



**Finnish National Fund for Research and Development**

## **Quality of Life, Knowledge and Competitiveness**

**Premises and objectives for strategic development  
of the Finnish information society**

**Sitra 211  
Helsinki 1998**

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## Preface

Finland needs a vision and strategy in order to be able to make full use of the opportunities inherent in the Finnish information society and to ward off the threats involved. Owing to the rapid pace of development, the strategy has to be constantly revised. The previous strategy was published on the initiative of Prime Minister Esko Aho's Government in early 1995. Many central objectives were also recorded in the programme of Paavo Lipponen's Government. The Information Society Forum took initiative for the overhauling of the strategy, endorsed by the National Council for the Information Society. The Ministry of Finance agreed with Finnish National Fund for Research and Development, Sitra on the updating of the strategy.

Finnish society must be developed according to people's needs, so that the development can be based on high-standard know-how and the utilisation of modern information and communications technology. The information society evolves in a decentralised manner, and it is neither possible nor necessary to coordinate it. It is, however, important to anticipate future developments and influence them. Some centralised measures are also needed. The following outlines the most important principles and objectives for the development of the information society.

Strategic development highlights co-operation both between sectors and administrative fields in Finland and in the international context. Public administration, industry and organisations are invited to take initiative, participate in decision-making and commit themselves to promoting defined objectives. The stated principles should be applied to decision-making concerning the allocation of resources. The principles should be reflected in the strategies and decisions of the different sectors and parties, in the ongoing projects and in the preparation of spearhead projects proposed. The rapid rate of change demands a continuing strategy process.

The steering group for strategy renewal was chaired by President Aatto Prihti, Finnish National Fund for Research and Development (Sitra), and the vice-chair was Juhani Kivelä, Under-Secretary of State, Ministry of Finance. The group consisted of the following members: Henry Ehrstedt, Managing Director, ICL Data Ltd; Markku Laukkanen, Chairman of the Administrative Board, Finnish Broadcasting Company; Markku Linna, Director General Ministry of Education; Matti Vuoria, Secretary General (up to 31 December 1997), Markku Mäkinen, Acting Secretary General (1 January-30 June 1998) and Erkki Virtanen (from 1 July 1998), Secretary General, Ministry of Trade and Industry; Yrjö Neuvo, Senior Vice President, Product Creation, Nokia Mobile Phones, Kaija Pöysti, Business Development Manager, Trantex Ltd; Jorma Rantanen, Director General, Finnish Institute of Occupational Health; and Vappu Taipale, Director General, National Research and Development Centre for Welfare and Health (STAKES). The National Council for the Information Society and the Information Society Forum were responsible for the follow-up, in which a number of organisations were invited to take part.

To back up the strategy renewal, a number of background reports were produced, experts were interviewed and several brainstorming events and seminars were arranged. Hundreds of people have contributed to the work in one way or another and an effort has been made to integrate their opinions. The project group had a full-time secretariat consisting of Antti Rainio, Project Manager; Kaisa Kautto-Koivula, Senior Adviser; and Petri Koistinen, Project Assistant, with part-time contribution from Antti Hautamäki, Director of Research, and Kari Tolvanen, Director, all from Sitra. The steering group convened 11 times during the project. The findings are hereby submitted to the Prime Minister.

Helsinki, 1 December 1998

Finnish National Fund for Research and Development, Sitra

## Summary

In terms of international comparison, Finland is in the absolute forefront of information society development. Finland makes a substantial investment in education, training, research and development. Information and communications technology (ICT) products have significantly contributed to the growth of Finnish exports. At the same time, the ageing of the population, high unemployment rates and the hectic pace of working life, together with shortages of competent workers in some fields are an everyday reality in Finland.

Finland is progressing towards a knowledge-based society. In the information society, knowledge forms the foundation for education and culture and constitutes the single most important production factor. ICT promotes interaction and exchange of information between individuals, business enterprises, and other organisations, as well as the provision of, and access to, services.

The point of departure for developing Finnish society should be people's needs. The national vision is a society which develops and utilises the opportunities inherent in the information society to improve the quality of life, knowledge, international competitiveness and interaction in an exemplary, versatile and sustainable way.

This opens up better opportunities for self-enhancement, interaction and influence. The decisive factors for the competitiveness of a business enterprise are rapid responses, flexibility and networking. The public sector develops the overall conditions for the information society and promotes the construction of technology and the infrastructure. To be able to make the best use of the opportunity thus offered, everyone needs new skills and cooperation.

The lines of strategy agreed upon highlight shared responsibility and innovation in the society as a whole. Finland seeks to be a forerunner in the implementation of a humane and sustainable information society. In practice this means user-friendly and safe electronic services and cultural and cognitive contents which are accessible to all on computers, digital televisions and mobile communicators.

To this end, it is important to develop individuals', organisations' and society's knowledge. The traditional education system must be complemented with learning environments for diploma-awarding studies.

The network economy action model will also renew working life and business in traditional branches. Information networks must be exploited for international marketing. The public sector must develop its processes, electronic services and transparent decision-making, availing itself of the opportunities inherent in ICT. A balanced regional development must also be ensured by means of increased telework.

ICT must be developed and applied innovatively, and its impact on society must be analysed. Finland should be the first in the world to introduce the new-generation broadband telecommunications network.

