Danish IT-pictures

Status Report

Digital Denmark

Introduction

Danish IT-pictures is a status report for use by both the Committee and the Reference and Follow-up Group for Digital Denmark. The Committee for Digital Denmark, which is made up of Lone Dybkjær, Member of the European Parliament, and Jørgen Lindegaard, managing director of GN Store Nord, was appointed by the Danish Minister for Research and Information Technology, Jan Trøjborg, in the autumn of 1998. The task of the committee is to draw up a memorandum for the future strategy of the Danish government with regard to IT-policy. The memorandum is to be completed by the end of 1999.

This status report aims to give a picture of the IT-situation in Denmark at the present moment – while we are fully aware of the considerable difficulty of defining a status in an area where the number of users of IT changes daily, and at the same time, and at almost the same tempo, new highly technological products are introduced, with offers of alternative subscription and scales of charges to the users of IT and telecommunication. The rapidity of developments – and also the many stories in the media of both the blessings and the terrors of IT – are nonetheless good reasons for freezing the picture – just for a moment.

Information technology – IT – has made its impression on everyday life in Denmark. At work as well as in leisure activities, in public administration and in private companies, in offices, in living-rooms and children's bedrooms. More than half of the Danish households own a PC and almost one in three has access to the Internet. Two out of three small companies and all companies with over fifty employees make use of IT. In the course of the last five years the public sector has set up about 1,600 homepages on the Internet. These figures and many more are presented in this report, together with investigations of the attitudes of the Danes to developments in IT – both for and against. Finally, the report gives an overview of the most essential IT-activities in the state in the last few years.

Figures and surveys are always interesting, especially when they are compared with situations in the other countries with which the Danes are normally compared. However, the main object is to look in behind the figures or possibly to rise above them and use them as one of several points of departure for a debate about which goals should be set for Denmark in a world-wide network society, and which IT-political strategy should be drawn up in order to reach these goals.

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Part I Danish IT in figures

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1.1 Use of information technology in Danish private homes

Two out of three Danes (66%) connect information technology with PCs and access to the Internet. However, a large number of other IT-products have also become a natural part of Danish everyday life. Scanners and CD-recorders are now beginning to appear in Danish private homes. Danes mainly buy computers to use for studying or in their work.

More than every other Danish household (52%) possesses at least one PC. Almost every third household (31%) has access to the Internet. These were the main results of a survey made by Gallup in the first three months of 1999 for the Ministry of Research and Information Technology. In direct figures this means that approximately 2.8 million Danes have a PC and about 1.6 million Danes have access to the Internet from their homes. To these must be added the numbers with access to PCs and the Internet from their school or college, place of work or similar.

Fig 1.1 IT and IT-related equipment owned by Danish households

Equipment	Percentage
TV	99%
Video	84%
Mobile telephone	57%
PC	52%
Cable-TV / Hybrid network	44%
Internet access	31%
Dish aerial	26%
Nintendo / Playstation	17%
Scanner	16%
TV-decoder or Selector box	14%
CD-recorder	8%
ISDN-connection	6%
DVD	4%
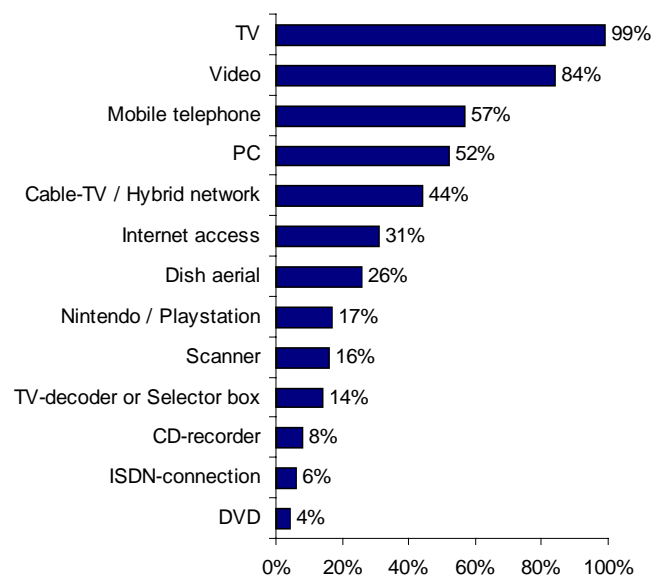
Source: AC Nielsen AIM, 1999. But PC and Internet access: Gallup, 1999

Danish families have a wide selection of IT and IT-related equipment at home. Figure 1.1 shows the distribution of different types of IT-equipment. TV and video are the most common. Practically every Danish household has TV, and as many as 84% have video, which indicates that Danes give priority to being able to decide for themselves when they will watch TV and films. The Internet also provides this possibility. In the third position of popularity, covering 57%, mobile telephones are now considered a normal facility, owned by more than half of Danish households. The spread of mobile telephones is of interest, because technologies which can bring the mobile telephone on-line are on the verge of a break-through. PCs have also spread to just over half of Danish private homes. The figure shows, in addition, that almost one private home in three has access to the Internet. Finally, it is important to note that a number of products are now common which only a few years ago were completely unknown to Danish households. These include among others TV-decoders and Selector boxes (14%), CD-recorders (8%) and ISDN-connections (6%). This is only the beginning of an explosive expansion. AC Nielsen AIM's survey from March 1999 shows, among

other things, that 73% of Danish households expect that a number of household functions will be computer controlled in future.

Danes buy computers and use them in connection with studies or work, or else for their children, or out of curiosity. This conclusion could be drawn from the analysis made by AC Nielsen AIM on the background of 754 randomly selected Danes with PCs at home. In a telephone interview they were asked: "For what reason did you buy a PC for your home?" and no immediate answer was suggested to the person interviewed. The twelve most frequent answers are shown in figure 1.2.

It is remarkable that the absolute top score, with 28% of the uses mentioned, went to "Preparing work at home". At the same time, a further three of the twelve answers relate to jobs or study. The second-largest category of answers, with 19%, was "Children's wish to help with homework". Children are also behind two of the other categories of answers, which are "Children's wish for computer games" and "Parents' wish to help with children's homework".

Fig. 1.2 Reason for purchasing a PC

Reason	%
Preparation of work at home	28%
Children's wish to help with their homework	19%
Aid to study	16%
To keep up with developments	14%
From curiosity	11%
Children's wish for computer games	10%
Place of work at home	10%
Supplied by employer	8%
Wish for Internet access	5%
Spouse's or partner's wish	5%
Parent's wish to help with children's homework	5%
To practise at home	4%

Source: AC Nielsen AIM, 1999

1.2 International comparisons

More than half of Danish private homes own a PC, while almost one in three have access to the Internet. Measured on a world scale, this puts Denmark among the leaders in the information technology field, but on a Scandinavian scale Denmark is lagging behind.

In the telephone branch the liberalisation which is in progress has already resulted in new telephone companies, new products and lower prices.

The wide availability of the Internet means that many Danes have the opportunity of shopping via the Internet. However, only a small number of Danes (1.6%) can at present be regarded as Internet shoppers. Nevertheless, the few who do trade accounted for a relatively large turnover in 1998.

1.2.1 Households and access to PCs or the Internet

For many Danes the development of information technology is connected with the explosive spread of PCs and the Internet in the course of the 1990s. Figures 1.3 and 1.4 show the distribution of access to PCs and access to the Internet in the countries with which Denmark is usually compared. The data material comes from telephone interviews carried out among representative samples of households in the various countries.

The results of the survey show that the USA and the Scandinavian countries are at the forefront with regard to the spread of access from private homes to PCs and the Internet.

Thus 73% of all households in Iceland have PCs in the home, followed by Holland with 65% and the USA and Sweden with 58%. After this come the other Scandinavian countries with Norway (57%), Denmark (52%) and Finland (48%) in that order.

Several analysts point out that the number of households with PCs has increased noticeably during the first three months of 1999. Some surveys indicate the level of Danish PC-owning homes at about 60% in the first half of 1999. For example, the number shown by AC Nielsen AIM is 63% at the end of March 1999. Probably this is mainly due to the fact that more and more employers are making home-PCs available for their employees. Please see section 1.4.2 in this report.

If one considers access from the home to the Internet, Figure 1.4 shows that the USA, Iceland and Sweden have the highest percentage with around 42%. Denmark, Norway and Finland follow, where about 30% of households have access to the Internet.

1.2.2 Computers in lower secondary schools

Of the countries in the OECD, Denmark has the largest number of lower secondary school children who use a computer at least once a month. This conclusion is drawn from an analysis carried out in a number of OECD countries. (Please see fig. 1.5). The figures are from 1995, and thus are from before the 1996 agreement between the government and the municipalities on a change of tempo in municipal purchases of computers for the

Fig. 1.3 Distribution of PCs in private homes
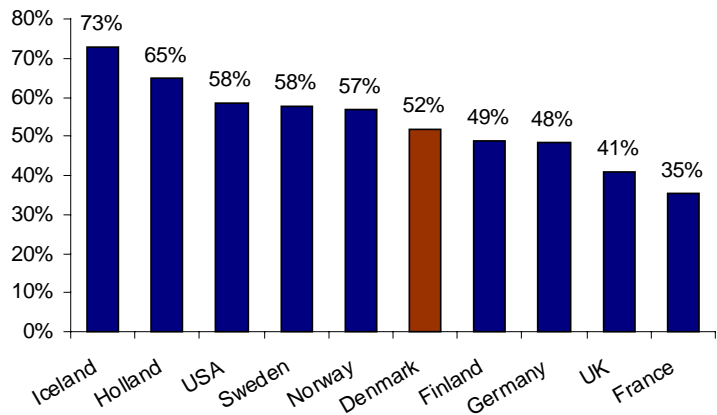
Source: Gallup A/S, 1999

Fig. 1.4 Internet access in private homes
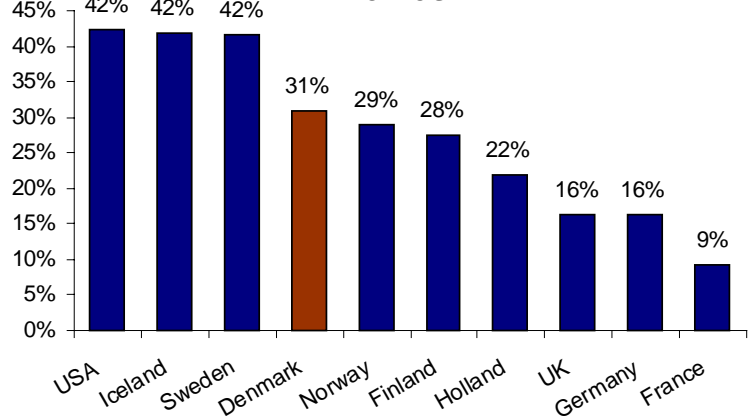
Source: Gallup A/S, 1999

Fig. 1.5 Students' use of computers in secondary school, 1995
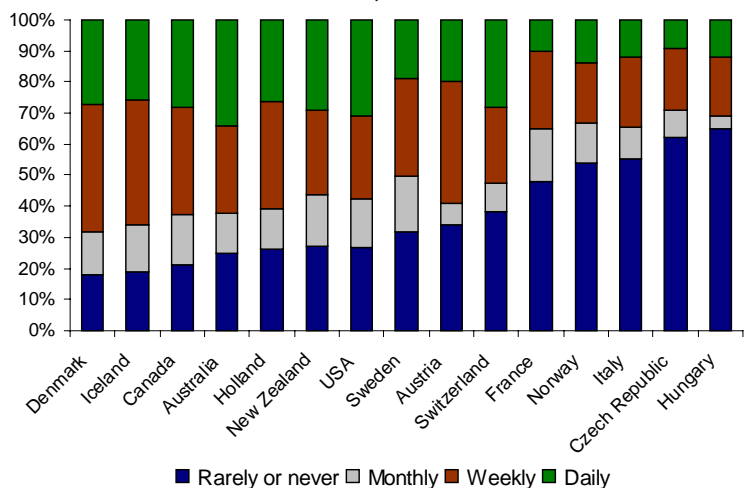
Source: Education at a Glance, OECD, 1998

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Folkeskole (7-16-year-old children). Together with a considerable interest for computers in the schools and among parents in general, this has presumably led to further increases in the use of computers in the Folkeskole.

1.2.3 Internet shopping and the public

One of the recent uses of the Internet is the possibility of buying products and services through the Internet. An outline is given in the following of how widespread Internet shopping is among consumers at the beginning of 1999.

Only 1.6% of the Danish public have tried private trading through the Internet, which is a significantly lower percentage of the population than in Finland and Sweden (figure 1.6). The analysts International Data Corporation (IDC) place Denmark as number seven among sixteen western European countries. If the number who trade through the Internet is compared with the proportion of the population with access to the Internet, the figure in Denmark is low. However, the most recent surveys suggest that the Danes are beginning to adopt Internet trading. An AIM survey in March 1999 showed that almost one Internet user in five (19%) states that he or she has ordered goods through the Internet.

One aspect is the number who trade through the Internet. Quite another aspect is the amount they spend in this way. Among west-European countries Denmark is number six ranked by the amounts spent. Danish Internet customers spent on average DKK 2,796 in 1998, which is more than those in Sweden or Finland (please see figure 1.7).

Fig. 1.6 Internet-trading in % of population, 1998
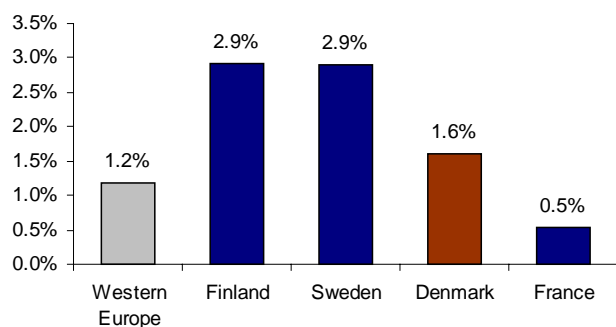
Source: IDC, January 1999

Fig. 1.7 Average turnover (DKK) per person trading on the Internet in 1998
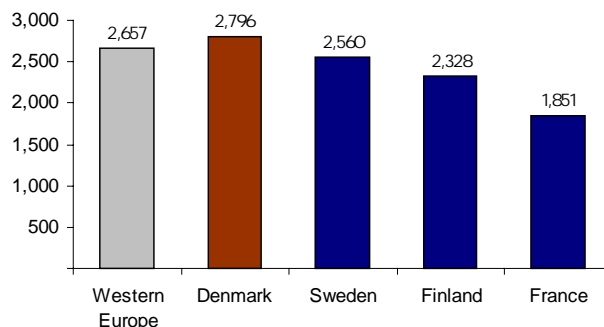
Source: IDC, January 1999

1.2.4 Telephone products and prices

The Ministry of Research and Information Technology has recently carried out a status analysis for use in the coming political discussions of the perspectives for telephone policy for the next five to ten years, which indicates that there are at present over fifty telephone products in general supply on the Danish telephone market. In addition to this, commercial users more often than previously are offered tailor-made solutions that include price offers and specially adapted installations.

The range of telephone products available, their quality and the prices for acquiring and using them are fundamental factors in the information society – and at the same time competitive factors in high degree.

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Since 1995 Denmark, as one of the first countries in the world, has begun the total liberalisation of the Danish telephone branch. This liberalisation, which is still in progress, is clearly visible in the form of new suppliers, more products and lower prices on the Danish telephone market. The general picture shows that the first phases of the establishment of this market have been carried out successfully.

There is considerable pressure on the markets for international telephone services, mobile services, domestic telephones and Internet traffic. In some areas, however, the small or directly negative competitive margins are problematical for the new companies. This applies, for example, to the market for ordinary domestic (and especially local) telephone services and Internet traffic to private subscribers. Unless prices are reduced for the joint traffic and the products and services which apply to this sector of the market, there is a risk that the market will stagnate, and possibly that some of the new companies will withdraw from this section of the market.

At the same time it is clear that product development in the range of products available is greatest in the sections of the market where competition has the greatest effect. Besides this, the analysis carried out by the Ministry of Research and Information Technology revealed that, compared with markets in other countries, the Danish market has a wide range of products which cover both the fixed net and the mobile net. In contrast, the picture is more varied concerning the use of Intelligent Nets (IN technology). These are telephone nets which can do more than transmit and interconnect telephone traffic, or in other words, they process in some way the signals or conversations transmitted. Their use is especially established on the mobile market, but there is still plenty of room for product development. The availability of high-speed Internet products for private consumers is also limited at present.

If the prices which Danish consumers pay today are compared with the prices they paid in 1990 or 1995, it becomes quite clear that liberalisation has made a difference.

The fall in Tele-Danmark's current prices for domestic services amounted to 7.6% altogether between 1990 and 1998. If the prices charged by the two new companies, Tele2 and Telia, are included in the calculation, there has been a fall of up to 19% (Tele2). Figure 1.8 shows the fall in real prices for a basket of services based on the total Danish domestic telephone traffic (both private households and business telephone traffic).

Fig. 1.8 Price development for domestic telephony 1990-1998 (fixed prices incl. VAT). Index 1990=100
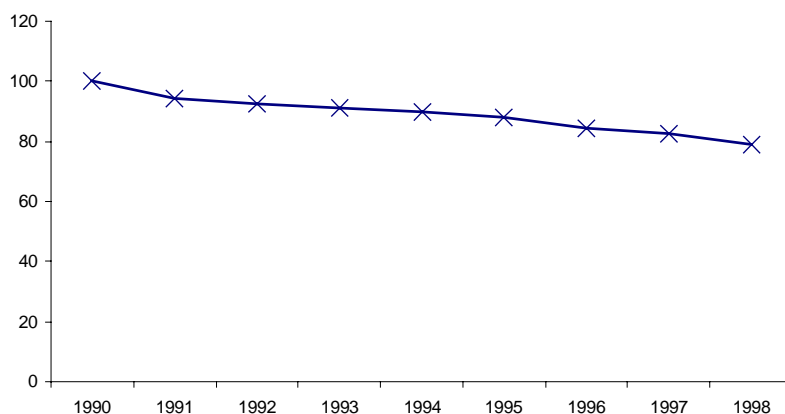
Source: Teleårbog 97, National Telecom Agency 1998
Note.: The curve, which symbolises a subscriber to Teledanmark, has been deflated by the net price index. The composition of the telephony-basket was adjusted between 1995 and 1996.

The real-term costs to subscribers for domestic telephone services fell more or less constantly throughout the 90s by about 2% per year. After liberalisation the fall in prices has accelerated to 5% per year. Depending on the patterns of use, the price-conscious subscriber can combine offers from the different companies to reach a price level 40% below the level in 1990.

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The effects of liberalisation can also be seen in international connections. Thus Denmark was in the third position in 1992 and 1994 among the countries with which it is usually compared, while in 1996 and 1998 Denmark was in the second position (please see table 1.1).

Table 1.1 The expenses of domestic telephone services for subscribers, in order of lowest prices, 1992-1998

1992	1994	1996	1998
Sweden	Sweden	Sweden	Sweden
Holland	Holland	*Denmark*	*Denmark*
Denmark	*Denmark*	Finland	USA
Finland	Finland	Holland	UK
Germany	Germany	UK	Holland
USA	UK	Germany	Finland
UK	USA	USA	Germany

Source: OECD Communications Outlook 1992-99 and Ministry of Research and Information Technology

Note: Adjusted for purchasing power parity

While prices for the more traditional telephone services have fallen slightly, prices for calls to mobile telephones and international calls have fallen significantly. For example, the price for a mobile call has fallen from DKK 2.35 per minute to DKK 0.80 per minute – and in both cases prices have been reduced in the period from 1995 – 1998 by about a third. This considerable fall in prices is mainly due to the fact that these two areas in particular are subject to competition between several companies. In general, gains have been greatest for business subscribers, who, as large-scale customers have paid relatively lower bills than private subscribers.

Where the Internet is concerned, Denmark is at the forefront, together with the other Nordic countries, with regard to low prices. (In Finland, however, the price is about half that of the other Nordic countries.).

Figure 1.9 illustrates the fall in total expenses of using the Internet as experienced by the average Danish private subscriber. This also shows that in the last few years the cost of the actual telephone services has only fallen slightly. In the most recent years it has become considerably cheaper to use the Internet. The fall in price is a result of the strong competition between Internet operators combined with the increasing number of specially adapted offers to different groups of Internet users. This means that today there are discount rates for major users – down to DKK 0.08 per minute after being connected for 60 minutes by a normal telephone line for private subscribers, and even lower rates per minute with a cable modem.

