

## Use of ICT in Nordic enterprises 1999/2000

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# Abstract

## Use of ICT in Nordic enterprises 1999/2000

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This report describes the use of Information and Communication Technology (ICT) in Nordic enterprises in 1999. Use of Internet was widespread among Nordic enterprises by the end of 1999. Internet connections were most frequent in Finland while the use of home pages was most common in Sweden. By the end of 1999 between 10 and 20 per cent of all enterprises in Denmark, Finland, Norway and Sweden had the possibility to receive orders via home pages. However, the results in this report show that the volumes of electronic commerce were still low. In most areas, Norway seemed less progressive than the other Nordic countries.



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# Preface

This publication presents the use of Information and Communication Technology (ICT) in Nordic enterprises in 1999. The use of ICT in enterprises is expected to exert a major impact on profitability, productivity and employment levels. International comparisons are becoming increasingly more important as ICT usage is generally considered to be a critical factor contributing to national performance on both micro and macro economic level. Benchmarking ICT performance against other countries is seen as a key issue in an Information Society characterised by increasing globalisation.

National statistical offices are experiencing high or growing demands for ICT statistics. As a consequence of these demands, the director generals of the five Nordic statistical institutes in November 1999 decided to set down a Nordic group for development of statistics on the Information Society. Among the responsibilities of this group are the preparations and publishing of statistical publications comprising different aspects of the Information Society based on harmonised definitions and concepts.

The common Nordic approach was first tested in Denmark and Finland with a questionnaire based survey of enterprises. A Danish-Finnish publication describing ICT usage in the two countries was published early in 2000. Later also Norway and Sweden carried out similar surveys. This publication is based on surveys done in Denmark and Norway late 1999. In Finland the survey was conducted early in 2000 and in Sweden in the middle of 2000. The collection of data was thus done within a time span of approximately six months. One consequence is that the Swedish figures for 2000 include the alternatives "Already implemented 2000" and "Planned 2000", and are therefore more certain than data from surveys conducted in 1999. The expectations of the enterprises for 2000 are mentioned several times in this publication. These expectations only show the assessments of the enterprises and should in no way be interpreted as a prognosis issued by the national statistical institutes. The gross samples in Denmark and Norway consisted of about 4000 enterprises while the Finnish and Swedish gross samples were made up of about 3000 enterprises. This is the first time this kind of data is published with a comparative focus. Even though a largely harmonised questionnaire was applied some of the national differences might be explained by different coverage of the surveys and dissimilar linguistic interpretations. Statistical offices are constantly following the ICT usage to develop better tools for measurement.

Statistics Denmark, Statistics Finland and Statistics Norway have already published national reports that described the use of ICT in enterprises. The national publications used another framework than this report and thus the results presented here will also be different. In this report some further harmonisation of the national surveys have been done to make benchmarking possible. If not otherwise is explicitly stated the figures and tables show the situation of all private enterprises in the national populations with at least 10 employees (some industries were not included in the harmonised samples).

Hopefully this report will contribute towards better knowledge of the use of ICT in enterprises. We also hope that the country comparisons presented in the publication will be useful for those presently working with internationally harmonised surveys on the use of ICT in enterprises. This report is an outcome of the work of the Nordic Working Group on Information Society Statistics. The publication is available via the home pages of the national statistical offices: [www.dst.dk](http://www.dst.dk), [www.stat.fi](http://www.stat.fi), [www.ssb.no](http://www.ssb.no) and [www.scb.se](http://www.scb.se). The work has been co-ordinated by Statistics Norway and the publications has been elaborated by the following persons:

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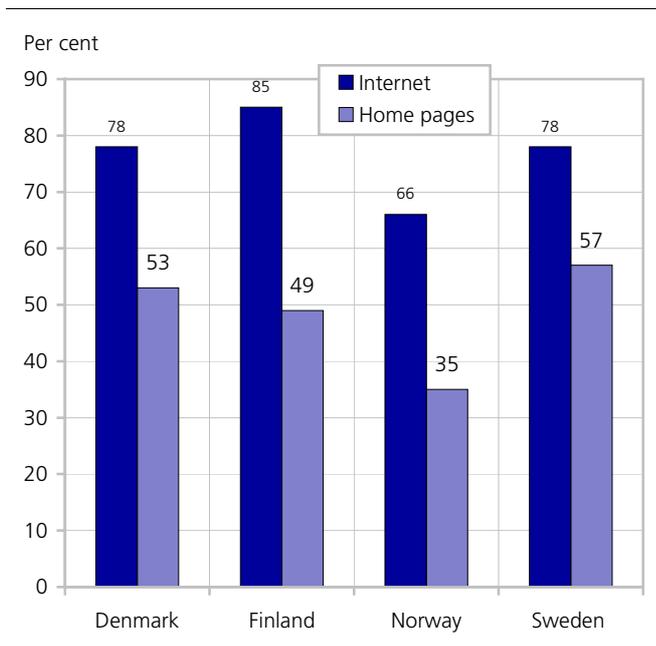
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# 1. Main findings