The construction of the information society and good results entail extensive development networks and spearhead projects in cultural and information products and services, electronic transactions and service processes, personal navigation, learning environments in the information networks, knowledge-intensive work, business networking and teleworking, and the local information society.

It is not possible to steer the development of the information society in a centralised manner. It is, however, important to anticipate the future, which entails some centralised measures. The development priorities must be revised annually as part of the continuing strategy process.

## Information society development

In the information society, knowledge is the basis of education and culture and the most important production factor. Information and communications technology (ICT) significantly promotes interaction and exchange between individuals, business enterprises and other organisations, the utilisation of information, and the provision of services and access to them.

In the information society, an increasing number of people work in jobs centring on information and knowledge and make use of ICT tools and services, both at work and during leisure time. An increasing share of products and services in different branches are produced, transmitted and consumed in an electronic form based on the use of information technology and information networks.

In terms of international comparison, Finland is at the forefront of information society development. It is estimated that two out of three Finns use information technology in their line of work, one in two has a mobile phone, and one in three has already used services available on the Internet. As a society, Finland makes a significant investment in education, training and R&D. Finland has an effective innovation system, does well in international competition, and provides favourable conditions for entrepreneurship. ICT products have significantly increased Finnish exports. Finnish communications policy has advanced competition and the development of a modern infrastructure. At the same time, the ageing of the population, high unemployment rates and the shortage of a competent work force are an everyday reality.

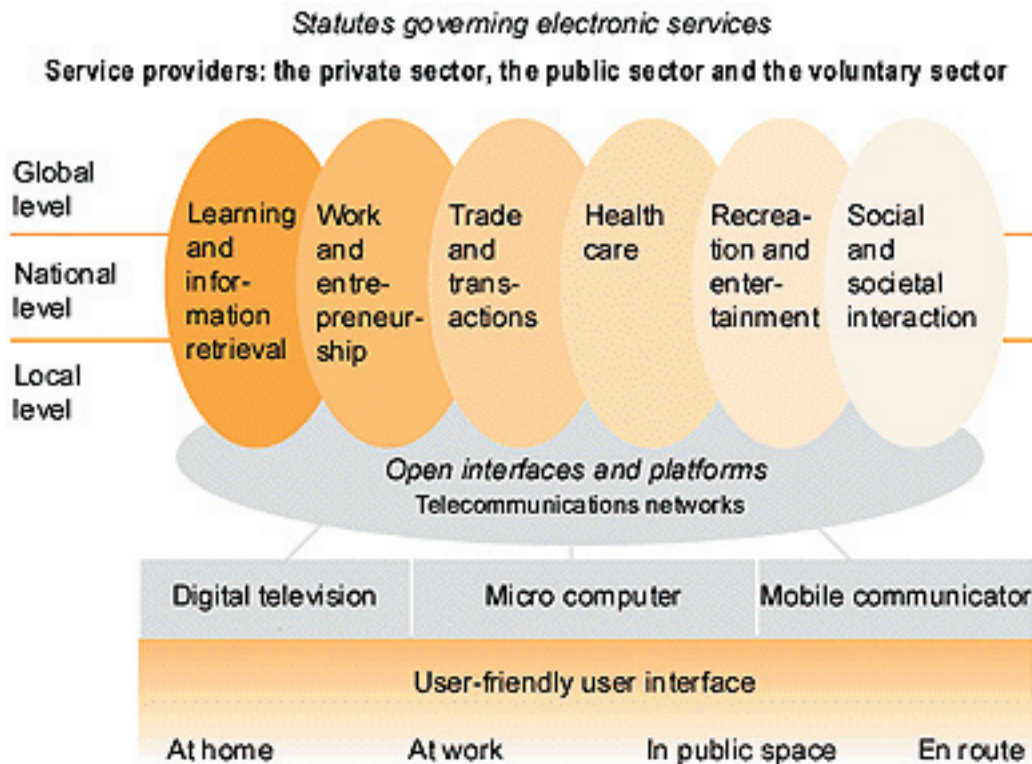
The information society can be called a network of interaction between individuals and information networks. ICT contributes to the development of a knowledge-based society. This can increase man's opportunities for the development of competence, for interaction and for self-realisation. By applying ICT, society can empower people and improve services and their accessibility.

The needs of business activities constitute one important force steering ICT development. The development of new technologies and their innovative application create new industrial branches and jobs. Information networks can also open up new markets for traditional trades, products and services, such as arts and crafts, culture and agriculture. Enterprises can improve their competitiveness by developing more efficient procedures based on information and knowledge management and on the utilisation of ICT.

Uncontrolled information society development may lead to the exclusion of some population groups and regions. The increasing use of ICT in office work is conducive to efficiency, and at the same time it reduces labour needs. Electronic transactions and trade may impair services for those with inadequate skills and knowledge for electronic self-service. Access to sources of information in the midst of the information flood may increase inequality between people if the cost of reliable and well-organised information services is too high. The constantly expanding data systems include more and more information about individuals, which, if abused, may compromise people's privacy. Dependence on ICT may increase risks in nearly all activities, which highlights the need to prepare for exceptional circumstances.