Fig. 1.9 Monthly Internet costs to private consumers in Denmark for 20 hours of weekly use
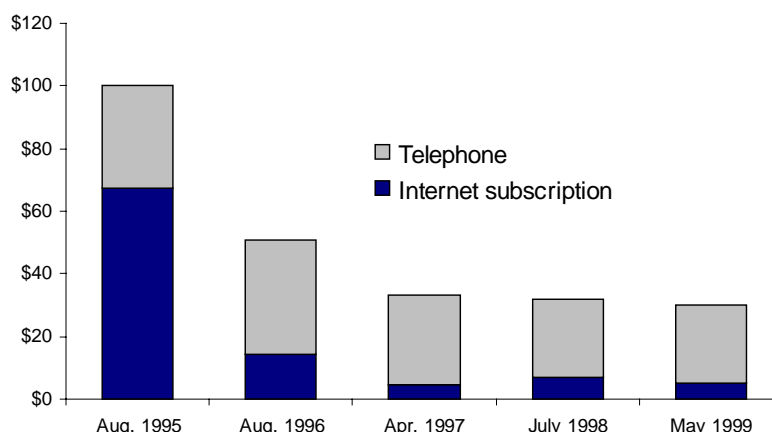
Source: OECD and The Danish Ministry of Research and Information Technology, 1999
Anm.: Prices are in USD, adjusted for purchasing power parity

1.3 Who, what and where on the Danish Internet

The typical Internet user is: a young man with a higher education, who was connected up yesterday from his own home. He used the Internet to send and receive electronic mail, to seek information and to surf on the World Wide Web.
But what about the rest of Denmark? Does the Internet present us with the problem of first-class and second-class citizens?

1.3.1 The age and sex of Internet users

Technology generally and information technology in particular have always been regarded as the province of men. Nevertheless, there are many signs that women also make use of information technology.

In June 1998 the news broke from the USA that America Online – the largest American Internet operator – had registered more female subscribers than male – in figures 52%[1].

In Denmark there are still more men than women who state that they have Internet access from home, their

Fig. 1.10 Internet access categorised by gender

Source: Gallup, 1998-1999

work, their place of education and/or other places, (please see figure 1.10) but the difference is marginal.
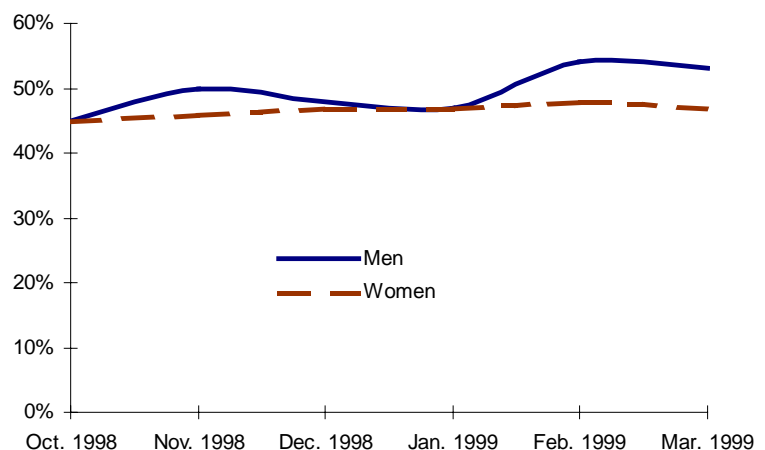
A somewhat greater difference is apparent when Internet access is compared between different age groups. Figure 1.11 clearly shows that the younger one is, the greater is the likelihood that one has access to the Internet. In the youngest age group (15-24 years) and to some extent also in the 25-39-year-old group, there will be many that have access to the Internet from their place of education, which undoubtedly contributes to the high proportions in these age groups. Another factor to be taken into consideration is that the age groups represent different fractions of the population. In

Fig. 1.11 Internet access categorised by age

Source: Gallup, 1999

the 15-24 age group there are about 650,000, or about 12% of the population, while the over-60 age group consists of about 1,000,000, corresponding to about 20% of the population.

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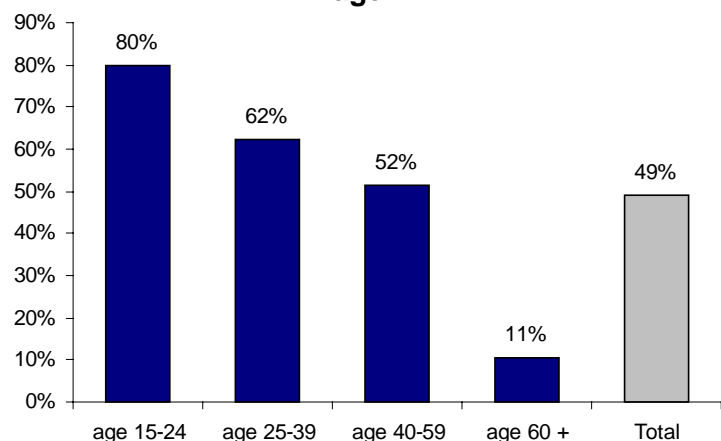
[1] Source: Nua Internet Surveys, www.nua.ie

Having access to the Internet is not synonymous with making use of it. It is therefore also relevant to consider how the Internet is used. Here the rule of thumb is that one Dane in eight (over the age of fourteen) was on the Internet yesterday. Within the last month nearly four out of ten Danes (39%) have been on the Net. (Please see figure 1.12.)

Fig. 1.12 Use of the Internet, 1st quarter 1999

Used the Internet yesterday 13%

Used the Internet within last month 26%

Longer since last use of the Internet 10%

No access 51%

Source: Gallup, March 1999
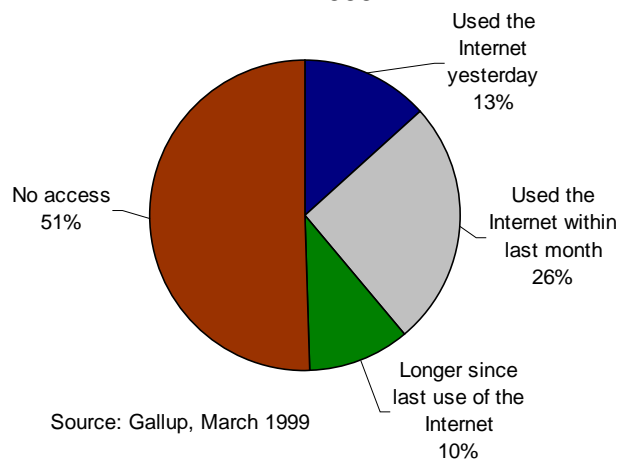
1.3.2 The problem of first and second class citizens: Use of the Internet related to income and education

From "Informationssamfundet år 2000" ("Information society in 2000") – the report from 1994 which put information technology on the political agenda – it can be seen that there is a tendency to "division of the population into information-technological first and second-class citizens. Through their work or leisure interests the first-class citizens will become familiar with information technology and be able to make use of its many opportunities. The second-class citizens will not be able to grasp the technology and will avoid it. Job opportunities for these second-class citizens will become more and more limited."

It is extremely difficult to come to grips with all the problems of information technology in relation to first and second class citizens. The concept of first and second-class citizens is based on the fear that the new technology can widen the divisions in society. To shed light on this, the use of the Internet has been investigated in relation to income groups and educational background.

In May 1998 the International Data Corporation (IDC) carried out a proportional analysis of more than 6,000 households in six European countries: Denmark, France, Norway, Great Britain, Sweden and Germany. The respondents in the survey were asked whether they had made use of the World Wide Web within the last three

Fig. 1.13 Use of the Internet in relation to household income

Legend:
- Less than DKK 150,000
- DKK 150,000-300,000
- More than DKK 300,000

Country	Less than DKK 150,000	DKK 150,000-300,000	More than DKK 300,000
Denmark	15%	17%	34%
France	5%	15%	32%
Norway	17%	24%	30%
UK	10%	15%	38%
Sweden	32%	36%	70%
Germany	15%	17%	30%
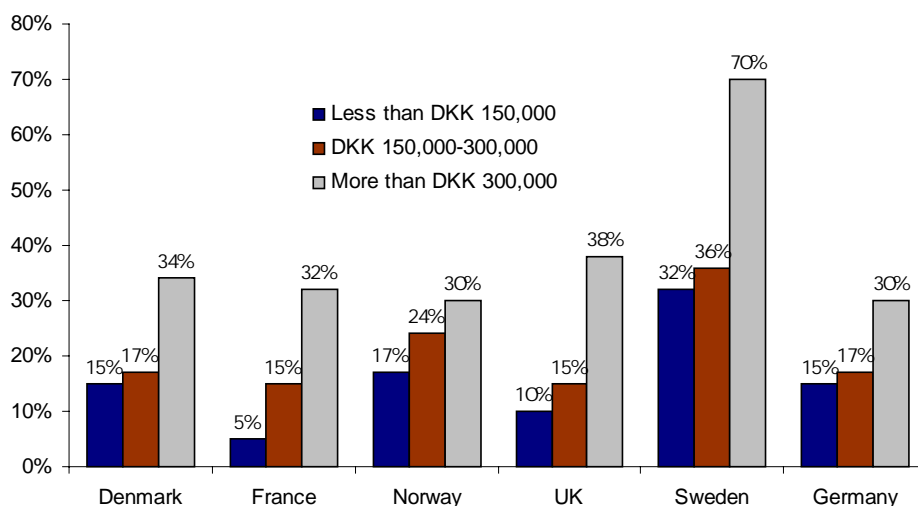
Source: IDC, May 1998

months. Note that there is no enquiry as to whether the respondents' household owned any point of access to the Internet. The respondent could just as easily have gained access to the Internet from a place of work, a place of study, the local library or some other public or privately available point of access to the Internet.

Figure 1.13 shows households with access to the Internet in relation to the household income. In all countries included in the survey the lower income groups make noticeably less use of the Internet. As the majority of students, who often have Internet access from their places of study, are to be found in the lower income groups, the actual gap between the first and second-class citizens is even greater.

Among the Nordic countries in the analysis, Denmark has the fewest Internet users among low-income groups.

In the summer of 1998 the analyst company IDC made a survey of use of the Internet which, as defined by IDC means that the Internet has been used at least once in the last three months – as a function of the last level of education completed. 8% of those with only Folkeskole education were Internet users. Among those with an education from High School (in Danish: Gymnasium) the percentage was 27%, for those with a vocational training the level was 29%, and for those with a higher education 40%.

Fig. 1.14 Internet use in relation to level of education
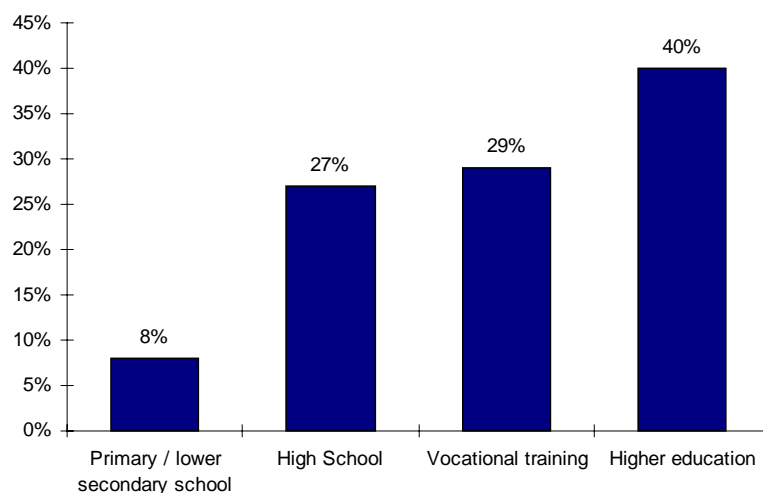
Source: IDC, 1998

Altogether the surveys show that groups with low incomes, people with limited education and the older age group in general make less use of the Internet than other groups. It is therefore still relevant to discuss the question of first and second class citizens, especially when more detailed figures allow consideration to be given to the different ways in which the different groups in society make use of the Internet.

1.3.3 Where does use of the Internet take place?

Most people make use of the Internet from home. This was one of the main results shown in IDC's analysis of Internet use in June 1998. Almost half (44%) of those who had made use of the Internet at least once within the last three months had made use of it from home.

The survey also shows that places of education (35%) and places of work (33%) are popular places to make use of the Internet.

Fig 1.15 Access to the Internet from where?
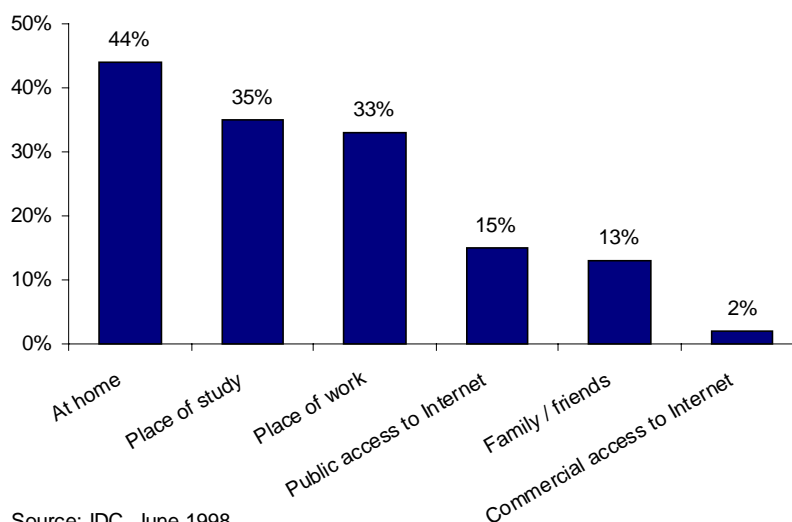
Source: IDC, June 1998
Note: Each user may have Internet access from several different places, so the sum of the columns will be more than 100%

The category "Public access to the Internet" chiefly covers public libraries with computers and Internet access available to the public, while the category "Commercial access to the Internet" primarily covers the "Internet cafés" where it is possible to pay for access to the Internet by the hour.

1.3.4 What is the Internet used for?

Four out of five users of the Internet (82%) use it for communication via e-mail.

In a survey carried out for the Ministry of Research and Information Technology by AC Nielsen AIM in March 1999, Internet users were asked what they used the Internet for when they used it from home. Apart from e-mail, seeking information (78%) and general surfing (61%) were the most popular forms of use.

Fig. 1.16 Use of the Internet from home

Category	%
Sending and receiving e-mails	82%
Information retrieval	78%
General surfing	61%
Reading news	45%
Downloading files and programs	43%
Ordering services	29%
Finding jobs	28%
Games and entertainment	28%
Chatrooms and on-line meetings	20%
Ordering goods	19%
Own homepage	14%
Inserting advertisements	10%
None of the above	1%
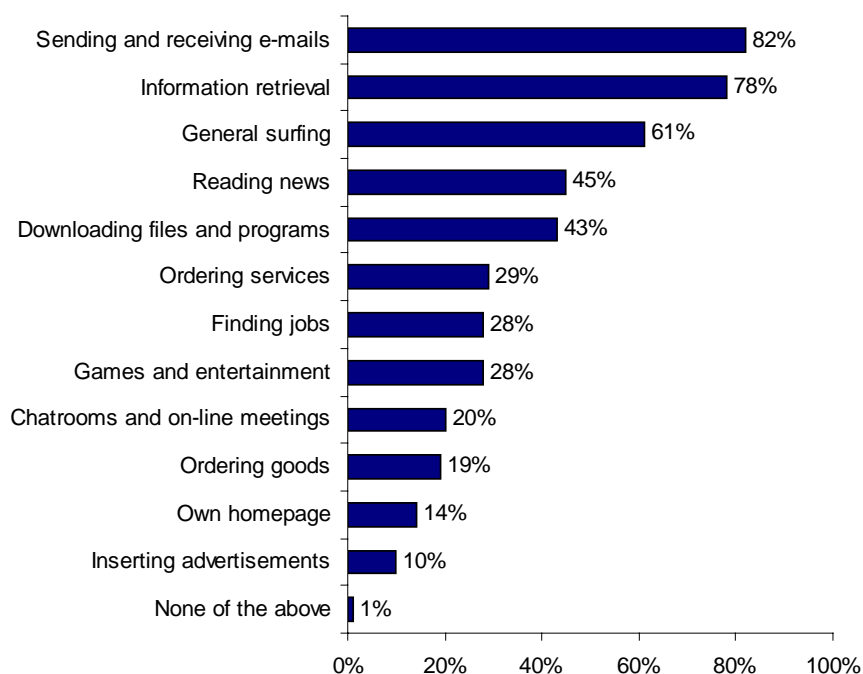
Source: AC Nielsen AIM, 1999

1.4 The digital workplace

The majority of Danes come into contact to a greater or lesser degree with IT at their place of work. This means that 70% of the Danish labour force uses a PC at work. Three out of ten enterprises offer PCs to their employees while a further 8% plan to do so in 1999.

1.4.1 Use of IT at work

On behalf of the Ministry of Research and Information Technology AC Nielsen AIM asked a representative sample of the Danish population in employment about their use of various types of IT-equipment at work. PCs (70%) and printers (63%) are the most widespread forms used at work, followed by mobile telephones and the Internet, which are used by four out of ten at work.
The survey clearly indicates that those with a longer-cycle education tend to make more use of different types of IT-equipment at work than those only educated in the Folkeskole. Thus practically all those with a higher education make use of a PC or computer and printer at work while only three

Fig. 1.17 Use of IT-hardware at work

Legend:
- Long-term higher education (dark)
- Only primary/lower secondary school (light)

Category	Long-term higher education	Only primary/lower secondary school
None of these	0%	52%
CD-recorder	20%	2%
Scanner	47%	9%
Modem	71%	8%
Internet	87%	6%
Mobil telephone	63%	30%
PC or computer	96%	31%
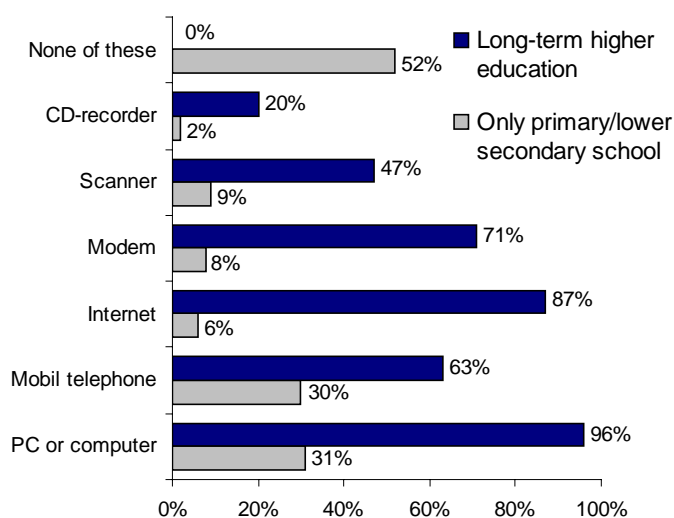
Source: AC Nielsen AIM, 1999

out of ten of those only educated in the Folkeskole use a PC at work. However, as a rule it can be assumed that the need for information technology at work increases in parallel with the level of education on which it is based.

1.4.2 Home PCs paid for by employers

A constantly increasing number of companies offer home PCs to their employees. The figures from a survey carried out jointly by the Ministry of Research and Information Technology and 'Danmarks Statistik' show that 29% of enterprises with twenty or more employees have to some extent offered home PCs to their employees while a further 8% expect to offer home PCs before the end of 1999. At the same time it should be noted that only three out of ten companies have made the offer of a home PC to more than half of their employees.

Fig. 1.18 Companies who offer or will offer PCs at home before the end of 1999
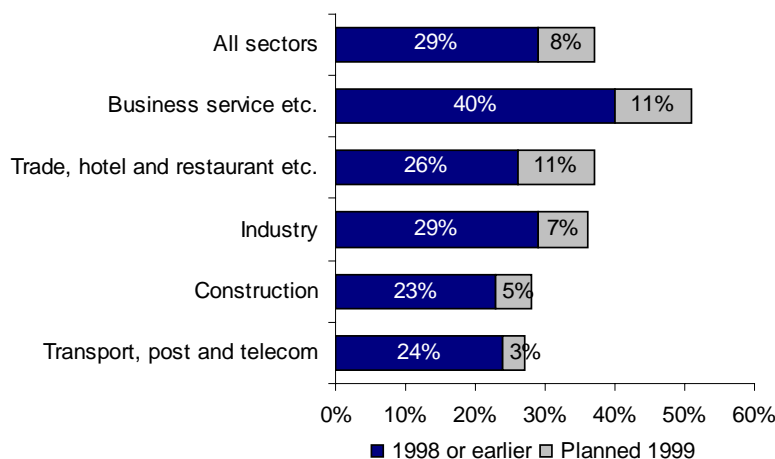
Source: The Danish Ministry of Research and Information Technology and "Danmarks Statistik", 1998

1.5 Attitudes in the Danish population to information technology

The Danish attitude to information technology is positive. Three out of four Danes have stated that they do not agree with the suggestion that modern technology seems frightening or that technology is more of a hindrance than a help in their daily lives.

