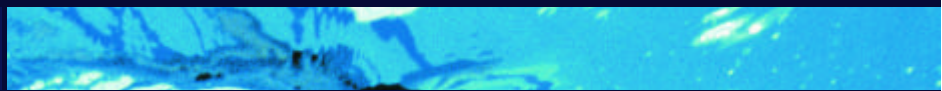


digital denmark



- conversion to the network society

## Digital Denmark

– *Conversion to the Network Society*

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# Preface

It was in November 1998 that we were given the assignment to draft a discussion paper for the Government's strategic IT policy in the future. One year later we are able to publish this report: Digital Denmark – Conversion to the Network Society.

Many people have said that a year is a very long time to spend on reflection in the Internet age. We say that it is a very short time, considering that every day brings news about the developments in IT – new mass-produced products, new services on the Internet, new launches in other countries and new issues that need to be considered.

It is not as if there is a natural limit for where IT policy begins and where it ends. IT development and IT policy make themselves felt everywhere – from children's learning to their parents' flexible working hours and their grandparents' gradual withdrawal from the labour market.

At the risk of being criticised for our omissions, we have chosen not to deal with everything under the sun. In some fields,

plans have already been made for IT development, and we do not want to change these. In other fields, such as the environmental consequences of IT and the role of the developing countries in IT development, the basis for analysis is still so slender that it is difficult to make any concrete recommendations. Furthermore, there are fields which we have chosen not to accord special treatment. These include women's use of IT, which is becoming similar to that of men in many areas, and use of IT by disabled persons. Our report has been based on a network society which is accessible to all.

Digital Denmark is in many ways a conventional committee report containing analysis, statement of objectives and recommendations but we have symbolically omitted to put the final full stop in the report. For better and for worse, we are experiencing an on-line revolution, whose development and tempo cannot be captured in a report.

What will be the next trend? We really do not know. But it is words such as *more*



and *quicker* that characterise the development of information technology. All the indications are that the possibilities offered by the Internet – and everything that this entails – will play an increasingly important part in our everyday lives. And inanimate objects will become intelligent. Our technological equipment – PCs, TVs, microwave ovens, refrigerators, telephones and mobile phones – will have many more applications in the future. They will be able to remember for us, talk to us and even reveal something about our health throughout our whole lives.

Denmark is heading towards a network society in which incredibly rapid technological development makes it difficult for even the best technicians to see as little as 3 years ahead. A development in which globalisation is breaking down the boundaries standing in the way of inter-human communication, and in which the digital economy with e-trade and new electronic procedures is changing our views as to how money can be earned.

In short, Digital Denmark is about the ways in which Denmark can become an influential IT nation in the network society, while we still uphold the best values of our welfare society.

This is not an easy task. And we do not have all the answers ready to hand. They do not exist, and the conversion to a network society is literally a task in which we must all participate. On the other hand, quick action is a prerequisite for Danish participation in the network society – a condition which the Government should take very seriously.

We hope that the Government can exploit our thoughts, our objectives and our recommendations constructively in the further process of conversion to the network society.

And we hope that the reader will take up a position on, and participate in predicting, the development of Denmark in the new Millennium.

The worst thing that could happen would be for the last word to have been said in this matter.

Finally, we should like to thank the many people who have contributed in different ways to the drafting of this report on  
Digital Denmark

  
LONE DYBKJÆR

  
JØRGEN LINDGREEN

# Summary

## The Challenge

The Internet and the new communication technologies bind together people and enterprises from all over the world in a global network society. The Internet has become the meeting place for people across national borders and cultures and the place where firms sell their goods in a global market.

## The Development of the Network Society

The digital economy has a growth potential of up to 50 per cent of the global gross national product. The countries whose enterprises are among the first to establish themselves on the Internet will have a share in this growth. The countries which do not adapt quickly enough will suffer a loss of earnings and jobs. The challenge is to be among the leaders in this field.

Citizens will be offered increasingly cheap goods on the Internet, and the new technologies will make it possible to customise many goods to meet the requirements of the individual customer. But the same

technologies will also make it possible to register the citizens' purchases and preferences. The challenge is to ensure that people are given reliable consumer information and are not monitored.

In the course of a few years, it will be possible to be linked up with the Internet for most of the day and work, shop, be taught or entertained via the Internet. At the same time, several of the objects with which we surround ourselves will have built-in intelligent components and will be connected to the Internet. The challenge is to use the new technological possibilities to improve the quality of our everyday lives.

Creative thinking, commitment, the ability to change and the ability to absorb, sort and condense large quantities of information will be central prerequisites for being able to take a critical view of the large quantity of information on offer on the Internet and for being able to work in the workplaces of the network society. The challenge is to ensure life-long learning for all citizens.

There is a trend towards a strengthening of the very near communities and the very global ones at the expense of the national community. The challenge is to lay greater stress, for example, on the responsibility of the schools to transmit to their pupils the shared values which ensure solidarity in society.

### **A Danish Standard of Values**

The conversion of Denmark to a network society is to be based on active, representative democracy in which there are equal opportunities for all and in which a feeling of solidarity binds society together and ensures help for those who need it.

The new technologies must give all citizens free access to information and exchange of information, and the possibilities for increasing the citizens' self-determination are to be exploited. It must be ensured that the technologies are not used for monitoring citizens or invading their privacy.

Digital Denmark is to be based on sustainable development in the international community.

With these values as a guide, the conver-

sion to the network society must be based on the potential of Danish society on the threshold of the new Millennium.

### **The Danish Conversion Potential**

Danish citizens are among those best equipped for life in the network society. But we shall not have the digital economy up and running until citizens and enterprises feel secure when using the Internet. A safe and reliable framework must therefore be given high priority.

Denmark has a well-developed educational system, offering extensive supplementary training and education activities. But the large investments in training and education are not sufficient to meet the requirements of the network society – either in structure or in content. A reorganisation is necessary.

The outline provisions for Danish enterprises are put under pressure in global competition. The challenge in terms of fiscal policy is to organise the tax system so that it ensures both the survival of our special welfare model and the competitiveness of Danish enterprises on the global market.

Denmark has a relatively weak high-tech

entrepreneurial culture. And we do not yet fully utilise the potential indicated by our high level of education and training. There is a need for initiatives which would promote the formation of advanced Danish IT enterprises.

We are entering upon a problematical demographic development: The number of elderly persons will increase markedly, whereas the influx of young people to the labour market will decrease even more markedly. IT is an obvious possible solution.

We have a large, well-functioning public sector. In addition to enhancing the efficiency of its administrative procedures, a conversion of the public sector to IT will make it possible to set the digital economy in motion. But it will be difficult to achieve this process of conversion for the public sector in accordance with one overall plan.

We have a well-developed telecommunications infrastructure and use of the Internet and mobile phones is widespread, but the use of broadband communications is only slowly gaining ground, and we are trailing behind the countries with which we normally compare ourselves.

## Objectives and Recomm

Denmark cannot be in the forefront on all points – the initiatives must be prioritised. We have chosen to highlight five objectives, and follow these up with concrete recommendations.



### Objective 1 Life-long Learning for All

As the first country in the world, Denmark is to ensure its citizens access to life-long learning in the network society.

#### Recommendation 1.1 Overall National Strategy

An overall strategy should be drawn up for how all Danish citizens can be ensured access to life-long learning. The strategy should be prepared with the involvement of all decision-making levels, educational establishments and the private and public sectors.

---

## **Recommendation 1.2 IT Support for Teachers**

The Danish county educational centres should be strengthened so that they can provide increased IT support for primary and lower secondary schools and out-of-school educational establishments and provide guidance for teachers on how to integrate IT in their teaching. In addition, an IT counsellor should be appointed at each primary and lower secondary school and out-of-school educational establishment.

---

## **Recommendation 1.3 PC Scheme for All Publicly Employed Teachers**

For a 2-year period, all publicly employed teachers and instructors should be offered a home PC with access to the Internet. The PC is to be acquired for an educational and/or vocational purpose. The PC scheme should be financed by a combination of user payment by means of subtractions from the gross salary and a contribution from the employer.

---

## **Recommendation 1.4 IT Integration in All Subjects**

Acts and Executive Orders dealing with all education and training should be revised so that requirements are laid down for the educational use of IT in classes and for exams. In parallel with this, the development of digital teaching aids and materials should be promoted.

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## **Recommendation 1.5 One link to the Internet for Every 10th Pupil**

All primary and lower secondary schools and out-of-school educational establishments should have one high-speed link-up to the Internet for every 10th pupil before 2003.

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## **Recommendation 1.6 English from Nursery School Class**

All teachers from the nursery school class and throughout the whole educational system should include material in English in their teaching. The actual teaching of English as a subject should commence in the second class.

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## **Recommendation 1.7 Virtual University**

A virtual university should be established offering remote teaching to students in Denmark and abroad via the Internet.

---

### Recommendation 1.8 More IT Students on Further Education Degree Courses

The number of IT postgraduate students should be increased in order to ensure more highly qualified teaching on further education IT degree courses.

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### Recommendation 1.9 More Computer Science Graduates

The number of students admitted to computer science degree courses should be doubled over three years.

---

### Recommendation 1.10 IT Competence for the Unemployed and Those Threatened with Unemployment

A training project should be implemented under which up to 10,000 unemployed persons and persons threatened with unemployment will be offered participation in a course leading to IT qualifications. The condition for participation will be that a contract has been entered into with an enterprise for long-term employment after the course has been completed.




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## Objective 2 Denmark as an E-commerce Nation

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Denmark is to be one of the five countries in the world which have the largest e-commerce turnover per inhabitant in 2003 and Denmark is to be able to offer competitive outline provisions for enterprises in the network society.

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### Recommendation 2.1 Danish E-commerce House (E-hus Danmark)

An E-commerce House should be established in Ørestaden. It should be established as soon as possible in connection with the IT College (IT-højskole) and the plans to establish a growth centre in Ørestaden.

---

### Recommendation 2.2 Digital Businessmen

Persons from the public and private sectors who have made a particularly noteworthy effort to convert their enterprise to the digital economy should be awarded prizes.

---

### Recommendation 2.3 Objectives for Public E-commerce

An overall plan should be drawn up for how public procurement is to be made digital with

objectives for the product groups which are first to be traded electronically and the percentage of overall public procurement which is to be done electronically.

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#### **Recommendation 2.4 A Public Auction Hall on the Internet**

One or more public Internet auction halls should be established where enterprises can make bids for supplies of goods and services to the public sector.

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#### **Recommendation 2.5 Research Consortium on IT and Telecommunications**

An IT and telecommunications consortium should be established involving all existing public and private centres in these fields. The consortium should, among other things, do research into the use of key IT technologies, e-commerce, encryption and "the Network Society for All".

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#### **Recommendation 2.6 IT "Incubators"**

Up to five IT "incubators" should be established in the immediate vicinity of training, education and research environments which are currently training and educating graduates and researchers in the IT field.

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#### **Recommendation 2.7 Attractive Share Options**

The regulations for the taxation of share options should be changed so that more use can be made of them as a valuable aid to recruiting and holding on to employees.

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#### **Recommendation 2.8 Immediate Depreciation of IT Investments**

The current depreciation regulations should be changed so that it is possible for enterprises to write off IT investments in a way which reflects more closely the actual useful life of the IT investments.

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#### **Recommendation 2.9 Adaptation of the Labour Market**

The Government and the two sides of industry should, as soon as possible, adapt labour-market rules to the conditions of the network society. This primarily concerns taxation, conditions of employment, the benefits system and the working environment.

---

#### **Recommendation 2.10 Increased Demand for Broadband Connections**

In order to promote the range of Internet services and broadband connections, the market should be helped on its way by means of increased public demand.



## Objective 3 More Effective and Cheaper Service via Digital Administration

At the latest by 2003, Danish public administration is to provide the best and most efficient public service in the Nordic countries with the help of digital administration.

### Recommendation 3.1 Personal Internet Access to the Public Administration

Internet access to the public administration should be established which citizens can adapt to serve their own requirements. It should give citizens access to all publicly registered information about themselves, to a customised information system and to easy, rapid and safe self-service.

### Recommendation 3.2 Title to Own Electronic Data

In order to ensure that citizens can have free access to their own data and that public data

on the citizens is not monopolised by various public authorities and enterprises, citizens should be given a statutory title to their own data.

### Recommendation 3.3 Electronic Forms

Before the end of 2000, citizens should be able, via the Internet, to retrieve, complete and submit the most common of the forms used by citizens.

### Recommendation 3.4 Public Information Server

A public information server should be established to give citizens and enterprises easy and secure access to public information and services.

### Recommendation 3.5 Free Digital Signature for All Young People Between 18 and 21 Years of Age

All young people between 18 and 21 years of age should be offered a free digital signature in the period 2000-2003. They can use this signature in connection with, among other things, their training or education and the Danish State Education Grants and Loan Scheme (Statens Uddannelsesstøtte).



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### **Recommendation 3.6 Internet Contact to All Public Institutions**

All of the approximately 24,000 public institutions should have an e-mail address by the end of 2001 and all central municipal, county and state administrations should have a home page.

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### **Recommendation 3.7 One Telephone Number for the Public Administration**

A call centre should be established which citizens can call using a three-digit number to obtain information about all public authorities and institutions.

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### **Recommendation 3.8 Quality Check of Public Home Pages**

All public home pages should be assessed for quality on a continuous basis to ensure that public electronic information is easily accessible in terms of both form and contents.

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### **Recommendation 3.9 Efficiency in the State Sector**

The State sector's internal administrative routines should be digitised where this is worth doing, for example payroll and personnel functions, IT operations and support and government procurement.

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### **Recommendation 3.10 Public IT Loan Scheme**

A loan scheme should be established whereby public authorities can borrow money to introduce IT to optimise case handling and the organisation of their work.



## **Objective 4 Danish Internet Initiatives**

15

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Participation in democracy, open decision-making processes and Danish cultural activities are to be supported by new and attractive Internet services for all citizens by 2003 at the latest.

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### **Recommendation 4.1 [www.danskpoltik.dk](http://www.danskpoltik.dk)**

A main portal, [www.danskpoltik.dk](http://www.danskpoltik.dk), should be established to be the common entry point for Danish citizens into political debate and information on the Internet.

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**Recommendation 4.2 [www.foreninger.dk](http://www.foreninger.dk)**

A main portal, [www.foreninger.dk](http://www.foreninger.dk), should be established to provide information about associations and to support the interactive communication of associations with their members, public authorities and other interested parties.

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**Recommendation 4.3 Research Programme on a Network Society for All**

Increased, focused research initiatives should be implemented to increase our knowledge of the social perspectives of the network society.

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**Recommendation 4.4 Strategy for Danish Language Technologies**

The development of Danish language technologies should be concentrated in a plan of action which has the preparation of a Danish language technology dictionary as one of its main points. The plan of action should, in particular, focus on accessibility, with a view to ensuring that all groups have access to new technology.

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**Recommendation 4.5 Report on Convergence in the Network Society**

A report should be prepared on the consequences of convergence in the network society on the basis of the assumption that the boundaries between the telecommunications, IT and media sectors are being broken down. The report should, among other things, look at the need for new regulations and define the concept of public service in the network society of the future.

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**Recommendation 4.6 The IT Rights of Citizens**

Formulation of the IT rights of citizens should specify the rules of play in the network society and, among other things, ensure free encryption without the possibility of illegal interception.



## Objective 5 IT Lighthouses in Denmark

Two IT lighthouses are to be established in Denmark, one in Northern Jutland and one in Ørestaden, to promote, from different perspectives, IT development and IT use in the network society.

### Recommendation 5.1 An IT Lighthouse in Northern Jutland

An IT lighthouse should be established in Northern Jutland on the basis of the very positive co-operation which has already been established between enterprises, Aalborg University, Northern Jutland's Science Park (Nordjyllands Videnpark – NOVI) and central political decision-makers in the area.

### Recommendation 5.2 An IT Lighthouse in Ørestaden

An IT Lighthouse should be established in Ørestaden on the basis of the major initiatives which are already planned for the area but with greater speed, more precise focus and clearer strategic cohesion.

## Follow-up

The following initiatives should be taken to ensure follow-up on IT policy:

### Recommendation 6.1 IT Policy Network Report

The Government should prepare an annual IT policy network report to the Danish Parliament in which:

- IT initiatives should be compared with the many objectives, strategies and plans of action within various sectors
- A review of legislation pertaining to IT policy should assess which Bills in the last session of the Danish Parliament have had the greatest significance for the development of IT and conversion to the network society
- A comprehensive IT statistical model should quantify the development of IT in Danish society and Denmark's position in relation to other leading IT nations.

### Recommendation 6.2 The Public IT Network

A public IT network should be established with separate political, administrative and technical levels and with the participation of the State, the counties and the municipalities.

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# The Structure of the Report

*The challenge* gives an introduction to how the global network society affects us and creates new market conditions, new living conditions and new conditions for the world community in general. Furthermore, Denmark's potential in the conversion to the network society is described. Our strengths and weaknesses are compared with the global trends, and five concrete objectives are laid down on this basis.

*Initiatives* presents recommendations for each of the five objectives. The areas of action are Life-long Learning, Denmark as an E-commerce Nation, Digital Administration, Danish Internet Initiatives and IT Lighthouses.

*Follow-up* presents recommendations on how to ensure follow-up on, and up-to-date organisation of, Danish IT policy.









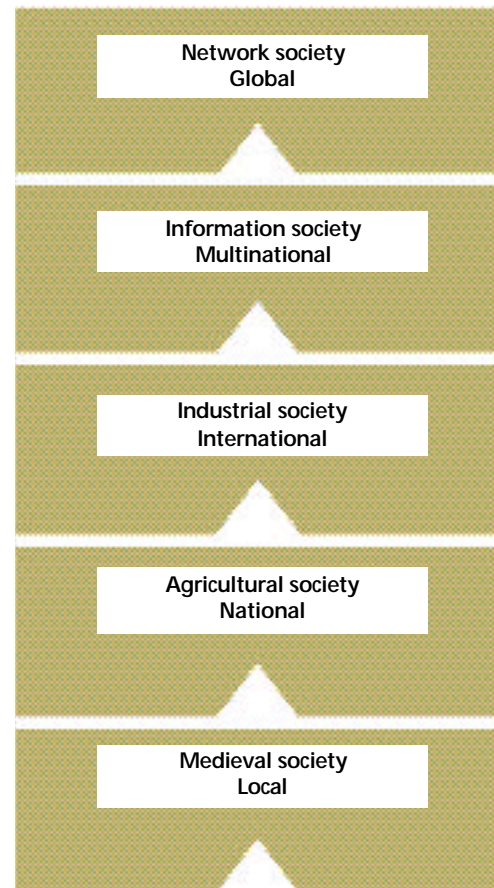
# The Challenge



# The Global Network Society

Technological development and the new forms of communication will turn our lives and the world as we know it upside down. A new social order with new possibilities and new problems has already heralded its arrival. Some call it the knowledge society, others call it the information society. We have chosen to go a step further and call it *the network society*, because we are of the opinion that it is the networks that are really changing the world. The electronic network of cables and computers links people together in new ways. New networks of communication between people, networks of employees and enterprises, networks of enterprises and shoppers, networks of teachers and students. A social development characterised by increasing globalisation and increased division of labour and specialisation, which is becoming more and more independent of time and place but, in turn, highly dependent on communication.

Type of society<sup>1</sup>





In this report, we use information technology (IT) as a catch-all term for electronics, media production, telecommunications and other fields which are based primarily on information technology.

Globalisation, with information technology as the driving force, is the central element in development. At the same time, this development primarily concerns the rich western world, and it can make the gap between the rich and the poor parts of the world even wider.