Information society development is influenced by global trends, such as progress in the global economy and electronic trade, the rapid progress and integration of ICT, the growing presence of the media, the growth and ageing of populations, growing social inequality, environmental problems, increasing mobility and interaction, growing urbanisation and migration, and European integration and the strengthening role of regions in Europe.

These opportunities and threats must be taken into account. The challenges they pose must be addressed in efforts to steer the direction of the information society.

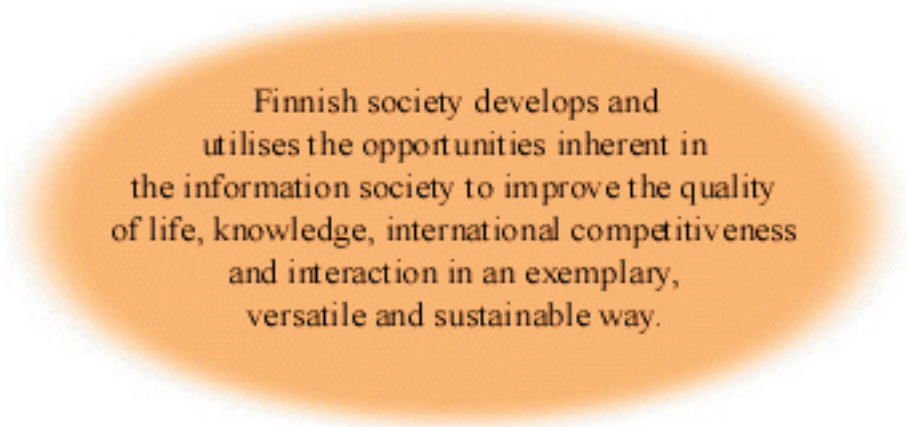


*Figure. ICT in the service of man*

*The provision of electronic services and contents should respond to people's needs in different life situations and be accessible to all on different terminals. One central need is to increase interaction between people, and to promote interaction as an attribute of service. The content and service processes should be renewed from the viewpoint of electronic markets in local, national and international collaboration. The statutes governing electronic services should promote data security and the consumer's position. Open service interfaces promote competition.*

## Vision and objectives

National vision:



Finnish society develops and utilises the opportunities inherent in the information society to improve the quality of life, knowledge, international competitiveness and interaction in an exemplary, versatile and sustainable way.

The goal in the Finnish information society initiative is

- \* to increase welfare and offer jobs and income
- \* to provide equal opportunities for the acquisition and management of information and for the development of knowledge
- \* to improve conditions for entrepreneurship and the quality of working life and promote competitiveness
- \* to increase opportunities for human interaction and cooperation
- \* to strengthen democracy and opportunities for social influence
- \* to improve security and the individual's data protection and status as a consumer
- \* to develop services and cultural provision and increase international interaction
- \* to boost Finland's attractiveness as a location for innovative enterprises
- \* to alleviate inequality between regions, and
- \* to support the objectives of sustainable development.



## **Partners and their roles**

Different partners build the information society both by their own action and by mutual cooperation locally, nationally and internationally. Each individual, business and organisation has responsibility for developing their know-how and availing themselves of the opportunities offered. The public administration, business and industry and organisations must cooperate extensively and avoid overlapping work. The parties concerned must make sure that the different projects support each other as far as possible and are well-timed. The respective responsibilities of the private and public sectors must be constantly reviewed.

## **Individuals**

The information society offers all people better opportunities for personal development and active interaction both at work and in leisure-time pursuits. The progress in ICT creates better opportunities for individuals, families and different communities to cooperate and interact, regardless of the distance between them.

As citizens, people have better tools and channels for realising their freedom of speech and influencing social decision-making, as well as acquiring information needed to this end. Similarly, civic organisations and other communities are better equipped to interact and exert influence. Different electronic services and cultural and information contents increase the options available to individuals and consumers. In the final analysis, services and access to services evolve on the basis of demand. People themselves have responsibility for their own choices, as well as for making their needs known or for putting their personal data at the disposal of the markets. In working life, the change in industrial structure entails lifelong learning. Especially in knowledge-intensive work, the tools of the trade are at the reach of entrepreneurs at an increasingly low cost.

To be able to avail themselves of the opportunities opening up, people must have new skills as citizens, consumers and employees. The skills are gained in everyday interaction and in work tasks, as well as in training offered in different sectors. The decisive factor is the individual's own initiative. Different communities must support their members in seizing the opportunities available and developing their competencies.

## **Business and industry**

Information society development, together with the liberalisation of world trade, create new business opportunities and new markets for enterprises, as well as subjecting them to stiffer competition and forcing them to internationalise. The decisive competition factors are information and knowledge management, swiftness in applying technologies and innovations, strategic management, flexible organisation and procedures, and networking throughout the value chain, both in product development and production as well as in marketing. This is equally true of traditional and new, growing fields. To fare well in open competition, enterprises must engage in ever-closer partnership with each other, with research institutions and with clients. Electronic trade and logistics pose great challenges for enterprises in their efforts to find new markets, develop their services, win the trust of their clients, and improve their competitiveness. It is up to the social partners to support their members to meet these challenges.

The information, ICT and content-creation industries play an important part in the construction of the information society both as rapidly growing branches and as important producers of tools and services for other branches and consumers.