A large majority (77%) believe that children can learn important skills by using a PC, but at the same time 66% of those asked also agree that children should not spend more than an hour each day sitting at a computer. The Danish population is less unanimous when asked whether the new technology in the home is introduced at the cost of time spent socially together with the family or friends: (45% say yes, 51% say no). Although most Danes do not at present shop actively through the Internet, many are aware of the importance that electronic commerce is expected to have in the future. Many Danes (77%) feel that the registration of personal details can lead to dangerous developments. At the same time a relatively large number of Danes (43%) see opportunities and advantages in connection with registration of data on the Internet which can contribute to the adaptation of marketing strategies to individual needs.

Only a small section of the population (12%) feel insecure about new technology at their place of work. Finally, the Danes are divided almost equally over the question of whether technological developments lead to more and more unemployment. Thus 49% agree or partly agree with this statement while 47% correspondingly disagree.

17

1.5.1 Attitudes to IT in the population

My husband says we must have e-mail and the Internet. I am tired of hearing that we need to – quite honestly, that PC is only a toy after all. I can't see any use for it. And we do not need it! (Stated by a woman in the 'late majority' group aged 44)[2]).

Is the above statement typical of the Danish attitude to IT, or are Danes in practice more positive in their approach to IT? How does the Danish population relate in general to the fact that IT is increasingly becoming an integrated part of their daily life? Figure 1.19 shows attitudes in the Danish population to various statements related to IT.

Fig. 1.19 Attitudes to IT

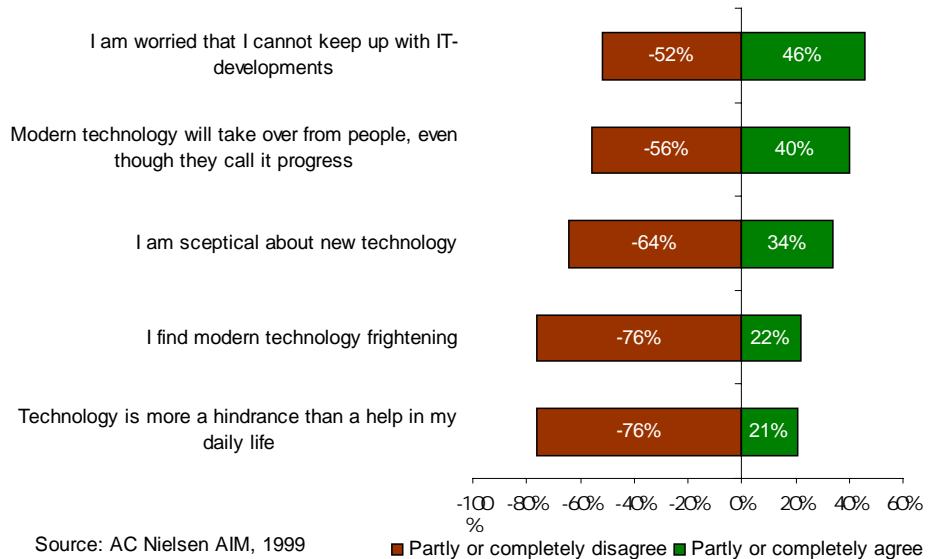| Statement	Partly or completely disagree	Partly or completely agree
I am worried that I cannot keep up with IT-developments	-52%	46%
Modern technology will take over from people, even though they call it progress	-56%	40%
I am sceptical about new technology	-64%	34%
I find modern technology frightening	-76%	22%
Technology is more a hindrance than a help in my daily life	-76%	21%

Source: AC Nielsen AIM, 1999

In general the Danes tend to welcome the possibilities inherent in information technology. In a representative survey undertaken by AC Nielsen AIM for the Ministry of Research and Information Technology, more than three quarters of those asked do not feel that modern technology is frightening, or find that technology is more a nuisance than a help. At the same time only one in three of those asked were sceptical when faced with new technological products.

A larger number are worried as to whether they can keep pace with IT-developments. Almost half (46%) of those asked expressed fears that they could not keep up with developments in IT.

However, although most of the Danish population are not afraid of the developments in IT, there are differences in attitudes depending on age and sex. Thus table 1.2 shows that relatively larger numbers of women (40%) than men (27%) are sceptical when faced with new technological products.

Similarly, roughly twice as many among the older generation as among those aged 15-29 are sceptical when faced with new technological products.

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[2] In the first three months of 1999 AC Nielsen AIM carried out a qualitative survey of Danish attitudes to IT in their daily lives. It was carried out through panel discussions among 'ordinary' Danish people divided into various segments. People were recruited for the panels discussions on the basis of Everett M. Rogers's so-called adaptor model, which describes attitudes to new skills or knowledge. The model divides the population into the following segments: *Innovators, early adopters, early majority, late majority* and *laggards. Innovators* are those who first take up the new technology and have an influence on its further development. *Early adopters* are the respected and knowledgeable group whom others ask for advice. The *early majority* consists of decisive individuals who rapidly accept the new technologies but are not the first to master them. The *late majority* are sceptical and only master new technology after a period of time. *Laggards* either do not want or are not able to master new technology. They are generally suspicious of new developments.

Table 1.2 Uncertainty in the Danish population when faced with new technological products

"I feel uncertain faced with new technological products"	Disagree totally or partly	Agree totally or partly
Men	72%	27%
Women	57%	40%
Aged 15-29	71%	27%
Aged 70 over	40%	53%
Average for all groups	64%	34%

Source: AC Nielsen AIM, 1999

1.5.2 Attitudes to free-time use of IT

"While I was still married, my husband often moaned that I always had more time to work with the computer than to spend on him. He used to get really mad!" (Early adopter, woman aged 34)

The remark quoted above indicates clearly that IT can have a strong influence on private life. The spread of PCs and access to the Internet everywhere is an important factor in drawing attention to the ways in which technology can alter the private lives of the population. The Danes are very divided in their attitude to the effects of the new technologies on their family relationships. 45% of those asked in the survey of attitudes agreed partly or wholly that new technologies mean

Fig. 1.20 Attitudes to IT in spare time

Source: AC Nielsen AIM, 1999

Partly or completely disagree ■ Partly or completely agree

that many people spend less time with family and friends, while a small majority of 51% did not agree with this statement. At the same time a majority of 54% did not believe that IT will bring possibilities for more free time in the future.
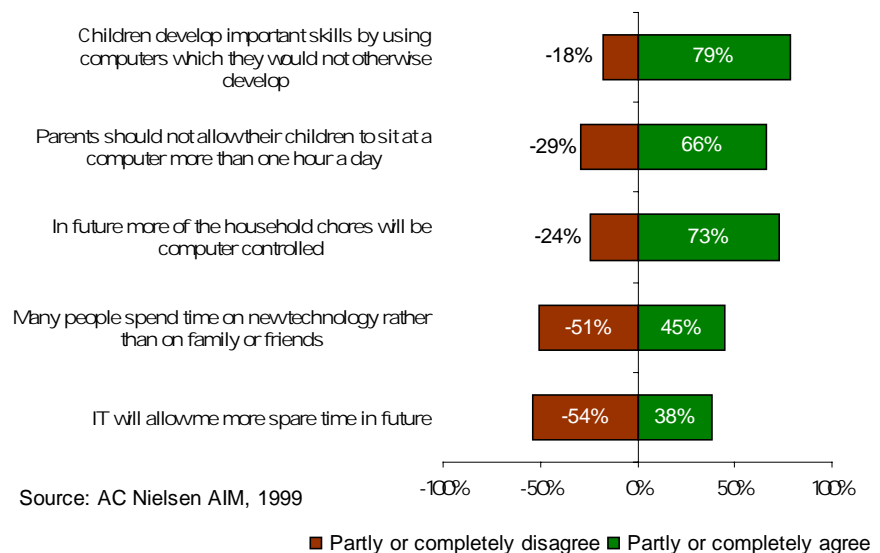
In contrast, the influence of IT on children's development is predominantly seen as positive. As shown in figure 1.20, almost eight out of ten Danes believe that children learn important skills through using computers. However, two thirds of those asked (66%) are of the opinion that parents should not allow their children to sit in front of the computer for more than an hour each day. It is to be noted that there are relatively more from the older groups with no children living at home, who subscribe to this opinion. The quotation below sums up the shift in relationships between parents and children resulting from the introduction of IT in the family.

"I have to give up on lots of the questions my daughter asks. I used to be an authority... " (Early adopter, man aged 38)

1.5.3 Attitudes to trading through the Internet

AC Nielsen AIM asked a representative sample of the Danish population about their attitudes to trading through the Internet. In general they agree that personal service is important to Danes when they trade. 81% of those asked said that they agreed wholly or partly that personal service was preferable if the alternative was to order goods through the Internet. The tendency to prefer electronic commerce was stronger among those with the highest education, the younger age groups and those living in the Copenhagen area, although there was a majority in all groups in favour of personal service. In evaluating the answers it is necessary to keep in mind that only a minority of the population has in fact traded through the Internet.

Fig. 1.21 Attitudes to Internet-trading

Source: AC Nielsen AIM, 1999

■ Partly or completely disagree ■ Partly or completely agree
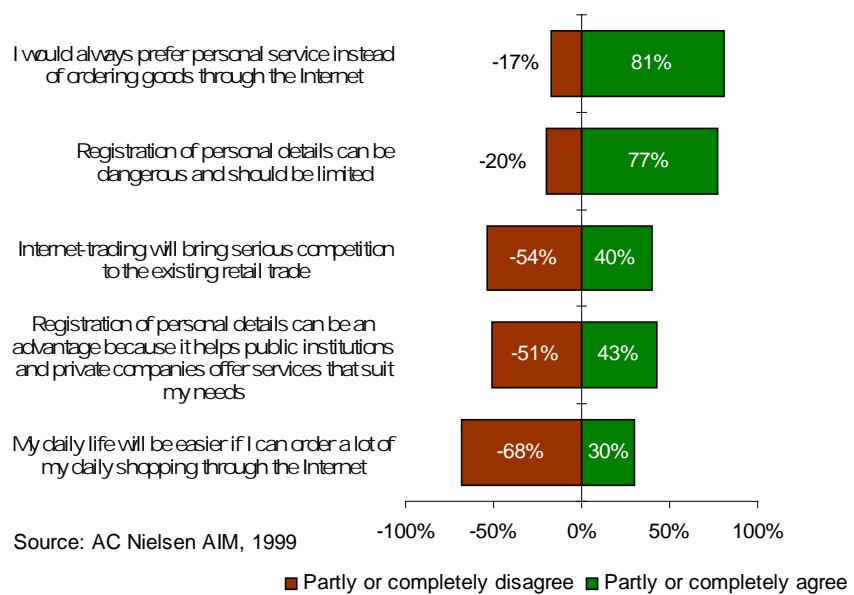
The Danes are also divided in their opinions when asked whether electronic commerce will be a threat to traditional retail trade. Slightly more than half the population (54%) thus believe that trading through the Internet will be a serious threat to traditional retail trade. This belief is especially held by those in the 15-29 age group (63%).

Similarly, the majority of Danes agree that the opportunities offered by trading through the Internet, making daily shopping available by electronic commerce, will not make their daily lives easier. Thus two out of three Danes (68%) do not believe that their daily lives will be easier if the daily shopping can be done via the Internet.

Finally, in connection with electronic commerce through the Internet there has been some discussion on the registration of personal information. Those offering goods and services on the Internet are interested in registering details of potential customer groups for use in their marketing. This raises the question of attitudes among the Danish public to entrusting personal details to companies or public authorities. In this connection the survey showed that opinions are divided on the registration of information. 43% of the population have no objection to the registration of personal details, because companies can in this way offer services which are individually adapted to the customer's needs. This is a relatively large percentage when at the same time more than three out of four Danes (77%) consider that the registration of personal details should be limited, as it can lead to dangerous developments.

1.5.4 Attitudes to IT at work

What attitudes do Danes express to IT at work? Are the various types of IT equipment widely accepted, or do they cause concern and insecurity as people go about their daily routines?

Danes clearly express an open attitude to IT at their places of work. Thus seven out of ten stated that they partly or completely disagree with the suggestion that new IT makes them feel insecure.

At the same time it is also widely held that training is important if one wishes to join in the development of IT. 84% of the respondents in AC Nielsen AIM's investigation stated that they partly or fully agreed that it is necessary to be trained in order to follow the developments in the IT field.

Half the population take a positive view of the possibilities of more time if they worked at home from a PC workplace. Only a third would agree that IT workplaces will mean that people have less time.

Fig. 1.22 Attitudes to IT a work

Source: AC Nielsen AIM, 1999

On the other hand the Danish population are more divided in their attitudes to future applications of IT. 49% believe that technological developments will lead to more unemployment while 47% state that they partly or wholly disagree.
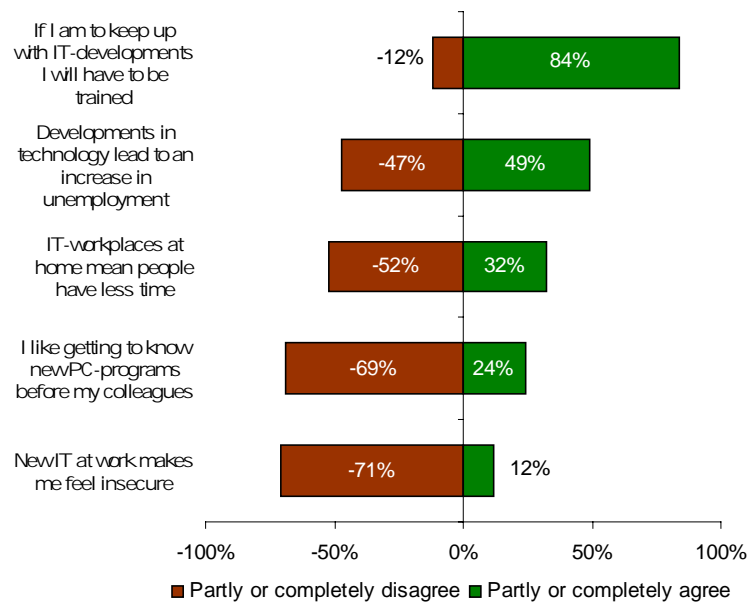
2 IT in public authorities

2.1 Applications of IT

The number of public homepages has been increasing rapidly, especially in the most recent years. At present it is estimated that there are approximately 1,600 public homepages. About half the public authorities in Denmark (53%) are now represented on the Internet. More than half the public authorities (51%) without homepages and practically all of those with homepages (96%) have set up an official electronic mailbox.

2.1.1 Setting up public homepages

The increase in the number of public homepages has been almost exponential in the period from 1994 to 1998. Today approximately 1,600 independent public homepages exist. However, there is still a long way to go, as these 1,600 homepages only cover 7% of all partly or wholly public authorities. This was

one result of a survey carried out in the period from January to March 1999 for the Ministry of Research and Information Technology by the consultants KPMG. The aim of the survey was to investigate in general terms the use of IT by public authorities. Therefore a number of different technologies were investigated such as the Internet, e-mail, text-tv, voice-response systems and comparable systems. The survey shows that the absolutely predominant focus is directed by the public authorities on Internet-applications and e-mail, and these technologies will therefore be emphasised here too.

Fig. 2.1 Number of public homepages

Source: KPMG, 1999
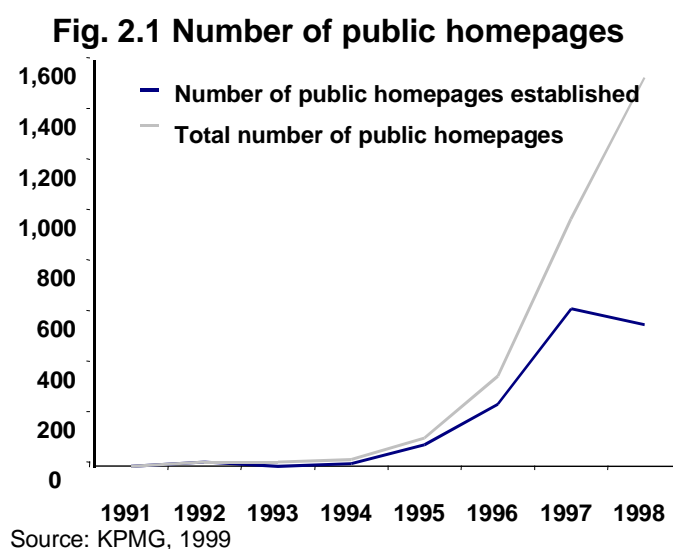
It should be noted that far more public authorities may be represented on the Net. It is important to distinguish homepages which are centrally operated and updated from homepages which are updated directly from the individual public authority. A homepage which is updated centrally is to be seen as one which covers a number of 'branches' of an institution. An example of this is www.folkekirken.dk, where all parishes and churches are represented, but in the large majority of cases only by their names, addresses and opening times or similar.

As shown in figure 2.1 the number of new independent public homepages was lower in 1998 than in 1997. One of several reasons for this is that more centrally operated homepages are being set up for nation-wide public services such as the Employment Exchange, the courts, the TICs (Technological Information Centres), the prison service and the police.

As can be seen from table 2.1, the twenty centrally administered state services and the fourteen centrally administered county services all have a homepage, while homepages for slightly more than half of the

275 central administrations in the municipalities are still to come. When it comes to the subsidiary public authorities, the state is further ahead in establishing separate homepages.

Table 2.1 Percentage of public authorities with Internet homepages

	Centrally administered	Subsidiary public authorities	Added together
State	100%	18%	19%
County	100%	3%	4%
Municipality	47%	4%	5%
Total	53%	6%	7%

Source: KPMG, 1999

A screening survey, also carried out by KPMG, of over 800 existing public homepages shows that the existence of homepages varies in relation to the size of the institution. Large public authorities with many employees are more likely to have homepages than smaller ones. This could result from the fact that the resources necessary to set up a homepage are a greater percentage of the budget in a smaller institution than in a larger one.

2.1.2 Use of e-mail

Public authorities make use of e-mail in many situations and the use is increasing. These function partly as internal post systems, partly in communication between different public authorities and finally as a means of communication with the public. The use of e-mail and internal electronic communication in public services opens up for interesting improvements in efficiency, especially when coupled with electronic handling of documents. So far these have not been systematically investigated. In the following, interest is focussed on the use of e-mail in communication between public service institutions and the private citizen.

The results of a questionnaire survey carried out by KPMG among about 500 public authorities showed that 96% of the public authorities with homepages and 51% of those without homepages had an official e-mail address. As the figure shows, an additional one in five (20%) of those without homepages planned to set up an e-mail address in the course of 1999.

Fig. 2.2 Can private individuals contact the organisation via an official e-mail address?

(Public institutions with homepages, early 1999)

Yes 96%
No 3%
Don't know 1%
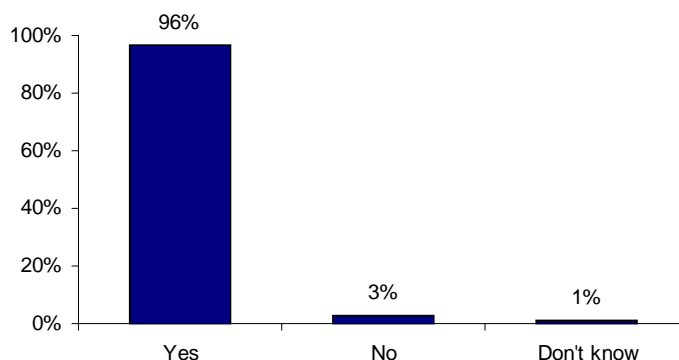
Source: KPMG, 1999

Fig. 2.3 Can private individuals contact the organisation or obtain information from it via e-mail?