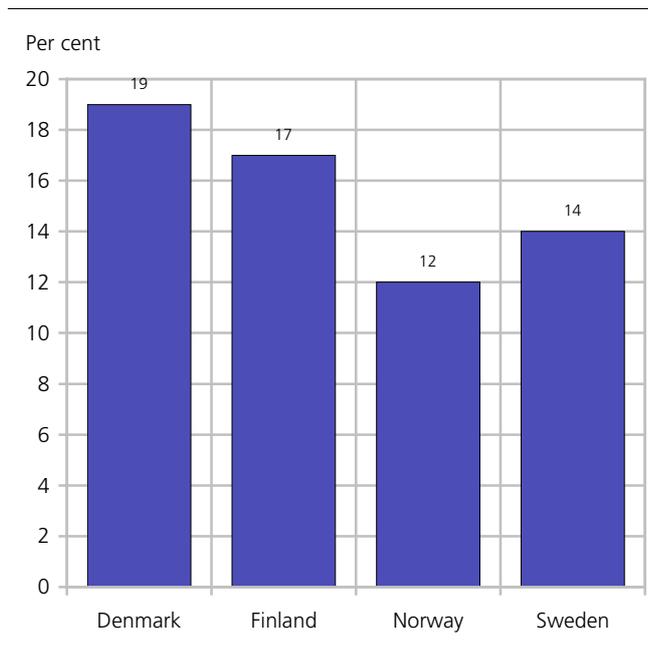
Use of Internet was widespread in Nordic enterprises by the end of 1999. Figure 1.1 shows that Internet connections were most frequent in Finland while the use of home pages was most common in Sweden. Norway seemed less progressive than Denmark, Finland and Sweden. It is evident that Internet technology was important to many enterprises everywhere.

By the end of 1999 between 10 and 20 per cent of all enterprises in the four Nordic countries had the possibility to receive orders via Home pages. However, the results presented in chapter 5 show that the volumes of electronic commerce were still low (see figure 1.2).

**Figure 1.1. Internet accesses and home pages among all enterprises by the end of 1999. Per cent**



**Figure 1.2. Share of all enterprises with the possibility to receive orders via home pages. 1999. Per cent**



## 2. ICT systems

There were evident differences between the four countries in the use of the ICT technologies Internet, Intranet, Extranet and EDI. Generally Norwegian enterprises lagged behind enterprises in the three other countries. However, Internet was by far the most utilised of these technologies everywhere. Fewer Nordic enterprises exploited the possibilities created by Intranet and Extranet. The technology EDI had also been less implemented than the Internet.

By the end of 1999 Internet connections were most frequent in Finland, accounting for 85 per cent of all enterprises with at least 10 employees. In both Denmark and Sweden 78 per cent of all enterprises had established Internet connections. Two out of three Norwegian enterprises had established access to the Internet by the end of 1999 (see figure 2.1). Chapter 3 presents a detailed description of Internet penetration among Nordic enterprises.