Business enterprises offer jobs and income and develop the quality of working life. In their occupations, people can develop and implement their competence and create new knowledge by their own action. The application of ICT makes for effective action and cuts down the number of unnecessary jobs. On the other hand, the emergence and development of new branches and the success of traditional enterprises and professionals create new jobs both directly and indirectly. ICT offers opportunities for the application of new, more flexible working methods, such as teleworking. This in turn is conducive to the balanced development of different regions and to sustainable development.

## **Public sector**

The role of the public sector is to create conditions for building an information society which meets the needs of both individuals and business enterprises by means of legislation, research and education. The public sector also promotes the development of serviceable technology and infrastructure. By means of strategic management, it will ensure access to information and promote the development of knowledge, an efficient innovation system, conditions for, and competition in, business activities, balanced regional development, the implementation of human rights, and equality, credibility and security in society. The public sector must constantly re-evaluate its own role and mission.

It is the administration's task to strengthen democracy and improve citizens' access to information and opportunities for social influence by developing legislation and procedures and making use of the opportunities offered by technology. Legislation and legal control also promote the implementation of the individual's data protection and freedom of speech and improve the individual's status as a consumer.

Educational and research institutes play an important part in creating and transmitting information and anticipating future developments. The ongoing rapid change in the industrial structure highlights the importance of continuing education and retraining.

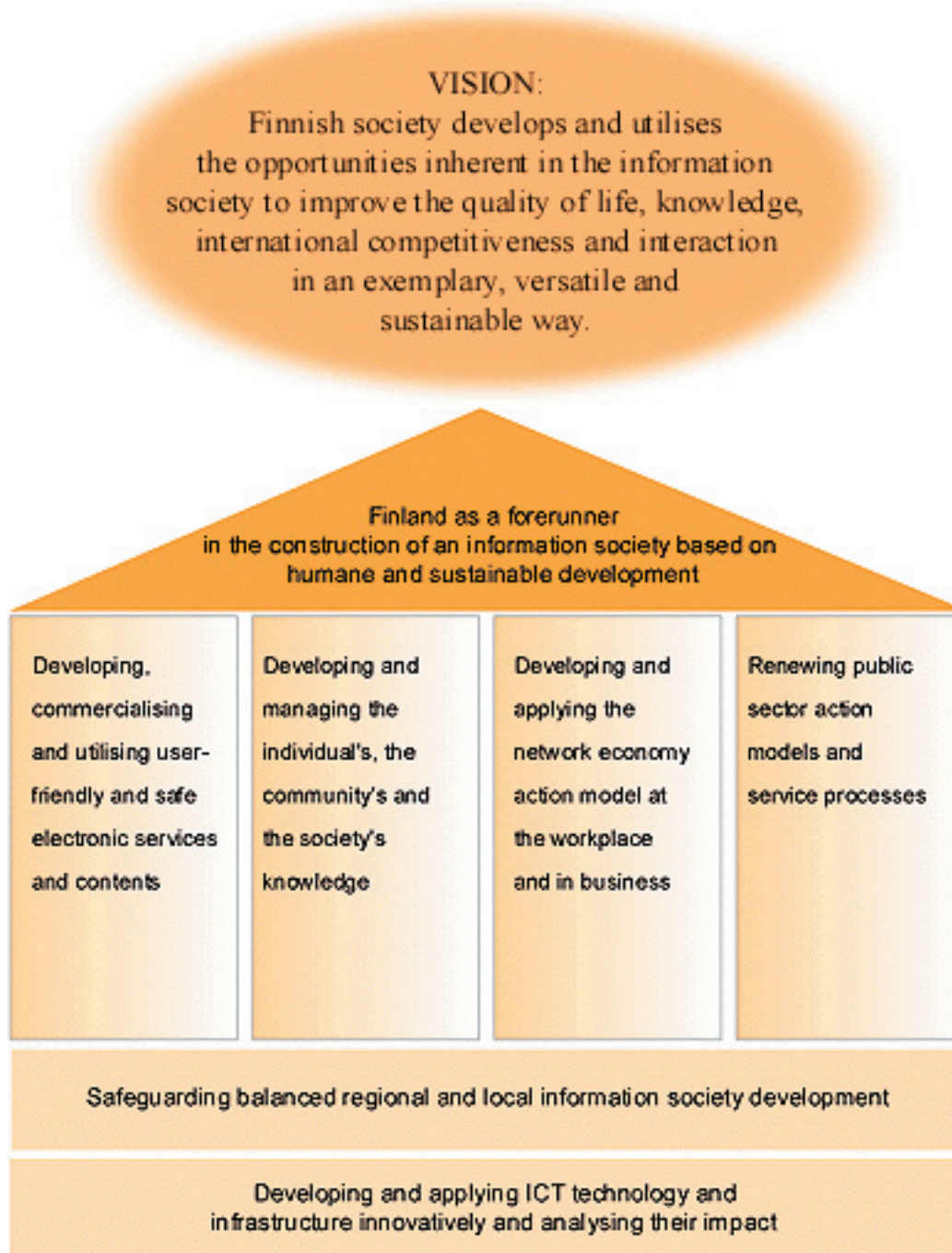
The progress in ICT makes it possible to develop coherent and cost-effective public services with due consideration to data security. The renewal of processes entails extensive cooperation between administrative sectors, local authorities and regions, as well as between the public, private and voluntary sectors. The public sector plays an important role in determining quality criteria for products and services purchased from other sectors.