(Public institutions without homepage, early 1999)

Yes 51%
No, but planned for 1999 20%
No, but planned for 2000 9%
Not planned 16%
Don't know 1%
No answer 3%
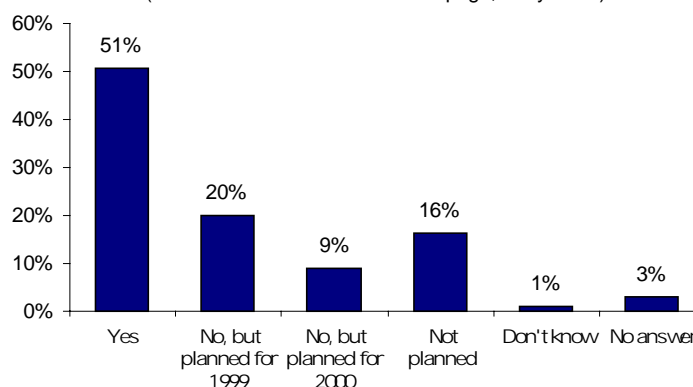
Source: KPMG, 1999

The figures above apply to the possibility of contacting the institution via an official electronic mailbox. E-mail addresses at individual employee level are not so widespread.

An official e-mail address will often apply to a large group of employees in the public organisation. It may only be emptied once daily. This can entail a risk that one of the major advantages of e-mail, the immediate exchange of information, cannot be fully exploited.

It is therefore of interest to examine what proportion of those employed by the public have access to individual e-mail addresses.

As can be seen in figure 2.4, the tendency is that either relatively few employees have access to e-mail, or else that the majority have access. The investigation also shows that there is a relatively large difference between the separate administrative levels.

While almost three out of four employed in the state-administered services have an e-mail address at present, this is only true for one in four employed in county administration and one in five of those in municipal administration.

Fig. 2.4 How many employees have an e-mail address which is accessible to the public?
(Public institutions with homepages, early 1999)
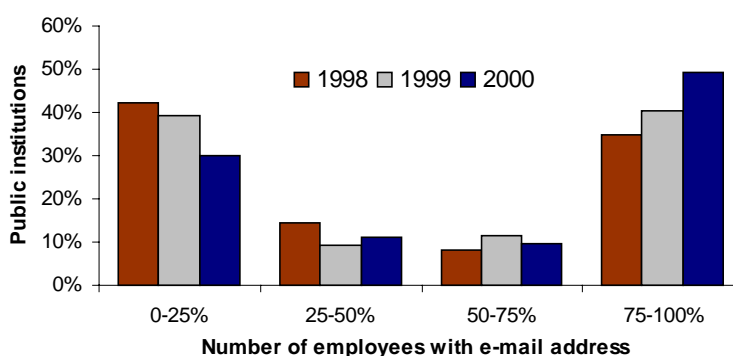
Source: KPMG, 1999

Developments are forecast to continue in the same direction. Thus the number of public authorities where practically all employees have an e-mail address open to the public is expected to reach about 50% in the year 2000.

2.2 Motives and barriers to the use of IT in communication with the public

The main reason why public authorities set up homepages on the Internet is to be visible, while the chief barriers to the development of public electronic communication are the costs of setting up a homepage and keeping it up to date.

2.2.1 Motives for introducing electronic communication in public service

Many public homepages have

Fig. 2.5 Motives for introducing electronic communication with the public
(Public institutions with homepages, early 1999)

	"Important" or "Very important"
Improve the organisation's image (become more visible)	95%
Show an overview of the organisation and its services	84%
Support marketing for the organisation	82%
Accessible to the public outside normal office hours	81%
Reaching new target groups	77%
Quicker answers to enquiries from the public	66%
Meet the demands of the public	60%
Strengthen democracy (more debate)	52%
Develop new services	49%
Create access to the organisation	44%
Meet the demands of superior authorities	37%
Relieve receptionists and staff answering the telephone	32%
Allow information to be obtained anonymously	23%
Savings	13%

Source: KPMG, 1999

come into being for a specific purpose and, as a result, have a narrow and specific aim. For example, the Municipality of Hillerød set up its homepage to provide a service for the press on the occasion of the Royal Wedding in 1995. Similarly, many municipalities and counties set up homepages in connection with the latest local government elections, to stimulate the local political debate. Later, marketing has been the central consideration for establishing many public authorities' homepages. In other words, they result from a wish to "be seen", or to take advantage of the "signal value" or to "attract attention to the service".

As can be seen from figure 2.5, the three most pronounced motives are connected with visibility, followed by a clear tendency to consider the convenience of the general public. It is significant that opportunities for improving efficiency in administration are considered so much less important in the public authorities which already have experience in electronic communication with the public.

In public authorities, which still have no experience of electronic communication with the public, the reasons for the introduction of electronic communication with the public are different from those in the public authorities, which already have established homepages. The latter group tends to pay more attention to improvements in the quality of the service. As shown in figure 2.6, reasons such as "meeting demands from the public" and "being able to give faster replies to enquiries from the public" are among those most often mentioned. Similarly, there is a tendency to give economic reasons high priority.

Fig. 2.6 Motives for introducing electronic communication with the public
(Public institutions without homepages)

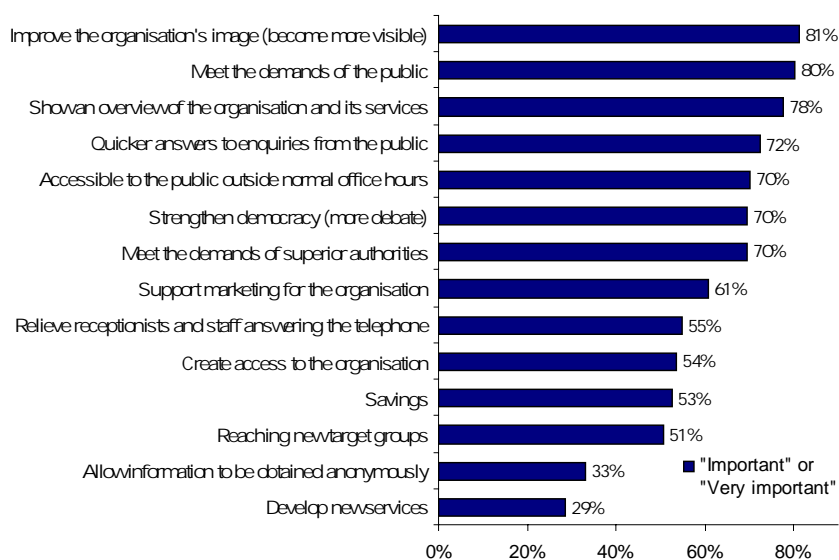| Motive	%
Improve the organisation's image (become more visible)	81%
Meet the demands of the public	80%
Show an overview of the organisation and its services	78%
Quicker answers to enquiries from the public	72%
Accessible to the public outside normal office hours	70%
Strengthen democracy (more debate)	70%
Meet the demands of superior authorities	70%
Support marketing for the organisation	61%
Relieve receptionists and staff answering the telephone	55%
Create access to the organisation	54%
Savings	53%
Reaching new target groups	51%
Allow information to be obtained anonymously	33%
Develop new services	29%

■ "Important" or "Very important"

Source: KPMG, 1999

2.2.2 Barriers to electronic communication with the public

Three significant barriers seem to crystallise which hinder the development of electronic communication in public service. The cost of setting it up and the running costs are mentioned by between 40 and 45% of all public authorities as a major or very great barrier. This should be seen in the light of the considerable uncertainty in the public authorities with regard to the allocation of resources for electronic communication.

Fig. 2.7 Barriers to establishing or extending electronic services
(Public institutions with homepages, early 1999)

Barrier	%
Initial costs	46%
Operating costs	39%
Staff qualifications	38%
Lack of usable electronic signature	19%
Too few who use the electronic media	16%
Staff attitudes	14%
Staff have no access to the Internet	14%
Inadequate suppliers or uncertain budgets for IT-projects	12%
Political support	11%
Technical capacity	11%

■ "Great" or "Very great" importance

Source: KPMG, 1999
Public institutions as a percentage of all respondents

Nearly half of the respondents have written "not known" in answer to the question of whether the number of internal man-hours spent on digital communication will increase or decrease. Many public authorities give the development of the digital signature as a barrier to developments. Without this, it will not be possible to set up an extensive self-service with the possibility of sending forms and similar. In the qualitative interviews, however, it becomes clear that until now only a few have met this as a concrete problem. Nevertheless, it is forecast that the lack of an official digital signature will soon become the most important barrier to the development of digital communication.

In general, the same barriers are found in public authorities with and without homepages. It should, however, be noted that a larger proportion of those without homepages experience these as major barriers or as very great barriers. To this question the answer "not known" appears far more often in replies from public authorities without homepages. This could indicate that experience of communication via the Internet or similar technologies generally reduces the barriers experienced to developments in this field.

Fig. 2.8 Barriers to establishing electronic services

(Public institutions without homepages, early 1999)

Source: KPMG, 1999

Public institutions as a percentage of all respondents
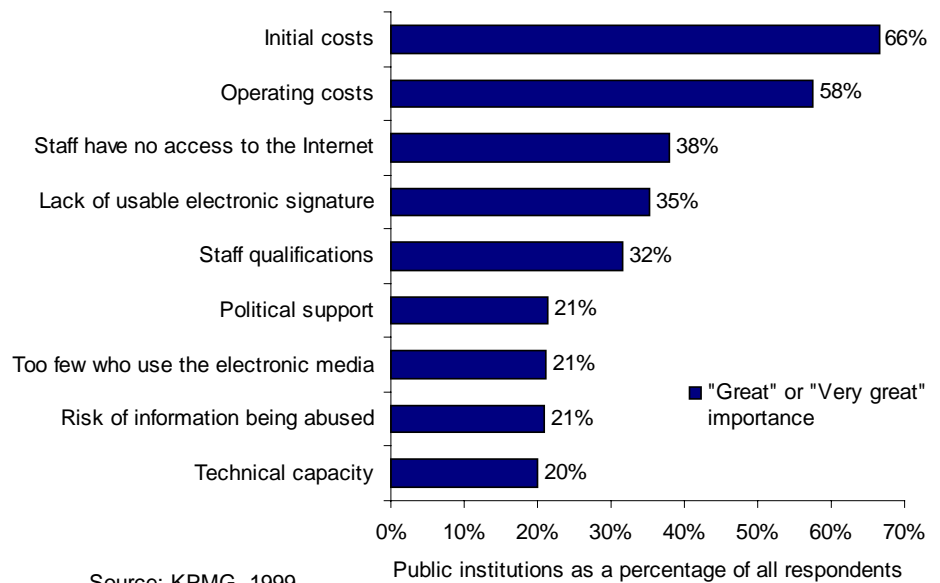
A qualitative survey among thirty public authorities shows that only a few have drawn up a written plan for the future development of their homepage. Developments are more usually carried by the ideas and attitudes of more or less clearly defined active groups, within which the strategy is often implied and the plans vague. This is demonstrated by the following selected statements from the survey:
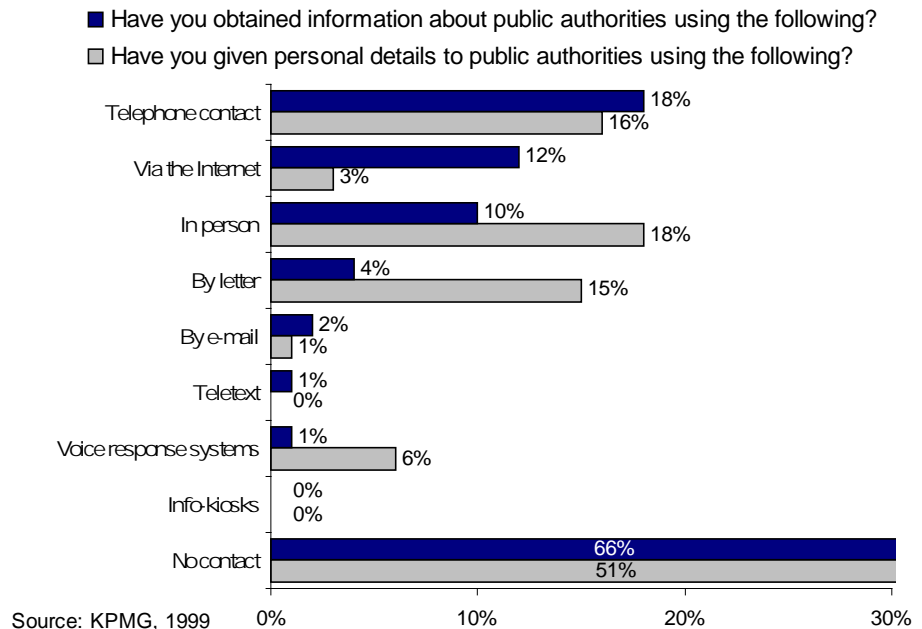
- "A clear political or managerial standpoint has not been reached on the use of the homepage"
- "The administration does not have many ideas of its own"
- "It is also important to support the ideological point of view in the society of knowledge"
- "We form our strategy according to what the public makes use of"
- "It has been allowed to develop by itself"
- "We feel our way forward"

2.3 Public opinion and digital administration

Only the telephone is used more than the Internet as a means of obtaining information on public authorities. For more than one out of three citizens (35%) it is important that it should be possible to obtain and send information electronically in communication with public authorities.

The Internet is today in a central position when it comes to obtaining general information about public authorities. Only direct contact on the telephone is now used more (please see figure 2.9). The situation is not identical, however, when it comes to information on personal details. These are still predominantly given via the more traditional media, over the telephone and in letters. In the light of the fact that 37% have stated that
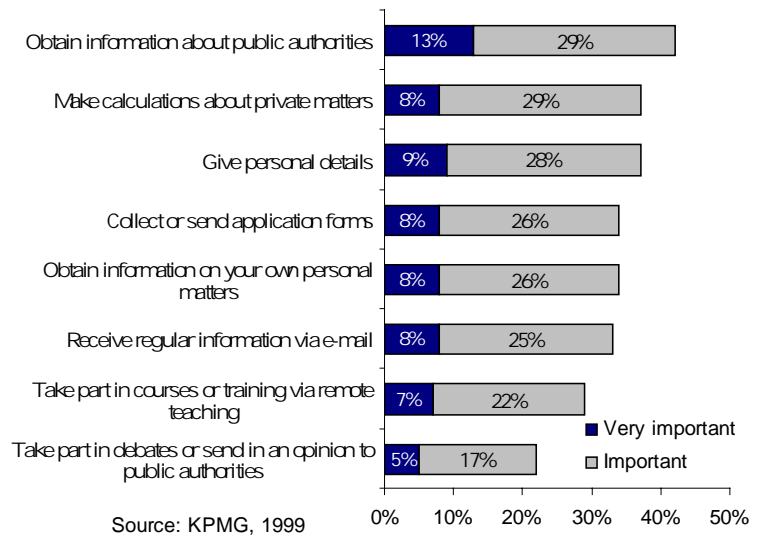
Fig. 2.9 Information to and from public authorities

■ Have you obtained information about public authorities using the following?
□ Have you given personal details to public authorities using the following?

Category	Obtained info	Given personal details
Telephone contact	18%	16%
Via the Internet	12%	3%
In person	10%	18%
By letter	4%	15%
By e-mail	2%	1%
Teletext	1%	0%
Voice response systems	1%	6%
Info-kiosks	0%	0%
No contact	66%	51%

Source: KPMG, 1999

it is important to be able to give personal details to public authorities through the electronic media (please see figure 2.10), this indicates that the relatively limited use of e-mail and the Internet are due to the strictly limited opportunities for the public authorities to make use of electronic reporting. However, the tendency is clear. Where there are extensive offers available to the public from service institutions, the public make a correspondingly extensive use of them. This shows that the availability of electronic services from public authorities, or the lack of them, is to a great extent the limiting factor for the public's use of electronic media in communication with service institutions.

Altogether, the demand for public services through the electronic media is considerable. Over 35% of the population consider it important or very important that information can be obtained or sent electronically. Attention must be paid to this considerable demand, which applies even when personal details are to be reported. In this context, the general public is highly concerned about security. 60% of the citizens express a fear that their personal details can be misused. There are several aspects to this problem:

Fig. 2.10 How important do you consider the following?

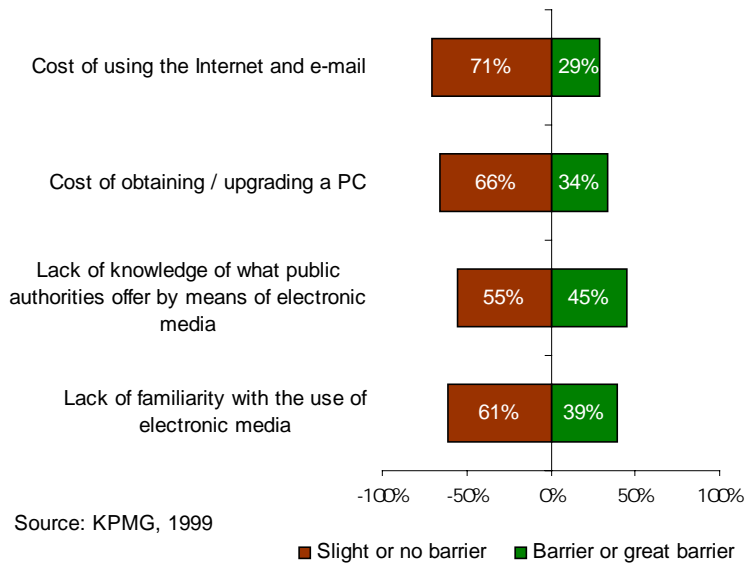| Category	Very important	Important
Obtain information about public authorities	13%	29%
Make calculations about private matters	8%	29%
Give personal details	9%	28%
Collect or send application forms	8%	26%
Obtain information on your own personal matters	8%	26%
Receive regular information via e-mail	8%	25%
Take part in courses or training via remote teaching	7%	22%
Take part in debates or send in an opinion to public authorities	5%	17%

Source: KPMG, 1999

- The risk of unauthorised access to personal information
- The risk of information being given under a false name
- The risk that the authorities may use the information for purposes against the public's wishes.

This can be summarised in the conclusion that there is considerable demand for electronic service, but that there are strict requirements for security in this type of service.

Unfamiliarity with the use of the media as well as with what the public service institutions have to offer is a greater barrier than the economic aspect. This is shown in figure 2.11.

This lack of knowledge of how to use the media applies especially to non-users. Thus the survey shows that, out of approximately 49% who do not use the Internet, about half consider that lack of familiarity with the medium is a barrier to the use of the Internet and e-mail in communication with public authorities. This does not apply to those familiar with electronic service. 45% of those who use the Internet daily believe that ignorance of the public electronic service is a barrier to its use.

Fig. 2.11 Barriers to electronic communication with public authorities

	Slight or no barrier	Barrier or great barrier
Cost of using the Internet and e-mail	71%	29%
Cost of obtaining / upgrading a PC	66%	34%
Lack of knowledge of what public authorities offer by means of electronic media	55%	45%
Lack of familiarity with the use of electronic media	61%	39%

Source: KPMG, 1999

■ Slight or no barrier ■ Barrier or great barrier

3 IT in companies

3.1 General IT-distribution in Danish companies

Two-thirds of small companies owned by a single person in Denmark (and all companies with at least 50 employees) use information technology. The largest barrier preventing the use of IT by companies is the lack of IT-qualifications among company employees.

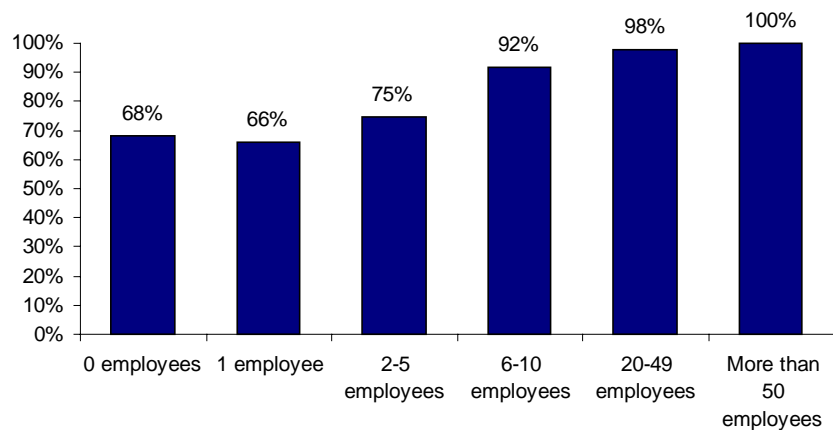### 3.1.1 IT – part of the daily life of companies

99% of large Danish companies use information technology. This is the immediate conclusion that can be drawn from one of the largest-ever Danish studies of IT in companies. The study was carried out by "Danmarks Statistik" for the Danish Ministry of Research and Information Technology in October 1998, and replies were received from 1,832 companies with at least 20 employees[3].