**Figure 2.1. Share of all enterprises with Internet. 1999-2000.**  
Per cent

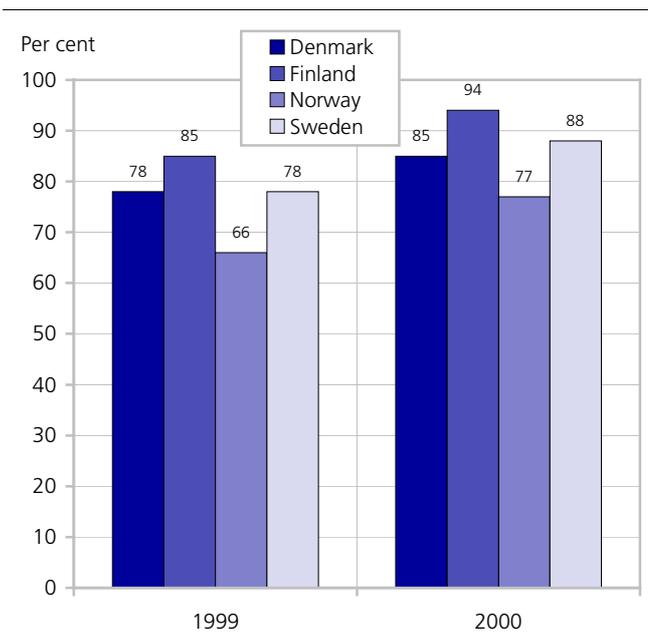
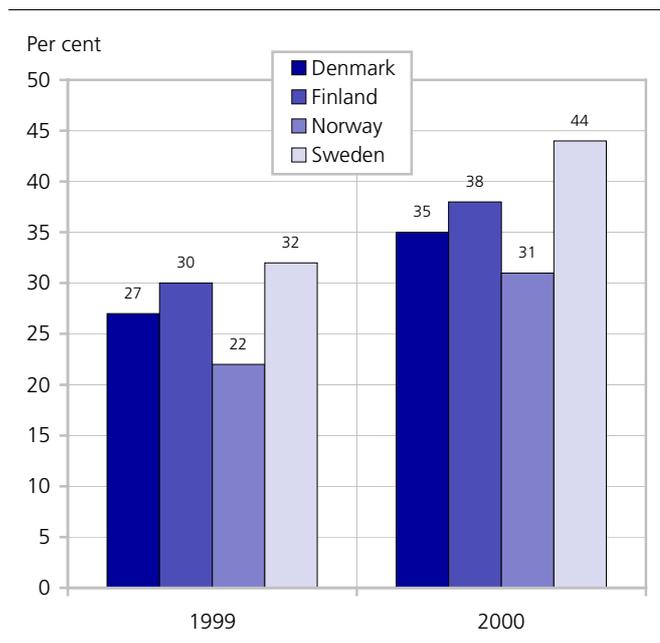


Figure 2.2 shows that 32 per cent of all Swedish enterprises with at least 10 employees had Intranet by the end of 1999. However, the share of enterprises with Intranet was almost similar in Finland and Denmark. In Finland and Denmark respectively 30 and 27 per cent of the enterprises had established an Intranet. Norwegian enterprises were least advanced. 22 per cent of all Norwegian enterprises had Intranet by the end of 1999. The differences can partly be explained by variations in industrial structure and size of the enterprises between the countries. The expectations for 2000 were high everywhere. While about 40 percent of the enterprises in Denmark, Finland and Sweden expected to have Intranets by the end of 2000 only 31 per cent of all Norwegian enterprises expected to establish Intranets during this year.