In this chapter, we describe some of the global development trends. Later in the report, the challenges presented by this development will be used by us to lay

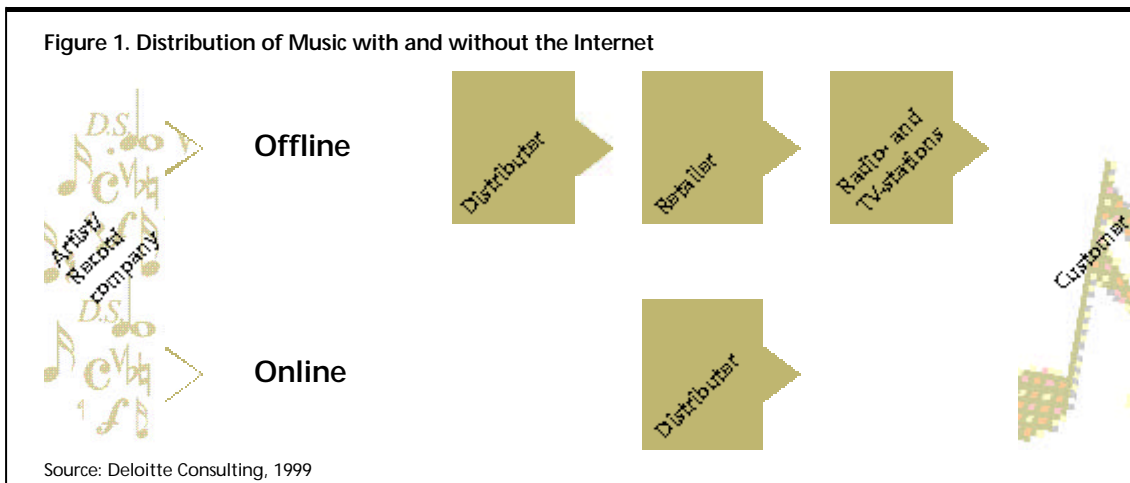
down a course of action for how we in Denmark are to use the new technologies and adjust ourselves to the network society.

## New Market Conditions

### Great Growth Potential

The Internet is a global marketplace. On the Internet, enterprises only need to be located in one place to be able to market and sell their goods directly to Internet users and enterprises all over the world<sup>2</sup>.

This process of change will not be painless. When middlemen and enterprises that cannot hold their own disappear, this



results in a loss of income and jobs in society in general.

How radical these changes are can be illustrated by an example from the music industry<sup>3</sup>. In recent years, music in the MP3<sup>4</sup> format has been marketed. MP3 makes it possible to retrieve and easily store, distribute and copy music digitally via the Internet in a reasonable quality. The CD is no longer necessary as a means of transportation for the music, and, therefore, customers do not have to go to the shop. This development is affecting production, distribution, wholesaling and retailing.

But the development also has a drawback in relation to copyrights. The special feature of digital files is that the copy is identical to the original. Pirate copying and global distribution of copies via the Internet are therefore also part of the new conditions for the music industry.

American researchers estimate that the digital economy has a growth potential of 50 per cent of the global gross national product<sup>5</sup>.

The enterprises which are able to adjust their business to the global network economy will, with the new technology, be

able to sell in 4-5 months what they would normally sell in a year<sup>6</sup>. The reasons for this are partly access to the global market and partly the fact that technologies make it possible to rationalise the production and distribution chains to a great extent.

There are today many examples of enterprises which have adjusted themselves to the digital economy. Interflora delivers flowers throughout most of the world from day to day. Interflora is found in approx. 145 countries and has a total of 56,000 shops. Via the Internet, you can choose to which country you want to send a bouquet, what the bouquet is to look like and then pay for it.

While Interflora has introduced IT in the sales process, LEGO has incorporated IT in the product itself. In addition to its conventional building bricks, LEGO has created an intelligent building brick with a built-in microchip and sensors – LEGO Mindstorm – which allows children to build robots and programme their behaviour. The product is sold via the Internet.

42 per cent of corporate executives in 13 European countries expect their enter-

prises to have a global supply chain before 2003. 30 per cent of Danish corporate executives have the same expectations<sup>7</sup>.

Trade on the Internet is the cornerstone of the digital economy. Consumers in the EU bought goods for approx. DKK 5 billion on the Internet in 1998 – primarily books, IT products, travel and music. This is only equivalent to one per cent of the total sales of goods in these product groups, but the expectations for increased Internet sales are very high. In three years, analysts expect that the approx. DKK 5 billion will have become approx. DKK 94 billion – or 11 per cent of the total sales within these product groups<sup>8</sup>.

In the media, the greatest focus is on Internet trade between enterprises and consumers. But it is the Internet business to business trade which clearly accounts for the largest volume. Various analyses present one almost unbelievable figure after another. The EU Commission expects that 80 million Europeans and a turnover of approx. DKK 3,700 billion will be directly or indirectly affected by e-commerce already before 2002<sup>9</sup>. This is more than three times the total annual Danish production.

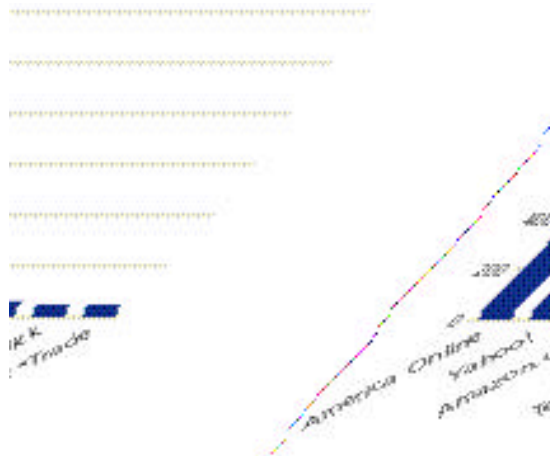
## **New Valuation**

The Internet and the World Wide Web (WWW) have made it possible for Internet enterprises and shareholders to earn money on completely different terms from before. Newspapers daily report acquisitions in the world of IT of a magnitude which is difficult to understand. Advanced search engines, portals and electronic auction houses today have a market value which is considerably higher than that of old, illustrious enterprises.

The search engine Yahoo! was started up in 1995 when two students designed an overview of websites on the Internet. Today Yahoo! is worth approx. DKK 330 billion with an annual turnover of DKK 1.3 billion. Yahoo!'s equity value is consequently approx. 250 times its turnover<sup>10</sup>. In more traditional enterprises, the equity value typically does not exceed the annual turnover by more than two to three times.

The industrial giant Volvo is another example. Volvo was sold to Ford in 1998 for an amount which was below the sale-price of the search engine Excite in the same year, despite the fact that Volvo's turnover was more than one hundred times greater than that of Excite<sup>11</sup>.

Figure 2. The market value for selected enterprises (in BDKK)



Source: Bloomberg, I.B.E.S., printed in Computerworld, 5 Nov. 1999

A third example is Priceline.com – a web-site which was launched in April 1998. Priceline.com sells “last-minute” plane tickets and hotel rooms. The enterprise’s first annual turnover was approx. DKK 250 million and a loss of just under DKK 1 billion.

But in May 1999, when Priceline.com became listed on the stock exchange, eager Internet investors nevertheless gave the enterprise a value of DKK 80 billion, equivalent to 320 times the annual turnover and 100 times the annual loss<sup>1,2</sup>.

The very high prices for new Internet enterprises with modest or negative earnings are an indication that investors believe in the Internet and in the ability of the enterprises to earn money in the long term. But another reason why the prices have sky-rocketed is that there is a great demand among investors for the relatively few IT shares which are offered for sale.

### New Conditions for Consumers

Microsoft’s Bill Gates predicts that the digital market will become a heaven for buyers<sup>3</sup>. Less will do, but the Internet makes it easier to compare what is on offer by various dealers and their prices, including by means of virtual agents<sup>4</sup>. And there is no legislation governing opening hours on the Internet!

The Internet also offers new possibilities for the political consumer. Information about enterprises which pollute the environment, treat their employees badly, support a specific political regime or exploit third world countries can quickly be distributed to a large market with great purchasing power, to politicians and to the press. Conversely, there is also a risk that misinformation which is disseminated so quickly to so many people may cause irreparable damage.

At the same time as consumers in the rich countries are shopping, communicating and looking for information and entertainment on the Internet, it will be possible to map the preferences of the individual consumer. This is an aspect which is both promising and alarming. Promising because it will become possible to offer consumers precisely the goods and information which meet their individual requirements and wishes. Alarming because consumers' private lives can be looked at through a magnifying glass so that it becomes possible to monitor and register, for example, consumers' shopping habits.

## **New Living Conditions**

### **New Technological Possibilities**

In a few years, citizens in the rich network societies will be linked up with the Internet most hours of the day. It will not be necessary to operate a complicated PC in order to gain access to the Internet. Mobile phones, TVs and minicomputers will, with the aid of simple push buttons or via speech, give access to the Internet, no matter where you are.

More and more of the objects with which

we surround ourselves are becoming intelligent<sup>15</sup>. It will become possible to operate the washing machine by remote control, follow cooking instructions from the Internet on the display of the cooker and download a new operating system for the drier from the Internet. In the car you will find the nearest route to your place of destination via a screen and receive information about the attractions which you pass en route. The temperature in a room will be automatically adjustable in accordance with our clothing, and the display of the mobile phone will be able to tell us that the water tap washers need to be decalcified. These new possibilities will soon be a natural part of our everyday lives.

### **New Conditions on the Labour Market**

There is much to indicate that management, organisational forms and working forms will change<sup>16</sup>. Easier communication and access to knowledge mean that more employees will have an information basis that will enable them to make decisions themselves.

It is becoming increasingly possible to work from home and still be in contact with the workplace, customers, clients and

partners. There is much to indicate that a considerable part of the workforce will do a large part of their work from home, and that forming a part of changing working groups and changing employment throughout one's working life will be the norm.

Some project workers will have no connection with a workplace at all. In the USA there are already today approx. 25 million Americans, known as free agents, who work without a permanent employer. These free agents are typically consultants, who sell their services to enterprises which depend on specific knowledge-based competence. Some free agents sell their services at electronic auctions such as [www.monster.com](http://www.monster.com)<sup>17</sup>. In Europe we cannot yet see the same significant movement from permanent employment to independent business activities or more temporary employment<sup>18</sup>.

If it is no longer necessary to report for work at the workplace every day, we can work in one region and live in another, where, for example, there is more nature or more cultural activities, better schools or more hours of sunshine<sup>19</sup>.

Parents in many families with small children will be able to put in a large

amount of their working hours at home. This will make it possible to loosen the tight schedule under which, during the hours from 8 am to 6 pm, parents have to take their children to school or kindergarten and pick them up again, manage their jobs and do the shopping. This can result in a better life, but it can also mean an endless working day.

### **New Competence Requirements**

One of the main competitive parameters in the global network society will be the competence and skills of the employees. The ability to be global, the ability to think creatively and to show commitment, the ability to adapt and the ability to take in, sort and condense large amounts of information will become central qualifications. The employees' ability continuously to develop their competence and skills, keep up with new knowledge and adapt will separate sought-after employees from those who are less desirable.

Many routine jobs will disappear. It must be expected that employees will be attracted to enterprises which can provide them with continuous access to competence development. Countries which ensure their citizens life-long learning will be

more attractive as a base for enterprises than countries which do not do so.

### New Conditions for Solidarity

The global market and the electronic communities of interests extend across borders and change languages, cultures and ways of life. The same is true of the large supply of news and entertainment from international media. This can alter the feeling of solidarity in societies – including in Denmark.

Today, solidarity is first and foremost built up around the family and our geographical and national affiliation. In the network society, we shall probably still have a feeling of solidarity with our local network – the school, the kindergarten, the flat owners' association. But we shall also have a close sense of community with those people all over the world who share our special interests.

There is a trend towards the strengthening of the very near local communities and the very special global communities, and this may take place at the expense of the solidarity which embraces everyone in the Danish welfare society. It is important to distinguish between the feeling of solidari-

ty which we have with people with whom we have mutual and binding contact and the feeling of solidarity which arises in, for example, chat rooms on the Internet and which can be free from obligations and anonymous.

## New Conditions for the World Community

### Greater Inequalities

With the spread of IT, we are in a situation in which the differences between the rich high-tech countries and the rest of the countries in the world are at risk of becoming even greater. With the network

Table 1. Number of Internet users in the world

	Internet users in millions
Africa	1.7
Asia	33.6
Europe	47.2
Middle East	0.9
Canada and USA	112.4
Latin America	5.3
Total	201.1

Source: Nua Internet Surveys, September 1999

technologies, the rich countries will be able to increase their affluence. For the poor countries, the efforts to obtain food, water and a physical infrastructure and to eliminate illiteracy will, of course, often be given top priority. Technological development is not a matter of top priority.

Half the world's population today has no possibility of communicating by telephone. Figures from NUA Internet Surveys<sup>20</sup> show that the use of the Internet is markedly greater in industrialised countries than in developing countries. The table shows that among the total of approx. 760 million Africans<sup>21</sup>, 1.7 million are Internet users, 1.6 million of whom are found in South Africa alone. This means that the number of Internet users in Denmark is just as high as the number of Internet users in the whole of Africa<sup>22</sup>.

## Conclusions

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- Information technology and global competition will render many middlemen and enterprises superfluous. The challenge will be to ensure that a sufficient number of Danish enterprises utilise the new technologies which are to secure earnings and jobs.
- The digital economy has a growth potential of up to 50 per cent of the global gross national product. The countries whose enterprises are among the first to establish themselves on the Internet will have a share of this growth. The challenge will be to be among the leading enterprises in this field.
- Internet enterprises which currently have modest or negative earnings are valued considerably higher than other enterprises. The challenge will be to secure good conditions for the entrepreneurs who are willing to establish enterprises which are geared towards the digital economy.
- The Internet will offer cheaper and more customised products and technologies which make it possible to register consumers' purchases and preferences. The challenge will be to ensure that consumers can obtain reliable information, that they are not monitored against their will and that the information which they supply is not misused.
- In the course of a few years, we shall be linked up with the Internet most hours of the day, and several of the objects with which we



- surround ourselves will have built-in intelligent electronics and will be connected to the Internet. The challenge will be to use these new technological possibilities to improve the quality of our everyday lives.
- The relationship between employers and employees will change. The challenge will be to ensure the development of organisational cultures and management forms which match the network society's flat decision-making structures and requirements for knowledge-sharing and reasonable working conditions for work from home.
  - Creative thinking, commitment, the ability to adapt and the ability to take in, sort and condense large quantities of information will be central. The challenge will be to guarantee citizens life-long learning.
  - There is a trend towards the strengthening of the very near and the very global communities and this is taking place at the expense of the national community. The challenge will be to strengthen, for example, the task of the school as a provider of the joint values which ensure a feeling of solidarity in Danish society.
  - The network society will generally widen the gap between the rich countries and the poor countries. The challenge will be to ensure that the world's poor countries have a share in the growth potential and knowledge-sharing of the digital economy.



# Notes to the Global Network Society

- 1 The figure has been calculated by the study group behind the book *Slip danskerne løs*, Lindholm & Møller, 1998
- 2 Børsens Nyhedsmagasins editor-in-chief, Michael Lindholm, describes the new market conditions as follows: "Old chains of values and business models are collapsing, whole industries and trades are being merged, whereas new ones are taking form. Those who know how to see their waythrough this can make fortunes. Those who discover this change too late risk losing everything." *Den Digitale Købmand* (The Digital Businessman), Copenhagen 1999. See [www.dendigitalekobmand.dk](http://www.dendigitalekobmand.dk)
- 3 Deloitte Consulting. Reflections on the role of IT in connection with the enhancement of the efficiency of selected industries, 1999
- 4 The MP3 format is actually called MPEG-3 and is named after the standardisation body Motion Picture Experts Group
- 5 US Department of Commerce/Lucent Technologies, 1999
- 6 According to Lindholm & Møller, *Slip Danskerne Løs*, 1998
- 7 According to an analysis made by journalist Bjørn Kassøe Andersen for Dansk Industri (the Confederation of Danish Industries), IT, Telecommunications, Electronics and Communications (ITEC), 1999
- 8 *Mandag Morgen*, no. 33, 1999
- 9 The EU Commission, Content and Commerce Driven Strategies in Global Networks, 1998
- 10 Bloomberg, The Institutional Brokers Estimate System (I.B.E.S.), printed in *Computerworld*, 5 November 1999
- 11 According to the Swedish IT Commission, 1999
- 12 Ole Grünbaum, *Den digitale darwinisme* (Digital Darwinism), *Tiderne Skifter*, 1999
- 13 Bill Gates, *Management at the Speed of Thought*, 1999
- 14 A virtual agent is a computer program which the consumer can send out on the Internet to find specific goods at specific prices. The agent searches the Internet and tells the consumer where the cheapest product can be bought. An example of a virtual agent can be found at [www.rusure.com](http://www.rusure.com)
- 15 Neil A. Gershenfeld. *When Things Start to Think*, New York 1999

- 16 Collaborative Economics, Linking the New Economy to the Liveable Community, White Paper, April 1998
- 17 Mandag Morgen, nos. 13 and 36, 1999
- 18 Gerhard Bosch. The Labour Market of the Future, 1999. The article is found in the appendix to the present report.
- 19 According to the Collaborative Economics White Paper, Linking the New Economy to the Liveable Community, April 1998, the dissolution of the geographical ties will, in the long term, mean a relocation of dwellings from cities, towns and suburbs to rural and natural areas.
- 20 Nua Internet Surveys. Nua primarily bases its statistics on different regional surveys of Internet use. The total number of Internet users should therefore be regarded as an uncertain estimate based on different regional surveys which often use different measuring parameters. Internet users are defined by Nua as persons (children and adults) who have been linked up to the Internet within the past three months. See [www.nua.ie/surveys/how\\_many\\_online/index.html](http://www.nua.ie/surveys/how_many_online/index.html)
- 21 The figure for the population of Africa does not come from NUA's survey, but from AISI National ICT Profiles, 1998. See [www2.sn.apc.org/africa](http://www2.sn.apc.org/africa)
- 22 According to Nua Internet Surveys, there were 1.7 million Danish Internet users as in September 1999

# Digital Denmark

We are faced with the challenge of repeating the feat achieved by Denmark in both the agricultural society and the industrial society: converting Danish society to a new technological and economic reality. The challenge is to ensure that Denmark takes the new technologies into use quickly so that we get a share in the great growth potential of the digital economy and so that the conversion is based on the values which form the foundation of Danish society.

## Standard of Values

Digital Denmark is based on an active, representative democracy in which there are equal opportunities for all and in which a feeling of solidarity binds society together and ensures help for those who need it.

The new technologies are to give all

citizens free access to information and exchange of information, and the possibilities of increasing the citizens' self-determination are to be utilised. It must be ensured that the technologies are not used for monitoring or are an invasion of the privacy of the citizens.

Digital Denmark is to be based on sustainable development in the international community.

With these values as a guide, the conversion to the network society must be based on the potential of Danish society on the threshold of the new Millennium.

## Conversion Potential

Depending on the criteria used, Denmark is placed at various positions at the upper end of the international ranking list in different surveys and reports.

In the following, we present the strengths and weaknesses of Denmark which will be of significance for Denmark's conversion to the global network society.

### **The Economic Prerequisites**

We are a rich society. If the gross national product per inhabitant is taken as an indicator of our wealth, Denmark is the fifth richest country of the OECD countries<sup>23</sup>. Enterprises, the public sector and the majority of consumers can afford to make the investments in the new technologies which are one of the prerequisites for the process of conversion.

### **Social Stability**

We have a high degree of harmony and relatively little social tension. Our society is fundamentally fair, with welfare amenities which are available to all citizens.