Fig. 3.1 Companies using IT categorised by number of employees

Source: 0-10 employees: Danish Commerce and Companies Agency, 1999
20 employees or more: Danish Ministry of Research and Information Technology and "Danmarks Statistik", 1999

On close consideration of the figures, it is also obvious that the hardware used by these companies consists of far more than a single computer tucked away in the far corner of a room somewhere. Almost four out of every five companies (79%) say that at least one in every four employees uses a PC or similar workstation. In addition, 96% of all companies with 100 or more employees say that a local network has been installed in their company, while 84% of companies with 20-49 employees say the same.

Among small companies with fewer than 20 employees there is a clear tendency to use IT less. Two-thirds of companies with no employees (one-man companies) or with a single employee use information technology. This was shown in a study carried out in March 1999 by Gallup for the Danish Commerce and Companies Agency.

So there is no doubt that information technology is a natural feature of daily life at the vast majority of private-sector companies in Denmark.

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[3] It should be pointed out that companies that do not use IT will probably tend to be less interested in the subject than other companies. So among the group of companies that do not reply to the questionnaire, there will be a disproportionately high number of companies that do not use IT at all.

3.1.2 Barriers preventing the use of IT in companies

The introduction of IT to companies is not without its problems. In the study carried out by the Danish Ministry of Research and Information Technology and "Danmarks Statistik" in 1998, companies were also asked to evaluate the importance of a number of potential barriers preventing their current and future use of IT.

The general conclusion of the study of IT-barriers is that the lack of IT-qualifications is a problem for Danish companies. More than six out of ten companies (63%) state that the lack of qualified IT-staff is of "major" or "some" importance. At the same time, more than four out of ten companies (43%) report that it is difficult to find qualified IT-staff. It is also interesting that almost six out of ten companies (59%) reply that internal resistance to IT among their employees is not a barrier.

Fig. 3.2 Barriers preventing the use of IT in companies
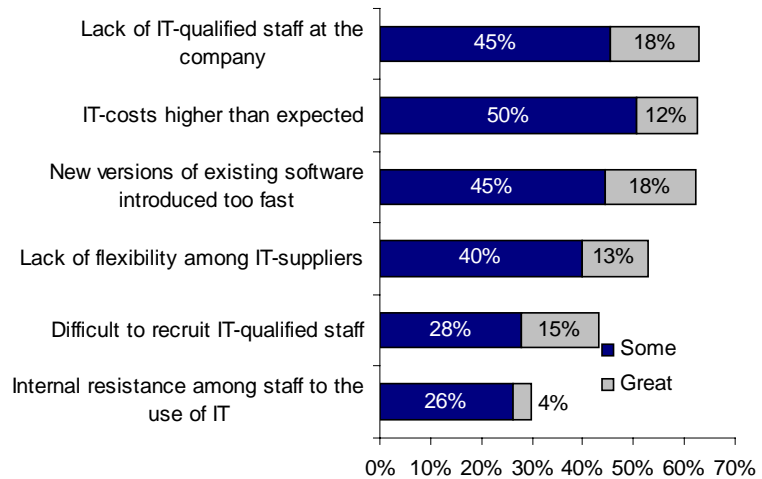
Source: The Danish Ministry of Research and Information Technology and "Danmarks Statistik", 1999

3.2 The Internet as a lifeline between companies and their customers and suppliers

Two out of five very small and four out of five very large private companies have access to the Internet. Companies use the Internet primarily to search for information and monitor their competitors. The lack of security on the Internet is regarded as the largest barrier preventing current and future use of the Internet.

3.2.1 Access to the Internet

Global electronic communication is now widespread. Three-quarters (77%) of the companies with 20 or more employees said they already had Internet access, or expected to have it by the end of 1998. This was one of the conclusions of the study of IT-use at Danish companies carried out by the Danish Ministry of Research and Information Technology and "Danmarks Statistik" in October 1998. By way of comparison, only 18% of Danish companies with 20 or more employees said they had a graphic Internet connection (i.e. access to the World Wide Web) in the spring of 1996.

In particular, large companies with 100 or more employees (82%) and companies engaged in "Business service etc."[4] (84%) had Internet access; while smaller companies with 20-49 employees (71%), and in particular companies in the "Construction sector" (58%), fell below the average of 77%.

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[4] "Business service etc." consists of the two so-called DB93 areas "Financing activities etc., business service" and "Public and personal services".

An additional 12% of companies said they expected to gain Internet access during 1999. If these expectations are realised, almost nine out of ten Danish companies (89%) with 20 or more employees can be expected to have Internet access by the start of the year 2000.

Small companies with up to 10 employees do not have the same degree of Internet access as large companies. This is not actually surprising, since they also use IT less (see section 3.1.1). As a rule of thumb, two out of every five one-man companies and companies with up to 5 employees can be expected to have Internet access, while every second company with 6-10 employees has Internet access.

Fig. 3.3 Companies with Internet access categorised by number of employees
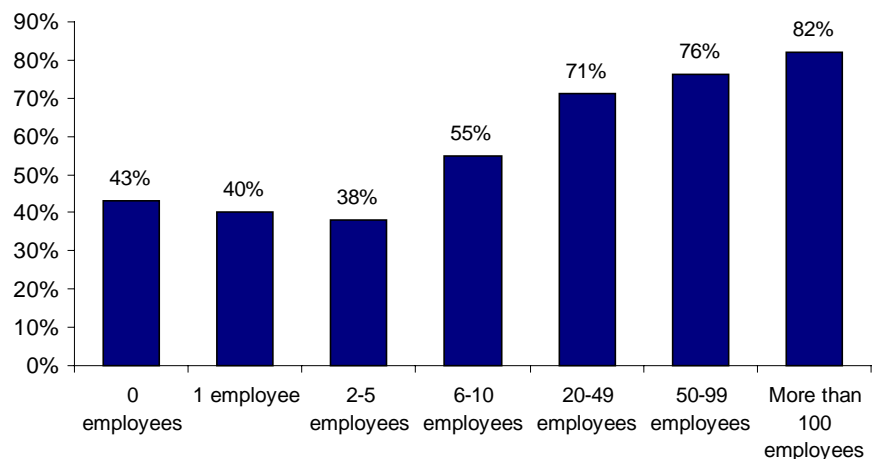
Source: 0-10 employees: Danish Commerce and Companies Agency, 1999
20 employees or more: Danish Ministry of Research and Information Technology and "Danmarks Statistik", 1999

Internet technology is still relatively new in companies. Almost half the companies that had the Internet in 1998 said they had not obtained it until that year.

3.2.2 General use of the Internet by companies

Information retrieval, information retrieval and information retrieval. That seems to be the answer to the question of what Danish companies primarily use the Internet for.

More than four out of every five companies (81%) said they used the Internet for *information retrieval from free homepages*. The second most frequent use was *information retrieval from commercial homepages* (71%). And the fourth most frequent use was *information from/to the public authorities* (46%). The category *competitor monitoring*, which involves retrieving information about competitors, was the third most frequent general use of the Internet (52%).

Fig. 3.4 General use of the Internet by companies
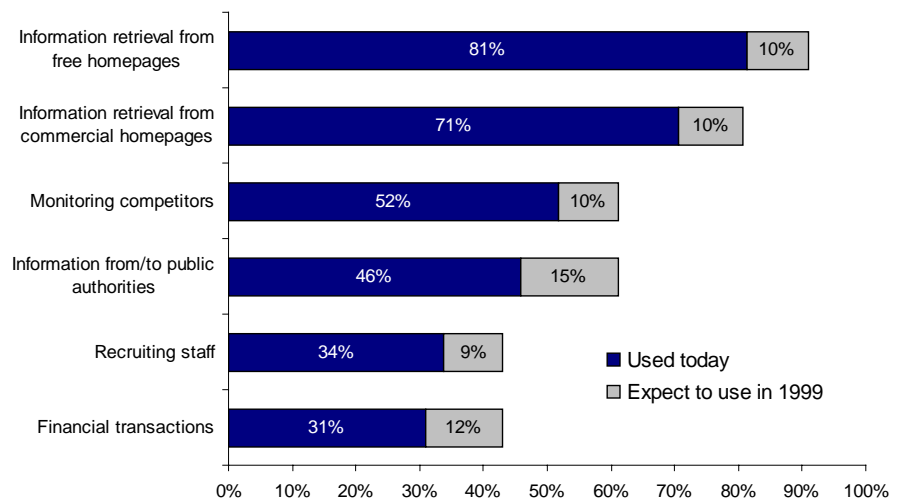
Source: The Danish Ministry of Research and Information Technology and "Danmarks Statistik", 1999

The huge "situations vacant" sections of many Danish newspapers now have a competitor in the Internet. One-third of the companies (34%) use the Internet to recruit new staff. The category called "Busi-

ness service etc." leads the field with regard to this use of the Internet (54%), while only 16% of companies in the "Construction sector" category recruit staff via the Internet.

3.2.3 Barriers preventing companies from using the Internet

Companies regard the risk of hacking, virus or other unauthorised access to company data as the greatest barrier preventing them from using the Internet both now and in the future. Four out of five companies (81%) state that the security risk is of "some" or "great" importance to them. It is also striking that this is the possibility that led to by far the largest proportion of crosses in the reply category "great importance"

Fig. 3.5 Barriers preventing general use of the Internet by companies

Source: The Danish Ministry of Research and Information Technology and "Danmarks Statistik", 1999

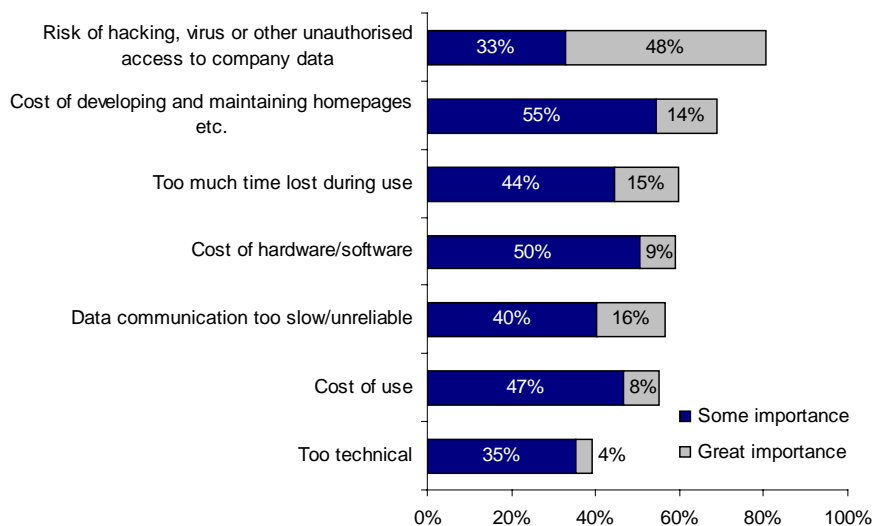(48%). In other words, almost 50% of Danish companies feel that the security risks connected with using the Internet are of great importance.

The technological difficulties are (by comparison) regarded as much less important. Four out of ten companies (39%) say that the complicated nature of the technology is of "some" or "great" importance as a barrier to increased use of the Internet. Less than one in 20 companies (4%) feel that technical difficulties are a barrier of great importance.

There are no significant differences between small and large companies (or between different sectors) when it comes to assessing the priority of the barriers concerned. Small companies and sectors using the Internet least reply "don't know" or "not relevant" with regard to the importance of the barriers more frequently than others, but the order of the barriers is the same.

3.3 The electronic marketplace

Denmark is one of the leading countries in Europe with regard to electronic commerce between companies (also known as "business-to-business" trading). But the same cannot be said of the electronic commerce that takes place between consumers and companies. For instance, only 1.6% of Danes traded on the Internet in 1998. Market analysts predict that Danish electronic commerce will grow almost exponentially during the next couple of years.

3.3.1 Electronic commerce in general
Internet trading is normally divided into at least two markets: the business-to-business-market (often abbreviated B-t-B or B2B), which focuses on trade between companies, and the business-to-consumer-market (often abbreviated B-t-C or B2C), which deals with trade between companies and consumers.

Denmark is among the leaders with regard to electronic commerce on the B-t-B market. The bar chart on the right shows that turnover on the B-t-B market in Denmark was about twice as much per capita as the average per capita in the whole of Europe. Denmark has also overtaken both Sweden and Finland in this respect. It should be noted that the calculation of turnover with regard to electronic commerce does not include

Fig. 3.6 Electronic commerce. Average B-t-B turnover per capita (DKK)

Source: IDC, January 1999

trading using EDI (Electronic Data Interchange). EDI-based trading is also an area in which Denmark has a strong position in international terms.

Even though 31% of all Danish households have an Internet connection, the IDC figures show that only 87,000 Danes (1.6% of the entire population) purchased or ordered goods as private individuals via the Internet in 1998. This figure excludes purchasers in the B-t-B market.

The sum of electronic commerce (see figure 3.7) shows that Denmark lies above the European average (but below both Sweden and Finland in Nordic terms).

Fig. 3.7 Electronic commerce. Total turnover as an average per capita in 1998 (DKK)

Source: IDC, January 1999

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3.3.2 Barriers preventing electronic commerce

The study carried out by the Danish Ministry of Research and Information Technology and "Danmarks Statistik" in October 1998 reveals some of the reasons why companies hesitate to introduce electronic commerce.

More than half the companies (51%) underline that the small size of the customer potential is a barrier preventing them using electronic commerce. But almost as many (48%) feel that uncertainties in connection with making payment, signing agreements, issuing guarantees etc. are significant barriers.
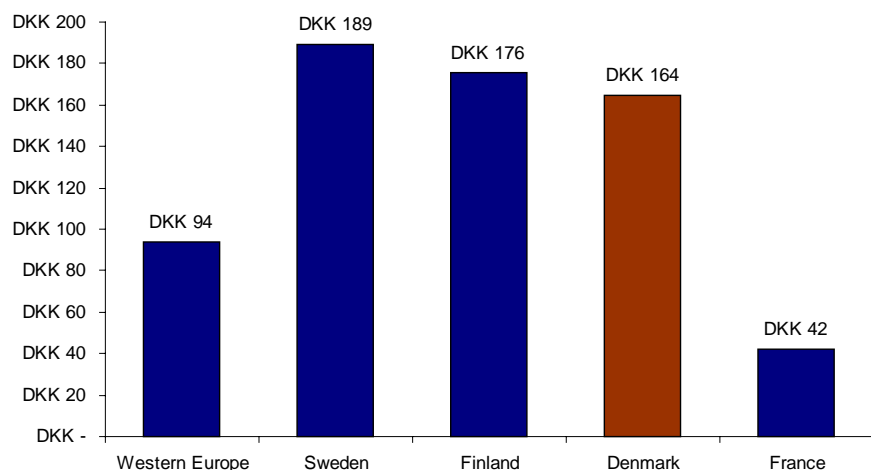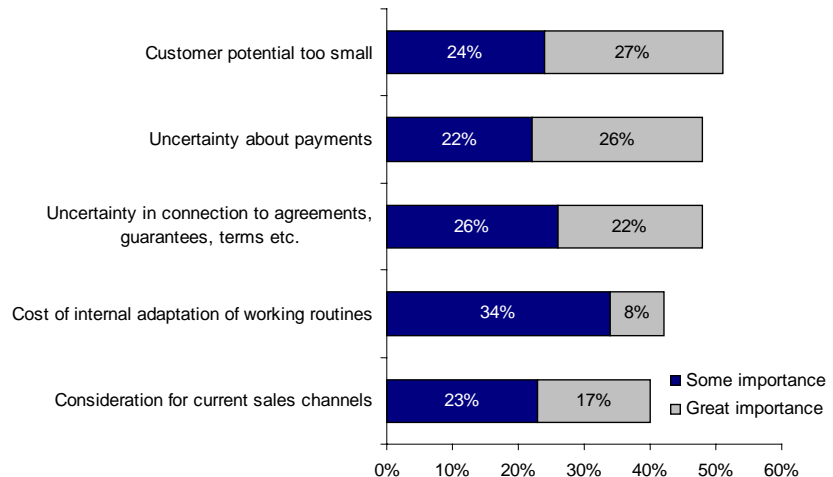
It is worth noting that companies that already use electronic commerce regard the barriers to electronic commerce as being highest. For instance, 48% of all

Fig. 3.8 Barrierer preventing companies from using electronic commerce

	Some importance	Great importance
Customer potential too small	24%	27%
Uncertainty about payments	22%	26%
Uncertainty in connection to agreements, guarantees, terms etc.	26%	22%
Cost of internal adaptation of working routines	34%	8%
Consideration for current sales channels	23%	17%

Source: The Danish Ministry of Research and Information Technology and "Danmarks Statistik", 1999

companies feel that uncertainty with regard to making payments is a problem. Among companies receiving orders via the Internet in 1998, no fewer than 60% felt that payments were a problem.

3.3.3 Perspectives for Internet commerce in Denmark

The figure below gives an indication of the way Danish Internet trading will develop in the years ahead. An average annual growth rate of 149% in Internet trading during the period 1997-2001 is predicted.

Such predictions are always very uncertain, and this is particularly true of an area such as IT. For instance, the number of Internet users at the end of 1998 was 1.13 million, which is 260,000 more than predicted in the IDC report on electronic commerce in 1998.

On the other hand, the number of users making purchases has been adjusted downwards for 1998 from 0.17 million in the IDC 1998 version to 0.09 million in the IDC 1999 edition.

The new figures for Denmark can be summarised as follows: there are more Internet users in 1998 than originally predicted. The number of purchasers is assumed to have been reduced significantly. But these purchasers turn over much more.

Fig. 3.9 Total expected electronic commerce in Denmark 1997-2002

Year	Value
1997	DKK 0.2 bn
1998	DKK 0.9 bn
1999	DKK 2.9 bn
2000	DKK 7.6 bn
2001	DKK 17.0 bn
2002	DKK 33.2 bn

Source: IDC, January 1999

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4 IT-spending

4.1 IT-spending in the 1990s in an international context

DKK 33.5 billion. That is the estimated size of Danish IT-spending in 1998. This places Denmark high up among the 14 countries included here for reasons of comparison, and far above the average for Western Europe. But in Nordic terms Denmark does not lead the field. The great majority of spending (72%) is in the private sector; but with no less than 19% of spending placed in the public sector, Denmark (compared with the other Nordic countries) is not typical.

4.1.1 IT-spending in selected countries

In 1998 Danish IT-spending totalled USD 5 billion (DKK 33.5 billion). This figure has been published by the analysis institute International Data Corporation (IDC) in its "Worldwide IT-Spending Patterns: The 1998 IDC Worldwide Black Book", December 1998.

The IDC estimated end-user IT-spending each year by collecting data locally and regionally from the IT-sector, from users, and from official trade figures. It is not yet possible for national statistic institutes to isolate IT-products and IT-services in their figures, so the IDC estimate is one of the only ways to obtain IT-spending data that can be compared in international terms.

Fig. 4.1 IT-spending 1998 per capita (DKK)

Source: IDC, 1998
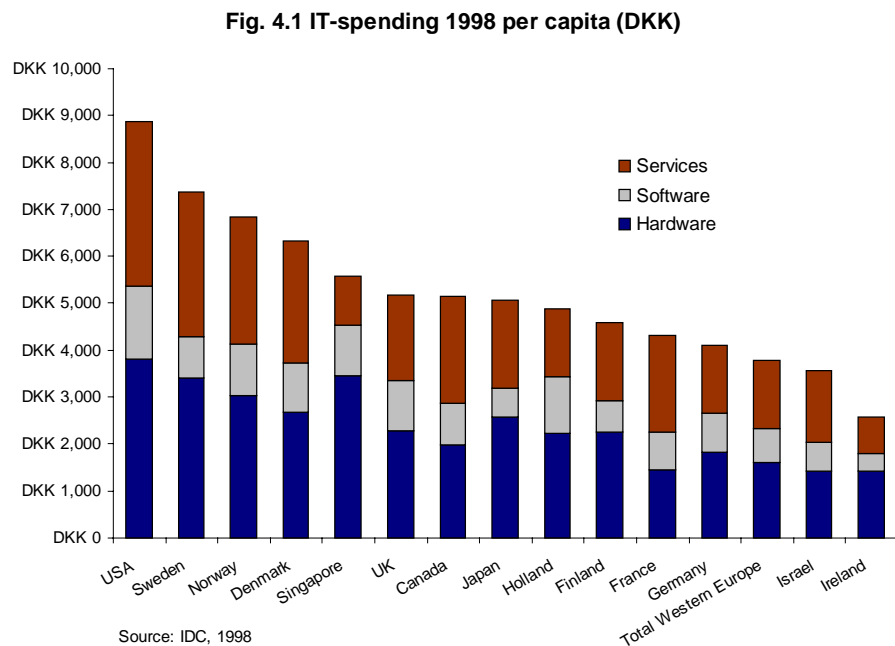
The DKK 33.5 billion that the IDC estimate private companies, public institutions and households in Denmark spent in 1998 on the purchase of IT-related products and services means that each Dane purchased IT for USD 943, the equivalent of DKK 6,320. This figure is high on an international scale - in fact, it is the fourth-highest figure among the 14 countries compared here (only the USA, Sweden and Norway are higher). The average for 16 countries in Western Europe (the 9 countries included here plus Belgium, Greece, Italy, Portugal, Switzerland, Spain and Austria) by comparison is USD 564 (DKK 3,778). IT-spending categorised in terms of hardware, software and services is shown in figure 4.1 and table 4.1.