The extent to which the information society is implemented in schools and libraries, health care, the promotion of business and industry and other administrative services, as well as enhancing transparent decision-making, largely depends on the decisions made and the measures taken by local authorities.

The information society initiative also intensifies international interaction between states and regions. Cooperation within the European Union and other international organisations is an important factor in efforts to develop favourable conditions for the information society and to ensure balanced development.

## Strategy lines

The strategy outlined with a view to achieving the national vision and objectives organises the underlying principles and the methods used in the development of the information society into several entities. They highlight shared responsibility and innovation in society as a whole. Apart from the utilisation of information and technology and the development of services, one important measure is to renew action models.



The first step action is the overall strategy, which stresses progressive and rapid action and shared responsibility. Finland must make use of all the possibilities which the information society offers for catering for the needs of all citizens; this in turn will open up opportunities in international business. This overall strategy is implemented by means of the four parallel lines of action. The next step converges them in a regional and local perspective. The last step highlights the role of technology as a central development tool. All the policy and action lines are heavily interdependent. The utilisation of electronic services, as well as the renewal of the action models entail dynamically evolving knowledge; regional and local development interacts with national

and international development. Development must be balanced throughout the system.

## **Finland as a forerunner**

The challenge for Finland is to be a forerunner in the development of an information society based on humane and sustainable development by renewing its services, know-how and action models. The role of a pacesetter is not an easy one, because it also means being the first to encounter problems. Shared responsibility and competitiveness must be developed in tandem, and due consideration must be given to ecological factors. The most effective way for Finland to influence international developments is by example and good practices, which will at the same time open up markets for Finnish products. Finland must keep abreast of international developments by applying and developing technology and new methods, while keeping national legislation in line with the evolving operational environment and international practices.

1. Finnish partners must intensify their cooperation in making the development objectives known and promoting them in international forums. They should also take the initiative in influencing developments globally as well as in the European Union and Northern Europe.

2. Finnish society must use its capacity for renewal to the full, developing its action models and the quality of working life. Finland must make its modern technology and communications environment, progressive innovation and business opportunities known in international contexts in order to attract new business and industry to Finland, encouraging them to cooperate with Finnish partners.

3. The focus in the development of services and products must be on people's needs. In R&D and commercialisation the aim must be extensive cooperation throughout the value chain and also orientation towards international markets and cooperation. The goal must be user-friendly and safe tools and services, and large-scale compatibility in the European Union and more widely in the global context.

4. Legislation must be developed to strengthen democracy and promote empowerment. Excessive regulation must be avoided and dismantled, and changes in the operational environment and the possibilities inherent in innovations must be anticipated. It is important in terms of legal credibility and commercial utilisation to ensure data security and data protection (confidentiality, integrity, non-repudiation), to promote the use of works and copyright, safeguard the freedom of speech, prevent crime, to guarantee consumer protection in international network trade, and to develop taxation and duties.

5. The possibilities inherent in the information society must be used to promote the principles of sustainable development. Electronic services, tele-activities, logistical telecommunications systems and the management of natural resources must be developed to alleviate the strain on the environment and growth pressures in urban centres and to support immaterial growth and consumption. To this end, Finland must draw up a special development plan and show initiative in the European Union.

## **Electronic services and contents**

One important way to facilitate people's day-to-day life is to develop, commercialise and utilise user-friendly, reliable and safe electronic services. Surveys of consumer needs help to develop electronic trade and transactions towards new, more flexible procedures and wider access to services in terms of time and place. This requires that network services are generally available to consumers and that consumers have the readiness for, and confidence in, these services. Apart from the development and application of ICT, it is important to convert and refine various cultural and information contents into an accessible and commercially feasible form. One indispensable and extremely demanding development object is the management of rights to works and their exploitation.

1. The development and implementation of electronic services must take account of the needs and experiences of people in different life situations. In order to win the trust of their clients, providers of electronic services must ensure both technical safety and the consumer's privacy and status as a party to electronic transactions. Services must be simple to use, and R&D relating to the development of user interfaces must be increased substantially. Lines of action must be defined and consumer information about electronic trade must be developed and increased with a view to removing obstacles to electronic trade and exploiting the opportunities inherent in this trade.

2. The supply of electronic services must be accessible as far as possible on different terminals, such as

the microcomputer, the digital television and the mobile communicator. Service providers must cooperate in implementing services based on open technical interfaces, promoting competition, safety and data protection. They must take joint action to find ways of limiting the dissemination of improper materials.

3. The most important aspects of the national cultural heritage must be converted into digital form and made accessible on the information network. Measures must be taken to promote the production of electronic services, for instance by the development of flexible practices in copyright remuneration and the exploitation of works. A joint funding programme must be drawn up for the development of content creation, R&D and international business in the field.