Differences between high income brackets and low income brackets are small in Denmark. If we look at the differences in disposable incomes, Denmark is at a relatively low level and below the level in, for example, Sweden, the Netherlands, Germany and, not least, the USA<sup>24</sup>. In the industrial society, large pay differences are

regarded as an important financial incentive. In the network society, the opposite may be true. Here small pay differences can promote flexibility because the employees consequently find it easier to switch between work assignments and jobs – without their pay changing markedly<sup>25</sup>.

### **Readiness to Adjust**

We have a positive attitude to change. If we look at the preparedness in relation to the 21st Century, Denmark is evaluated as being the country in the world which is most ready to meet the challenges of the future, according to a survey from World Economic Forum<sup>26</sup>.

Our corporate culture is based on small differences between the various strata of the power structure and an informal tone between management and employees, and we bring up our children with the emphasis on independence, a critical sense and tolerance. Qualities which are precisely those that will be in demand in the workplaces of the future<sup>27</sup>.

But our critical sense also means that we are very sceptical when it comes to, for example, the introduction of new technology. One example of this was seen in

connection with the introduction of the Danish electronic payment card system, Dankortet, which only became widely used as a form of payment after the passage of a number of years.

E-commerce, where citizens shop directly on the Internet, is being met with the same scepticism as Dankortet was, when it was introduced. In a survey made in 1999, 81 per cent of the respondents stated that they preferred personal service to the alternative of ordering goods via the Internet<sup>28</sup>.

A self-appointed Competence Council has undertaken the task of evaluating the abilities and qualifications of the Danes in relation to the global society of the future. Using 132 indicators, the Council has given Denmark the overall mark of 8, based on a marking scale between 0-13. Our network co-operation ability contributes to improving the mark, whereas the lack of new enterprises and lack of investments in information technology pull in the other direction<sup>29</sup>.

### The Educational System

Denmark has a well-developed educational system and extensive supplementary training and education activities. Denmark

allocates approx. 14 per cent of its total public expenditure to training and education, which is equivalent to DKK 88 million<sup>30</sup>. However, one weakness is that the educational system is unable to provide graduates with the qualifications demanded by trade and industry, one example being the shortage of engineers. The annual influx of students to the degree courses in engineering has decreased from just under 5,000 in 1990 to just over 3,000 in 1999<sup>31</sup>. And more than 60 per cent of all Danish enterprises look upon the shortage of IT-qualified staff as a barrier to their use of IT<sup>32</sup>.

The question is whether the content and structure of the present educational system meet the requirements of the network society. The weekly newsletter Mandag Morgen claims that the basic structure of the educational system, divided according to age, the form of learning, curriculum and teaching aids and materials, seems to be out of step with the requirements made by the dynamic workplaces of the future: requirements for creativity, willingness to take risks, adaptability, information-processing and the ability to form a part of changing working groups and changing employment throughout one's working life<sup>33</sup>.

## **The Framework Conditions of Trade and Industry**

Denmark has a high tax level and high wages and salaries. It is therefore necessary that Denmark should be able to compete on other parameters such as the competence and qualifications of the workforce.

But even if we give priority to investing in developing the competence and qualifications of our workforce, the global competition of the network society will put our fiscal policy under pressure. The high Danish rate of VAT constitutes a special problem. All 15 EU Member States have common rules for calculating and levying VAT, but the rates of VAT vary from country to country. Denmark has the highest rate of VAT, 25 per cent, in the world. In 1998, an IT Committee under the Ministry of Taxation evaluated that the boom in trade via the Internet is not as imminent as expected and that the problem is therefore not acute. But the IT Committee also stated that more widespread use of trading via the Internet will put pressure on the administrative systems whose task it is to ensure that VAT is paid in Denmark. Furthermore, the Danes' shopping pattern will probably change from purchasing goods from a Danish supplier with Danish VAT to purchasing goods from a foreign sup-

plier who is exempt from the high Danish rate of VAT<sup>3,4</sup>.

If the many forecasts for e-commerce which predict an explosive increase hold even partly true, Denmark will experience a distortion of competition as a consequence of the different rates of VAT.

## **Entrepreneurial Culture and Financing**

New high-tech enterprises are important catalysts for the development of IT products and services. The proportion of new enterprises which are being established in Denmark is low compared with Sweden, the Netherlands and France<sup>3,5</sup>.

Know-how-based and technology-based enterprises make great demands on innovation. Analyses of the enterprises' investments in research and development, seen in relation to their increase in value, carried out in a number of countries show that the Danish manufacturing sector is in a poor position compared with, for example, Sweden, the USA and Japan. On the other hand, investment in research and development in the service trades and the other sectors is only surpassed by Swedish enterprises<sup>3,6</sup>.

Innovative enterprises, including Internet enterprises, have a special problem. Often no major investments are required to start up a know-how-based or high-tech enterprise. But even a low start-up capital can be difficult to obtain. Banks and financing companies are used to enterprises putting up real property or machines as security for a loan. Many of the new enterprises often have nothing but a few computers, a good idea and their general know-how to put up as security.

In Denmark we have several schemes aimed at promoting development projects. One of them is the Growth Fund, which, with a State-funded basic capital of DKK 2 billion, can co-finance development projects in both new and existing enterprises. In October 1999, the Growth Fund launched two new funds with money for newly-formed IT and biotech enterprises<sup>37</sup>.

The question is, however, whether these initiatives are sufficient. A report from the firm of consultants KPMG concludes, among other things, that new, small, innovative enterprises have an unsatisfied annual financing requirement in the order of DKK 3.1 billion<sup>38</sup>.

Approx. DKK 7 billion per annum is

given by the State to trade and industry – and these subsidies are not decreasing. For example, the subsidy to shipyards is increasing by DKK 67 million in the period 1999-2000, even though the number of shipyards is decreasing. The subsidy to the agricultural sector has increased by DKK 250 million in the period 1998-2000<sup>39</sup>.

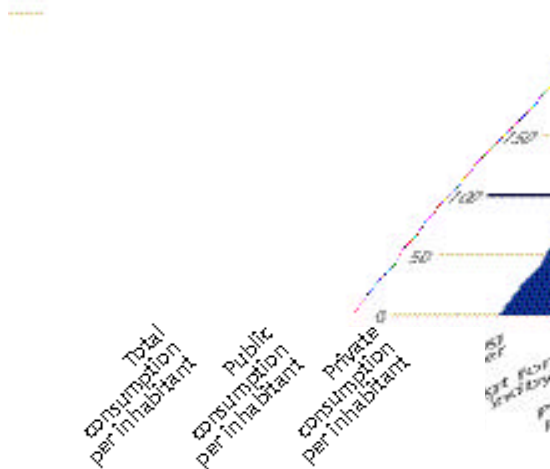
### The Age of the Workforce

The Danish workforce will become older in the coming years. Compared with today, there will be 150,000 more people aged 60-66 years in 2010. In the same period, the number of 20-34-year-olds will decrease by just over 200,000. In addition, demographic development does not take place proportionally in all industries and sectors. The public sector in particular stands out by having a considerable over-representation of employees over 45 years of age<sup>40</sup>.

In the three large municipal service areas – day care, primary and lower secondary schools and the elderly – alone, 100,000 nursery-school teachers, primary and lower secondary school teachers and social services and health care personnel will need to be recruited up to the year 2006. Roughly speaking, this is equivalent to



Figure 3.  
Total public and private consumption per inhabitant in Denmark compared with the OECD average. Index, OECD average = 100



Source: Finansministeriet, Strukturovervågning 1999  
(The Ministry of Finance, Structural Monitoring 1999)

approx. every third young person of a particular year enrolling on one of these training courses, when the present drop-out rate is taken into consideration<sup>41</sup>.

The same work will have to be done with the same quality but by fewer people. The rationalisation gains inherent in the implementation of IT in institutions and enterprises are not, therefore, merely to be seen as an optional advantage. Rationalisation is a necessity.

## The Public Sector

The Danish welfare model is based on a large public sector which finances considerable transfer payments and a number of joint welfare amenities such as education, training, health care and nursing. Public consumption per inhabitant is nearly twice as high in Denmark as that in the other OECD countries.

A number of public institutions in the State, counties and municipalities work hard to use new IT to improve service to the citizens and to enhance the efficiency of their administrative procedures. But there are many institutions which are not utilising the new possibilities. 93 percent of the total number of public institutions did not have a home page at the beginning of 1999. Virtually all institutions which have a home page can be reached by e-mail. The same only applies to half the public institutions which do not have a home page<sup>42</sup>.

However, a large-scale conversion of the public sector to the network society will be problematic. The sharp sector division and the decentral structure are barriers to radical interdisciplinary processes of conversion – for example across State, counties and municipalities.

The Report on the Information Society Year 2000 was given a distribution and coverage enjoyed by few committee reports and political initiatives. It put the information society on the political agenda. An analysis of the impact of the report, on the other hand, shows that a number of the proposals aimed at the public sector have not been implemented.

### Danish Culture

A great deal of the provision of Danish culture – public-service radio and TV, theatre, film and libraries – reaches a wide section of the population. Danes spend two hours a day watching TV on our public-service channels. Danish libraries lend 86 million books, etc. every year. Danish films sell 1.6 million tickets every year, and Danish theatres 2.4 million tickets<sup>43</sup>. With its firm anchoring in the population, the cultural sector is a good basis for maintaining and further developing Danish identity and the Danish language in the global society.

Danish film, TV, architecture and design have a high international standard and can contribute the scientific and cultural contents to the digital services which will be one of the essential competitive parameters in the products on the digital market.

But Denmark's smallness and the limited number of people who speak Danish are a poor basis on which to start. The major figures in the Danish media such as Denmark's Radio (the Danish Broadcasting Authority) are very small compared with the international media giants such as Time Warner. And they make a very limited impact in the digital field.

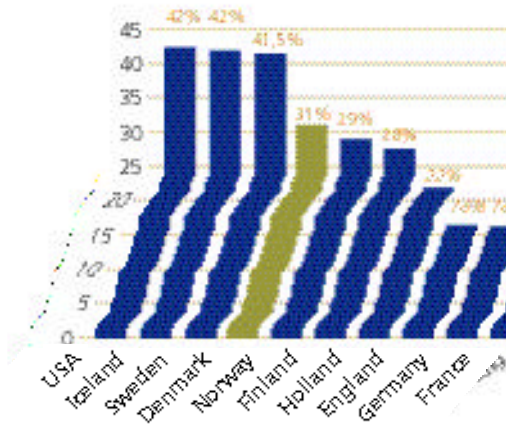
### Denmark's Internet Basis

The Internet is the central nervous system of the network society. Nearly every third Danish household has access to the Internet (cf. figure 4) – a figure, however, which is surpassed by the USA, Iceland and Sweden, which all have a household coverage of 42 per cent<sup>44</sup>.

Many Danes have access to the Internet at their workplace. In the first quarter of 1999, half the Danish population stated that they had access to the Internet<sup>45</sup>. However, there is an imbalance in the distribution of the use of the Internet. Only approx. 15 per cent of households with an income below DKK 150,000<sup>46</sup>, 8 per cent of persons with a low level of education<sup>47</sup> and 11 per cent of persons who are 60 years of age or older<sup>48</sup> use the Internet.

Regarding e-commerce, Denmark is in

Figure 4. Internet access in households



Source: Gallup A/S, 1999

front in terms of trade between enterprises. Here, with an average of DKK 120 per inhabitant, Denmark is ahead of both Sweden and Finland. If we look at the total e-commerce, which also includes the citizens' e-commerce, the picture changes. Here, Sweden is on top with DKK 189 per inhabitant, followed by Finland with DKK 176 and Denmark with DKK 164 per inhabitant<sup>49</sup>.

Broadband connections are necessary if the citizens and enterprises are to have access to transmit large amounts of data

and use Internet services with sound and live pictures. The availability of broadband connections – and the prices to be paid for such a connection in Denmark – do not live up to the development in the 3-5 countries in the world which are in the forefront in this field<sup>50</sup>.

As an example of a market development which we have not yet seen in Denmark, it can be mentioned that the enterprise “Framtidsfabriken/Bredbandsbolaget” in Sweden markets cheap Internet solutions which comprise 10 Mbit/s for private individuals and enterprises. In Denmark, the market has been dominated by ISDN<sup>51</sup>. Denmark has 15 ISDN connections per 1000 inhabitants. In comparison, Germany has 35 ISDN connections per 1000 inhabitants<sup>52</sup>.

The use of the Internet, the actual availability of broadband connections, the prices which you have to pay for a broadband connection in Denmark and the e-commerce which takes place between enterprises and consumers do not measure up to the levels achieved in the 3-5 leading countries in the world. In particular the other Nordic countries and the USA seem to be 12-18 months ahead of Denmark on a number of points regarding demand,

market development, prices, product supply and consumer interest.

On the other hand, OECD's statistical surveys show that Denmark has the world's lowest telecommunications prices for private enterprises and the second-lowest for ordinary users<sup>53</sup>.

Today, nearly 60 per cent of all Danish households have a mobile phone. This will be a good basis when the new mobile networks, which can give quality access to the Internet from a mobile phone<sup>54</sup>, are, as expected, introduced on the Danish market at the end of 2001. However, Finland and Sweden have more mobile phones per inhabitant than Denmark.

Measured in terms of, among other things, Internet access from the home and telephone prices, the American IT research enterprise Jupiter Communication ranks Denmark in third place on the list of the world's most advanced IT nations – only surpassed by the USA and Sweden. The same research enterprise is also, however, of the opinion that the top placing of Denmark and the other Scandinavian countries is under threat. Denmark is

number 19 on the list of the countries in the world which have the greatest IT potential in the long term.

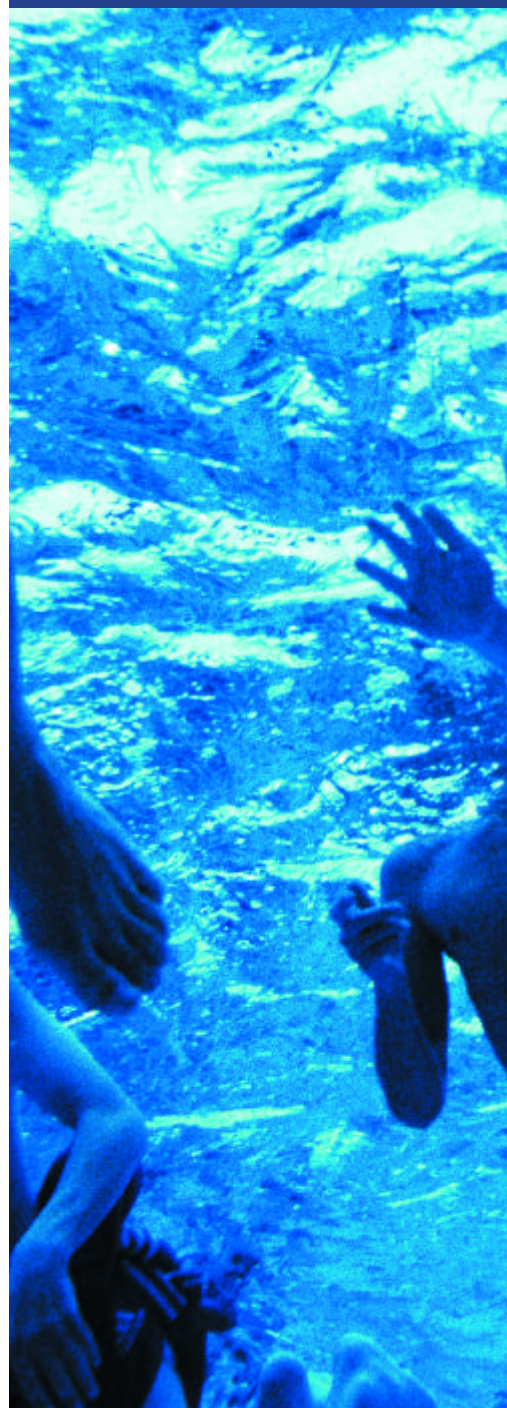
## Conclusions

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- Danish citizens are among those who are best equipped for life in the network society. But we shall not have the digital economy up and running until citizens and enterprises feel secure when using the Internet. A safe and reliable framework must therefore be given high priority.
- Denmark has a well-developed educational system and extensive supplementary training and education activities. But even these large investments in training and education do not meet the requirements of the network society either in structure or content. A restructuring is necessary.
- The Danish tax level and the level of wages and salaries are high. It is therefore necessary that Denmark can compete on other parameters, first and foremost our competence and qualifications.
- The outline provisions for Danish enterprises are put under pressure in global competition. The challenge in terms of fiscal policy will be to organise the tax system so that it secures both our special welfare model and the competitiveness of Danish enterprises on the global market.
- Denmark has a relatively poor high-tech entrepreneurial culture. And we do not yet fully utilise the potential which our high level of training and education would indicate. There is a need for initiatives which promote the formation of advanced Danish IT enterprises.
- We are entering upon a problematic demographic development: The number of elderly persons will increase markedly, whereas the influx of young people into the labour market will decrease even more markedly. The age profile in the public sector means that this is the most exposed sector. IT is an obvious possible solution.
- We have a large, well-functioning public sector. In addition to enhancing the efficiency of its administrative procedures, a conversion of the public sector to the network society will make it possible to push the digital economy forward. But it will be difficult to achieve this process of conversion for the public sector in accordance with one overall plan.
- We have a widely ramified and publicly-funded cultural sector which reaches a wide section of the population. Danish culture has a high standard and can provide the scientific and cultural content in the digital services. But Denmark's

size makes it difficult for it to influence international development on an equal footing. It is therefore necessary to encourage Danish language, culture and media supply.

- We have a well-developed telecommunications infrastructure and widespread use of the Internet and mobile phones, but the use of broadband connections is only slowly gaining ground, and we are trailing behind the countries with which we normally compare ourselves.



# Five Objectives

Denmark cannot be in the forefront on all points – priority must be given to specific initiatives and areas of action.

We have prioritised 5 objectives, which, in the rest of the report, will be followed up with recommendations for concrete initiatives.



## Objective 1 Life-long Learning for All

As the first country in the world, Denmark is to ensure its citizens access to life-long learning in the network society.



## Objective 2 Denmark as an E-commerce Nation

Denmark is to be one of the five countries in the world which have the largest e-commerce turnover per inhabitant in 2003 and Denmark is to be able to offer competitive outline provisions for enterprises in the network society.



## Objective 3 More Effective and Cheaper Service via Digital Administration

At the latest by 2003, Danish public administration is to provide the best and most efficient public service in the Nordic countries with the help of digital administration.



## Objective 4 Danish Internet Initiatives

Participation in democracy, open decision-making processes and Danish cultural activities are to be supported by new and attractive Internet services for all citizens by 2003 at the latest.



## Objective 5 IT Lighthouses in Denmark

Two IT lighthouses are to be established in Denmark, one in Northern Jutland and one in Ørestaden, to promote, from different perspectives, IT development and IT use in the network society.