Table 4.1 IT spending in 1998 categorised in terms of hardware, software and services, plus total spending per inhabitant.

Country	Hardware	Software	Services	Total
USA	43%	18%	39%	DKK 8,864
Sweden	46%	12%	42%	DKK 7,362
Norway	44%	16%	40%	DKK 6,849
Denmark	43%	17%	41%	DKK 6,320
Canada	62%	19%	19%	DKK 5,571
UK	44%	21%	35%	DKK 5,164
Japan	39%	17%	44%	DKK 5,138
Singapore	51%	12%	37%	DKK 5,074
Holland	45%	25%	30%	DKK 4,889
Finland	49%	15%	36%	DKK 4,573
France	34%	18%	48%	DKK 4,313
Germany	44%	20%	35%	DKK 4,093
Western Europe (total)	42%	20%	38%	DKK 3,778
Israel	40%	17%	43%	DKK 3,565
Ireland	55%	15%	30%	DKK 2,563

Source: IDC, The 1998 IDC Worldwide Black Book, December 1998.

In Denmark the three categories of IT-expenditure (hardware, software and services) constitute 45%, 18% and 37% respectively, which is very close to the average for the 14 countries and for the group including the 16 Western European countries.

Throughout the 1990s Denmark has held a relatively good position on the IT-spending list. In 1994 and 1998 Denmark was in fourth position, but was second in 1990 and 1996 among the countries selected here.

4.1.2 IT-spending categorised by sector

The IDC has also categorised IT-spending into different sectors. The Danish figures in figure 4.2 show that almost three-quarters (72%) of IT-spending is in the private sector. Almost one-fifth (19%) of IT-spending is in the public sector (11% in the central administration and 8% in the local/regional sector). The health and education sectors and private households represent 3% of spending each. So Denmark has a similar distribution of spending as the 16 Western European

Fig. 4.2 IT-spending in Denmark categorised by sector, 1998
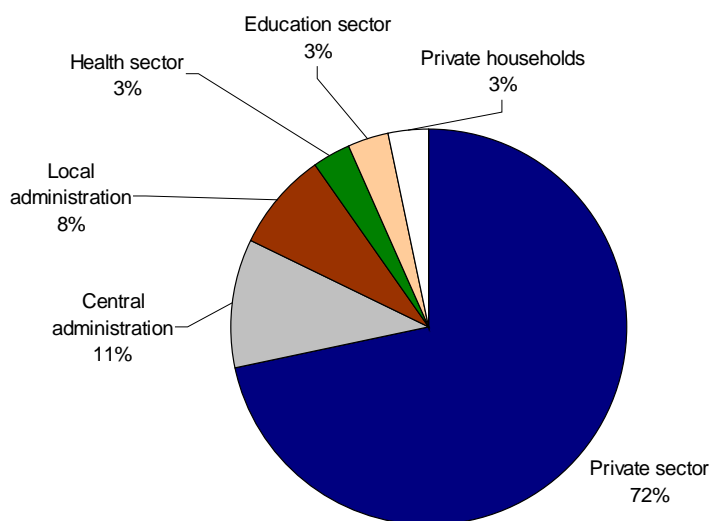
Source: IDC, 1998

countries for which the IDC produces an average figure. The Western European average shows a slightly larger private sector proportion (77%) of total IT-spending than the figure for Denmark. In addition, the total public sector share (13%) in the Western European average is lower than that of the public sector in Denmark. If the Danish sector distribution is compared with that of the other Nordic countries, the similarity in terms of distribution is even larger. In

Fig. 4.3 IT-spending in Western Europe (16 countries) categorised by sector 1998

Education sector
3%
Private households
5%
Health sector
2%
Local administration
5%
Central administration
8%
Private sector
77%

Source: IDC, 1998

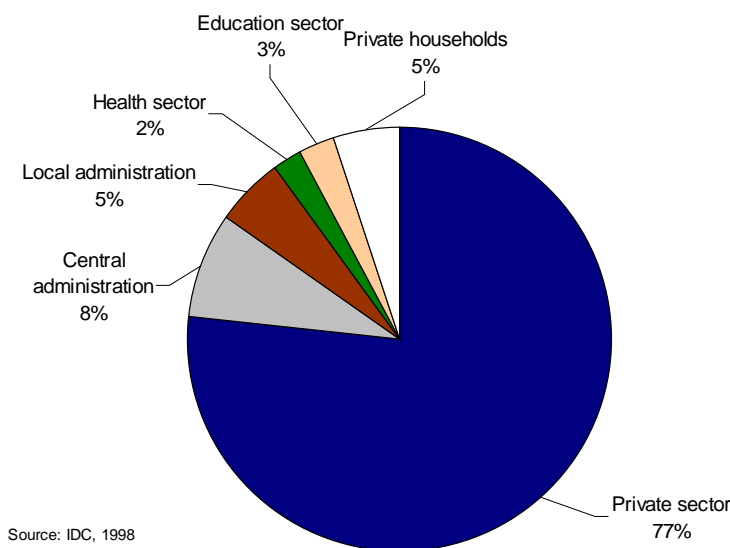particular, the Swedish and Norwegian distributions resemble that of Denmark almost entirely. But in the USA the distribution is somewhat different. Here 84% of spending is in the private sector and only 6% in the public sector. Such differences in IT-spending categorised by sector are probably not due to national differences in the private and public sectors. It is more likely that the differences are due to the sizes of the respective sectors in the countries concerned. In Western Europe (and particularly in the Nordic welfare states) the public sector constitutes a larger proportion of the total economy than it does elsewhere. So the public sector in such countries will also have larger IT-spending requirements than in countries where the public sector is relatively small.

4.2 A case study on IT-spending

A case study of 11 IT-investments in the public and private sectors indicates that IT can be a good tool to fulfil service objectives, that IT can be used to reduce resource consumption, that IT can be used to improve competitiveness, and that it is difficult to say anything about the effect of IT-spending on employment.

IT spending can also be viewed in terms of its effect on the organisations making such investments. Professor Mogens Kühn Pedersen, Doctor of Commerce from the Copenhagen Business School has performed such a study at the request of the Danish Ministry of Research and Information Technology. In partnership with his colleagues and students, Mogens Kühn Pedersen has investigated a total of 11 cases (five in the public sector and six in the private)[5].

The aim of the investigation was to discover the importance of IT-spending with regard to resource consumption and the service level in the public administrations studied; and with regard to competitiveness and employment in the private companies.

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[5] The study (whose Danish title can be translated "Private and public IT-spending in Denmark. Evaluation of effects of IT-spending in 11 cases") can be viewed in Danish in its entirety at the Danish Ministry of Research and Information Technology's homepage at the address http://www-fsk.dk/ under the menu point "Publications".

The analysis team focused on four achievement goals: service goals, resource consumption, competitiveness and employment.

With regard to **service goals** the case study shows that IT-applications can directly improve the service provided to both the public and customers. The most obvious example of the service improvement provided by IT consists of the opportunities offered by Internet-based homepages for self-service 24 hours a day. Customers of private companies can order goods and services (and even make payment) via the Internet. Similarly, the public can make payment to the public authorities and obtain confidential information which may form the basis of their rights and obligations.

In the private companies IT-applications are the basis of various measures taken to improve customer service, such as homepages (Carlson Wagonlit Travel) and call centres (ALKA Forsikring). The analysis team believes that customer service requirements will increase owing to easy access to (and the chance of handling) information. Companies which fail to meet this service challenge will appear old-fashioned, and risk losing part of their customer base.

In the public sector the case study shows that the use of IT tends to lead to more efficient service for the public. People who have the chance (and desire) to serve themselves do so - thus reducing the strain placed on public service staff (Municipality of Frederikshavn).

The analysis team concludes that as a whole the material shows clearly that service goals will be incorporated into the tasks performed by an increasing number of companies and public authorities. The use of IT to meet service goals is expected to reduce the number of service staff required.

In both the public and private sectors there is interest in analysing **resource consumption** with a view to reducing the general level of costs. In the public sector the pressure caused by demographic developments (the number of elderly people and children is increasing in relation to the number of people still in active employment) means that public spending will increase considerably in the years ahead. And the tax base needed to cover such spending will be reduced. So there is a clear incentive for the public authorities to use IT to reduce costs. In addition to the above-mentioned IT-based self-service options, IT can be used to process large amounts of data and thus form the basis for the improved control of costs (Municipality of Ikast)

Several of the companies involved in the case study use IT to process realtime data ("De Grønne Bude" and "Korn- og Foderstof Kompagniet"). In such situations, IT can perform actions which people have performed until now - but it can do so much more cheaply. And in general IT has an extra advantage - fewer errors and more rapid processing.

For private companies facing an increasingly global and competitive situation, the potential of technology with regard to improving **competitiveness** is of major importance. In a world which is growing increasingly digital, many companies need to incorporate IT at all stages from design through to production, marketing, sales and administration. IT makes the establishment of an electronic marketplace relatively cheap and quick (Carlson Wagonlit Travel and Interflora). Companies that lead the way with regard to electronic commerce are expected to gain a competitive advantage. At the very least, the overall IT-competence of such companies will be improved, and the experience gained can be used in future IT-based systems.

One of the distinguishing features of several of the organisations studied was that they measured the success of information technology based on whether it cut the level of resources (generally seen in terms of human resources) consumed in performing the task in hand. The fact that it was not possible to conclude that the introduction of IT always has a negative impact on **employment** was due to (1) that the increased use of IT can increase employment in other industries and companies; (2) that the use of IT in private companies may be a competitive parameter that leads to growth in such companies; and finally (3) that the cases also included examples of IT-applications resulting in the appointment of new members of staff (often staff with the relevant IT competences).

The analysis team emphasises that when IT is introduced it is important to have a clear view of the reason for doing so, and to lay down a strategy for introduction. If this is not done, it will be difficult to control the costs and activities arising in the wake of IT-projects. And in addition, new demands on the competences of staff will lead to uncertainty and resistance to IT among staff if a clear strategy has not been drawn up in advance.

5 IT-political status in the ministries

With the report "Info-samfundet år 2000" ("Info society 2000"), published in 1994, and the following IT-political action plans as the point of departure, a number of activities have been launched in the IT-field in the central administration with a view to improving the quality and efficiency of public services through the use of IT.

A review is presented below of the most essential initiatives taken by the state authorities in order to achieve these main goals. It should be noted that this is by no means a complete summary of all IT-activities at the state level. For example it does not include the setting up of homepages for the ministries or the installation or up-grading of internal IT-equipment. Nor are IT-initiatives in the counties or the municipalities included in this overview. Finally, it should be mentioned for the record that this overview contains no evaluation of how far the IT-initiatives have achieved the goals for which they were set up. Only the purposes of the initiatives have been described.

In the extent to which it is possible, a reference has been given for each initiative to an Internet address, where further information can be obtained.

The review is divided into six main subject areas:

1. Public service in general
2. Health
3. Traffic
4. Education and research
5. Commerce
6. Telecommunications

5.1 Public service in general

The public service activities of the ministries can be divided according to two main criteria: on the one hand the outwardly directed activities in relation to the public as users of public services and on the other hand the internal activities aimed at rationalising and improving the efficiency of casework and daily routines.

The external activities are chiefly concerned with making public information generally available and to provide opportunities for self-service for the public and users of services as they wish to make use of them.

The internal activities are primarily concerned with better exploitation and re-use of data held by public authorities and the introduction of IT with a view to rationalising working processes and making them more efficient.

5.1.1 External activities

The official Danish homepage
The Ministry of Research and Information Technology, in the department of the Danish State Information Service, has established an official Danish homepage with information from and about public services - www.danmark.dk. Information can be obtained here about Danish society based on everyday situations, information on the different areas of responsibility of the various authorities, addresses, telephone numbers, e-mail addresses, homepages etc. and a summary of laws, directives, circulars and other publications from the Folketing, the state administration and EU. These can be sent on request and there are links to electronic editions.

The committee on public information policy
In the autumn of 1996 the Minister for Research and Information Technology convened a committee on public information policy with the former Minister for Finance, Knud Heinesen as chairman. The committee produced the report "Information til Tiden" ("Information in Time") in 1997. www.fsk.dk

The follow-up of this report is included in the Danish State Information Service basis for operations from the autumn of 1998. The central subjects are: increased co-ordination of public information, improvements to danmark.dk, guidance in the construction of public homepages and guidance on appropriate language for use on the Net. www.si.dk

A common state-municipal co-ordination committee
In the autumn of 1998 an agreement was entered into between the National Association of Local Authorities in Denmark, the Association of County Councils and the state, represented by the Ministry of Research and Information Technology, to establish a co-ordinated information committee. The committee is to seek to promote the development of user-adapted and co-ordinated public electronic information. At the same time the Committee will seek to ensure progress in public use of electronic information. www.fsk.dk

On-line publication
Resulting from an initiative in the government's IT-political action plan in 1996, all new publications from ministries and public departments from 1997 onwards are to be published on the Internet in parallel with the printed edition. The Ministry of Research and Information Technology has drawn up a standard procedure for these publications, in order to make them available to as many as possible.
http://www.fsk.dk/fsk/publ/online-pub/

In this connection the Danish State Information Service has issued a computer-programme to guide and assist the staff of public authorities in producing electronic publications on the Internet.
http://www.si.dk/service/program.htm

Distribution system for public data
A widespread exploitation of public data throughout society means that this data must be available to private individuals, companies and between the public authorities. To make data accessible and expand the present use of details of real estate, (for example when buying or selling, financing or insuring real estate) the Ministry of Housing and Urban Affairs has taken the initiative to establish a new system of distribution. It is expected that the first phase of a web-based distribution system with the most essential registers of data on real estate will be operational by the year 2000 (the Register of Buildings and Housing, the inter-municipal register of property data, the cadastre register and the state register of sales

and evaluations - *BBR, Det fælleskommunale Ejendomsdataregister*, *Matrikelregistret* and *Statens Salgs- og Vurderingsregister*). In later phases the system can be extended to include other registers of property data. A number of counties and municipalities have shown an interest in supporting additional phases to include data from the state, the counties and the municipalities. For the time being the system will be financed by users.

The Web cadastre

The National Survey and Cadastre in Denmark has made available the data in the cadastre register – *Matrikelregister* - and the Cadastre Map - *Matrikelkort* - via the Internet. This service is chiefly used by case workers in the municipalities and counties and by privately practising chartered surveyors. www.kms.dk

Municipal key statistics

The municipal key statistics published by the Ministry of the Interior, which appear twice a year, have been available on the Internet since 1998. The aim is to encourage the use of them and give access to comparable information on municipal expenditure in relation to the extent and types of municipal services. http://www.im.dk/software/kn98/installering.htm

PC plant protection

PC plant protection, developed by *Danmarks JordbrugsForskning* (Danish Agricultural Research), is a system to support decision-making, used by farmers and consultants. The system is a guide to users on matters such as the need for pest control, choice of pesticides, and dosage. It gives information on plant protection, pests and pesticides.

Meteorological data on the Net

A joint project is being run by the navigation authority *Farvandsvæsenet*, the Danish Meteorological Institute and the Coastal Inspectorate, *Kystinspektoratet*, presenting their hydrographic and meteorological data on the Internet. This includes for example tide levels round the country. This service has proved extremely valuable when there is a risk of flooding.

The electronic "Statstidende"

In the autumn of 1995 the Ministry of Research and Information Technology convened a committee on an electronic edition of "Statstidende", the Danish official Gazette. Mr. Jens Møller, the Folketinget's Ombudsman, was chairman. The committee produced a report in 1997, and has prepared the way for the publication of announcements from "Statstidende" and "Tingbladet" can be circulated on the Internet. A Bill introducing the Act on "Statstidende" was presented (L131) in the Folketing in December 1998. http://www.fsk.dk/fsk/publ/1997/statstid/

"Retsinformation" – electronic legal database

In 1998 the State's electronic legal database, "Retsinformation", became freely accessible for everyone via the Internet at www.retsinfo.dk. This now gives the public electronic access to find, read and retrieve laws and directives. Similarly, "Ministerialtidende" has existed in an electronic edition since 1998 at www.retsinfo.dk/min98/min98

Kulturnet Danmark – the cultural net

In 1996 the Ministry of Culture set up "Kulturnet Danmark" at www.kulturnet.dk. This service offers the public access via the Internet to public authorities under the Ministry of Culture, including the

collections of Danish cultural institutions. Information is also available on current and planned cultural events and on the activities of these institutions.

Electronic application forms

On its homepage the financial administration, *Finansstyrelsen,* has made it possible to send in electronic applications, for example from those applying for a remission of study debts. These functions provide an opportunity for self-service and an alternative to approaches in writing or on the telephone. They will be extended later to include the possibility of payment via the Internet and digital signatures. http://www.finansstyrelsen.dk/

A new system for the administration of export subsidies from the EU for agricultural products will also make it possible to transfer applications for export subsidies electronically from customs and excise, *Told&Skat,* to the EU directorate.

Electronic tax returns

To make it easier for taxpayers to send in details of tax returns and tax assessments in advance the Customs and Excise administration *Told- og Skattestyrelsen* has set up type-in systems. This has also eased the burden of keying-in data in the regional and municipal tax authorities. The Customs and Excise administration has also formed an electronic tax return form to make administrative processes easier both for the public and for employers. http://www.toldskat.dk/

The electronic parish register

The Ministry of Ecclesiastical Affairs has begun the process of transferring the present legally valid basic registration of individuals from the parish registers, which are kept manually, to an electronic register, *Den ny Kirkebog,* which is a database with data in common with the civil registration system, the *Centrale Personregister (CPR).* The aim is to improve efficiency and simplify the routines of registration and to improve service to the public. A private individual who requires a copy of his birth or baptism certificate will in future be able to apply to any parish office and receive the appropriate certificate, instead of being obliged to apply to the parish where his birth is registered. A detailed description of the project can be seen at www.dnk.dk.

The handicapped and the use of IT

Handicapped members of the public and their opportunities for making use of the new technology have from the start been a central theme in government IT policy. One of the results of this has been the action plan *"Frihed til at vælge"* ("Freedom to choose", Ministry of Research and Information Technology 1996), which suggested concrete initiatives related to the handicapped and IT, such as the development of Danish synthetic speech. A follow-up group has been established for the handicapped with representatives of the various handicap organisations to monitor the many initiatives in this area. http://www.fsk.dk/fsk/publ/1996/frihed/

Danish synthetic speech

In the near future synthetic speech will be an integrated facility in PCs as well as many other technological products. As the interest of the market forces is centred on developing synthetic speech in "the main languages", it is necessary to support and ensure the development of synthetic speech in Danish.

After a competition calling for projects and the subsequent negotiations with two syndicates, the Ministry of Research and Information Technology is expected to enter into a contract in 1999 with one of the syndicates for the development of high quality synthetic speech in Danish. www.fsk.dk

Universal design

I 1997 the Ministry of Research and Information Technology together with the Centre for Accessibility, *Center for Tilgængelighed* opened a competition for universally designed products. This competition, which was open to architects, designers and product developers, was concluded with awards of prizes to the winners in the spring of 1998. The prize-winning project suggestions can be seen at the address www.fsk.dk/fsk/publ/#it

IT and the elderly – mapping out the area

In collaboration with Dan Age (Ældresagen) and Mobility for older people (Ældremobiliseringen), the Ministry of Research and Information Technology carried out a nation-wide survey of the extent to which older people make use of IT and their needs relating to this in 1997/98.
http://www.fsk.dk/fsk/publ/it_ae/

Based on this survey and other information, the Ministry of Research and Information Technology in co-operation with the Danish Research Agency designed a development programme for the use of IT by older people. One of the primary aims of this programme was to investigate what possibilities IT can provide for a more flexible retirement from the employment market. In addition, the possibilities of new applications of IT were to be studied, with the aim of improving the general situation and living conditions for the elderly, as well as finding social-educational methods of increasing IT-competence among the elderly. www.forsk.dk/

5.1.2 Internal administration

E-mail

In 1995, at the initiative of the Ministry of Research and Information Technology, ten e-mail operators set up a framework for collaboration on the exchange of e-mail. In order to promote the use of e-mail as well as to make it easier to use and more reliable, the Ministry of Research and Information Technology has also drawn up guidelines for the use of e-mail in the public sector and published a series of guidelines. There are now official e-mail addresses for the great majority of state authorities.