## **Knowledge management**

The development of the information society and the utilisation of the opportunities it offers entail investment in the development, transfer and management of individuals', communities' and society's knowledge. The individual requires new skills as a citizen, consumer and employee in order to manage, critically analyse and make full use of the information flow. The proportion of knowledge-intensive jobs is constantly increasing, and the rapidly developing technologies and new-media enterprises are facing labour shortages. The rapid change in the industrial structure entails constant upgrading of knowledge. Knowledge management requires good feedback channels, indicators and incentives, as well as constant alertness to changing needs. The prerequisites of knowledge management can be improved with the introduction of renewed procedures. Educational institutions, business enterprises and other work communities can engage in closer cooperation with a view to knowledge transfer and the utilisation of information reserves.

1. Strategic management of knowledge and processes which support it must be developed to keep Finnish know-how at a high standard on a wide front and a sufficient part of it at the top level. The national priorities in education and research and their financing must be regularly reconsidered by the combined cooperation of both the public and private sectors to ensure a flexible response to changes. Methods for anticipating changes in working life and in industrial structures must be developed to help business enterprises and educational institutions to respond better to the challenges arising from these changes. Enterprises in growth fields could make the know-how qualifications in their key professions available to job seekers and educational institutions on the information network.

2. The close and productive cooperation carried out by Finnish business, research and public administration must be further developed and expanded to social and organisational innovations. Finnish universities, polytechnics, research institutes and other knowledge clusters must further intensify their international networking and interaction. Opportunities for intensifying the distribution of research findings must be explored, and a generally valid model must be developed for the utilisation of research findings.

3. Measures must be taken to develop such methods for measuring human capital which encourage organisations to appreciate and increase their own human capital and which also serve to develop funding for growth enterprises. The accounting of organisations must indicate the investment made in know-how. Taxation practices must give incentive for the development of know-how.

4. Wide-scale cooperation must be carried on, and further expanded, to offer the necessary basic skills in the use of information society tools and electronic services to all citizens, and especially to those who have not had instruction in the new skills during their education or in their line of work. All levels of education must increase the teaching of skills needed to acquire, critically evaluate, transmit and present information and to interact in the modern, international communications environment. Teachers' initial and continuing education must be essentially improved to enable teachers to utilise the possibilities of the information society and to pass on relevant knowledge to their pupils.

5. In support of the traditional education system and opportunities for independent individual learning, extensive cooperation is needed to develop learning environments which utilise the methods of distance learning, information networks and electronic services and in which it is possible to study for diplomas and degrees. In order to facilitate electronic publishing of learning materials, it is necessary to develop action models which seek to overcome juridical, technical and economic obstacles to the creation, commercialisation, distribution and utilisation of materials. The public information reserves, especially library catalogues, must be made available on the information network to facilitate the acquisition and utilisation of information. Methods for describing information materials and services must be developed and applied by different parties in cooperation in order to enable users to analyse information flows and to identify and utilise reliable information.

## **Network economy**

It is essential to apply the network economy action model to working life and business with a view to developing the quality of activities and the competitiveness of enterprises. Networking based on the mutual trust and cooperation of business enterprises allows enterprises to concentrate on their core know-how and to purchase other services from their partners all over the world. The network economy is not only for the information industry; new action models and information networks can facilitate activities within and between enterprises in nearly all branches. The opportunities inherent in the information network for marketing products can also benefit those SMEs which have previously only had local clients. Enterprises can form networks for the production of commodities and services which enable them to give a more flexible response to changes in demand.

1. In order to improve their competitiveness and to intensify their activities, organisations must dismantle rigid hierarchical structures and operate in networks. Based on mutual trust, they must prune overlapping activities and pool their specialised know-how and their product development and customer processes, thereby improving their capacity for reacting rapidly to changes in the operational environment and to the changing needs of their clients.

2. Enterprises, organisations and the public administration must jointly promote the creation of networks within and between different branches. The social partners must support their members in such renewal. The network economy models must be further developed through experimentation and research. At the same time, efforts must be made to explore ways of removing obstacles to the application of the action models.

3. Conditions conducive to entrepreneurship and business networking must be promoted with the creation of electronic services and transactions for the needs of SMEs. Measures must be taken to promote the use of information networks as a channel for international marketing.

4. With a view to developing the supply and demand of labour and flexible working methods, organisations must make full use of the possibilities offered by teleworking and seek to identify and develop jobs which allow teleworking. At the same time, measures must be taken to encourage the development of recruitment services for telework and temporary teleworkers.

## **Renewal of the public sector**

The renewal of public sector action models aims at improving the quality of activities and developing favourable conditions for the operations of individuals and business. Information society development is rapid and requires a susceptibility to change and an ability to anticipate. Decentralised decision-making highlights the need for management by strategies. ICT creates new opportunities for producing and distributing public services, but at the same time it entails the renewal of processes in cooperation with the private and voluntary sectors. The renewal of processes based on clients' needs is essential for improving the cost-quality ratio. Information networks also empower citizens and make for transparent public administration. The public administration collects and produces a great deal of information which could be of great use in society, provided that the public and private sectors can generate synergy in the commercialisation of this information.

1. Information society development and changes in the operational environment must be constantly monitored to provide support for strategic management. The action models and cost-effective utilisation of technology must be developed and promoted in the administration to ensure compatibility and sufficient steering of information management. Efficient procedures and funding practices which provide incentive for good performance must be developed and instituted for cross-sectoral R&D projects in particular. All this entails substantial annual funding.