# Notes to Digital Denmark

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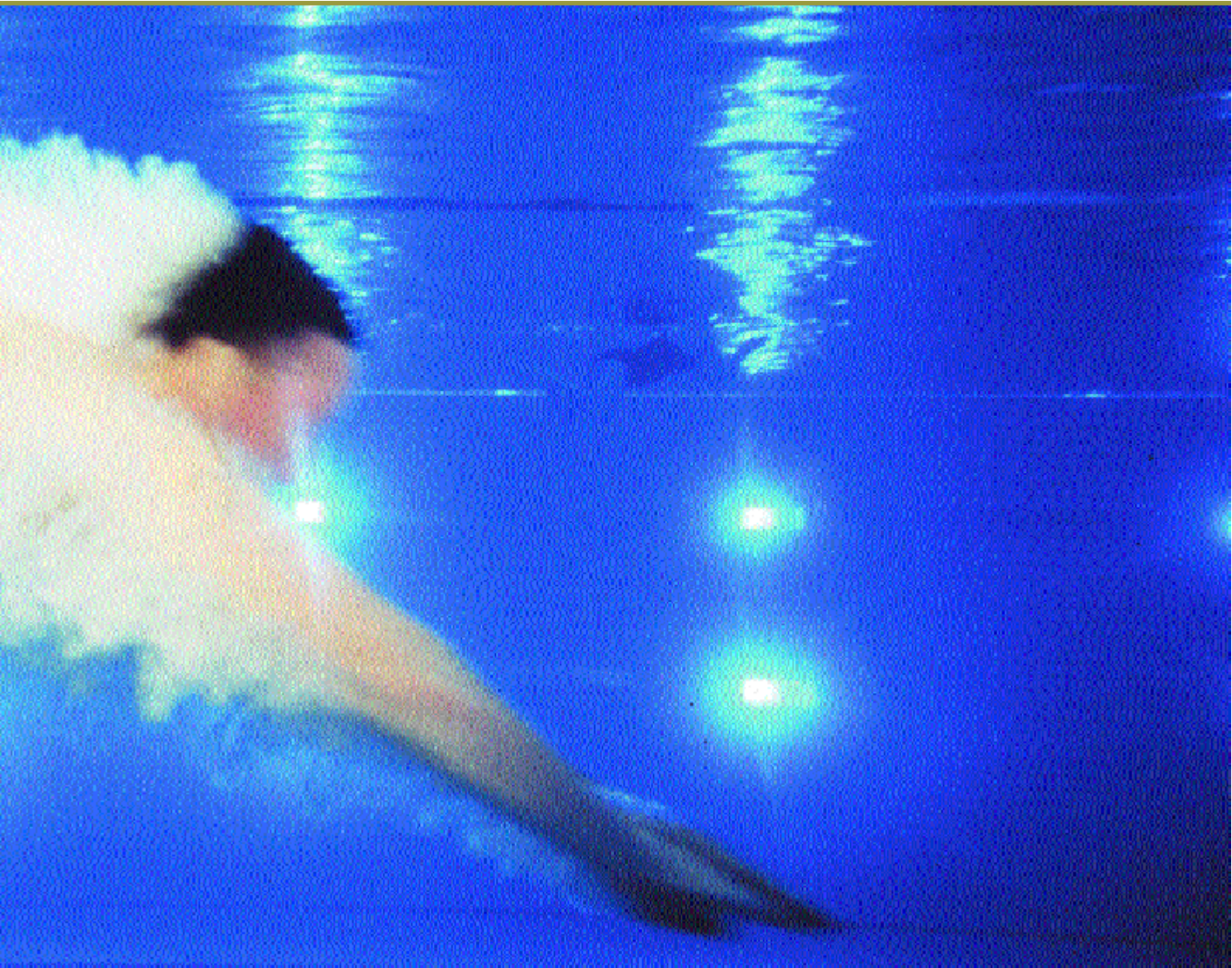


- 1999 (The Growth Fund - Study of the Establishment of Innovation Funds, 1999). See [www.vaekstfonden.dk/nyheder/rapporter/innovationsfond.pdf](http://www.vaekstfonden.dk/nyheder/rapporter/innovationsfond.pdf)
- 39 Uffe Gordel: "Erhvervslivets Cigarkasser" (The Cigar Boxes of Trade and Industry) in *Berlingske Tidende* on 7 November 1999
- 40 Arbejdsministeriet, *Den offentlige sektors rekrutteringsmuligheder frem til år 2005*, 1999 (The Ministry of Labour, *The Recruitment Possibilities of the Public Sector up to the Year 2005*, 1999)
- 41 Kommunernes Landsforening, *Kampen om arbejdskraften*, 1998 (The National Association of Local Authorities in Denmark, *The Battle for Labour*, 1998)
- 42 KPMG, *Den digitale forvaltning – udbud og efterspørgsel*, 1999 (Digital Administration – Supply and Demand, 1999). See [www.fsk.dk/fsk/publ/1999/forvaltning/default.htm](http://www.fsk.dk/fsk/publ/1999/forvaltning/default.htm)
- 43 Danmarks Statistik, *Statistisk Tiårsoversigt*, 1999
- 44 Gallup, 1st Quarter 1999
- 45 Gallup, *Internet Bus*, 1st Quarter 1999
- 46 IDC, May 1998
- 47 IDC, May 1998
- 48 Gallup, 1999
- 49 IDC, January 1999
- 50 Telestyrelsen (the Danish National Telecom Agency) and *Mandag Morgen*, no. 38, 1999
- 51 ISDN is a pure digital network as opposed to the ordinary telephone network, which is analog. The speed is 64 kbit (65,536 bits per second). In recent years, there has been a heavy growth in the number of ISDN connections in Denmark. In 1996 there were approx. 30,000 ISDN connections. In 1997 the figure was approx. 58,000 and in 1998 there were more than 117,000 ISDN connections in Denmark. This is equivalent to approx. 3-4 per cent of all subscription lines in Denmark. Telestyrelsen, *Teleårbog 1998* (The Danish National Telecom Agency, *Telecommunications Yearbook*, 1998)
- 52 OECD, *Communication Outlook*, 1999
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- 55 Jupiter Communications, 1999





# Initiatives



# Objective 1 Life-long Learning for All



**As the first country in the world, Denmark is to ensure its citizens access to life-long learning in the network society**

This objective is to be met through investments in, and initiatives aimed at an adjustment of, the educational system and by ensuring special IT competence.

**Table 2. Computers and the Internet in schools**

	no. of students per computer	no. of students for each recent* computer	% of PCs with Internet access
Primary and lower secondary school <sup>6</sup>	8,63	10,75	49%
Upper secondary school <sup>7</sup>	6,63	6,89	44%

\* Computers with an Intel processor of the type i486, Macintosh PowerMac and other equivalent or more recent computers

## Conversion of the Educational System

The educational sector has begun the process of conversion to the network society. However, locally, the development is, to a great extent, being driven by enthusiasts. This can, for example, be seen from the equipment situation in the educational sector. The average figures for the stocks of IT equipment in the educational system look impressive, but they cover over very large local differences. In the worst situation, more than 44 upper secondary school students have to share one recent computer, whereas another upper secondary school has more than one recent computer per student<sup>5 8</sup>.

It is important that the conversion of the educational sector to the network society can take place in accordance with an overall plan for the whole country, whether this concerns supplementary training of teachers, ensuring IT integration in the subjects taught or improvement of the equipment situation.

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## Recommendation 1.1

### Overall National Strategy

An overall strategy should be drawn up for how all Danish citizens can be ensured access to life-long learning. The strategy should be prepared with the involvement of all decision-making levels, educational establishments and the private and public sectors.

A national strategy for life-long learning should comprise learning at all ages and at all levels: pre-school children, school pupils, students, people engaged in active employment, the unemployed and the elderly.

The strategy is to:

- make Denmark a well-supplied com-

petence country with a qualified, up-to-date workforce and consequently a competitive competence area

- ensure the individual citizen access to competence development throughout his or her life
- ensure optimal utilisation of the potential of information technology.

A Commission on Life-long Learning in the 21st Century, *LL-21*, should be set up.

The task of *LL-21* will be to formulate an ambitious strategy for life-long learning.

Three important elements in the strategy are:

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## The Integration of IT in Training and Education Is under Way

- Sektornet is the Danish schools' joint network and connection to the Internet. In 1995, Sektornet's first cables were laid, and today Sektornet is a wide network. Approx. 2,300 institutions are connected to Sektornet.
- In the same year, a national centre of science for remote education and technology-supported teaching, CTU, was set up.
- The Ministry of Education has started a number of educational services which have seen the light of day on the Internet, including Fagenes Infoguide, Kidlink, Skolernes Databaseservice, den Elektroniske Markedsplads for Undervisning and SkoleKom.
- In 1998-99, all employees at 23 primary and lower secondary schools were given a home computer with Internet access in connection with the Ministry of Research and Information Technology's IT project
- The Ministry of Education's projects such as Poseidon, Janus, Banebryderprojektet and Den Elektroniske Skole have shown new ways forward for the integration of IT in teaching.

- radical adjustment of the content of training and education, forms of learning and methods of evaluation
- increased initiatives aimed at learning at the workplace
- increased co-operation between the educational establishments and the labour market on life-long learning.

*LL-21* will establish a network organisation to ensure that the relevant parties are involved in binding co-operation on the formulation of, and follow-up on, the strategy. Furthermore, *LL-21* will prepare an annual situation report on the strategic work and continuously highlight areas of action in which strategic initiatives can lead to marked improvements.

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### Recommendation 1.2

#### IT Support for Teachers

The Danish county educational centres should be strengthened so that they can provide increased IT support for primary and lower secondary schools and out-of-school educational establishments and provide guidance for teachers on how to integrate IT in their teaching. In addition, an IT counsellor should be appointed at each primary and lower secondary school and out-of-school educational establishment.

IT integration presents teachers with completely new requirements, which they must be able to meet. This does not mean that IT integration is simply to be left to the individual teacher. Respect must be shown, and conditions must be created which will enable teachers to handle this large and difficult social task.

Danish teachers and instructors are generally well-trained, but they are lagging behind on the IT front. At primary and lower secondary school level, teachers are, however, making headway, with 8,500 teachers (equivalent to every seventh primary and lower secondary school teacher) having enrolled in a course to obtain the educational IT driver's licence in 1999. A formalised IT training programme is being developed for upper secondary school teachers. In addition to formalised training, teachers are to be given the opportunity to develop competence and skills for IT-integrated teaching in their day-to-day work. More initiatives aimed at IT support of schools and teachers could take place with an extension of the existing county educational centres. They should provide increased IT support to the schools so that the teachers can concentrate on the educational work, while others ensure that the technology works. And they should be



able to guide teachers in how they can integrate IT in their daily teaching. Such support should be provided locally by persons with close knowledge of the possibilities and limitations of the individual school. In addition, each institution should appoint an IT counsellor who can support the teachers in the integration of IT in their teaching. The schools are also urged to think along unconventional lines in connection with this development and, for example, involve pupils who have in-depth technical knowledge in the maintenance of the computers and in training the teachers.

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### **Recommendation 1.3 PC Scheme for All Publicly Employed Teachers**

For a 2-year period, all publicly employed

teachers and instructors should be offered a home PC with access to the Internet. The PC is to be acquired for an educational and/or vocational purpose. The PC scheme should be financed by a combination of user payment by means of subtractions from the gross salary and a contribution from the employer.

Another way of increasing teachers' IT competence would be to provide more teachers with a home PC under a home PC scheme.

In October 1999, it became possible for public institutions to offer their employees a home PC scheme via subtractions from their gross salary. Public servants – and consequently many teachers – are excluded from this scheme for the time being.

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## **Home PC Schemes in Denmark**

226,000 Danish households currently have a PC which they have received under a home PC scheme. Private enterprises are responsible for approx. 60 per cent of these PCs, while the remainder are distributed through a number of different schemes provided by the public sector and the

trade union movement. Only approx. 20 per cent of the PCs have been acquired via a public home PC scheme. The home PCs are used diligently. Approx. 10 hours on average a week per household. They are primarily used for homework, education, communication and the

search for information. In addition to the group of home PC recipients who are under an obligation to take a supplementary IT training course, a surprisingly large share of approx. 20 per cent use their computers for voluntary training and education<sup>5</sup>.

This obstacle should be removed, and a special initiative should be taken for, to begin with, publicly employed teachers who are to train the rest of us in active participation in the network society.

Therefore, a home PC scheme should be established under which all the approx. 85,000 publicly-employed teachers are offered a PC and Internet link-up. The offer is aimed at the individual teacher, who consequently does not depend on whether his or her workplace chooses to offer the scheme. The PC is acquired for educational and/or vocational purposes. The purchase is financed by user payment via subtractions from the gross salary and by a contribution from the employer, that can be set off by savings on expenses for supplementary training.

A round of invitations to tender should give publicly-employed teachers the possibility of choosing different PC solutions.

### Recommendation 1.4 IT Integration in All Subjects

Acts and Executive Orders dealing with all education and training should be revised so that requirements are laid down for the educational use of IT in classes and for exams. In parallel with this, the development of digital teaching aids and materials should be promoted.

Danish training and education and the subjects taught are well described in Acts, Executive Orders and curricula. Unfortunately, there is not much about IT in the framework provisions for training and education. The integration of IT in all subjects has been given high priority by the Ministry of Education, which treats it as one of five areas of action in the plan of action for IT in training and education from 1998. There is a need for concrete provisions as a supplement to the Ministry of Education's focus on an examination of the importance of IT integration.

### The Ministry of Education's Plan of Action 1998-2003

In 1998, the Ministry of Education drew up a plan of action for information and communication technology in the edu-

cational system 1998-2003. One of the objectives of the plan of action is to examine the importance of IT to the

content of the subjects, methods, didactics, evaluation forms and the composition of the subjects offered.



In order to ensure the integration of IT in all subjects, IT integration must be described in Acts and Executive Orders. In a large part of the educational system and in many subjects, IT integration has been described in the curricula and is consequently only intended as a guide. This is not enough. IT should be inserted in the framework provisions for training and education on a level which ensures that IT must be integrated in the teaching and not merely that it can be included. A revision of Acts and Executive Orders is to be begun immediately.

Another way of promoting the integration of IT in teaching is to ensure access to digital teaching aids and materials of high quality. In connection with the revision of Acts and Executive Orders, a partnership is to be established between the Ministry of Education, the teachings aids and materials industry and multimedia enterprises on the development of digital teaching aids and materials. The finished products can be offered via Sektornet.

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#### **Recommendation 1.5 One link to the Internet for Every 10th Pupil**

All primary and lower secondary schools and out-of-school educational establishments should have one high-speed link-up to the Internet for every 10th pupil before 2003.

The Government's policy is that primary and lower secondary schools are to have one recent computer per 5-10 pupils in 2003. The current national average is one recent computer per 10.75 pupils (see table 2, page 46). While this positive trend continues, new developments must be taken into account. In the course of the past five years, the Internet has acquired a very central position in society. Internet link-ups are therefore the next central target for equipment in schools and out-of-school educational establishments.

The use of the Internet in teaching is essential for pupils and students to be able to learn how they can find, sort and process large quantities of information. In addition, the use of the Internet ensures a global perspective on learning so that pupils and students can learn how the subjects are used and developed in other countries.

The Internet also gives access to network-based teaching aids and materials, which have the advantage that they can be updated quickly. With the rapid development in society, it is becoming necessary to replace, for example, history books and geography books on a continuous basis. This means that the schools must replace

whole class sets, even though it may be only individual paragraphs or maps which are outdated. With network-based teaching aids and materials, it becomes possible to replace individual parts of the teaching aids and materials without having to scrap everything.

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### Recommendation 1.6 English from Nursery School Class

All teachers from the nursery school class and throughout the whole educational system should include material in English in their teaching. The actual teaching of English as a subject should commence in the second class.

It is important that the schools and educational establishments have teaching aids and materials in Danish. But in a global network society Danish is not enough. The principal language in the network

society is English. Only with really good proficiency in English, orally and in writing, will we be able to utilise the enormous amount of knowledge and information offered by the Internet – at the same time as we need to be able to relate to it critically. Therefore, all teaching in Denmark, from the nursery school class and upwards, should include material in English – for example via the Internet. The weekly teaching in the subject of English should be commenced in the second class. Supplementary training should be ensured for teachers in need of this.

## Ensuring Special IT Competence

In 1998, European enterprises had difficulties finding qualified IT employees for every 20th position. The research enterprise IDC predicts that, in three years, it

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### Educational Establishments Compete for Students

In the USA and Canada, 24 universities have joined forces to promote their remote teaching programmes via an overall online catalogue. The 24 universities, which are spread over a large geographi-

cal area, are all linked up to the same high-speed network. This type of co-operation will, together with the internationalisation of degree courses via the Internet, result in increased competition for

Danish educational establishments. This competition will become fiercer as interactive multimedia are developed further and the capacity of high-speed networks is increased.

will be every fifth job within the field of IT which the enterprises will find it difficult to fill<sup>60</sup>. One of Denmark's special strong points is our strong tradition for general education for all. However, the network society also makes demands for special knowledge to an extent which our present educational system cannot meet. The very urgent need for people with special IT competence must be met – at all levels.

#### Recommendation 1.7 Virtual University

A virtual university should be established offering remote teaching to students in Denmark and abroad via the Internet.

Globalisation means that there will be international competition in the field of education on an unprecedented scale. Therefore, it will be necessary to equip Danish universities technologically for this new competitive situation. Great Britain currently has more than 100,000 students who are studying by distance teaching and who reside outside the British Isles, and in Sweden 10 per cent of all further education courses are taken via remote teaching. At Oslo University, 35 courses are offered as remote teaching. In comparison, only 0.82 per cent of the students in open edu-

**Table 3. The IT Colleges' estimated admission of students**

	Students at IT College, East	Students at IT College, West
1999	140	70
2000	290	120
2001	370	170
2002	530	240

Source: IT-højskolerne

cation at Copenhagen University took their degree course after remote teaching<sup>61</sup>.

There are no overall statistics for remote teaching in Denmark. But in a survey published in November 1999, 81 per cent of the respondents among university teachers stated that they had never used remote teaching. And 97 per cent of the students stated that they had never participated in remote teaching<sup>62</sup>. On this point, Denmark is lagging behind our neighbouring countries and other countries with which we normally compare ourselves.

Involving all further education degree courses, a virtual university is to be built up offering remote teaching to students in Denmark and abroad via the Internet. The virtual university is to be established as a network organisation with members from

all Danish educational establishments for further education. The degree courses offered by the virtual university will consequently be able to draw on the best teachers in the country.

The virtual university is to be launched via an educational platform on the Internet, [www.educationdenmark.dk](http://www.educationdenmark.dk). This educational platform is to be a gateway to all training and education in Denmark. Here it shall be possible for everyone to locate, pay for, complete and take exams in a degree course or other course. It must also

be possible for Danish suppliers of degree courses to find tools which will facilitate the establishment of remote teaching.

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### Recommendation 1.8 More IT Students on Further Education Degree Courses

The number of IT postgraduate students should be increased in order to ensure more highly qualified teaching on further education IT degree courses.

In 1999, two new IT Colleges were set up in Denmark. The first students were

## 58 The Ministry of Education's Engineer Package

In the autumn of 1999, the Ministry of Education introduced an "Engineer Package" aimed at remedying the expected shortage of 5000 engineers in 2005. The Engineer Package contains

- the "merit scheme" aimed at technicians, engineers et al. with a need for vocational upgrading or retraining
- a new technical ICT63 diploma training course under open education aimed at unemployed engineers, including unemployed ethnic

engineers, engineers in employment and others with a need for vocational upgrading within information and communications technology

- a new diploma engineer line within information and communications technology, aimed at young students
- a trial scheme for Eastern European and other foreign engineering students at, at least, bachelor level.

In order to ensure the recruitment of young students for the degree courses in engineering,

more long-term initiatives will be implemented:

- revision of the Executive Order on an entrance course to the degree courses in engineering
- revision of the Executive Order on degree courses in engineering
- strengthening of the educational environment on the degree courses in engineering through an extension of the Educational Network of the degree courses in engineering.

admitted in September 1999. Over the next couple of years, the IT Colleges will increase the number of students admitted by several hundred per cent.

The IT Colleges have strengthened the top IT competence in Denmark and will continue to do so in the future. In addition the Ministry of Education's initiatives for further training of engineers for top IT competence ("The Engineer Package" – see text box page 58) and the Ministry of the Interior's current work on improving the possibility for the IT industry to recruit engineers from abroad.