IT spearhead municipalities

In 1995 the Minister for Research and Information Technology and the Minister for the Interior together with the chairmen of the National Association of Local Authorities and the Association of County councils designated ten municipalities and two counties to be IT spearheads in the information society.

The twelve participants met for a series of seminars, and the experiment was concluded in 1997 with the publication of *"Kom med i front"*, ("Join us at the front"), which sums up the experiences and passes on advice from the spearhead municipalities and counties, making it available to all counties and municipalities. http://www.fsk.dk/fsk/publ/1997/spydspids/

Better use of data in the basic public registers

The lack of co-ordination in the data held by public authorities hinders the use of data to develop an efficient public administration service. To solve this problem within the field of data on real estate the Ministry of Housing and Urban Affairs has drawn up a common data model for five administrational areas: the cadastre, the inter-municipal register of property data, property evaluation, land registration and the area covered by the BBR (the Register of Buildings and Housing). This model, which is available to the public, forms a basis for better exploitation of data held by public authorities. www.bm.dk

Standardisation plays an important part when it comes to improved exploitation of data by public authorities. The National Survey and Cadastre supports and co-ordinates national standardising activities in the area concerned with information on location (map surveys and the cadastre). The aim is to make registration unambiguous so that it can be used in building up collections of data and in data exchanges.

The National Survey and Cadastre has set up the first digital version of the nation-wide data collections for which this authority is responsible (the cadastre register, navigational charts and fixed point information). The database for the basic topographical map survey will cover the whole of the country by the end of the year 2000.

Exchange and inter-department use of public data
To promote inter-departmental use of data held by public authorities it is necessary to make use of common keys and identification tags to the data in the separate registers. The address is often the only usable key which can connect data together from the three basic registers with data on individuals (CPR), real estate and geodata (*BBR,* Buildings and Housing, and the inter-municipal register of property data) and companies (CVR, the central register of companies). In this connection the Ministry of Housing and Urban Affairs has set up three sub-projects: an agreement on closer official collaboration between those responsible for the three basic registers (CPR, BBR/inter-municipal property register and CVR) in order to establish common addresses, a project has been set up to establish the geographical positions of addresses, and the National Survey and Cadastre has developed a new product in which all cadastre numbers are linked with map co-ordinates.

Infodatabase
To provide an overview over information on existing data collections with geographical and place-related information, the National Survey and Cadastre has built up an information database including all essential public and private data collections within this subject area. This infodatabase is accessible on the Internet at www.geodata-info.dk

Payment for data
In the government action plans for 1995 and 1996 plans were laid for an analysis of different arrangements for the delivery and sale of data held by public authorities to other public authorities, private companies or private individuals. To aid this analysis, a report was drawn up entitled "Betaling for data i offentlige registre" ("Payment for data from public registers", Ministry of Finance, 1997). Five basic principles are defined in this report, which public authorities should follow in setting the price of data services. These price policies are now integrated into state guidelines on budgets.

Against this background the Ministry of Housing and Urban Affairs has negotiated with the owners of the state and municipal registers concerned, covering the area of data on real estate. The aim was to establish the price of data on real estate in compliance with the principles set out in the Ministry of Finance report. It is expected that the agreement will be finally approved in the summer of 1999.

Re-use of data
Several departments have drawn up internal IT strategies in order to rationalise working routines and make them more efficient.

For example, the Ministry of Defence has drawn up an IT strategy for the areas under its jurisdiction, with the aim of avoiding keying in the same data several times, and to automate a number of routine

processes. The DeMars System (*Dansk Forsvars Management- og Ressourcestyringssystem, 1998-2003*, Danish Defence Management and Resource Regulation System) has been acquired and will be used to manage and administer finances, materials, personnel etc. and is expected to lead to simpler working routines as well as better management of stores, purchasing and purchasing agreements. www.forsvarsministeriet.dk/

The Ministry of Food, Agriculture and Fisheries has also introduced an overall IT-strategy covering the whole of its ministerial area, in order to make better use of data, to provide a better service for the customers of the ministry and to modernise and improve quality in the carrying out of tasks in the ministry. This involves a general agricultural register – a common database covering farming enterprises for use in the departments of the ministry, supplying information to Danmarks Statistik among others. It also "reuses" data from the basis registers held by public authorities. www.fvm.dk/

In 1998 an IT strategy was drawn up for the Supreme Court, the Western Division of the High Court, the Eastern Division of the High Court and the Maritime and Commercial Court. This entails modernisation and replacement of the hardware etc. in order to provide better support for the administrative processes in the courts.

POLSAS
In connection with the three-year plan for the police (1996-1999) a considerable renewal of equipment has taken place throughout the force, including the installation of PC equipment in all police districts. In parallel with this, a nation-wide network has been established and a new case-management system, POLSAS, has been set up. The chief aim is to ensure rapid and efficient casework and research.

The register of visas
The Danish Immigration Service has set up an internal register of visas as a result of a fully electronic case-management system to improve the efficiency in dealing with applications for visas and also complaints. At the same time it has become possible to transfer data electronically between the Ministry of the Interior, the Ministry of Foreign Affairs with Embassies and consulates, the police and the Danish Immigration Service.

Globalnet
The Ministry of Foreign Affairs has established the Globalnet, linking it to Danish representatives abroad. This also includes Danish representatives to EU and NATO in Brussels. Its chief purpose is to exchange electronic post and documents between the representations and the service in Denmark.

Reporting votes counted
On an experimental basis the ministry of the Interior has introduced the possibility of reporting electronically the results of the vote-counts at the elections to the European Parliament on 10 June 1999. This experiment with the electronic vote-counting system will provide experience for future reporting from elections and referenda.

The System for Social Information and Analysis
The Ministry of Social Affairs has established electronic reporting systems for the municipalities and counties to be used in financial completion statements and for use in the System for Social Information and Analysis. The material on forms and tables which the Ministry of the Interior sends to the municipalities and counties is also available in an electronic version on the Internet, and the local authorities

are free to choose whether they will use the reports on paper or via the Internet. Up to now, results show that there is a preference for the electronic edition.

Reporting of municipal quarterly accounts via the Internet
From 1999 a quarterly reporting system has been introduced for the quarterly accounts from the municipalities, the counties and from Copenhagen City and the municipality of Frederiksberg. The Ministry of the Interior has established an electronic reporting system through the Internet for the municipalities and counties.

The Ministry of the Interior has also established an electronic reporting system through the Internet for the municipalities for matters concerning foreign citizens, to transmit completion statements and reports of subsidies and refunds in connection with integration.

Industrial injuries
In 1995 the Industrial Injuries administration started the EDIFACT project with the purpose of making communication easier between the administration and the agencies with whom it collaborates – primarily insurance companies – over the registration of data on industrial injuries.

"Danmarks Statistik"
From the first half of 1999 it will be possible to subscribe to an electronic version of "Nyt fra Danmarks Statistik" in sections according to subject areas, making current data rapidly available. Similarly there will be on-line access to data banks where users can select statistics in almost unlimited combinations. In addition to this, since 1995 "Danmarks Statistik" has made use of electronic enquiry forms, which the respondents can return on diskettes. www.dst.dk

New state system for financial management
The State Central Accounting system (*Statens Centrale Regnskabssystem,* SCR) is being reorganised to operate using a new standard financial management programme, Navision Financials, with the main aim of bringing state financial management up to date and making possible an easier and faster exchange of information between the state authorities and private companies. www.oes.dk

IT committee on the consequences of the Internet for the tax system
In 1996 the Minister for Inland Revenue convened an IT-committee to analyse the consequences of the Internet for the tax system. Its report in the summer of 1998 (betænkning 1356, 1998) summarised among other topics the current rules for the taxation of Internet commerce and investigated the effects of Internet commerce on the incomes from taxation It is expected that the committee will produce a new status report in the course of 1999. www.skm.dk/publika.htm

Electronic data forms
Several public authorities are in the process of making their paper forms available electronically.

Thus, in response to general demands and in the hope of eventually saving on the costs of administration, the Central Customs and Tax Administration has taken initiatives to make its paper data forms available electronically via the Internet. The Central Customs and Tax Administration also hopes to collaborate with the Danish State Information Service, the Companies and Commercial Agency and the National Association of Local Authorities in Denmark to draw up and publish standards for forms and reporting facilities.

The Directorate for Unemployment Insurance (*Direktoratet for Arbejdsløshedsforsikringen,* DfA) is also in the process of developing electronic forms with the aim of improving its service to the members of A-kasser (unemployment insurance funds) as well as rationalising casework and making it more efficient both in the A-kasser and in DfA.

Electronic reporting system

In 1998 the Data Surveillance Authority began work to draw up an electronic reporting system which will make it possible for private and public authorities to make electronic reports via the Internet in accordance with the new Act on processing personal details and also to provide access to an updated list of the data reported.

The working environment

The Directorate of National Labour Inspection is in the process of establishing an information system (ATIS) to ensure the data basis for drawing up documents in the Directorate of National Labour Inspection as well as improving access to data on the working environment for external users. It is expected that the system can be taken into use in the course of 1999.

Libraries and archives

In 1995 the Ministry of Culture convened a committee on libraries in the information society (UBIS), which was to look closely at the tasks of the libraries and their terms of reference in the light of developments in electronic publication. This included clarification of the urgent questions of copyright, legal deposit of electronic works, information services in the future and the possible ways of financing the use of the new media in libraries.

Against the background of the committee's report in 1997 the Minister for Culture will be presenting a bill in the course of 1999 with suggestions for new legislation on the running of libraries. This will deal among other things with equal status for the media in libraries and the maintenance of the principle of service free of charge at libraries throughout the country. www.kum.dk

The Danish State Archives have begun digitalising parts of the most-used material in the archives (census statistics, parish registers, the register of emigrants) and will make it available partly as CD-ROM and partly via the Internet. Digitalisation makes it possible to seek information from one register to another and makes the material more easily accessible to the public. It will also relieve pressure on the archive reading rooms. www.sa.dk

Electronic casework and records

In close collaboration with the State Archives, the Ministry of Research and Information Technology has carried out a number of initiatives to promote a rational development towards electronic casework and recording of the results in all public authorities.

In 1995 the Ministry of Research and Information Technology and the Ministry of Culture produced a joint publication:" *Elektronisk arkivering, aktuelle muligheder og anbefalinger"* ("Electronic archives, current possibilities and recommendations") At the same time the State Archives produced a circular on electronic archives in state authorities. This allowed the state authorities to abandon the traditional archiving processes on paper in favour of electronic archives and in 1997 the Danish State Archives approved the first digital archiving systems in state authorities. www.sa.dk

In 1995 the Ministry of Research and Information Technology gathered a group of state and municipal "spearheads" in this area in order to gather in their experiences with of digital administration and especially to formulate general requirements for future IT-systems to be used by authorities, IT-suppliers and consultants. The result of the work done by the spearhead group can be seen in a number of publications from the Ministry of Research and Information Technology. www.fsk.dk/fsk/publ/

Trials with open post lists
In 1998 the Ministry of Research and Information Technology initiated a trial of open post lists in selected ministries, counties and municipal administrations to investigate the possibilities of improving the implementation of the principle of openness in public administration by means of IT.

The trials are designed to reveal barriers and potential advantages in relation to open post lists in electronic form (via the Internet). In the spring of 1999 the Ministry of Research and Information Technology produced the publication *Åbne Døre* (Open Doors) which deals with the main problems and experiences up to the present in connection with open electronic post lists.

Year 2000 dates in IT systems
At the turn of the year to 2000 there is a risk that many IT-systems will fail because of errors in the management of dates, due to the year being given with only two figures.

In order to relieve the problems which can arise in general, if these IT-failures are not prevented, the Ministry of Research and Information Technology is co-ordinating an action plan which was initiated by the government in 1997. One of the results of the plan has been the establishment of the Year 2000 Forum where representatives of 50 organisations have taken part, and the establishment of a Year 2000 Secretariat organised by the Danish Data Union. At the state authority level the Ministry of Research and Information Technology is monitoring closely the current status for Y2K compliance. www.fsk.dk

5.2 Policy on health

In the health sector IT has primarily been used as a tool for statistics, administration and financial management. However, technological developments in recent years have opened up possibilities for direct IT contributions to improvements in co-operation, quality and service in the actual treatment of patients.

National strategy for the hospital system
The Danish Ministry of Health has begun work on a national strategy for the hospital system and is expected to present this strategy in the summer of 1999. The aim is to meet the need for a closer focus on the patient in the use of IT and for better co-ordination and correlation of IT-activities. In addition it is hoped to give clearer priority to IT-initiatives and resources as well as drawing up more long-term plans for the contribution of IT in the nation's hospitals.

Electronic patient journals

Electronic patient journals are a new IT-tool for the professional staff in the health service. These journals contain linked health details linked of each patient and are stored in a system specifically designed to support the staff, giving them opportunities for systematic evaluation of treatment methods, results, consumption of resources and patient progress. Electronic patient journals will bring about improvements professionally and service-wise in the treatment of patients by providing better information to the patient and a better co-ordinated health service.

Health data net (the MedCom project)

Since 1994 a number of parties in the health service have been working together to establish a nation-wide health data net, MedCom. MedCom has served as a cover organisation for a large number of county and municipal projects. Almost all hospitals and pharmacies as well as 1,400 medical practices are at present able to make use of the health service data net.

Clinical databases

As part of the quality development strategy for the Danish hospitals, a central goal is to promote the establishment of clinical databases. One major advantage of these clinical databases is that the data can be re-used in as far as possible, up to the extent that the clinical database is integrated in the other registration and information systems at the hospitals. Until now the Ministry of Health has supported the establishment of eleven clinical databases.

Waiting list information on the Net

The Ministry of Health provides information via the Internet on waiting lists for twenty four selected treatment groups. The system was started in 1998 with the aim of giving the public a better basis for their decision when choosing hospitals to treat them. At the start of 1999 the waiting list information has been supplemented with operation statistics, indicating how many of the selected operations each hospital performs. http://www.info.sum.dk/ventelister/

Electronic booking

The Ministry of Health has monitored a number of experiments with electronic booking, where individual patients can book their own appointments for their operations. Experience to date shows that electronic booking leads to more efficient use of hospital resources through different ways of organising the working routines. This means in turn that more operations have been performed in the departments which have introduced electronic booking.

Electronic information on medicines

Based on collaboration between the Danish Medical Association, the Pharmacists' Association, the negotiating committee for health insurance, the Danish Medicines Agency and the Ministry of Health, general electronic information on medicines was compiled for doctors and pharmacists. This medicine catalogue contains details of all medicines on the market, giving indications, side effects, prices etc. The purpose of this is to assist practitioners in making appropriate and effective prescriptions.

5.3 Traffic

Information technology plays an important role in traffic matters. Choice of destination, means of transport and the route for the journey, whether the choice is to be made from the bus or railway terminal, from home or from a place of work.

Operational punctuality system (RDS)
The purpose of this system is to monitor in detail all rail traffic in order to improve punctuality. Information is shown on the Internet, so that passengers can check up on the delays of particular trains. The system has resulted in a closer, faster and considerably more flexible follow-up of train punctuality.
http://www.bane.dk/korevej/regular/s/s_main.htm

The country's pulse (Landets puls)
The Danish National Railways Agency has taken the initiative to establish an Internet service, Landets puls (The country's pulse), which shows the current traffic situation as a graphic on-line picture. Its purpose is to give passengers access to at-a-glance information on the current situation, for example in connection with delays.
http://www.bane.dk/trafinfo/main.htm

The journey planner
The journey planner (Rejseplanlæggeren) is an Internet service set up jointly by DSB and a number of traffic operators, making it possible to see the transport connections available between particular addresses, using several different means of transport. In this way it is easy to plan both the journey and the times of travel. The service also makes it possible to buy tickets, reserve seats, cancel previous reservations and similar. www.rejseplanen.dk

Travel card project
"Projekt Rejsekort" is a joint project between Copenhagen Transport (HT), Danish State Railways (DSB), the Ørestadselskabet and the private rail companies. Its aim is to produce a new electronic ticket system in the greater Copenhagen area, so that instead of the present travel cards and monthly subscription cards, every resident in the greater Copenhagen area should have a personal travel card, which will always be valid and ready for travel. It would be possible to renew or "recharge" it by making automatic payments through the banks' network (PBS). It is expected that the card will be based on the contact-free chip card ("smart card").

Traffic control systems
The Road Directorate at the Ministry of Transport has initiated a system which will ensure real-time information to the public, in the first instance on the traffic situation on the motorways around Copenhagen. The information will be freely available on the local radio and via the Internet. The system will also be applicable as background information for dynamic traffic regulation, as well as for analysis of traffic problems and as an aid to initiatives to solve these problems. www.vd.dk

Traffic information centre (TrafikInformationsCenteret, T.I.C.)
The information line at the traffic information centre supplies current information on traffic round the clock, all year round. The centre also provides a service for road-users in the form of aids to route-planning or similar. In 1996 an initiative was taken to establish a system to register and classify all the traffic information which is used by the T.I.C. According to plan, this system will be extended to the

county authorities and the police, so that a dynamic network can be set up to collect current traffic information. www.trafikinfo.dk

The State Department of Vehicle Inspection (SBI)

In connection with the Act on regular inspection of vehicles from January 1998 it has been necessary for the State Department of Vehicle Inspection (SBI) to double its inspection capacity. In the course of this SBI started a number of IT projects to ensure an optimal exploitation of resources in combination with a high level of service to customers. An example is the nation-wide data communication service to all SBI's inspection halls and the linked private workshops where SBI carries out inspections, as well as a system to manage notifications of inspections when they are due, allocation of resources, booking and payments and also a computer-based system to set up and manage a technical journal of vehicles to support the practical inspections.

Joint Scandinavian database on traffic safety

In 1996 the Danish Road Safety Council set up a database on traffic safety together with the corresponding organisations in Norway, Sweden, Iceland, Finland and the Faeroes. Since 1998 this database has been accessible on the Internet at www.ndts.com

The Civil Aviation Administration, Denmark

At the beginning of 1999 the Civil Aviation Administration established a system for statistics on the Internet based on a database covering delays in flights either starting or landing at the major Danish airports. The statistics are intended for public use and will in the longer term be extended to include further statistics on civil aviation. www.slv.dk

5.4 Education and research

IT in the Folkeskole (children aged 7 – 16)

IT in the Folkeskole (children aged 7 – 16) was a central point in the government's aims in its first action plan on IT policy. The initiative was formulated in the report "Information technology in the Folkeskole, 1996" and in a following agreement from 1996 with the municipalities that the investments in IT were to be doubled, and that the municipalities would ensure that from the year 2003 not more than ten pupils would share each of the newer computers. Http://147.29.40.164/it

IKT[6] strategy and action plans throughout the educational system

The Ministry of Education has drawn up a strategic plan for IT in the education system for the period 1998 – 2003, where the following five areas are discussed: pupils, students and ICT; teachers and ICT; school subjects and ICT; equal rights of access and flexibility in lifelong education; and co-ordination of ICT-based research and education. www.uvm.dk/pub/1998/inform/

The Sektornet – connecting places of education

The Ministry of Education has set up an electronic network connecting all the institutes of higher education, vocational training centres, the High Schools and junior schools. Its purpose is partly to ease the administrative routines by means of electronic reporting and partly to make increased use of IT in teaching and training, and also in the institutions as organisational units. In the course of 1999 it is

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[6] Informations- og Kommunikationsteknologi (Information and communication technology/ICT)

expected that 2,300 schools and other institutions will be connected to the network. Its address is: www.sektornet.dk

Centre for Technology-supported education (Center for teknologistøttet Uddannelse/CTU)

In 1995 the centre for technology-supported education, CTU was established as the result of the work of a committee which investigated the possibilities of increasing the use of technology in teaching, where special attention was paid to adult education. CTU serves as a national centre for knowledge of distant teaching and technology-supported teaching. It has an advisory function for public authorities and educational institutions, and through the administration of a DKK 122 million fund to support reorganisation in the period from 1995 – 2000 it will stimulate and support an increase in the offers available of distance teaching and technology-supported teaching. www.ctu.dk

Quality assurance of distant teaching

There is a considerable need for the development of mechanisms to ensure the quality of the increased range of courses of study available through distant teaching and similar. A central section of the Ministry of Education's action plan on ICT deals with the development of a structure for quality evaluation in distant teaching courses, including courses under Open Education and the development of tests in distant teaching which are organised as distance tests or examinations.