2. The accessibility and cost-effectiveness of public services must be improved with the increased development and implementation of electronic transactions according to the joint-services and one-window principle. The key processes in public services must be developed, and new action models must be sought in cooperation with the private and voluntary sectors.

3. With a view to transparent decision-making and the empowerment of citizens, users must be able to access the information produced by the public sector in an electronic form.

4. The public and private sectors must ensure large-scale economic utilisation of the public sector information reserves by cooperating in commercialising information materials. With a view to clarifying the information

markets, measures must be taken to define those information reserves which any business enterprise can utilise at the cost of transfer within the scope of copyright.

5. The public sector must take responsibility for data security in society and, together with enterprises, ensure that all critical systems function under all circumstances. The administration must develop norms and regulations governing exceptional circumstances and see to the dissemination of information.

## **Balanced regional development**

The opportunities inherent in the information society must be made equitably available to all. Heavy migration to growth centres causes problems and high costs. The information network enables local business and industry to find new markets. The development and expansion of distance learning, teleworking and electronic services cancel out long distances and improve the quality of life for all citizens, regardless of their place of residence. Through cooperation, regions can find, distribute and adopt the best practices without delay and thereby prevent the doubling of mistakes.

1. The exclusion of regions must be prevented through growing cooperation between local authorities within a region and the pooling of resources in the development of services and know-how. In order to ensure the vitality of regions and to promote innovative business, each region must have access to sufficient provision of know-how and a modern infrastructure.

2. Enterprises, the administration and organisations must cooperate to develop a dense network of electronic services and transactions, ensuring that clients also obtain instruction in the use of electronic services whenever needed.

3. Open work premises and environments which offer tools and supportive services for teleworking and entrepreneurship must be made locally available for different kinds of undertakings, including short-term projects, to rent.

4. Alongside their more traditional services, schools and libraries must develop themselves into open learning centres, helping people to use the supply of information and the cultural and distance learning services on the information network. Young people's growing knowledge and skills stand in good stead in the development of such services.

5. Information society development must be used to combat regional marginalisation, to empower people to carry out personal and communal activities, realise their freedom of expression and increase their influence on matters relating to them.

## **Technology and infrastructure**

Innovative development and the application of IC technology and infrastructure creates new opportunities for enhancing the quality of life and business activities. The progress in technology must be used to find sustainable solutions to current problems and to respond to emerging challenges. Impact analysis is an important element in the assessment of the benefits and safety of innovations, and the consequent need to change procedures.

1. Scenarios on the diversification and integration of the technological environment, the modalities of ICT development and application, and development needs in the infrastructure must be devised and utilised for identifying and anticipating the possibilities inherent in technology. The input into research and development of ICT must be kept at a level which ensures international competitiveness.

2. Apart from the development and application of ICT, measures must be taken to study its social, societal, environmental and psycho-physiological effects. The information society action models and service structures must be taken into account in urban planning and the design of buildings and premises, in relevant research and education and in regulations.

3. The choice of priorities in ICT development must promote user-friendly tools and applications and cater for the needs of the ageing population in particular. In addition, it is essential to make extensive and efficient use of ICT in society, to promote networking and logistics between enterprises, especially SMEs, the development of know-how and information management, and the creation of safe, environmentally sustainable and confidence-inspiring innovations.

4. Statutes and the various parties' knowledge and skills must be developed to encourage rapid adoption of the new technologies on the basis of commercial supply. Finland should seek to be the first country in the world

to put a broadband wireless telecommunications structure in place; the possibilities offered by the convergence of telecommunications technology should extensively utilised.



## Spearhead projects and development networks

here are a large number of ongoing joint projects geared to developing the information society. It is essential to promote synergy between these projects, eliminate overlapping and doubling, and thus reduce costs. Development networks must be created between existing and starting projects in order to enhance knowledge and information transfer and the compatibility of the services being developed. More input into the utilisation of the results is needed. The spearhead projects below, and the development networks relating to them, are a concrete way of promoting the stated objectives and principles of development.

The public sector must promote cooperation and make sufficient funding available to the spearhead projects in order to generate useful services, action models and other outcome, and promote wide-scale application of the results in society.

Preparations must be launched for compiling ongoing projects and existing resources at least in the following spearhead areas:

1. Cultural and information products and services
2. Electronic transactions and service processes
3. Personal navigation
4. Electronic learning environments
5. Knowledge-intensive work
6. Business networking and teleworking
7. The local information society

**Cultural and information products and services.** One aim in the project is to promote the digitalisation of major archival and library materials and an extensive and varied use of information materials maintained and produced by authorities. Another aim is to develop content creation business and enhance its international competitiveness. The public and private sectors must cooperate to develop and disseminate new solutions developed for the description, refinement and commercialisation of information materials, for the management and integrated use of information, for the pricing of information materials, and for copyright management which promotes the use of such information.

**Electronic transactions and service processes.** This project aims at compiling development projects relating to electronic transactions and trade and at promoting synergy and coherent services. The public administration, research institutes, business enterprises and organisations must cooperate to ascertain service needs from a client-centred viewpoint and to develop service production processes and safe and reliable methods and user interfaces for electronic transactions and trade. At the same time, measures must be taken to remove obstacles to electronic trade and to develop the data protection and status of individual consumers.