However, these initiatives cannot stand alone. Therefore, continuous investments are to be made in IT research as a part of the strengthening of top IT competence (see Recommendation 2.5 IT and Telecommunications Research Consortium).

The expectation is that the investment in IT research within fields such as key IT technologies, encryption, e-commerce and "The Network Society for All" will also result in an increase in the total number of IT researchers and IT students.

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### Recommendation 1.9 More Computer Science Graduates

The number of students admitted to computer science degree courses should be doubled over three years.

One of the special areas of competence in which there is a shortage in trade and industry is computer science graduates. Of the 5,005 students who applied for admission to the computer science degree course in 1999, 2,465 had this degree course as their first choice, but only 1761 were admitted<sup>64</sup>.

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## NetJob Obtains Employment for Physically Disabled Persons in the IT Industry

The Århus-based employment project, NetJob, uses IT to get physically disabled people into the labour market. If you can move a mouse or a forehead

pointer, you can, by means of IT, move around and process all sorts of information on an equal footing with other people. In 1999, NetJob has

held 4 courses for a total of 44 course participants. Of these participants, more than 80 per cent are now in employment<sup>68</sup>.

### Recommendation 1.10 IT Competence for the Unemployed and Those Threatened with Unemployment

A training project should be implemented under which up to 10,000 unemployed persons and persons threatened with unemployment will be offered participation in a course leading to IT qualifications. The condition for participation will be that a contract has been entered into with an enterprise for long-term employment after the course has been completed.

The labour market of the network society lays down requirements for the employees

to take part in life-long learning. The enterprises have an increasing need for frequent adjustment and adaptation to a rapidly developing market<sup>65</sup>. The employees are to possess the following qualifications, among others:

- *Basic IT qualifications.* The need to be able to handle the most common office programs and the Internet will be an essential requirement in an increasing number of job descriptions – in line with the ability to read, write and do arithmetic.
- *Derived IT qualifications.* The need to

## 60 IT Courses Secure Jobs for Unemployed Persons

During the past five years, the Employment Service in Greater Copenhagen has secured employment for up to 80 percent of the unemployed persons who have completed an IT course. Unemployed graduates in

Greater Copenhagen have been specially targeted. In 1998, DKK 75 million was allocated in the Budget to IT-related training activities aimed at unemployed persons with higher education. In the past two years, up to 500

persons have completed these courses, and the Employment Service in Greater Copenhagen has just implemented an evaluation of the initiatives<sup>66</sup>.

### SwIT

In 1998, the Swedish Government invested an amount of 1.3 billion SEK in increasing IT competence in trade and industry. SwIT has been behind the training of 10,000 IT technicians in trades with a shortage of IT

competence. SwIT is directed by representatives from the Federation of Swedish Industries, IT enterprises and the Swedish Ministry of Labour, who form a Programme Council, which advises on the content and

implementation of the programme and a Programme Secretariat. SwIT has been established as a network organisation based on wide geographical cover<sup>70</sup>.

be able to develop both vocational and personal qualifications on a continuous basis will be a central requirement for employees, as enterprises restructure their organisations and procedures<sup>66</sup>.

The IT plan of action for AMU (the labour market training courses) does, in fact, contain the objective that IT is to be integrated as an independent content element in AMU to the greatest possible extent, and it is also the intention that IT as a tool should improve the quality of the teaching. IT can improve the learning ability of participants who have problems in reading, spelling and doing arithmetic.

But, at the same time, teaching specific IT skills currently does not come under AMU. In the report "IT i AMU" (IT in the Labour Market Training Courses (AMU)) from 1999, there is the following statement:

*"The AMU are not to provide teaching in school subjects such as informatics [or] specific spreadsheets, but only in which tasks can be performed with spreadsheets. Employees who are to be trained in concrete computer programs are referred to private course suppliers<sup>67</sup>".*

With the great shortage of employees with

concrete IT skills, the principle that such courses cannot be taken under the auspices of AMU should be scrapped. When the labour market has a need for people who can use a computer and computer programs, AMU should also be able to provide the employees with these skills. Experience from, for example, NetJob in Århus and the Employment Service in Greater Copenhagen shows that IT courses create employment for persons who were previously outside the labour market. This is a trend which should continue and which should be strengthened. In line with the Swedish SwIT Project, a training project is to be implemented under which up to 10,000 unemployed persons and persons threatened with unemployment are offered courses in basic and derived IT skills and qualifications. The enterprise describes the competence and skills which it is looking for and the unemployed person enters into a contract with the enterprise on long-term employment after the course has been completed with a satisfactory result.

In Sweden, the financing of SwIT was secured through the existing financing of the unemployment system. A Danish project is to be based on a similar type of financing.

## Notes to Objective 1

- 5 6 Folkeskolen år 2000 (The Primary and Lower Secondary School System Year 2000) (a partnership between the Ministry of Education, the National Association of Local Authorities in Denmark and the Danish Union of Teachers), IT Survey, under publication
- 5 7 Undervisningsministeriet, EDB udstyrsundersøgelse 98/99, 1999 (The Ministry of Education, Computer Equipment Survey 98/99, 1999). See [www.uvm.dk/statistik/gym/udstyr99/udstyr99.htm](http://www.uvm.dk/statistik/gym/udstyr99/udstyr99.htm)
- 5 8 Undervisningsministeriet, EDB udstyrsundersøgelse 98/99, 1999
- 5 9 IDC, Effekten af hjemme-pc ordninger i Danmark, 1999 (The Effect of Home PC Schemes in Denmark, 1999)
- 6 0 IDC, Europe's IT Skills Crisis – Whose Problem Is It?, 1999
- 6 1 Kristian Klarskov, "Efteruddannelse svigtes, Politiken, 1. november 1999 (Supplementary Training Is Being let Down, Politiken, 1 November 1999)
- 6 2 PLS Consult, IT-anvendelse på de videregående uddannelser, 1999 (IT Use in Further Education Degree Courses, 1999)
- 6 3 ICT stands for information and communications technology
- 6 4 See [www.sdu.dk/ivuc/Optagelse/kot\\_hand.htm#data](http://www.sdu.dk/ivuc/Optagelse/kot_hand.htm#data)
- 6 5 Gerhard Bosch, The Labour Market of the Future, 1999. Is found in the appendix to this report.
- 6 6 Arbejdsministeriet, Rapport fra udvalget om informationssamfundets betydning for jobindhold og arbejdets organisering, 1998 (The Ministry of Labour, Report from the Committee on the importance of the information society for job content and the organisation of work, 1998)
- 6 7 Arbejdsmarkedsstyrelsen, IT i AMU, 1999, s. 6 (The Danish Labour Market Agency, IT in the Labour Market Training Courses (AMU), 1999, p. 6)
- 6 8 See [www.netjob.dk](http://www.netjob.dk)
- 6 9 See [koebenhavn.af.dk/regioner/storkoebenhavn/index.htm](http://koebenhavn.af.dk/regioner/storkoebenhavn/index.htm)
- 7 0 See [www.swit.org](http://www.swit.org)





# Objective 2 Denmark as an E-commerce Nation



**Denmark is to be one of the five countries in the world which have the largest e-commerce turnover per inhabitant in 2003 and Denmark is to be able to offer competitive outline provisions for enterprises in the network society.**

This objective should be reached through initiatives in three areas: top quality e-commerce, research and innovation and the outline provisions of trade and industry.

## Top Quality E-commerce

The spread of e-commerce and increased globalisation will have a direct effect on trade and industry in terms of competition. At the same time, they will significantly change procedures in both the private and public sectors.

It is, of course, up to the enterprises themselves to make the necessary investments and adjustments and this is a market-driven process. However, the Government and the public sector can promote development in a number of areas.

With its large concentration of population and the many initiatives which are already in progress, for example the Government's plans for a new IT growth centre in the Øresund region, Copenhagen has the potential to become Europe's motive force and know-how centre for e-commerce. This should be utilised. We should work to ensure that all major players in the IT area, whether they be enterprises or researchers, choose Denmark as a natural location for placing research and development divisions in Europe. We should create an environment which can compete interna-

tionally and position Denmark as the main European e-commerce centre.

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### **Recommendation 2.1 Danish E-commerce House (E-hus Danmark)**

An E-commerce House should be established in Ørestaden. It should be established as soon as possible in connection with the IT College (IT-højskole) and the plans to establish a growth centre in Ørestaden.

The Danish E-commerce House should build up know-how, methods and tools and international contacts and promote commercial exploitation within e-commerce.

The Danish E-commerce House should be established via public and private co-financing and in co-operation between the

Ministry of Research and Information Technology, the Ministry of Trade and Industry, several research environments in the field of e-commerce and logistics and enterprises within a wide section of Danish trade and industry.

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### **Recommendation 2.2 Digital Businessmen**

Persons from the public and private sectors who have made a particularly noteworthy effort to convert their enterprise to the digital economy should be awarded prizes.

To support the spread of e-commerce and the conversion of public and private enterprises to the network economy, there should be a system of ongoing prize awards to the digital businessman(men) who has/have made a particular effort to convert his/their enterprise(es) to the digital world. The awards will be published on

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## **E-commerce Initiatives**

In 1998, the Focus on E-commerce (Fokus på E-handel) initiative was created as an untraditional common initiative between the Government and a number of major trade organisations and non-governmental organisations. The initiative

focuses on, among other things, awareness and dissemination of experience, security, infrastructure, contractual and regulatory frameworks and social aspects of e-commerce. Focus on E-commerce also involves preparation for the creation of a Danish

marking scheme for e-commerce enterprises. In 1998 the Centre for E-commerce (Center for Elektronisk Handel) was established in connection with the Copenhagen Business School and the new IT College has e-commerce as a core subject area.

the Internet and in the daily press once per quarter so that others can be inspired to convert their own enterprises and to spotlight e-commerce.

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**Recommendation 2.3**

**Objectives for Public E-commerce**

An overall plan should be drawn up for how public procurement is to be made digital with objectives for the product groups which are first to be traded electronically and the percentage of overall public procurement which is to be done electronically.

A number of initiatives in all parts of the public sector have been directed at establishing an infrastructure which could sup-

port the e-commerce of both the public sector and trade and industry. The initiatives have been centred on the construction of a common e-commerce infrastructure via, among other things, the standardisation of commercial documents and the development of software and services in the State and Municipal Purchasing Services and Kommunedata's purchasing systems.

These initiatives have borne fruit, but the expected gains are far from being realised. A plan should be drawn up for how public commerce can be made digital. The plan should contain objectives for the product groups which are first to be traded electronically and the percentage of overall public

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**IT Research is in Progress**

On the basis of the national sub-strategy for IT research, a number of IT research initiatives have been established:

- Two IT Colleges in East and West Denmark which strengthen IT training and education and IT research across institutional and disciplinary borders
- The Centre for IT research

- (Center for IT-forskning – CIT), which promotes interaction between the public and private sectors
- The Centre for Communications, Optics and Materials (Center for Kommunikation, Optik og Materialer – COM centre), which carries out research of an international standard in telecommunica-

- tions and optical technologies
- The Research Network (Forskningsnettet) which is to guarantee researchers reliable network access
- The Electronic Research Library (Det Elektroniske Forskningsbibliotek), which is to provide optimal access to electronic library information

procurement which is to be done electronically, as well as a timetable for the gradual transition to e-commerce.

The ability to handle e-commerce is also to be included as a criterion in connection with the submission of tenders and quotations and it should be possible for the public sector's trading partners to be charged fees if they use paper documents without good reason.

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#### **Recommendation 2.4 A Public Auction Hall on the Internet**

One or more public Internet auction halls should be established where enterprises can make bids for supplies of goods and services to the public sector.

The potential suppliers of e-commerce are hesitating to commence business on account of a lack of demand. At the same time, customers are hesitating on account of the limited supply.

The public sector has the ability to break the deadlock. A solid public move towards e-commerce can provide trade and industry with the necessary impetus because they have to follow suit in order to ensure their trade with the public sector. Demand

by the public sector for e-commerce systems will also start the development of technical solutions for e-commerce and thus form part of a general expansion of the e-commerce infrastructure.

Moreover, the public sector has a duty to realise the considerable rationalisation gains inherent in the use of e-commerce.

Therefore, the public sector should invest heavily in digitising its transactions with enterprises and citizens and internally between the sector's organisations, in order to establish a versatile, varied infrastructure for e-commerce. The range of solutions and concepts available for the operation of e-commerce should be expanded to involve all types of purchases and situations.

The possibilities for online auction systems and other new electronic forms of trading which exist in the private sector should also be utilised in trade with the public sector. Therefore, at least one public Internet auction hall should be established at which enterprises can tender for supplies of goods and services to the public sector. The electronic marketplace should be supported by commercial incentives and should be based on commercial business models.

In addition to the above recommendations, an e-barometer should be established which continuously analyses and measures the degree and extent to which Danish trade and industry are converting to the network society, with particular focus on e-commerce.

## Research and Innovation

The network society continuously entails new research requirements and requirements for creating and adapting the frameworks for public research and for interaction with private research. Moreover, in certain areas there is a clear need to increase the transfer of know-how from public research institutions to private enterprises.

### Recommendation 2.5 Research Consortium on IT and Telecommunications

An IT and telecommunications consortium should be established involving all existing public and private centres in these fields. The consortium should, among other things, do research into the use of key IT technologies, e-commerce, encryption and "the Network Society for All".

The new research consortium should consist of the existing power centres, including universities and trade and industry, which should jointly promote new initiatives. The consortium should focus on research and development work in the specialist areas in which Danish IT and telecommunications research either holds a strong position or can attain such a position. The consortium should promote the

### Research Park Close to the IT College

The Symbion research park in Copenhagen launched Symbion-IT in October 1999. Close to the IT College in Copenhagen, it offers premises, advice, administrative assistance, secretarial support, etc. to individuals and enterprises who come

with a good concept and development potential. There is free access to office and laboratory facilities and support, advice and assistance are provided to procure the necessary capital when the concept is to be developed into a concrete busi-

ness plan. However, Symbion-IT only has room for 12-16 small enterprises in a total area of 1000 m<sup>2</sup>. The plan is for the activities at Symbion-IT to be moved to the IT research park, which is expected to be established in Ørestaden.

development of key IT technologies, expedite their use and extend their use to relevant areas of society. This may involve advanced technology for, and the management of, information processing, communication and network systems.

Moreover, the research consortium should constitute the platform for new research within e-commerce, encryption and “the Network Society for All”

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#### **Recommendation 2.6 IT “Incubators”**

Up to five IT “incubators” should be established in the immediate vicinity of training, education and research environments which are currently training and educating graduates and researchers in the IT field.

The aim of the IT “incubators” is rapidly and easily to create cohesive environments for research and innovation throughout Denmark by bringing researchers, students and other developers together under the same roof. The aim is also to care for the undergrowth of IT grass roots which cannot yet find a foothold in the existing research and innovation environments because there is no room, their business concepts are at a very early stage of development or the necessary risk capital is not in place.

The IT “incubators” should be established close to the strongest training, education and research environments. The “incubators” should draw on know-how, advice and preliminary project capital from, for example, the six innovation environments which have been established in connection with universities, research parks and other scientific institutions. And the “incubators” should be co-ordinated with the activities at the two IT Colleges and the plans for an IT research park in Ørestaden.

The “incubators” should be established within a year at the most, possibly in leased premises where a broadband connection should be established. The “incubators” should have favourable access to IT equipment and telecommunications and Internet traffic.

## **The Outline Provisions for Trade and Industry**

The increased pressure of competition on trade and industry has created an increased focus on the framework conditions of enterprises, for example the level of training and education of the employees, taxes, VAT, duties, the environment, attractive surroundings and expanded infrastructure.



The Danish outline provisions are advantageous in some areas and weak in others in comparison with those in other countries. We shall never be able to match the most liberal countries in terms of taxation, for example, but we should ensure that we always have a good overview of the competitive situation so that we can continuously make the necessary adjustments to the outline provisions. The outline provisions will also be dealt with in the Government's new industrial strategy.

### Recommendation 2.7 Attractive Share Options

The regulations for the taxation of share options should be changed so that more use can be made of them as a valuable aid to recruiting and holding on to employees.

Share options give holders the right to buy shares in the future at a pre-agreed price. They are used by enterprises as a pay supplement to employees and will, therefore, benefit financially weak, new enter-

## Public IT Initiatives in Trade and Industry

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In recent years, a number of initiatives have been implemented by the Government to promote the use of IT in trade and industry and in the interaction between the private and public sectors. These initiatives include the following:

- The EDI plan of action "E-commerce in Denmark" (Elektronisk handel i Danmark) of 1996
  - The overall strategy for the IT/telecommunications/electronics industry of 1998
  - Plans for an IT growth centre in Ørestaden
  - [www.indberetning.dk](http://www.indberetning.dk)
  - Liberalisation of the telecommunications sector
- Further information can be found on the home page at [www.detdigitaledanmark.dk](http://www.detdigitaledanmark.dk)

## Overall Strategy for Industrial Development

The Government has decided to prepare an overall strategy for industrial development which will focus on the requirements for industrial renewal and innovation which arise out of the

transition to a more know-how-based economy. The strategy will result in an overall initiative which is directed at both high-tech industries with a particular need for research-based know-

how and traditional industries dependent to a greater degree on market-based know-how. The Government's industrial strategy is expected to be presented in the spring of 2000.

prises in the competition to get the best employees. Share options are very widespread in, for example, the USA, but are only gaining ground slowly in Denmark, among other things on account of the taxation regulations.

The use of share options should be made more attractive via new legislation. This recommendation is made generally for reasons of competition and capital and more specifically out of a desire to ensure that financially weak, new IT enterprises in particular have a better chance of being able to employ IT specialists.

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#### **Recommendation 2.8 Immediate Depreciation of IT Investments**

The current depreciation regulations should be changed so that it is possible for enterprises to write off IT investments in a way which reflects more closely the actual useful life of the IT investments.

Rapid technological innovation means that the life of IT products and equipment is relatively short. Most IT investments are depreciated in real terms 5 to 10 times more rapidly than traditional production equipment. As a rule of thumb, a virtual enterprise which operates in the global Internet economy typically has to scrap

and redevelop significant parts of its systems at intervals of 6 to 12 months. There is thus a need for more flexible depreciation rules which reflect the useful life of investments to a greater degree than the current rules, which only allow rapid depreciation if investments have a short physical life.

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#### **Recommendation 2.9 Adaptation of the Labour Market**

The Government and the two sides of industry should, as soon as possible, adapt labour market rules to the conditions of the network society. This primarily concerns taxation, conditions of employment, the benefits system and the working environment.

The growth in the number of flexible forms of employment will change the conditions on the labour market. The current complex of Acts and regulations cannot handle the requirements and problems which will arise on a daily basis in the labour market of the network society.

During recent years, a rapidly growing part of the workforce has become difficult to categorise. This group cannot be described as employees, employers or self-employed businessmen. Instead the

members of this group are usually called freelancers.

Some trade unions have opened the way for actual organisation of this new group on the labour market but this has not solved all the problems. Significant parts of the existing set of rules on the labour market have been developed precisely to regulate relations between employers and

employees in an industrial society comprising mainly permanent employees, who are physically present at the same workplace every day.

The spread of the new technology has reduced repetitive work in the form of assembly line work and the consequent working environment problems. However, new problems, for example “mouse strain”,

### Working Environment Initiatives

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The Danish Parliament (Folketinget) has allocated DKK 22 million to study how better monitor workplaces can be created. DKK 4 million has also been granted to a separate research initiative at occupational medicine clinics to uncover any causal relations between monitor work with a

mouse and injuries in the neck, shoulders and/or arms and the significance of stress for injuries. Preliminary studies by the Danish Occupational Health Institute (Arbejdsmiljøinstituttet) show that 61% of Danish employees use computers in their work. This is a significant in-

crease from 1990 and 1995 when 25% and 47% used a computer in their work.