**Figure 2.2. Share of all enterprises with Intranet. 1999-2000.**  
Per cent



**Figure 2.3. Share of all enterprises with Extranet. 1999-2000. Per cent**

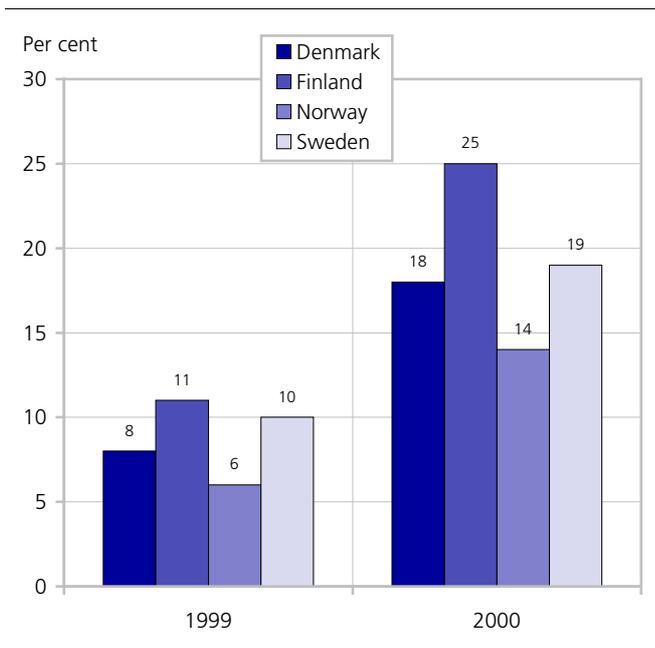
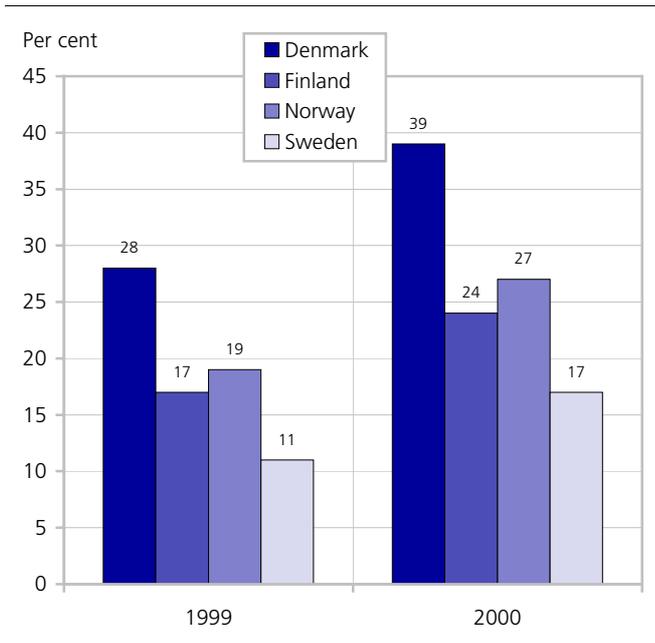


Figure 2.3 shows that Extranets were not common among Nordic enterprises. 11 per cent of all Finnish enterprises with at least 10 employees had an Extranet by the end of 1999. Enterprises in Sweden and Denmark were not far behind with 10 and 8 per cent. Norwegian enterprises were the least advanced in this important field. By the end of 1999 6 per cent of all Norwegian enterprises had established an Extranet. In all the four countries enterprises expected to double the number of Extranets in 2000.

Figure 2.4 shows that Danish enterprises are clearly more progressive in the implementation of EDI than enterprises in other Nordic countries. By the end of 1999 about 30 per cent of all Danish enterprises with at least ten employees had EDI. The share of enterprises in the other Nordic countries with EDI was considerably lower. In Norway, Finland and Sweden respectively 19, 17 and 11 per cent of the enterprises had implemented EDI. About forty per cent of all Danish enterprises with at least ten employees expected to have EDI by the end of 2000. Expectations in the three other countries were not that high. The distribution and use of EDI will be examined more closely in chapter 6.

**Figure 2.4. Share of all enterprises with EDI. 1999-2000. Per cent**

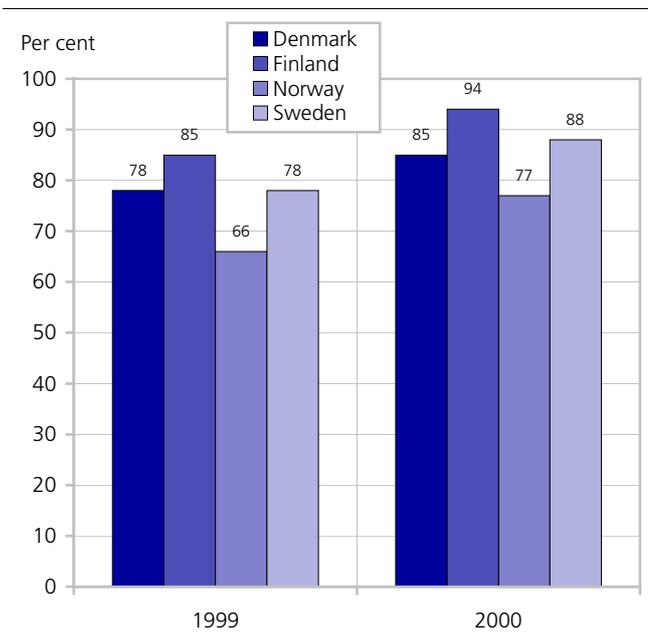


### 3. Internet penetration

This chapter will present the Internet penetration rate among Nordic enterprises in more detail. The distributions of Internet accesses follow somewhat different patterns in the four countries. Still, the Internet penetration rate is everywhere dependent on the size of the enterprises. The relative number of Internet accesses was higher in the largest enterprises than among the smaller ones in all the countries.