**Personal navigation.** This project aims at developing an entity of services for personal navigation which supports all forms of mobility and which will be implemented gradually as the terminal hardware and data transfer technology develops. Necessary services relating to traffic and transportation, such as maps, addresses, routes, prices and timetables and different services relating to transactions and trade must be implemented on open technical interfaces based on tenders. At the same time, the transfer of location data must be developed with a view to emergency situations.

**Electronic learning environments.** This project aims at collecting ongoing projects and developing and implementing an ICT-based service and content entity which complements the traditional education system, supports independent, lifelong and special-needs learning and enables learners to study for a diploma. The project must develop methods for the creation and publishing of electronic learning materials. At the initial stage, it is designed to help in the study of general upper secondary syllabuses. At a later stage, it must be expanded to university and polytechnic education and vocational training.

**Knowledge-intensive work.** The aim is to develop alternative organisational models for knowledge-intensive work; knowledge requirements for individuals, working groups and networks; and knowledge transfer meth-

ods. At the same time, it must ascertain the demands placed on the knowledge-intensive work environment by people's psycho-physiological welfare. The project must develop, implement and test different action models and tools for the management of electronic interaction and the growing information flow and for the assessment of work loads with a view to preventing accidents due to burn-out and exhaustion.

**Business networking and teleworking.** The aim is to collect, develop and test services, good practices and action models which promote entrepreneurship and networking between SMEs and to eliminate obstacles to networking. The project must develop and implement electronic services for the international marketing of commercial products and services and promote electronic transactions and interaction between business enterprises. It must also develop opportunities for teleworking and relevant recruitment systems. The supportive services needed must be developed in close collaboration with business enterprises. The aim of supportive services is to generate new business.

**The local information society.** The aim is to collect and develop good practices in implementing regional and local information societies and to promote regional cooperation and interaction with a view to improving services and consolidating democracy. The project must promote the pooling of resources with a view to developing generally applicable solutions and products for both international and national markets. In addition, the project must produce a handbook on the best practices and create a supportive service for local and regional decision-making.

## **Rolling strategy process**

he different parties in society must cooperate to organise a rolling strategy process in support of decision-making. The process seeks to identify and anticipate the opportunities and threats arising from information society development. The strategy process must focus on monitoring changes in the operational environment. It must make extensive use of information society statistics and project monitoring, which in turn must be further developed. One part of this process is to evaluate the implementation of the strategy with the help of a wide range of expertise and to revise the priorities accordingly. Research into the social and societal effects of ICT and new procedures and services is an important element in the strategy process. It is important to disseminate information concerning the monitoring and the achievement of objectives both on a day-to-day basis and with a more comprehensive annual review.

# Appendix 1

## Follow-up groups of the strategy updating project

### National Council for the Information Society

Chair: Jouni Backman, Minister for Administrative Affairs

Vice-chair: Olli-Pekka Heinonen, Minister of Education and Science

#### Members:

Governor Pirjo Ala-Kapee, City of Vantaa

Sari Baldauf, President, Nokia Telecommunications Ltd.

Christian Brandt, Secretary General, Swedish Assembly of Finland

Tarja Cronberg, Executive Director, Regional Council of North Karelia

Vilho Hirvi, Secretary General, Ministry of Education

Jorma Karjalainen, Director General, Ministry of Finance

Juhani Korpela, Secretary General, Ministry of Transport and Communication

Hannele Koivunen, Counsellor for Cultural Affairs, Director of the Cultural Division, Ministry of Education

Eeva Kuuskoski, Secretary General, Mannerheim League for Child Welfare

Matti Lehti, President and CEO, Tieto Corporation

Hannele Pohjola, Head of Department, Confederation of Finnish Industry and Employers

Timo Relander, Director General, Statistics Finland

Professor Pertti Vakkari, University of Tampere

Marjaana Valkonen, Development Manager, Central Organisation of Finnish Trade Unions (SAK)

### Information Society Forum

A forum of some fifty experts invited by the Ministry of Finance to assist the Council

Chair: Rector Yrjö Sotamaa

Taskforces led by Antti Hautamäki, Director of Research; Veli-Antti Savolainen, Ilkka Tuomi, Principal Scientist; Marja-Liisa Viherä, Communications Researcher

## **Back cover**

Finland is progressing towards a knowledge-based society. To be able to make the best use of the opportunities inherent in the information society and ward off relevant threats, Finland needs a vision and a strategy. The rapid rate of change necessitates constant revision of the strategy. Finland wishes to be a forerunner in the construction of an information society based on humane and sustainable development.

User-friendly and safe electronic services help people in their work and in their leisure pursuits, and electronic learning environments encourage independent study. The competitiveness of business enterprises increasingly rests on high-standard knowledge and flexible cooperation.

Information networks help local business to find new markets. The public sector renews its processes according to people's needs. Innovations in information and communications technology aim at improving the quality of life for all. Different parties are constructing the information society locally, nationally and internationally by their own action and in mutual cooperation. Citizens, enterprises, organisations and the administration are challenged to implement the principles compiled by a wide range of experts in the course of the strategy renewal.