The study also shows that every fifth employee works almost exclusively at a computer monitor.

### Broadband Connections Can Be Established in Several Ways:

- as ISDN or xDSL connections which make it possible to increase the capacity in the existing copper cables from the exchanges to individual households or enterprises
- through cable TV networks and satellite solutions

- as a wireless subscription (FWA), a radio-based technology which supplies a wireless broadband connection between a household or enterprise and the telecommunications network as a whole
- through 3rd-generation

mobile technologies such as UMTS and through better utilisation of the existing mobile network (WAP)

- through the installation of fibre-optic cables to individual households and enterprises.

have arisen. If the working environment gains from the spread of information technology are to be reaped, it is necessary to change the organisation of work and the layout of the workplace and to pay greater attention to the amount of working time spent working at a monitor. The new technology does not automatically lead to new organisation of work and an improved working environment. Therefore, the enterprises' own work on the working environment is decisive for effective, intensive initiatives in this area.

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#### **Recommendation 2.10 Increased Demand for Broadband Connections**

In order to promote the range of Internet services and broadband connections, the market should be helped on its way by means of increased public demand.

If citizens and enterprises are to exploit the potential and products and services offered by the network society, they must have access to broadband connections. A rapid spread of broadband connections is necessary to ensure the competitiveness of enterprises and the ability of the citizens to use the many new services and technologies. In line with the increase in use of the Internet, and as telephony, multimedia

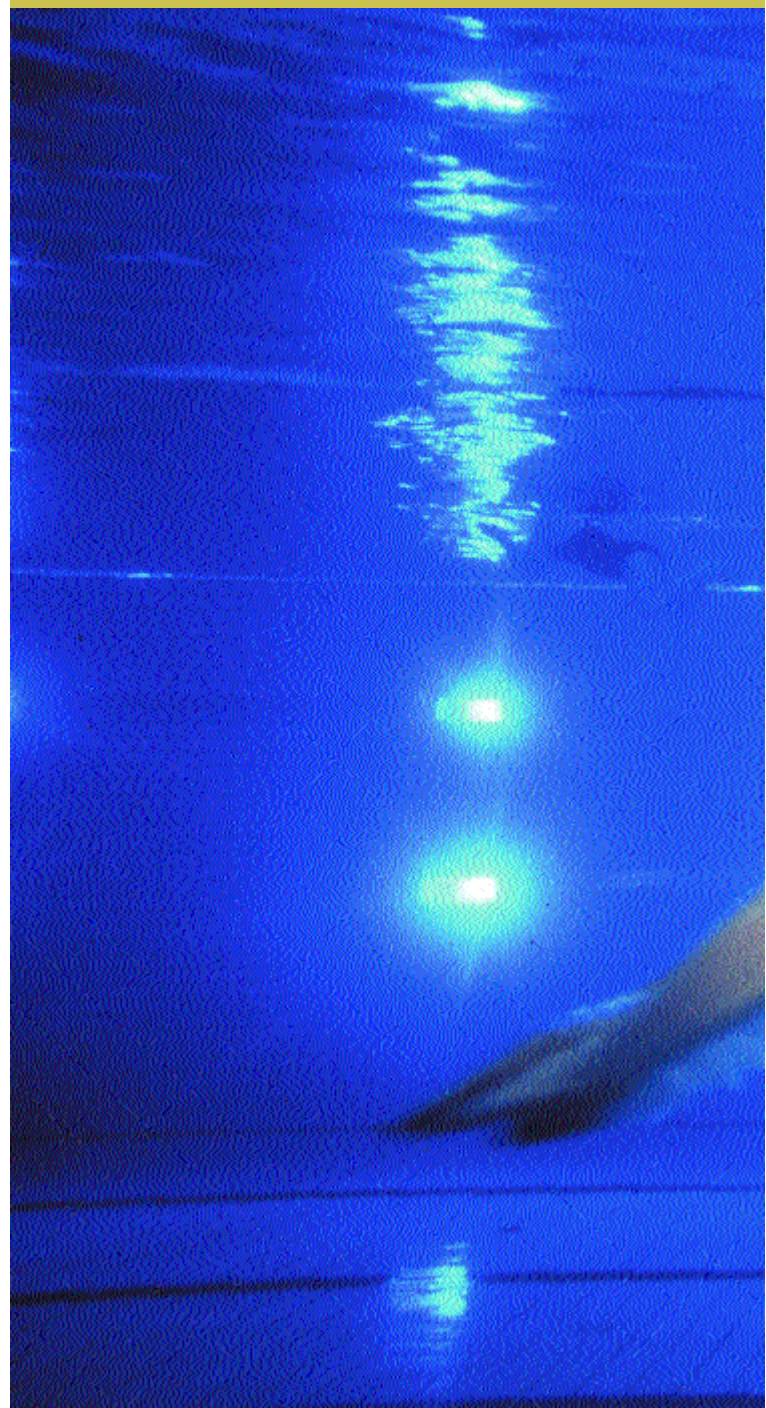
products and other services which require the transmission of large quantities of data are offered via the Internet, the demand for bandwidth will increase.

We lack a competition-driven market for broadband connections from individual households or enterprises to the Internet. However, it may be difficult to create market-related, financial incentives to invest in what will eventually be the ideal solution, namely the laying of fibre-optic cables to individual households or enterprises. This will probably only occur if there is a massive increase in user demand for bandwidth.

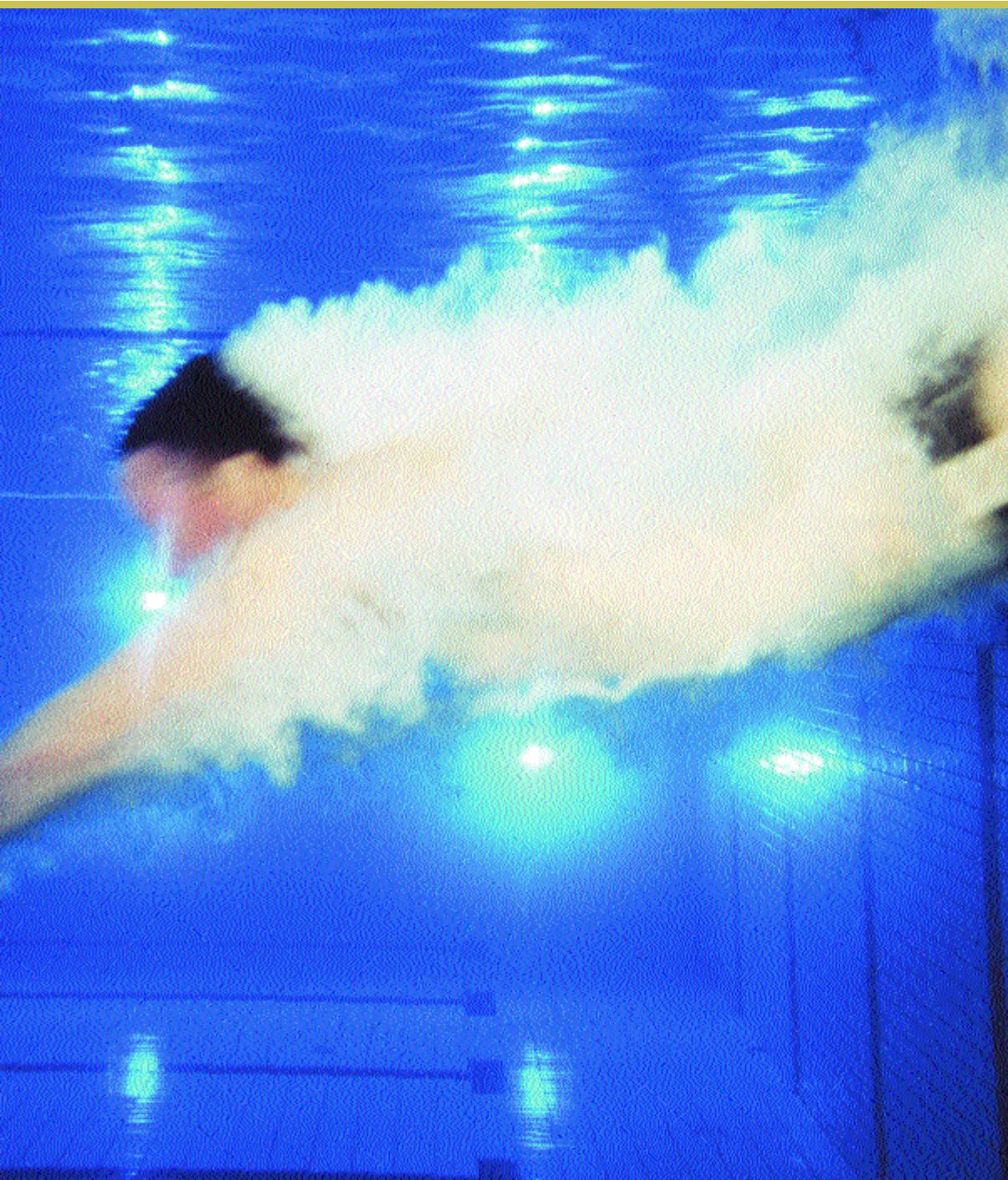
In order to increase demand for Internet services and the installation of broadband connections, the market should, therefore, be helped on its way by increased public demand. This is the object of, among other things, the recommendations on broadband for primary and lower secondary schools and out-of-school educational establishments and on public e-commerce. In connection with decisions on public infrastructure, for example in the area of radio and TV, the focus should also be placed on stimulating demand for and the spread of technologies and network types which can be used for radio and TV, new

multimedia services and other services and functions which have high bandwidth requirements.

At the same time, it is necessary to focus on how competition can be stimulated and how the market for the supply of access paths to the Internet can be expected to develop in the coming years, compared with the products and services offered and the prices in other countries, and the factors which affect the development of this market.







# Objective 3 More Effective and Cheaper Service via Digital Administration



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**At the latest by 2003, Danish public administration is to provide the best and most efficient public service in the Nordic countries with the help of digital administration.**

This objective should be reached through initiatives towards: better public service, an accessible public sector and efficient digital administration.

## Better Public Service

Many public institutions and authorities think that if only about 15 per cent of citizens regularly use IT there is no basis for establishing digital self-service facilities. The opinion of the citizens is somewhat different. At least 75 per cent of the Danish population uses electronic means

of communication and self-service systems in one form or another and about half of the population has a positive attitude to electronic information and self-service from the public sector<sup>71</sup>.

The public sector has great potential to meet demand by establishing a number of concrete offers of service with 24-hour electronic self-service.

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### Recommendation 3.1 Personal Internet Access to the Public Administration

Internet access to the public administration should be established which citizens can adapt to serve their own requirements. It should give citizens access to all publicly registered information about themselves, to a customised information system and to easy, rapid and safe self-service.

Each citizen should be offered overall

access to precisely the public information and services which are relevant to him or her via personal Internet access to the public administration. Using a digital signature, he or she should have access to the information which the public administration has registered about him or her and the possibility of following cases involving him or her. Citizens should be able to customise their personal Internet access so that precisely that public information and news in which they are interested are presented first. Personal access to the public administration should also give access to self-service using electronic forms.

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### **Recommendation 3.2 Title to Own Electronic Data**

In order to ensure that citizens can have free

access to their own data and that public data on the citizens is not monopolised by various public authorities and enterprises, citizens should be given a statutory title to their own data.

Giving citizens a statutory title to personal data would make it clear that citizens are to have access to electronic data. At the same time, it would prevent monopolisation of various items of citizen data which might make it difficult to establish self-service systems for those citizens who might want to use them.

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### **Recommendation 3.3 Electronic Forms**

Before the end of 2000, citizens should be able, via the Internet, to retrieve, complete and submit the most common of the forms used by citizens.

## **Change of Address Forms**

In 1997, there were a total of 900,000 changes of address<sup>2</sup>. With an estimated average cost of DKK 150-200 per notice of change of address, changes of address cost Danish society approximately DKK 135-180 million per annum to handle. A large part of this cost concerns personal processing of the

change of address notice forms, involving opening post, telephone messages, input of data, error corrections, etc. If 50 per cent of the notices of change of address were moved to a digital platform operated by the citizens themselves, resource consumption could be reduced by up to 40-50 per cent, equiva-

lent to DKK 60-80 million per annum. Investment in an electronic change of address form would cost less than DKK 10 million. Change of address forms also constitute approximately 10 per cent of the total volume of the 15 most used forms.



There are major advantages to be had from placing those forms on the Internet which are used most frequently by citizens in their communications with the public administration. 10 million of the communications by citizens with the public administration per annum are made using only 15 forms<sup>73</sup>. The forms represent a structured, standardised form of information which can easily be digitised. Electronic forms will allow both citizens and the administration to save time and money because the handling of the forms will be automated to a great extent.

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#### Recommendation 3.4 Public Information Server

A public information server should be established to give citizens and enterprises easy and secure access to public information and services.

With the construction of central and decentral registers, the public sector has created the foundation for flexible, efficient servicing of citizens and enterprises. The reuse of data from register to register produces gains from enhancement of efficiency.

In many cases, efficient utilisation of data is difficult on account of the organisation

and financial interests which are associated with the ownership of data in public registers. In certain cases, legislative barriers can also impede the efficient utilisation of public data. In some cases, this is absolutely justified in order to protect sensitive data. In other cases, this occurs because of deep-rooted but inexpedient traditions and routines. Such traditions and routines should be changed if they impede the reuse of data and thus improvement in public service.

On the basis of the existing public registers, a public information server should be established. It should give citizens access to the many items of information registered by the public administration on Denmark and Danish citizens.

A public information server will also be a step on the way to citizens only needing to provide the public administration with data once. When citizens and enterprises contact public authorities and institutions, they then only need to provide “new” information, as information already provided can be retrieved directly from the public registers with the consent of the citizen or enterprise concerned.

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### **Recommendation 3.5 Free Digital Signature for All Young People Between 18 and 21 Years of Age**

All young people between 18 and 21 years of age should be offered a free digital signature in the period 2000-2003. They can use this signature in connection with, among other things, their training or education and the Danish State Education Grants and Loan Scheme (Statens Uddannelsesstøtte).

A lack of security is seen by many as one of the main impediments to the spread of electronic self-service in the public sector. The introduction of a digital signature would largely solve this security problem.

The digital signature will play a major role in the continued development of electronic self-service as it guarantees the identity of the sender. A rapid spread of the use of digital signatures will also be a decisive factor in the spread of e-commerce between citizens and enterprises.

The EU is currently preparing an EU Directive on digital signatures. Denmark should not wait for the EU project to be concluded but should, in parallel with it, begin work on digital signatures for Danish citizens. As a pilot project, all

young people aged 18-21 should be offered, over the next three years, a digital signature which they can use in connection with, among other things, their training or education and the Danish State Education Grants and Loan Scheme.

At the same time, services in the public administration which require a digital signature should be developed so that interest in using a digital signature increases.

## **An Accessible Public Sector**

Access to the public administration can be increased considerably by digitisation. The basic principles are that citizens should have access to all data about themselves, citizens should be able to choose between several different electronic channels, and the information should be easily comprehensible.

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### **Recommendation 3.6 Internet Contact to All Public Institutions**

All of the approximately 24,000 public institutions should have an e-mail address by the end of 2001 and all central municipal, county and state administrations should have a home page.

The Internet is a good platform for public information. The information can be arranged so that the citizens themselves can choose how detailed the information should be.

Without public home pages, it is not possible to realise the ambition for accessibility and self-service. It has, therefore, been a political objective since 1997 for all public authorities to have a home page<sup>74</sup>. As the table below shows, the central administrations are well on the way to meeting this objective.

If the ambition for accessibility and self-service is to be realised, the remaining municipal administrations must establish home pages and all 24,000 public institu-

tions must have an e-mail address as soon as possible and at the latest by the end of 2001.

### Recommendation 3.7 One Telephone Number for the Public Administration

A call centre should be established which citizens can call using a three-digit number to obtain information about all public authorities and institutions.

Citizens who do not have Internet access should have improved opportunities for obtaining information from the public administration. Therefore, the information provided by telephone by the public administration should be improved. The establishment of a call centre will give citizens the opportunity to obtain information about all public authorities and institutions with a home page by making just one call. This will enable those citizens who do not have the opportunity to use the Internet, or who do not want to use it, to obtain the same information as Internet users.

The call centre should have extended opening hours so that citizens can call outside normal office hours. Within normal office hours, it will also be possible to be transferred, via the call centre, to any state

**Table 4. Percentage of public authorities and institutions which had a home page at the beginning of 1999**

	Central administrations	Subordinate institutions	Total
State	100%	18%	19%
County	100%	3%	4%
Municipality <sup>75</sup>	47%	4%	5%
Total	53%	6%	7%

Source: KPMG, Digital Administration – Supply and Demand, 1999 (Den digitale forvaltning – udbud og efterspørgsel, 1999)

authority and, in the longer term, to the entire public sector.

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### Recommendation 3.8 Quality Check of Public Home Pages

All public home pages should be assessed for quality on a continuous basis to ensure that public electronic information is easily accessible in terms of both form and contents.

An accessible public sector is not only to be established as a technical solution. The provision of public electronic information should also be immediately comprehensible, useable and of high quality. This requires that the public authorities are extremely attentive to the requirements of special groups. This applies to, for example, the disabled, the elderly and ethnic minorities. Once every 3 months, the quality of the public home pages should, therefore, be checked and the results published. In this connection, the home pages which are best in specific areas or overall should be held up as examples to be followed.

## Efficient Digital Administration

Efficient digital administration means, among other things, ensuring optimal

internal procedures. IT should contribute to the public administration by optimising its organisation and working procedures to produce results in the form of measurable rationalisation gains. These gains will also contribute significantly to the public sector, solving the demographic problem which will mean that in a few years it will have to function with a smaller workforce.

A digital administration has its foundation in data stored electronically. The fundamental advantages of this are:

- the possibility of unlimited reuse of data stored electronically. With a sensible integration of systems, double or triple data input work can be avoided because data are instead retrieved directly from one of the base registers of the public administration
- the possibility of rapid, cheap access to, and distribution of, data electronically. Relevant information and knowledge can be spread to all relevant authorities and institutions at the same time without costing any more than separate distribution.

These fundamental advantages are neither new nor revolutionary. In the last decade they have been the guidelines for the

efforts of both private and public organisations to digitise data flows and procedures.

However, it has proved to be more difficult than first assumed to fulfil these ambitions in practice. One of the reasons for this is that the rationalisation effect of IT investments is not realised if the organisation in question is not adapted to the procedures which the IT systems make possible. Very few public institutions and authorities have faced up to the organisa-

tional consequences of their technological investments<sup>76</sup>.

In the USA, on the other hand, digitisation of the administration has been used for rationalisation with positive results. Solely to preempt a future lack of manpower, the use of digital administration should be targeted at releasing manpower from those parts of the public sector where this is possible.

## Reinventing Government

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The effect of simultaneous investment in organisational changes and new technology is documented, for example, in the US Government project "National Partnership for Reinventing Government". IT has been a central instrument in

the project, which has been in progress since 1993, for the enhancement of efficiency and reduction of costs. The first round of recommendations in the project concerned potential savings equivalent to USD 108 billion and resulted in the loss

of 252,000 jobs in the public administration. The first efficiency round was followed up in 1996-97 with a target for savings in public budgets equivalent to 22% over a period of six years<sup>77</sup>.