Figure 3.1 shows that by the end of 1999 Internet connections were most frequent in Finland. 85 per cent of all Finnish enterprises with at least 10 employees had access to the Internet by the end of 1999. Enterprises in Denmark and Sweden seemed not far behind. Norwegian enterprises were the least advanced. 66 per cent of Norwegian enterprises with at least 10 employees had Internet access by the end of 1999. However, Norwegian enterprises expected a marginally higher increase in the relative number of Internet connections than enterprises in the other countries in 2000.

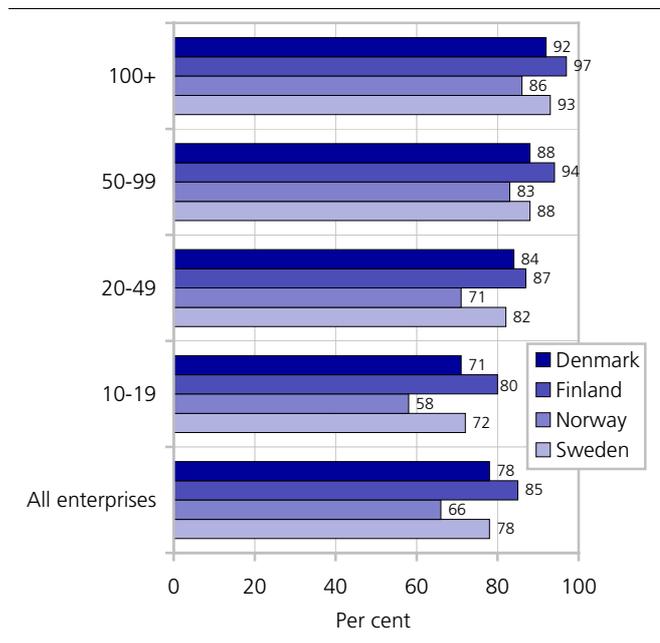
**Figure 3.1. Share of all enterprises with Internet. 1999-2000. Per cent**



The share of Internet accesses is dependent on the size of enterprises. The relative number of Internet accesses was higher in the largest enterprises than among smaller ones everywhere. By the end of 1999 over 90 per cent of enterprises with at least 100 persons employed had access to the Internet in Denmark, Finland and Sweden. The Internet penetration rate was not much lower in smaller enterprises. In enterprises with 10-19 persons employed the relative number of Internet accesses was between 70 and 80 per cent in these three countries. The Internet penetration rate in Norwegian industry was different. Norway was not far behind among enterprises with at least 50 employees. However, enterprises with 10-49 employees had an Internet penetration rate about 15 per cent below enterprises in Denmark, Finland and Sweden (see figure 3.2).

Table 3.1 shows that Danish, Finnish and Swedish enterprises with at least 10 employees expected to reach an Internet penetration rate around 90 per cent by the end of 2000. Norwegian enterprises were less

**Figure 3.2. Share of all enterprises with Internet access. Distributed by employment. 1999. Per cent**



**Table 3.1. Access to Internet. Distributed by employment. Expectations for 2000. Per cent**

	Denmark	Finland	Norway	Sweden
All enterprises	85	94	77	88
Employees				
10-19	78	91	69	84
20-49	91	96	83	92
50-99	94	99	90	93
100+	97	100	93	98