Educational services on the net

In recent years the Ministry of Education has set up a number of educational services on the Internet. Examples which can be mentioned are:

SkoleKom (www.skolekom.dk) – (School Com) – a post and conference system which as a free service on the Sektornet gives teachers and pupils from all types of schools and colleges access to e-mail and to more than 4,000 open and closed conferences on teaching.

Fagenes Infoguide (www.infoguide.dk) – (Subjects Infoguide) – a service on the Sektornet with references to educational resources on the Net. The target group is primarily teachers in the Folkeskole, the High Schools and in adult education areas.

Kidlink (www.kidlink.dk) – a world-wide communication project for children, which was launched in Danish in 1998. It is used to a rapidly increasing extent, as the project enables teachers and pupils to plan and carry out their own teaching programmes via the Internet.

SkoDa – (www.sdbs.dk) – The Schools' Database Service, a subscriber service for all types of schools, which gives general access to a wide selection of databases.

EMU (www.emu.dk) – the electronic market place for education. Its aim is to open a gateway to teaching, where all relevant resources are presented together, whether they are in the form of general information, free services on the Sektornet, other free resources on the Net or one of a number of services for which there is a charge.

VisionQuest – the development of supplementary teaching material which uses advanced, interactive tools to visualise and present data. They are especially designed for use in high schools in order to strengthen the pupils' interest in the area of technology and the natural sciences.

The educational IT licence

In 1997 the Ministry of Education took the initiative for the development of an educational IT licence, or in other words course-material and a course concept for junior schools, the high schools and teacher-training colleges offering supplementary training in the ICT area. Further information is available on www.skole-it.dk.

The Poseidon project

The Ministry of Education has designated ten different places of education from Folkeskole level up to university level to take part in the Poseidon project, which is being carried out in the period from 1996 – 1999 (www.poseidon.uvm.dk). The selected places of education will develop their own ICT strategy through an envisaging phase, a status phase and an implementation phase in order to develop process-oriented tools to support the development of ICT in the organisation at any level.

The Janus project – the digital Folkeskole

This project, which ran from 1995 – 1997, was designed to follow the effects of ICT on school subjects and teaching, starting out from two class levels in each of three schools which were equipped with machines and teachers who had been trained in ICT. A summary report can be seen at
www.uvm.dk/fsa/janus/janus.htm

The Learn IT project

In 1995 the Ministry of Education set up a Learn IT project with the aim of informing teachers in junior schools about the new Folkeskole Act as well as central innovations in the content of the subjects and the educational aspects in its requirements for the integration of IT in teaching processes.
www.laer-it.dk

The Ground-breaker project

In 1996 the Ministry of Education initiated a ground-breaker project to develop, test and put into production teaching aids which would encourage the use of IT and build up know-how on the integration of IT in the development and production of new teaching aids for the Folkeskole. The legislative and economical aspects in connection with these products were also to be investigated, and a new basis established for organisation in the teaching aid sector. The project is divided into two phases, of which the first will be concluded in the autumn of 1999 and the second in 2001. www.skolemedia.dk,
www.groundbreaker.dk

KOM.IT at vocational training centres

KOM.IT is an offer to all vocational training centres which combine COMpetence, Information Technology and educational theory (KOMpetence, InformationsTeknologi og pædagogik). The project was started in 1997 and runs until the end of 1999. Its purpose is to develop qualifications, frameworks and nets to aid the use of information technology in education. This is carried out in the individual school, where the management and staff work in teams to define and implement development projects with assistance from consultants who have specialised in IT and educational theory.

The electronic school

In 1995, with two classes at a high school as the point of departure, the Ministry of Education initiated a project with the aim of testing systematically the use of portable computers in teaching and in examinations in the high schools. It was also the aim of the project to identify opportunities and limitations connected with the use of information technology in relation to the particular subjects or similar aspects. This initiative has resulted in the setting up of a number of parallel experiments in one or several subjects. Almost all high schools and Higher Preparatory Examination (HF) centres are to a greater or lesser extent carrying out trials following these guidelines.

The IT leap

In 1997 the Ministry of Research and Information Technology held a conference on the development of IT skills among public employees through the establishment of places of education at home. This

conference was the starting signal for the establishment of a DKK 400 million fund which in 1998/1999 was distributed to projects involving home education within the public sector. Thirty one public authorities at the state level as well as twenty three municipal and private junior schools are as a result able to offer a home PC to all their employees for educational purposes. http://www.fsk.dk/cgi-bin/theme-overview.cgi

National substrategy for IT research

In 1998 the government introduced a national substrategy for IT research. In this substrategy the research area is defined and particular needs for research in the field of information technology are identified. Finally the strategy defines a framework for working out priorities and co-ordinating IT research and research-based IT education. http://www.fsk.dk/fsk/publ/1998/nation/

The research net

With a view to linking Danish research institutions to each other in an up-to-date electronic infrastructure, and to make possible high-speed transmission of text, sound, pictures, video or similar, the Ministry of Research and Information Technology took the initiative in 1996 to establish the research net (Forskningsnettet). In 1997 a comprehensive expansion of the Danish research net carried out, and it was upgraded at the same time. Thus practically all Danish research institutes and universities, about a hundred altogether, now have access to a network which, by the standards of today has an acceptable capacity at reasonable prices. http://www.fsk.dk/cgi-bin/theme-overview.cgi

The Danish electronic research library (Danmarks Elektroniske Forskningsbibliotek)

From now until the year 2001 the Ministry of Research and Information Technology, the Ministry of Culture and the Ministry of Education will be working to set up a Danish electronic research library (Danmarks Elektroniske Forskningsbibliotek, DEF). The purpose of DEF is to create an inter-connected research library structure in Denmark which will be able to develop the digital capacity of the libraries as well as user interfaces to assist researchers and research users. www.deflink.dk

IT university

In 1999 the Ministry of Research and Information Technology and the Ministry of Education will be establishing an IT university in the Copenhagen area, which will develop to offer a broad selection of educational courses in IT at diploma, undergraduate, post-graduate and PhD-d levels, as well as in the form of supplementary education. The studies will be based on research environments of international standard. The first students should be able to begin their studies in the autumn of 1999. www.fsk.dk

There are similar plans to establish an IT university in the west of Denmark, which is also expected to admit students in the autumn of 1999.

The Danish National Centre for IT Research (CIT)

In 1996 the Danish National Centre for IT Research was established as a temporary institution under the Ministry of Research and Information Technology with a budget for the financial years 1996 – 1999 of DKK 130 million. Its chief purpose was to maintain and expand Danish research in the field of information technology based on the best IT research environments in Denmark and in collaboration with Danish industry and commerce. www.cit.dk

Centre for Communication, Optics and Materials (COM-Centret)

The rapid increase in the use of the Internet and multimedia cannot continue without a corresponding development of telecommunications technology. The Danish COM centre was set up for the purpose

of reinforcing education and fundamental research, so that Denmark can both contribute to and reap the benefits of international developments in these central areas of research. The centre was opened in 1998 and is situated at Denmark's Technical University, but it is led by an independent management committee and director. www.fsk.dk

Special educational ventures
During the last few years the regional employment services have made special efforts through education in IT skills to prevent bottleneck problems, where unemployed persons at all educational levels have been re-trained or offered supplementary training for employment in this sector.

For a considerable period the adult vocational training centres (AMU)have been working to establish IT and multimedia as educational and cultural tools for use in teaching in the same way as the more traditional teaching aids. At present work is in progress on an action plan for integrating IT into adult vocational training courses.

VIDAR
The Ministry of Labour, the Ministry of Education, the National Labour Market Authority and the National Council for Educational and Vocational Guidance (R.U.E.)have developed an Internet database known as VIDAR with information on education and training courses for adults in Denmark. It aims to give an overview over the range of education opportunities and courses for adults with information on times, places and costs for the particular courses. www.vidar.dk

SMEC/ADAM
In 1995 the macroeconomic model SMEC was made freely available via UNI-C to institutions offering higher education. Together with ADAM and a number of data banks it is thus included in an "economic research package".

5.5 Commerce

Tripartite meeting between the government, labour and management representatives
In 1996 the Ministry of Research and Information Technology arranged a tripartite meeting between the government, labour and management representatives to discuss commercial policies and the development of qualifications in the information society. This tripartite meeting was concluded with the publication of a conference document in which it was agreed that:
- A committee should investigate the effects of the information society on the organisation of work and job specifications. This committee produced a report with thirty eight recommendations in 1998.
- IT should be reinforced in the Folkeskole. During the municipal economic negotiations in 1996 agreement was reached between the municipalities and the government on a plan for the introduction of IT in the Folkeskole.
- Technology-supported teaching should be promoted.
- High-speed nets should be established to link public research environments and private companies. The research net was established in 1997.
- A national EDI action plan should be established. This plan was presented in 1997.

The effects of the information society on jobs and the organisation of work

In 1996 the government convened a committee to discuss the effects of the information society on job specifications and the organisation of work. The report of this committee will present recommendations for new terms of employment, new requirements for qualifications, greater differences on the labour market and projects on the working environment. To conclude the work of the committee a conference will beheld in the autumn of 1999 for companies at the forefront of developments. www.am.dk

A sideshoot of the work of this committee is an attempt to set up a co-ordinated advisory service on the labour market in two counties, which the local companies can make use of when the introduction or the application of IT raises questions, for example on matters relating to the working environment, organisational changes, planning of training or specific training offers.

Work at home

In 1997 the Ministry of Research and Information Technology published "Analyse af den potentielle udbredelse af hjemmebaseret telearbejde i Danmark" ("Analysis of the potential distribution of home-based distance work in Denmark"). The report describes distance work in Denmark and it is estimated that potentially there will be about 250,000 home-based workplaces on the Danish employment market. http://www.fsk.dk/fsk/publ/1997/telearb/

Working Environment

In the area of the working environment, work is being done on, among other things, adapting the regulations of the Act on the Workplace Environment for work in the home of the employee. The Folketing has moreover set aside DKK 22 million to elucidate the cause of "mouse illnesses" and other workplace environment problems involving work with screens. www.ami.dk

EDI Action Plan

In the spring of 1996, the Minister of Research initiated, in conjunction with the Minister of Business and Industry and the main organisations of the business community, the national EDI action plan. The three-year effort is intended, via development, information and the establishment of standards, to promote the use of electronic document exchange in the business community and the public sector. www.edi.dk

The Danish Register of Companies

The Danish Register of Companies was created by legislation in 1996, and its purpose is to ensure an unambiguous registration of all companies in Denmark, and thus ensure the re-use of data in public registers plus minimise the reporting burden for the companies in connection with reports to public authorities. The system is expected to be put into use in the last half-year of 1999. www.cvr.dk

Indberetning.dk

In extension of the government's efforts to ease the administrative burdens of companies, a common Internet service, www.indberetning.dk, has been introduced, and it will serve as a common portal to the public reports. The services will give the companies an overview of which reports they in particular have to prepare.

Reporting in general

The Central Customs and Tax Administration has set up self-service data entry solutions with associated payment transmission for VAT and income tax withholding, plus for the reporting of the civil registration numbers of employees, in order to make it easier for companies to report and pay their VAT

and income tax withholdings. At the same time, it will ease the data entry workload of the regional offices of the Customs and Tax Administration. www.toldskat.dk

The Central Customs and Tax Administration has conducted an experiment with the electronic exchange of income tax data and information related to annual financial statements for the purpose of easing the workload of business operators with respect to income taxes and the reporting of accounting information to the public authorities.

The Danish Commerce and Companies Agency has custom-developed a program which puts companies and their consultants in a position to perform electronic reporting of changes in company information that it is mandatory to have registered. www.eogs.dk

In order to utilise financial statements to a continually greater degree, the Danish Commerce and Companies Agency has initiated work, on the basis of the registration of the companies in the IT systems of the agency, which will make it possible for companies and their consultants to submit statements of accounts, etc. to public authorities by using EDI.

The Ministry of Foodstuffs has taken the initiative to enable farmers to be able report their fertiliser accounts via the Internet.

The Common Payroll Withholding System (Finance Authority) is a measure that has been carried out under the government's committee on easing the administrative burdens of companies. The companies are thus released from having to prioritise the payroll withholdings and obtain information on which public authority and which type of debt is involved. www.finansstyrelsen.dk

The Finance Authority has, in conjunction with the National Building and Housing Agency, taken the initiative in establishing the electronic exchange of loan, yield and security information for the Finance Authority, the National Building Fund, the municipalities and the Landowners' Investment Fund. The purpose is to significantly lighten the administrative burdens for the mortgage-credit institutions and give the public sector benefits via electronic processing of this data in downstream work. The system is expected to be put into use in 1999.

Publi-com.dk
At www.publi-com.dk, there is free access to "Registreringstidende", basic information on registered enterprises, information on green accounts and those companies which are submitting them, plus the ability to order various print-outs. During the course of the first half-year of 1999 the service will be expanded to also include an information system with full company information.

Strategy for the IT/Telecommunications/Electronics trade
In the autumn of 1998, the government presented an overall strategy for the IT/Tele/Electronics trade which encompasses the most important of the trade's Danish and international framework conditions. The objective is for the Danish and international framework conditions for the trade to on the overall be among the best in the world. http://www.em.dk/publika/itstrategi/dk/index.htm

Focus on E-commerce

Focus on E-commerce, established in 1999, is an untraditional joint initiative by the government and a number of central trade organisations and interest groups. A broad partnership is a prerequisite for creating tenable solutions under the special conditions posed by the development of IT. The objective of Focus on E-commerce is to set in motion tangible activities which will promote the development of electronic commerce in Denmark. www.elektroniskhandel.dk

Knowledge centre for electronic commerce

The Danish Agency for the Development of Industry and Trade has given support to the development and operation of a virtual knowledge centre on Internet Commerce under the auspices of the Danish Technological Institute and the Stock Exchange. The objective is to furnish a virtual meeting place where the problems of companies with the implementation of E-commerce can be discussed.

Business service

The Ministry of Business and Industry has developed a concept with to a greater extent than was the case previously will make it possible especially for small and lesser-sized enterprises to outsource their administrative tasks. IT will contribute here to keeping the expenses of the enterprise down by virtue of the communications between the enterprise and service suppliers, and between suppliers and public authorities, being made more efficient.

The Ministry of Business and Industry has in addition taken the initiative for a search engine on the Internet with centralised access to information on all real property being offered for sale, as a service for consumers, inclusive buyers of real property. The system has not been implemented yet. www.em.dk

Export promotion

The Royal Danish Ministry of Foreign Affairs is in the process of introducing an IT system for activities promoting exports, Marketing Manager, which will be able to construct databases, communicate the interests of Danish companies, target information-gathering activities, manage quotations, orders and export development projects, etc., plus exchange data with the Ministry's financial system.

The Danish Agency for the Development of Trade and Industry has prepared a guide for exporting over the net, which gives practical information on how the companies can get started with exporting via the Internet. www.efs.dk

Promotion of digital communication and trade

In 1997, the Minister of Research, in conjunction with four other ministers in the government, issued a report on secure digital communication to the Folketing. The report came at the same time as a communication from the EU Commission on electronic signatures and encryption.
http://www.folketinget.dk/Samling/19971/redegoerelse/R8.htm

Future Danish legislation on digital signatures will, among other things, ensure that paper-based communication will be positioned on an equal footing with digital communication, also when it comes to entering into agreements, the reporting of information to public authorities and other legally binding transactions. The Ministry of Justice has appointed a committee in connection with this, consisting of representatives from the public sector and the private sector in order to elucidate the problematics being posed in connection with the legal effects of a digital signature.

The proposed legislation on digital signatures is expected to be submitted before the end of 1999.
http://www.fsk.dk/cgi-bin/theme-overview.cgi

Digital signature pilot projects
In order to obtain the requisite experience to be able to introduce digital signatures extensively in the public sector, the Ministry of Research has granted DKK 15 million for the implementation of nine different pilot projects. The pilot projects encompass more than 3,000 users - private, students, farmers and small and large businesses – and will lead to the elucidation of the needs for placing digital signatures and hand-written signatures on an equal footing in different jurisdictions. The experiences will also enter into continued work on the legislation concerning digital signatures. http://www.fsk.dk/cgi-bin/theme-overview.cgi

The nine pilot projects:

The Danish Commerce and Companies Agency wishes, in conjunction with the Central Customs and Tax Administration, the National Statistical Office of Denmark, the Danish Labour Market Supplementary Pension and the Danish Financial Authority, to use digital signatures in connection with the electronic reporting of the companies.

Ringsted Municipality will integrate digital signatures on electronic forms in the municipality's citizen's handbook on the Internet for the use of its residents and companies in connection with: An electronic moving pack (selection of doctor, tax card, housing support, etc.), change of tax card and the application for permission to excavate.

Næstved Municipality will use digital signatures internally in its administration, including in connection with hiring new employees, applications for leaves of absence and terminations. The National Association of Local Authorities in Denmark will participate in evaluative and communicative tasks, and as a consultant for parts of the project.

Vordingborg Municipality will use digital signatures in connection with inquiries for information on real properties plus with applications for building permits.

The Danish Agency for Development of Trade and Industry will use digital signatures in connection with applications for import licenses for textiles and clothing goods.

The EU Directorate (Danish Intervention Board) will use electronic forms with a digital signature in order to ease the application procedure for hectare support.

Århus County wishes to use digital signatures in connection with settlements between doctors, dentists, etc. and the public health insurance, the securing of communications between hospital departments and practising physicians, including discharge letters and laboratory responses, and for communications between physicians, including the exchange of patient journals when physicians are changed.

The Danish State Education Grant and Loan Scheme Authority will use digital signatures for electronic self-service within its system, as a replacement for the traditional signature, in conjunction with its application forms and as an identity check in connection with electronic access via the Internet to the users' own data in its system.

The Copenhagen Business School wishes to introduce chip-based student cards with a digital signature. The digital signature will be used for self-service educational administration, including signing up for subjects, looking up the results of exams, requisition of library cards, electronic submission of exams and special assignments, plus electronic submission of applications to the staff-student study committee.

Centre contracts and IT
The Danish Agency for Development of Trade and Industry has the possibility for supporting centre contracts, where one or more companies work together with technological service institutes and research institutes on a research or development project with commercial prospects. www.efs.dk

The Employment Service
The Employment Service is about to develop a new EDP system, AMANDA (ArbejdsMArkedets Nye DAtabase [the employment market's new database]), which will give the opportunity for better service to the companies and applicants for jobs and training.

An IT Development Forum has been appointed under the auspices of the Directorate General for Employment, Placement and Vocational Training with the purpose of creating increased knowledge about the IT job market and thus strengthening the Employment Service's services to companies and job applicants.

A job bank and a CV bank has been created on the Employment Service's homepage. Companies can submit notices of open positions and search for employees, and job applicants can obtain an overview of the offerings and post their CV. www.arbejdsformidlingen.dk

5.6 Telecommunication

With a point of departure in the report entitled "The Information Society Year 2000", in 1994 the Ministry of Research submitted a topical draft in 1995 on Danish telecommunications policy: "Best and least expensive through true competition". The draft led in 1995 to a political agreement in principle on the total liberalisation of the Danish telecommunications sector. The agreement, which along with diverse supplementary agreements continues to form the basis for Danish telecommunications policies, focuses primarily on two fields: 1) better and less expensive telephony for the individual Dane and 2) the significance of the telecommunications sector to the realisation of the information society.

The agreement in principle has up to the present been minted in a comprehensive body of laws in the telecommunications field with the purpose of liberalising the Danish telecommunications market. The total liberalisation has, among other things, given rise to the opportunity for anyone to establish themselves as a supplier of telecommunications networks and telecommunications services. An open-market structure has thus been created – where licenses and the like are not required - in Denmark, which ensures the greatest degree of competition possible. Moreover, there are openings for liberalisation in areas which up to now had been encompassed by Tele Danmark's monopoly. The provisions regarding such entered into a statutory order on the offering of telecommunication networks and telecommunications services, which was issued in July of 1997. The provisions are supplemented by the Act on Public Mobile Communications, which sets the framework for access to the limited frequency resources which can be used for the offering of the public mobile communications network. These are allocated by public bidding, where the primary allocation criteria are set based upon the overall objective of the telecom-

munications policy on ensuring the users continually improved and less expensive telecommunications services.

The total liberalisation of the Danish telecommunications sector continues to take place, and in 1999 a revision of the objectives of the telecommunications policy will be launched. Additional information can be found at www.fsk.dk

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