## Electronic Handling of Invoices

Tele Danmark handles electronically around 55% of the 500,000 invoices which the company receives annually from 15,000 different suppliers. Together with a reorganisation of working procedures, this has

enhanced the efficiency of the work in Tele Danmark's central accounts department by approximately 30%, the equivalent of eight man-years. To this is added enhancement of the efficiency of a number of

decentral functions, for example courier services and decentral archives. All in all, Tele Danmark estimates that electronic handling of invoices has currently produced savings equivalent to 30-40 man-years<sup>78</sup>.

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### **Recommendation 3.9 Efficiency in the State Sector**

The State sector's internal administrative routines should be digitised where this is worth doing, for example payroll and personnel functions, IT operations and support and government procurement.

The internal administration of the public sector is an important area for digitisation initiatives. There are approximately 24,000 public institutions, each of which handles the majority of its internal administrative tasks itself. Reorganisation and amalgamation of the functions could ease the administrative pressure on internal services via economies of scale.

In concrete terms, rationalisation gains can be achieved by digitising and centralising payroll and personnel functions, rationalising IT operations and support and converting to electronic handling of invoices. In the latter area alone, digitisation would produce rationalisation gains. The municipal sector handles approximately 21 million invoices per annum<sup>79</sup>. There are no statistics for the total number of invoices in the State sector but, if we compare a Swedish survey<sup>80</sup> with Danish conditions, we can estimate that the State sector in Denmark handles up to 15 million

invoices per annum. A change from manual handling of these invoices to electronic bookkeeping and payment would produce significant savings because it would be possible both to save time and to create improvements in the quality of the handling of public procurement.

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### **Recommendation 3.10 Public IT Loan Scheme**

A loan scheme should be established whereby public authorities can borrow money to introduce IT to optimise case handling and the organisation of their work.

The public sector is caught between the pressure of increasing expectations and a lack of resources caused by the demographic development in society. As one element of the initiatives to meet this challenge, a public loan scheme should be established with the aim of increasing the rationalisation gains in the public administration as much as possible. The scheme should guarantee money to public authorities which want to introduce IT to optimise case handling and the organisation of their work. The loan scheme should be financed via the outline reductions and reductions in block grants which IT-based rationalisation would make possible.

## Notes to Objective 3

- 7 1 KPMG, Den digitale forvaltning – udbud og efterspørgsel, 1999 (Digital Administration – Supply and Demand, 1999). See [www.fsk.dk/fsk/publ/1999/forvaltning/default.htm](http://www.fsk.dk/fsk/publ/1999/forvaltning/default.htm).
- 7 2 Danmarks Statistik, Statistisk Årbog, 1998 (Statistics Denmark, Statistical Yearbook, 1998)
- 7 3 KPMG, Kortlægning af elektroniske blanketter, One Stop Shop, 1999 (Mapping Electronic Forms, One Stop Shop, 1999)
- 7 4 Forskningsministeriet, Handling gi'r forvandling – IT-politisk handlingsplan 97/98, 1997 (The Ministry of Research and Information Technology, Action Produces Change – IT Policy Plan of Action 97/98, 1997)
- 7 5 According to a survey by the secretariat of the National Association of Local Authorities in Denmark (Kommunernes Landsforening), 60% of the central administrations in the local authorities had a home page in October 1999. For further information on the use by local authorities of IT in their administration.
- See [www.kl.dk/webguide/framesintro.shtml](http://www.kl.dk/webguide/framesintro.shtml)
- 7 6 PLS Consult, IT i praksis 1999, 1999 (IT in Practice 1999, 1999)
- 7 7 Government Information Technology Services, Electronic Government – Serving the Public on its Terms, USA 1997. See [www.accessamerica.gov/docs/appndxc.html](http://www.accessamerica.gov/docs/appndxc.html)
- 7 8 WM-Data, Indblik nr. 2, 1999 (Insight no. 2, 1999)
- 7 9 Kommunernes Landsforening, Elektronisk handel og kommunale indkøb, 1999 (The National Association of Local Authorities in Denmark, E-commerce and Local Authority Procurement, 1999)
- 8 0 Svenska Kommunförbundet, Elektronisk handel för kommuner, landsting och stat, 1997 (The National Association of Local Authorities in Sweden, E-commerce for Local Authorities, County Councils and the State, 1997)







# Objective 4 Danish Internet Initiatives



**Participation in democracy, open decision-making processes and Danish cultural activities are to be supported by new and attractive Internet services for all citizens by 2003 at the latest.**

This objective should be reached through initiatives in: digital participation, a network society for all, language and culture, media and public service and a secure network society.

## Digital Participation

### Recommendation 4.1

[www.danskpolitik.dk](http://www.danskpolitik.dk)

A main portal, [www.danskpolitik.dk](http://www.danskpolitik.dk), should be established to be the common entry point for Danish citizens into political debate and information on the Internet.

The expectations for the potential of information technology to promote participation in democracy are extremely high. However, information technology will not automatically result in increased participation in democracy.

Online votes and opinion polls on the Internet are among the most frequent suggestions as to how IT can be used to promote participation in democracy. However, such solutions conflict with a number of fundamental features of Danish democracy.

It is positive that both newspapers and various web companies are already using the Internet to gauge opinion on selected problems. However, online votes on the Internet provide a view which cannot be the citizens' only reply to the politicians.

There is a risk that online votes will simplify important political problems and weaken interest in a political debate which is more difficult than an emotive click on yes or no. At the same time, the online votes, opinion polls and political chats which are offered today on the Internet are patronised and marked to a very great degree by those familiar with the Internet, i.e. the young, the well-paid and the well-educated.

However, IT can become a good democratic tool because it can create new channels and forms of communication between citizens and politicians. IT can be used to create openness in the political system and

a new closeness between citizens and politicians.

Many public institutions are already aiming at increased openness and closeness to citizens with active home pages. However, with the exception of some isolated chats with politicians, the electronic dialogue is primarily between citizens and officials in the public administrations.

Therefore, a main portal, [www.danskpoltik.dk](http://www.danskpoltik.dk), should be established to be the common entry point for Danish citizens into political debate and information on the Internet. The home page [www.danskpoltik.dk](http://www.danskpoltik.dk) should, among other things,

### Few Danes Chat Politics

In connection with the local elections in 1997, Kommunedata and the National Association of Local Authorities in Denmark developed an Internet concept with the title KV97, where candidates could present their political views and where it was possible to hold political discussions on the Internet. KV97 enjoyed only limited success. In the roughly 2 months the project lasted, 5 per thou-

sand of the population logged onto [www.ditdanmark.dk](http://www.ditdanmark.dk), which was the portal to KV97, while only 0.5 per thousand of the population sent a contribution to the home page. There were 1,700 contributions to the various discussion fora and approximately 80,000 clicked into the contributions. A characteristic feature of the participants in KV97 was that by far the majority of them were al-

ready politically active members of trade unions<sup>81</sup>. The Danish Parliament's electronic debate on the Danish Constitution in 1999 enjoyed more success. According to researchers, the debate was serious and many new voices were heard. 550 people wrote 2,398 contributions on 29 different subjects and the debate was clicked into 131,000 times<sup>82</sup>.

provide electronic contact to all political committees and governing bodies in State, municipal and county administrations and direct electronic access to electronic debates, hearings and relevant information material.

## A Network Society for All

### Recommendation 4.2 [www.foreninger.dk](http://www.foreninger.dk)

A main portal, [www.foreninger.dk](http://www.foreninger.dk), should be established to provide information about associations and to support the interactive communication of associations with their members, public authorities and other interested parties.

Denmark is a land of associations. Associations of all shades play an invaluable role in Danish democracy and our welfare society. However, some activities of Danish associations suffer from the fact that our time is becoming ever more precious. It will, therefore, be interesting to see whether IT can be used positively in connection with associations in Denmark.

A survey of Internet use in the third sector (comprising organisations, associations and so forth) estimates that over 60% of associations which have at least one employee

have a home page. Virtually all associations with at least ten employees are on the Internet with a home page. Most home pages are clear and user-friendly. The general level of information and service on the home pages is also good, especially considering that many of the pages have been created on a voluntary basis<sup>83</sup>.

However, few home pages allow interaction and dialogue with either members or other users. Therefore, very few associations have registration functions and they do not offer the opportunity of ordering material online. Even fewer have debate fora, where members can discuss topical issues or activities. Payment over the Internet is virtually non-existent.

Few associations have a fixed strategy or a planned schedule for developing the aims and function of the home pages, although many point out that there should be more focus on the members in the future. The transition to a more interactive member service in particular will require the use of more advanced solutions which definitely cannot be expected to be implemented by the associations themselves, especially not the small associations with limited resources.

Associations are one of the fulcrums of Danish democracy and they should be supported as well as possible using the Internet. Therefore, a main portal, [www.foreninger.dk](http://www.foreninger.dk), should be established to provide information on associations and to support the interactive dialogue between associations, their members, public authorities and others. The portal [www.foreninger.dk](http://www.foreninger.dk) would also have the purpose of reducing the time spent by associations on administration to the benefit of the actual activities of the associations.

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#### **Recommendation 4.3 Research Programme on a Network Society for All**

Increased, focused research initiatives should be implemented to increase our knowledge of the social perspectives of the network society.

We currently know too little about the changes in society and in the relationship between people which the development of IT, globalisation and the network society will cause. Changes which raise questions such as “Does our social inheritance influence how we use IT technologies?” “Will our solidarity with other citizens in Denmark be reduced while our solidarity with people the world over with whom we have made contact via the Internet increases?” “How can we overcome the gap in knowledge between those who can use IT technologies and handle the information available and those who find this difficult?”

It is typical that studies of IT use and the development of IT often set the agenda in the media and politics for a few days. Then the agenda is taken over by other studies with differing results.

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#### **New Libraries Act**

In an overall objective for a network society for all, libraries play a central role. The libraries sector is currently undergoing a comprehensive process of re-organisation as a consequence of the development of IT. A new Act is expected in 2000 to

give public libraries better frameworks within which to perform their tasks in the fields of information and culture in the information and knowledge society. Among other things, public libraries will be under an obligation to provide

access to the Internet and to lend, for example, CD-ROMs. Moreover, it will be made possible to search for and order material in the libraries' joint catalogue, DanBibbasen, via the Internet.

We need increased, focused research initiatives which can give us more and better knowledge of the social perspectives of the network society, with particular focus on IT and democracy, Danish cohesion and the risk of a gap in IT knowledge between different population groups. Funds should, therefore, be allocated to a research programme on the network society for all.

## Language and Culture

### Recommendation 4.4 A strategy for Danish Language Technologies

The development of Danish language technologies should be concentrated in a plan of action which has the preparation of a Danish language technology dictionary as one of its main points. The plan of action should, in particular, focus on accessibility, with a view to ensuring that all groups have access to new technology.

The possibility of translating between texts or between speech and electronic text offers many citizens a much more problem-free access to the network society. The visually disabled and those with reading disabilities can have texts read to them. Persons with hearing impairments can read information as text. And speech technologies give us all the opportunity to operate devices without our eyes and hands being in contact with monitors and keyboards.

Within the major language areas, these technologies are already far advanced, in response to market demands. The small Danish language area is of less interest to the major players on the language and speech technology market.

An overall strategy for the development of

### Dansk Taleteknologi (Danish Speech Technology)

In July 1999, the Ministry of Research and Information Technology entered into an agreement on the development of high quality Danish synthetic speech with Dansk Taleteknologi A/S, a company formed by Novi A/S and Tele Danmark A/S.

The Centre for Personal Communication (Center for Person-Kommunikation) at Aalborg University and the Institute for General and Applied Linguistics (Institut for Almen og Anvendt Sprogvidenskab) at Copenhagen University are responsible

for the research and development in the project. The first examples of practical use of Danish synthetic speech in the new high quality are expected to be available in 2000.

Danish language and speech technologies should be developed, taking into consideration the dynamism which characterises IT development environments and market forces.

A cornerstone of the strategy should be the preparation of a Danish language technology dictionary. This differs from a traditional dictionary in that it not only translates word for word but also word for meaning. The language technology dictionary would provide input for machine translation between Danish and another language and would be a good basis for the development of commercial language technology tools.

The plan of action should, in particular, focus on the concept of accessibility, with a view to ensuring that all groups have access to new technology.

## Media and Public Service

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### Recommendation 4.5 Report on Convergence in the Network Society

A report should be prepared on the consequences of convergence in the network society on the basis of the assumption that the boundaries between the telecommunications,

IT and media sectors are being broken down. The report should, among other things, look at the need for new regulations and define the concept of public service in the network society of the future.

Technological developments are currently moving the boundaries between telecommunications, information technology, media and multimedia. We are moving towards a sector which can best be described as an information and communication sector with the digital technologies and the Internet as the central driving forces.

There is a need for us to acquire more knowledge about this development and qualified suggestions as to the areas in which the convergence trend is undermining existing legislation in, among others fields, that of telecommunications and media.

The EU Commission Green Paper on convergence should be used as the basis for the work<sup>84</sup>. The report could also take as its starting point the convergence reports which have been completed in Sweden<sup>85</sup> and Norway<sup>86</sup> in 1999.

In the not so distant future it will be possible for a user to order a personal program

platform made up of programs from various suppliers without the user needing to know the individual suppliers.

The developments in technology and media necessitate a new definition of the role to be played by the public service media in the network society. When the range of digital media available is wide but mainly characterised by internationally and commercially based media suppliers, it is necessary to ensure that Danish citizens are offered media which have their roots in Danish society. The media should cover news, background information, daily life, culture, drama, science, debate, quality Danish entertainment and programmes for children and young people.

The report should, therefore, also specify the requirements for public service in the network society of the future.

## Security and Reliability in the Network Society

If citizens and enterprises do not know the rules of play on the Internet or if they do not believe that the rules provide adequate safety and security, the development of IT, and thus Danish participation in the network society, will be impeded.

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### Recommendation 4.6 The IT Rights of Citizens

Formulation of the IT rights of citizens should specify the rules of play in the network society and, among other things, ensure free encryption without the possibility of illegal interception.

Much legislation applies both in the physical and the virtual worlds. Both in Denmark and internationally work is being carried on to adapt Acts and regulations to the network society. Nevertheless, in cen-

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### The Rules on the Internet Are Not Clear to Most People

Can you, for example, answer the following questions?

- What is the validity of a reply to an e-mail?
- May a manager look at the contents of the e-mailboxes of his employees?
- May the police and other authorities get access to the files of citizens?
- May the tracks left by citizens' Internet surfing be exploited by commercial enterprises?
- May a buyer cancel an electronic purchase?
- What regulations apply to international e-commerce?



tral areas such as e-commerce, e-mail and Internet surfing, most citizens and enterprises are not clear about which Acts and Sections from the physical world apply and how they are to be interpreted.

The network society has provided us with IT tools which make it possible to invade private space, for example by registering our buying habits, monitoring our mail and sending unsolicited e-mail messages. There should be absolutely clear regulation for electronic privacy, both in the relationship between the State and the citizens and between the citizens themselves, and also in relation to citizens' rights on an Internet which effortlessly crosses national borders.

It is necessary for citizens to be given precise details of the rights they have in the network society. The IT rights of citizens should be formulated on the basis, for example, of the following:

- international legislation and agreements
- Danish legislation, guidelines and circulars
- self-regulation, where trade organisations, consumer organisations and others commit themselves to guarantee schemes or marking schemes which are not stipulated by law.

The IT rights of citizens should, in particular, be specified in relation to encryption, legal and illegal tapping and monitoring, e-mail, e-commerce and electronic registration.

Information on these rights should be provided on a continuous basis, for example on a special home page. Moreover, consideration should be given to providing legal expertise for any questions about the IT rights of citizens.

One major issue is how we should, in future, ensure that communication by Danish citizens and enterprises is not intercepted against their will and without their knowledge. Encryption, i.e. techniques for encoding information so that it is incomprehensible to unauthorised persons, is the means for creating secure communication via open networks, for example the Internet. On the other hand, the access of enterprises and citizens to free encryption products will make it more difficult for the criminal investigation authorities to use tapping as a tool in the fight against crime.

Back in 1996, the Government's IT Security Council considered that there should be access to free encryption in Denmark<sup>87</sup>.

This assessment has been reinforced in several subsequent reports on encryption, including in the recommendations which the Government's expert committee on encryption submitted in 1998<sup>88</sup>.

One of the most important preconditions for the development of the network society is that citizens and enterprises can use encryption to secure their data when it

is sent via digital networks such as the Internet. Therefore, it should be stated that in the network society there is a fundamental right to free encryption without the possibility of illegal interception.

## Notes to objective 4

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- 82 Flemming Svith, "Internet i demokratiets tjeneste" ("The Internet in the Service of Democracy"), *Jyllands Posten*, 19 July 1999
- 83 Foreningen for Dansk Internet Handel (The Danish E-commerce Association) and IT-Kompetence A/S, *Fokus på foreninger – en undersøgelse af Internetanvendelse i den tredje sektor* (Focus on Associations – A Study of Internet Use in the Third Sector), 1999
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- 85 Kommittén för samordning av lagstiftning för radio, TV och televerksamhet, *Konvergens och förändring* (The Swedish Committee on Co-ordination of Legislation for Radio, TV and Telecommunications Activities, Convergence and Change), Sweden 1999
- 86 Committee appointed by Royal resolution, *Konvergens – sammensmeltning av tele-, data- og mediesektorerne* (Convergence – the Fusion of the Telecommunications, Data and Media Sectors), Norway 1999
- 87 IT-sikkerhedsrådet, *Danmarks IT-sikkerhedspolitik – et oplæg* (The Danish IT Security Council, Danish IT Security Policy – a Discussion Paper), 1996
- 88 Ekspertudvalget om kryptering, *Anbefalinger om kryptering* (Expert Committee on Encryption, Recommendations on Encryption), 1998

# Objective 5 IT Lighthouses in Denmark



**Two IT lighthouses are to be established in Denmark, one in Northern Jutland and one in Ørestaden, to promote, from different perspectives, IT development and IT use in the network society.**

## Two IT Lighthouses

In many places in the world, for example the USA, Sweden, Finland and Ireland, very strong IT lighthouses have been established. These are IT growth areas which have arisen as a result of solid, focused initiatives and investments. The IT lighthouses act as magnets to high-tech enterprises, financial investors, entrepreneurs, researchers and students who interact dynamically with a high level of competi-

tion. They are recognised as being the financial and scientific cornerstones of the network society. Like lighthouses they light up and can show the way forward for the development of IT.

Oulu Technopolis, in the north of Finland, is a good example of the fact that IT lighthouses do not have to be close to the heart of a city. For Oulu and for other growth areas it is important that there is a physical concentration of enterprises, research and education institutions and other innovative environments. Moreover, in spite of the effortless cross-border communication, there must be a good physical infrastructure. It must be easy to get to and from the very north of Finland.

Both economically and in terms of employment, it is important for Denmark to

create IT lighthouses which are attractive in both a Danish and an international context as soon as possible and in line with other leading IT nations.

However, the IT lighthouses should also function as large-scale IT-based experiments directed at citizens, the training and education sector, the public administration, trade and industry and the infrastructure. In this way, we can achieve no-

ticeable utilisation of “Digital Denmark” and conversion to the network society.