**Table 3.2. Access to Internet. Distributed by area of industry. Expectations for 2000. Per cent**

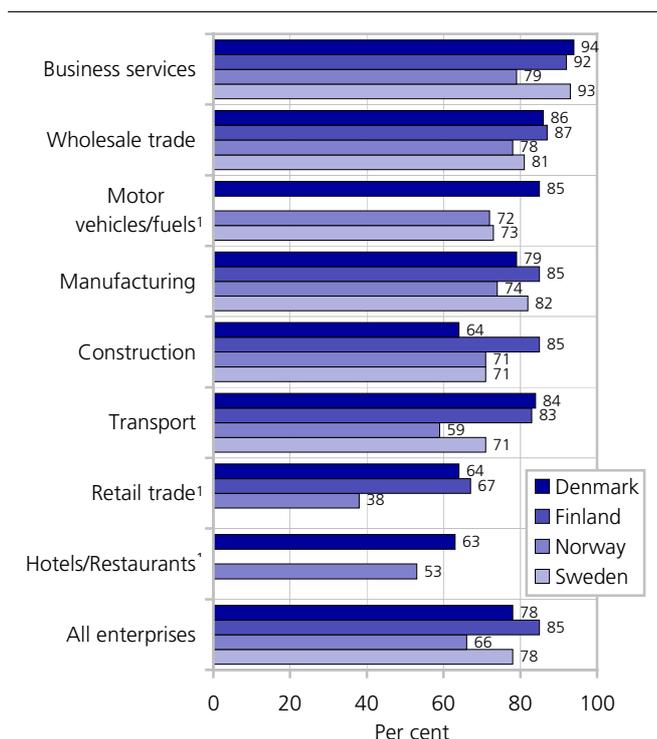
	Denmark	Finland	Norway	Sweden
All enterprises	85	94	77	88
Industry				
Manufacturing	85	95	85	92
Construction	71	92	83	86
Trade with motor vehicles and fuels	92	:	82	89
Wholesale trade	96	99	89	93
Retail trade	76	82	52	:
Hotels, restaurants and catering	73	:	66	:
Transport	87	90	67	85
Business services	95	98	87	96

optimistic. In Norway only enterprises with at least 50 employees expected the Internet penetration rate to be at that level during 2000.

Figure 3.3 shows some distinctive national differences in the Internet penetration rate of Nordic industry. Clear contrasts were found within Transport. In Transport respectively 84, 83, 71 and 59 per cent of the enterprises in Denmark, Finland, Sweden and Norway had Internet access by the end of 1999. Within Retail trade 67 and 64 per cent of the enterprises in Finland and Denmark had Internet access by the end of 1999. The difference between Retail trade enterprises in these two countries and Norwegian Retail trade enterprises was striking. Only 38 per cent of the Norwegian enterprises in Retail trade had access to the Internet by the end of 1999. Within Trade with motor vehicles and fuels and Hotels/Restaurants Danish enterprises most frequently were connected to the Internet. Variations in the response rates between the industries create uncertainty.<sup>1</sup>

Table 3.2 illustrates that the national differences in the Internet penetration rate of Nordic industry are not likely to disappear soon. In Denmark, Finland and Sweden most industries expected to reach a 90 per cent Internet penetration rate by the end of 2000. In Norway the expectations of several industries were considerably lower.

**Figure 3.3. Share of all enterprises with Internet access. Distributed by area of industry. 1999. Per cent**



<sup>1</sup> Due to a low number of responses Finnish figures are not presented for Hotels/Restaurants and Trade with motor vehicles and fuels, and Swedish figures are not presented for Retail trade and Hotels/Restaurants.

<sup>1</sup> Due to a low number of responses Finnish figures are not presented for Hotels/Restaurants and Trade with motor vehicles and fuels, and Swedish figures are not presented for Retail trade and Hotels/Restaurants.

## 4. Use of Internet

The enterprises with access to Internet were asked for which purposes they were using Internet and when they started/expected to start the usage. Furthermore, all enterprises were asked if they had home pages. This chapter illustrates the frequency of the different purposes of Internet use in 1999 in Danish, Finnish, Norwegian and Swedish enterprises. The purposes are grouped in three different aspects of Internet usage: general purposes, the enterprise as customer and the enterprise as supplier.

