECD ITU ETSI ERO	Ministry of Transport and Communications: Ojala Kari Ministry of Trade and Industry: Eskola Antti FICORA: Andersson Martin	2

| 46. The international cooperation aims of the National Information Security Strategy will be met. | **Ministry of Transport and Communications** | Continuing | - Measure 1.2 of the National Information Security Strategy has been launched.
- A list has been drawn up of the persons and organizations participating in international forums and will be published on the Internet.
- Participation in ENISA by publicizing current affairs at the agency and notifying the agency actively of information concerning surveys in the various sub-areas.
- Survey conducted on international information security legislation.
- The Commission initiative for a European information strategy is based on the Finnish model. | Pietikäinen Kristiina | 2 |

Completion stages: 1 = Planning stage, 2 = In progress, 3 = Completed

Monitoring the strategy

Measures	Responsibility	Timetable	Details of progress	Contact person	Completion stage
47. The regional councils will be given training and guidance in drafting regional broadband strategies, and information will be efficiently provided on the different broadband connection options and potential, especially to regional councils, municipalities, SMEs and housing companies.	**Ministry of Transport and Communications**, Ministry of Trade and Industry, Ministry of the Interior, Association of Finnish Local and Regional Authorities	2004-2006	- Meeting at Municipal House on March 4, 2004. - A 'Broadband Day' was held at the Ministry of Transport and Communications in March 2004. - Drafting of a strategy outline begun on March 15, 2004. - Regional councils invited to a training session on April 6 and May 18, 2004. - Training days organized. - Material ready and sent to persons responsible on May 27 and to the regional council directors on June 2, 2004.	Ministry of Transport and Communications: Tuominen Tatu Ministry of Trade and Industry: Eskola Antti Ministry of the Interior: Urjanheimo Pekka Association of Finnish Local and Regional Authorities: Meisalo Leena	3
48. A broadband strategy monitoring group drawn from the main ministries involved and other actors will be set up, and it will report to the Government on implementation of the strategy and its recommended measures annually by the end of September. User interest in acquiring broadband will be monitored on a regular basis, and the factors affecting this will be analysed.	**Ministry of Transport and Communications**	2004 - 2007	- Monitoring group appointed December 2003. - First interim report 2004. - Second interim report 2005. - Third interim report 2006. - Final report 2007.	Tuominen Tatu	3
49. An information point will be maintained on the Internet (www.laajakaistainfo.fi).	**Ministry of Transport and Communications**	2003 - 2007	- Website set up.	Tuominen Tatu	3
50. Statistics on broadband and regional monitoring of broadband provision will be developed.	**FICORA**, Statistics Finland, telecommunications companies	May 31, 2004	Coverage and reliability of broadband statistics has been improved with a new questionnaire form. Broadband questionnaire survey 4 times a year, now with new questions on the number of VoIP connections provided by telecommunications companies for household and business customers. In addition, from the autumn onwards, businesses will be asked to estimate what proportion of the broadband connections they provide have a speed of 2 Mbit/s or more.	FICORA: Räsänen Liisa Statistics Finland: Niemi Mervi	3

Completion stages: 1 = Planning stage, 2 = In progress, 3 = Completed

Additional measures

The following nine projects were launched as new measures under the Government Resolution of February 3, 2005:

Measures	Responsibility	Timetable	Details of progress	Contact person	Comple-tion stage
51. Cooperation between the regional councils and the Ministry of Transport and Communications will be enhanced by coordinating the regional planning processes with the national broad-band policies.	**Ministry of Transport and Communications**, Ministry of the Interior, regional councils	September 1, 2005	Joint working group set up September 27, 2005. Four regional broadband seminars in spring 2006 together with interregional authorities.	Tuominen Tatu	3
52. The economic impact of the 'operator-independent' open access model presented in some regional plans, and its implications for communications policies and competition, will be investigated with reference to the different technology alternatives.	**Ministry of Transport and Communications**	May 31, 2005	Report *Telecommunications services competition models – Open Access* completed in September 2005.	Ojala Kari	3
53. Application of the guidelines on public funding will be monitored, and any shortcomings will be reported.	**Ministry of the Interior**	December 31, 2005	The Ministry of the Interior circulated a questionnaire to the regional councils, in which they were asked to report on their use of public funding. According to a summary of the survey, a total of EUR 18.6 million was used for broadband projects between 2000 and 2005. Of this, municipalities spent 41% and the share of the EU Structural Funds was 35%; 15% was central government funding and 9% private funding (mainly from telecommunications operators).	Urjanheimo Pekka	3
54. The responsibilities of municipalities and other public bodies in the role of telecommunications companies maintaining communications networks will be investigated.	**Ministry of Transport and Communications**, Ministry of the Interior, FICORA	June 1, 2005	FICORA has published a statement on the roles and responsibilities of public corporations and instructions on legislation and regulations pertaining to broadband service providers.	Ministry of Transport and Communications: Ojala Kari Ministry of the Interior: FICORA: Nieminen Klaus	3
55. Rapid adoption of the IPv6 standard will be promoted through international cooperation.	**Ministry of Transport and Communications**, FICORA	December 31, 2005	FICORA has begun the necessary work.	Ministry of Transport and Communications: Tuominen Tatu FICORA:	3

				Lehtimäki Timo	
56. The use of Internet phone call (VoIP) and Internet multi-media (MMoIP) systems will be promoted.	**Ministry of Transport and Communications**	Continuing	- VoIP report published. - FICORA has prepared a policy draft for promoting the provision of VoIP. - Bundling of UMTS phones allowed → increased use of multimedia. - Report: *NGN network ground rules and connections* (31/2006).	Ojala Kari	2
57. The broadband service needs of sparsely populated areas will be taken into account when the decision is made to reallocate the frequency band released from the NMT-450 service for new uses.	**Ministry of Transport and Communications**	July 1, 2005	In June 2005, the Government granted an operating licence to Digita Oy for construction of a wireless broadband network.	Kohtala Antti	3
58. Regional UMTS operating licences will be granted for data transmission.	**Ministry of Transport and Communications**	March 1, 2005	An operating licence was granted in September 2005.	Ahola Riku	3
59. The availability of necessary telecommunications connections in health care and hospitals will be investigated and the required measures taken to improve their availability.	**Ministry of Transport and Communications**, Ministry of Social Affairs and Health	April 1, 2005	Investigation completed. Connections mainly satisfactory.	Tuominen Tatu	3

Completion stages: 1 = Planning stage, 2 = In progress, 3 = Completed