There is great IT potential in Denmark and there are already examples of areas in which high-tech enterprises have positioned themselves side by side and in some cases right nextdoor to education and research institutions and research parks. This is the case, for example, with the communication partnership NorCom in Northern

## Examples of International IT Lighthouses

The world’s foremost IT region is Silicon Valley in California on the West Coast of the USA. From being an agricultural area for fruit-growing, Silicon Valley has become the leading melting pot in the field of IT, propelled forwards by fruitful interaction between further education establishments and a wealth of the foremost IT-specific and IT-related enterprises. [www.silvalonline.com](http://www.silvalonline.com)

In Ireland, the town of Ennis won a competition in 1996 to be Ireland’s Information Age Town. The award came with

£15 million, which was provided in sponsorship by the Irish telecommunications company Eircom. The idea of the Information Age Town is to study what happens when all enterprises have ISDN and high-speed access to the Internet, when all pupils and students have access to IT in the education system and when all public bodies and the majority of households are on the net. [www.ennis.ie](http://www.ennis.ie)

Finland had the first technology park in the Nordic countries, Oulu Technopolis, which is loca-

ted in the very north of Finland and was established in 1982. Technopolis consists of 130 enterprises with approximately 3,000 employees. Technopolis focuses primarily on telecommunications, electronics and software development. [www.sciencepark.com](http://www.sciencepark.com)

Sweden has its largest and the world’s fifth largest IT park in Kista, outside Stockholm. 600 enterprises, 27,000 employees and 3,100 university students are associated with the park. [www.kistasciencepark.org](http://www.kistasciencepark.org)

Jutland and the IT quarter right by Aarhus University, which has recently been reinforced by the establishment of the Alexandra Institute, which carries on research, development, training and education in applied information technology. Other examples are the IT enterprises in the Laurup park in Ballerup and the telecommunications and mobile telephone companies which have settled in recent years close to the last part of the access road from Copenhagen Airport.

The public sector also has its front runners. Among several good examples are the municipalities in Næstved, Ringsted, Holstebro and Copenhagen, as well as the County of Northern Jutland<sup>89</sup>.

Developments are positive in many places but we have not yet created the IT lighthouses or a network society in which the change in IT use is so great that a serious step forward can be said to have been taken.

There is much to indicate that more IT growth areas rooted in strong research and education environments and innovative enterprises will arise in Denmark in the course of the next few years. However, there is a need to support this develop-

ment by making the IT environments which already have the strongest and best IT potential even stronger and thus better equipped to be IT lighthouses of international standard.

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#### **Recommendation 5.1 An IT Lighthouse in Northern Jutland**

An IT lighthouse should be established in Northern Jutland on the basis of the very positive co-operation which has already been established between enterprises, Aalborg University, Northern Jutland's Science Park (Nordjyllands Videnpark – NOVI) and central political decision-makers in the area.

Within a short period of time, Northern Jutland has undergone a conversion from an industrial crisis area with high unemployment into a new centre for high technology and science-based industry.

Two factors have contributed greatly to the conversion of Northern Jutland. One is the funds from the EU which were granted to Northern Jutland on account of the crisis suffered by the region after a very significant part of its industry, the shipyard industry, was shut down in the mid-80s. The other factor is that the regional and local decision-makers in Northern Jutland thought along visionary

lines when they planned the future of the region and directed their activities at attracting enterprises characterised by new technology. Among other things, this has paved the way for the constructive interaction which has been created between Aalborg University, NOVI and a number of high-tech enterprises.

Aalborg University carries on very extensive research in the field of IT and telecommunications and, in the humanistic courses, there is a focus on problems associated with IT, for example within humanistic informatics and communication.

Aalborg University and trade and industry in Northern Jutland have worked closely together for a number of years. In order to support the necessary presence of specialist and personal networks, the University has taken the initiative to formalise the network co-operation between University researchers and developers from the private business sector within, among other areas, mobile telephony, telecommunications and navigation.

NOVI contains a research park of 15,000 m<sup>2</sup>, an innovation centre and a venture department. There is widespread agreement that NOVI has succeeded in being

regarded as an important research centre by many national and international companies. Several Danish and international IT and telecommunications companies have moved their development departments to Northern Jutland in recent years to exploit the know-how potential in the region.

Moreover, the County of Northern Jutland has well-functioning co-operation with all the public authorities (municipalities and county) and with Aalborg University. This has given rise to, among other things, a number of IT projects directed at the public administration, the training and education sector and the citizens of Northern Jutland. The combination of a high-tech growth area, which is already germinating, and a general will to change makes Northern Jutland a platform on which an IT lighthouse can be established.

In a large-scale experiment, Northern Jutland could be Denmark's first IT lighthouse via the activities which have already been commenced and via a number of prioritised initiatives which should be formulated in a partnership between the Government, decision-makers in Northern Jutland and the private enterprises in the area.



The purpose of a large-scale experiment in Northern Jutland, an IT lighthouse, is to promote development in an area which has already shown that it contains great IT potential, with private enterprises, Aalborg University and NOVI as driving forces.

The large-scale experiment should promote IT development and IT use and, via concrete projects, kick-start life into the network society. The concrete projects should reinforce the electronic infrastructure, competence development, e-commerce, efficiency and service in the public sector, the democratic dialogue and the opportunities for the individual citizen to exploit the potential of the network society.

The overall experiment should be begun as soon as possible in 2000 and run for a 3-year period.

The experience gained from the large-scale experiment in Northern Jutland should make us all more knowledgeable about conversion to the network society.

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#### **Recommendation 5.2 An IT Lighthouse in Ørestaden**

An IT Lighthouse should be established in Ørestaden on the basis of the major initiatives which are already planned for the area but

with greater speed, more precise focus and clearer strategic cohesion.

Ørestaden contains particularly promising potential for the establishment of an IT lighthouse of international standard. Via the Øresund Bridge, 2.9 million people will be linked together, 1.8 million from the Danish metropolitan region and 1.1 million Swedes. 120,000 students and 10,000 researchers together constitute Scandinavia's largest concentration of know-how resources<sup>9</sup>.

Together with the Swedish Government, the Danish Government has presented visions and plans for the development of the Øresund region<sup>9</sup><sup>1</sup>. These plans have been made more concrete in other publications. The ambition is for the region to house two internationally leading growth environments in the fields of IT and biotechnology within a number of years<sup>9</sup><sup>2</sup>.

Funds have been allocated to establish the IT College in Ørestaden and concrete work is being carried out on plans to establish a private IT research park close to the IT College. The research park should offer commercial premises and consultancy to new high-tech entrepreneurs and the research units of established enterprises. At

the same time, the relocation of the Danish Broadcasting Authority (Danmarks Radio) and the State Archives (Statens Arkiver) to Ørestaden offer very exciting prospects for the content of such an IT-based power centre.

The Øresund region and Ørestaden have a very great potential and can become an IT lighthouse, a European hub.

It is important to act quickly. Some of the development projects in Ørestaden have an establishment period of up to 5 years. This is a long time for a field in which developments move at high speed and in which a number of other countries have the same ambitions as the Danish Government.

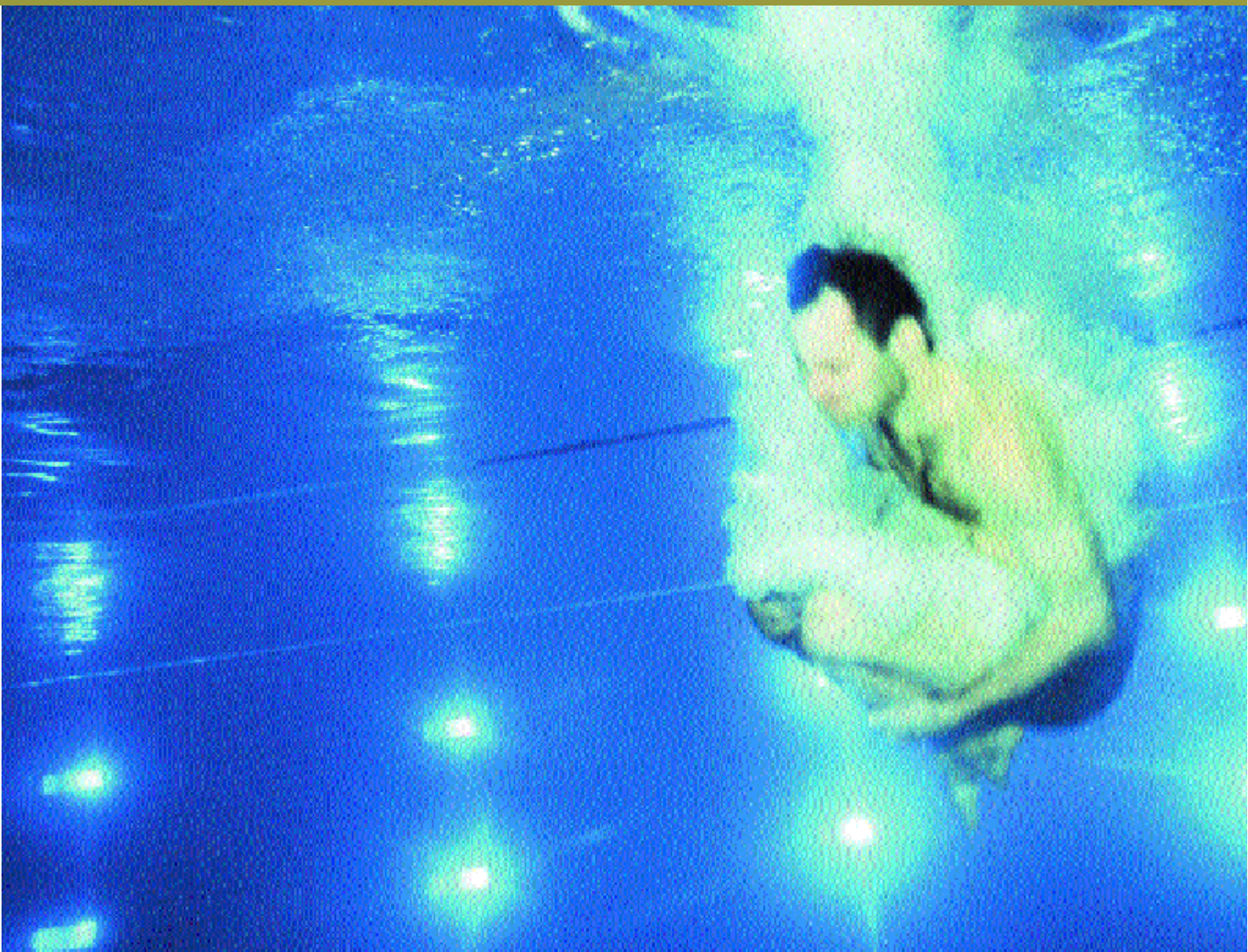
It is also important for the IT plans in Greater Copenhagen and the rest of Zealand not to come to a standstill pending the establishment of the growth centre or IT lighthouse in Ørestaden. In the meantime, provisional solutions should be aimed at such institutions as the IT College, which has been established temporarily in Nørrebro. And Symbion-IT, which has been established close by the IT College but plans to move its activities to Ørestaden when the building work there has been completed.

Moreover, the IT initiatives in Ørestaden need to be formulated in more detail. What areas of strength are to be used to assess the IT lighthouse? E-commerce can become a trademark for the activities in Ørestaden, in terms of training and education, research and innovation. However, there can be other trademarks, for example rooted in the multimedia environment which is expected to emerge upon, among other things, the relocation of the Danish Broadcasting Authority.

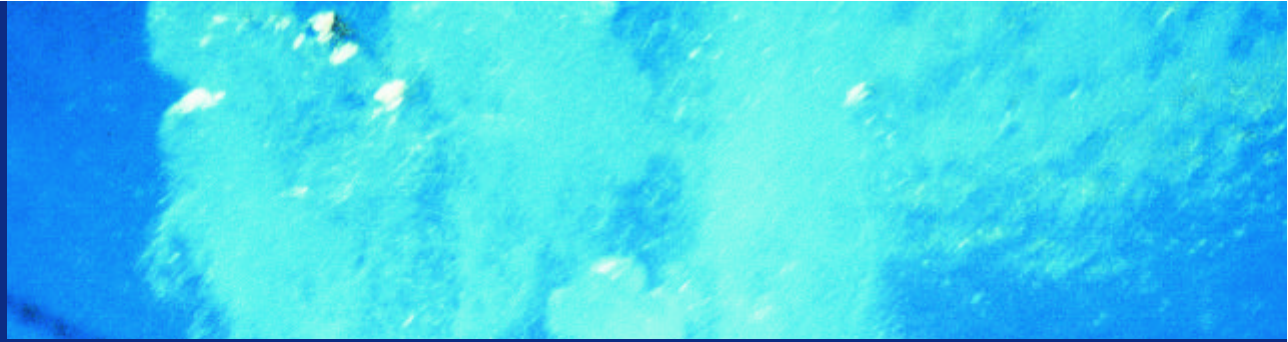
On this basis, the IT lighthouse in Ørestaden should be promoted as rapidly as possible with a sharper focus and clearer strategic cohesion between the projects in the area.

## Notes to Objective 5

- 89 See [www.naekom.dk](http://www.naekom.dk); [www.ringsted.dk](http://www.ringsted.dk); [www.holstebro.dk](http://www.holstebro.dk); [www.copenhagencity.dk](http://www.copenhagencity.dk); [www.nja.dk](http://www.nja.dk)
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- 92 Finansministeriet, Øresundsregionen – nye, kreative vækstmiljøer (The Danish Ministry of Finance, The Øresund Region – New, Creative Growth Environments) (in the series “Danmark som foregangsland” (“Denmark as a Pioneering Country”)), 1999







Follow-up

# Responsibility for Decision-making on IT Policy

Rapid conversion of Denmark to the network society requires significant political focus and targeted action. IT policy organisation and decision-making power are important instruments for ensuring this.

Units have been established which are to guarantee IT co-ordination and qualified IT policy decisions. However, this does not seem to be sufficient in relation to the following challenges:

- that the strongly decentral, public decision-making structure requires close co-ordination and a joint forum which has the competence to make the necessary decisions
- that the Danish labour market is self-regulating to a great extent, for which reason a number of central decisions in the conversion to the global network society depend upon negotiations between the parties of the labour market

- that many IT plans and strategies are now being conceived and implemented along sectoral lines in the ministries and many other places
- that central IT policy issues are being dealt with in international fora where Danish influence depends on highly co-ordinated Danish consensus based on the pooling of knowledge and resources.

In addition many large public authorities, ministries, counties, municipalities, agencies and public corporations have formulated their own IT strategies in recent years and established their own separate windows on the world on the Internet or are in the process of doing so. The ambitions are good in themselves. However, the question now is whether the many IT policy solutions are too small-scale in relation to other public IT initiatives and in relation to the requirements and wishes of the citizens.



It is urgently necessary to co-ordinate and organise IT policy, with the Government as the prime mover, in order to reinforce the decision-making power of the now numerous IT policy players.

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### Recommendation 6.1 IT Policy Network Report

The Government should prepare an annual IT policy network report to the Danish Parliament in which:

- IT initiatives should be compared with the many objectives, strategies and plans of action within various sectors

- A review of legislation pertaining to IT policy should assess which Bills in the last session of the Danish Parliament have had the greatest significance for the development of IT and conversion to the network society
- A comprehensive IT statistical model should quantify the development of IT in Danish society and Denmark's position in relation to other leading IT nations.

In the agreement in principle on the overall objectives of telecommunications policy, it was stipulated that the Government should present an annual network report to the Danish Parliament. In connection

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## Co-ordinating IT Policy Initiatives

**The Ministry of Research and Information Technology.** Established in 1993. Responsible for, among other things, co-ordination of the Government's IT policy and promoting IT development in the public sector.

**The Government IT Forum (Staten IT-forum).** Established in 1992. Is to act as a catalyst for the development and implementation of Government IT policy.

**Year 2000 Forum (År 2000 Forum).**

Established in 1997. Made up of a broad spectrum of organisations and trade associations. Its task is to co-ordinate information work and take common initiatives in relation to the Millennium bug.

The Co-ordinating Information Committee (Det Koordinerende Informationsudvalg). Established in 1998 as a partnership between the State and the municipal

authorities with the purpose of ensuring progress, cohesion and quality in the public sector's use of electronic information.

**Danish Internet Forum (Dansk Internet Forum - DIFO).** Established in 1999 as an independent institution, the purpose of which is to develop and monitor the allocation of Internet domain names in Denmark; the so-called DK hostmaster function.

with this report, the Government was to report on the many conversion processes and IT projects which are in progress throughout Denmark in the State, counties and municipalities. In connection with this report on IT development in the public sector, the IT policy results in areas such as the labour market, transport, health, business and industry and training and education should be assessed. The results should be assessed in relation to other countries and in relation to the objectives of the specific areas. Moreover, in connection with the network report, an annual review of legislation pertaining to IT policy should be produced assessing which Bills in the last session of the Danish Parliament have had the greatest positive or negative effect on IT development and Denmark's participation in the network society.

Finally, a comprehensive measurement of IT development in Denmark should be carried out using an indicator-based IT statistical model. This should, on a continuous basis and with high reliability, put figures to IT use in Danish society and, via best practice, analyse Denmark's position in relation to other leading IT nations. The content and the focus areas which are to be measured should be selected in co-

operation between the Ministry of Research and Information Technology, other relevant ministries and trade and user organisations.

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### Recommendation 6.2 The Public IT Network

A public IT network should be established with separate political, administrative and technical levels and with the participation of the State, the counties and the municipalities.

With The Co-ordinating Information Committee, a forum has already been established which can, on a high administrative level, co-ordinate decisions in the IT area between the Government, the counties and the municipal parties and make such decisions. The Co-ordinating Information Committee should be supplemented by two other associated but supplementary levels, namely:

- a group of top IT policy executives consisting of those Ministers who have IT development and use high on their political agendas and top county and municipal politicians
- an IT technology forum consisting of representatively selected IT technology managers in the central administration, counties and muni-

icipalities, as well as large public corporations.

These three fora could also be used for the exchange of experience and assessment in connection with major IT investments but they should have no decision-making competence in relation to the individual IT projects, which should continue to be the responsibility of the institution where the project is to be implemented.

In connection with IT policy organisation, consideration should also be given to whether the State is properly organised and staffed to handle the technical and specialist IT management and authority tasks. The specialist expertise which has been built up in many ministerial areas will be challenged by the development of IT and there may be a need to gather specialist IT resources together from all ministerial areas. Consideration should, therefore, be given to whether it would be advantageous for a unit to be established to gather together the State's specialist IT expertise.

The annual report on IT development and Denmark's conversion to the network society could be made at conferences of Ministers. This would be one way of

remaining in focus and having the necessary decision-making power. Another way might be the establishment of an independent IT council, with the task of being the network society's watchdog to make decision-makers aware of IT policy issues and possibilities as they arise, while it is still possible to influence developments.

Finally, it should be recognised that the content of Danish IT policy depends to a great extent on decisions which are made internationally. Therefore, Danish participation in international decision-making fora in, for example, the EU, OECD and WTO, should continue to be given very high priority. This is a prerequisite for ensuring that Danish attitudes and priority issues can be asserted both inside and outside Denmark.





# Conclusion – A Rapid Conversion

We face a massive task: Danish society must be converted rapidly from an industrial society into a network society in which technological development, globalisation and the digital economy are setting an agenda with which we have not yet become familiar. Every day foreign companies are taking the new technologies into use to rationalise their chains of production. Every day new foreign suppliers are opening home pages with offers to Danish consumers and every day more and more Danes are buying goods and services over the Internet for ever increasing amounts of money.

Digital Denmark is our answer to how the network society is held together, what objectives we should set ourselves in Denmark and how we should pursue these objectives with concrete initiatives.

Digital Denmark deals with how we should participate actively in the network society, while preserving the best values of our welfare society. The key words are conversion, innovation, co-ordination, drive and speed.

On account of the cut-throat international competition, we have to convert rapidly in order to secure our welfare society. However, developments should not be left solely to market forces. Society as a whole must immediately shift up a gear with solid initiatives which can contribute to bring about the necessary conversion.

One thing is certain: IT is developing furiously, the network society is in the process of finding its form and it will not necessarily wait for Denmark to catch up

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Further background material in the form of, for example, investigations, articles and reports can be found at [www.detdigitaledanmark.dk](http://www.detdigitaledanmark.dk)