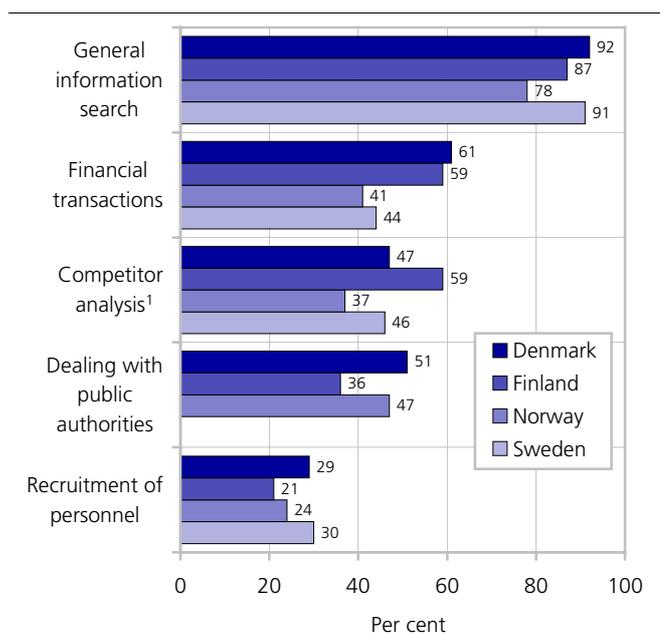
### 4.1. General purposes

The pattern of Internet usage for general purposes looks relatively similar in all the four countries. However, there are some minor differences. Figure 4.1 illustrates the pattern of general Internet use in Denmark, Finland, Norway and Sweden by the end of 1999. Everywhere general information search was the most common task carried out with the help of Internet. About 90 per cent of the enterprises in Denmark, Sweden and Finland and almost 80 per cent in Norway used the Internet for this purpose. In Denmark and Finland financial transactions via the Internet were more common than in Norway and Sweden. While only about 40 per cent of the Swedish and Norwegian enterprises conducted financial transactions via the Internet about 60 per cent of the enterprises in Denmark and Finland had exploited this possibility. In Denmark, Sweden and Norway 47, 46 and 37 per cent of the enterprises used the Internet to monitor competitors.<sup>2</sup> Enterprises in Finland used the Internet less than other Nordic enterprises to communicate with public authorities. 36 per cent of Finnish enterprises reported to deal with public authorities via the Internet against about 50 per cent of the Danish and Norwegian enterprises. The Swedish survey in 2000 lacked this variable. About one quarter of the enterprises in all the four countries reported that they used the Internet to recruit new personnel.

The Nordic enterprises expected an increase in the recruitment of personnel via the Internet during 2000.

By the end of this year about one third of the enterprises intended to use the Internet for this purpose. In 2000 respectively 54, 48 and 46 per cent of the enterprises in Denmark, Sweden and Norway expected to use the Internet for competitor analysis (see table 4.1).

**Figure 4.1. Internet usage for general purposes. Enterprises with Internet. 1999. Per cent**



<sup>1</sup> The Finnish survey asked "monitoring competitors."

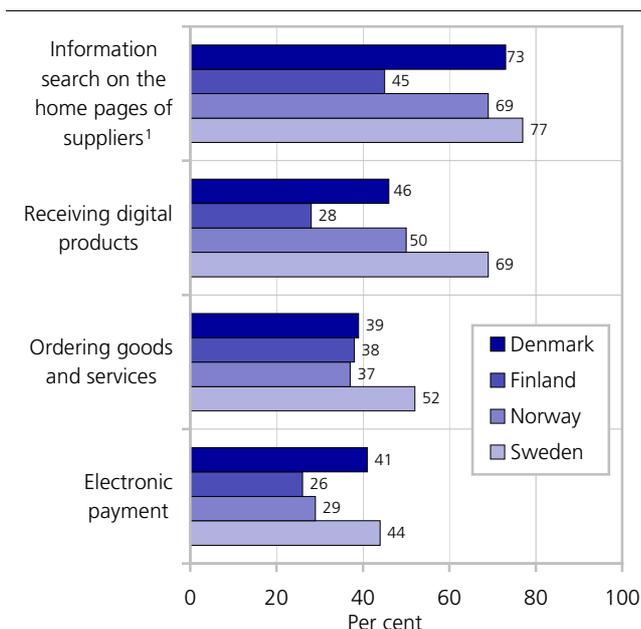
**Table 4.1. Internet usage for general purposes. Enterprises with Internet. Expectations for 2000. Per cent**

	Denmark	Finland	Norway	Sweden
General information search	99	95	91	90
Financial transactions	71	66	57	55
Competitor analysis <sup>1</sup>	54	70	46	48
Dealing with public authorities	64	56	62	:
Recruitment of personnel	36	30	34	36

<sup>1</sup> The Finnish numbers are higher due to a broader concept of "monitoring competitors."

<sup>2</sup> The Finnish numbers are higher due to a broader concept of "monitoring competitors."

**Figure 4.2. The Internet usage of the enterprises as customers. Enterprises with Internet. 1999. Per cent**



<sup>1</sup> The Finnish numbers are lower due to a more limited scope of search for price information.

**Table 4.2. The Internet usage of the enterprises as customers. Enterprises with Internet. Expectations for 2000. Per cent**

	Denmark	Finland	Norway	Sweden
Information search on the home pages of suppliers <sup>1</sup>	84	56	86	79
Receiving digital products	57	36	64	71
Ordering goods and services	55	56	58	58
Electronic payment	53	36	44	52

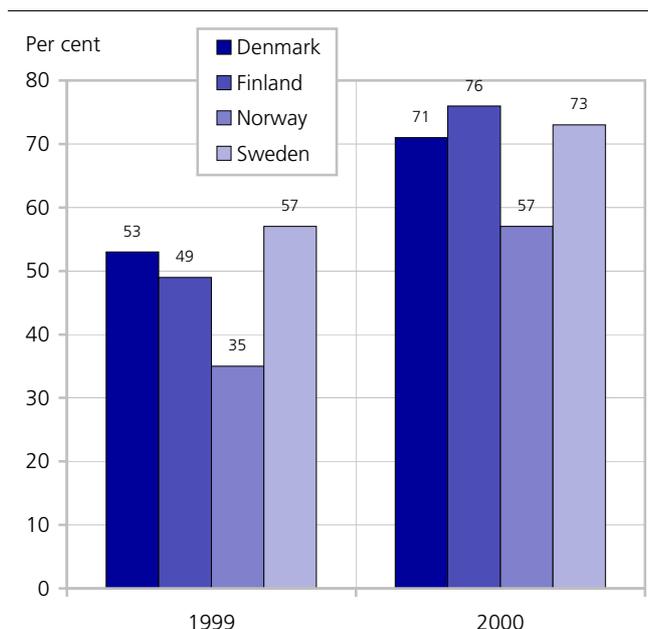
<sup>1</sup> The Finnish numbers are lower due to a more limited scope of search for price information.

**4.2. The enterprise as customer**

Information search was also the most important use of Internet by the enterprises as customers. Figure 4.2 shows that by the end of 1999 three out of four enterprises with Internet access in Denmark, Sweden and Norway searched for information on the home pages of suppliers.<sup>3</sup> A smaller number of enterprises in Denmark, Sweden and Norway ordered goods and services via the Internet than the number that received digital products. Almost 40 per cent ordered goods/services electronically while 69, 50 and 46 per cent of the enterprises in respectively Sweden, Norway and Denmark received goods/services in digital form via the Internet. The downloading of free software etc. explains the higher record for receiving digital products than ordering. In 1999 38 per cent of Finnish enterprises reported to have ordered goods and services via the Internet while 28 per cent received digital products. In Finland and Norway fewer than 30 per cent of the enterprises used the Internet for actual

<sup>3</sup> The Finnish numbers are lower due to a more limited scope of search for price information.

**Figure 4.3. Share of all enterprises with home page. 1999-2000. Per cent**



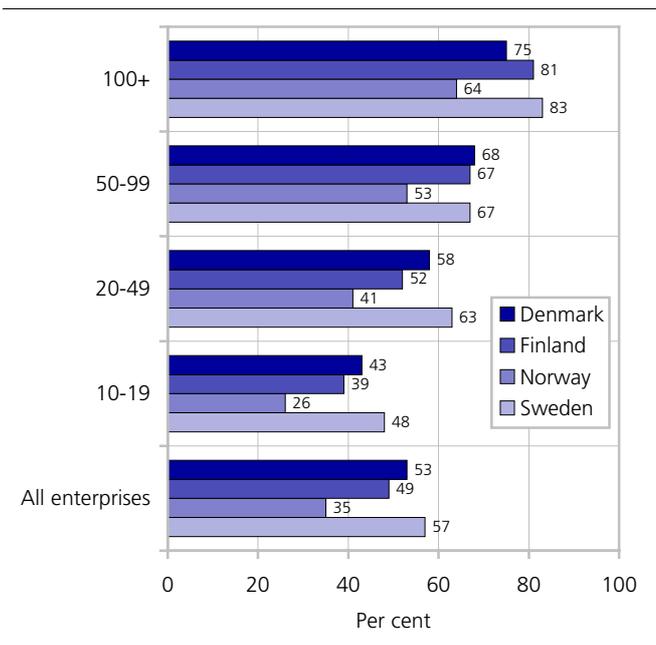
payments. In Denmark and Sweden the corresponding number was over 40 per cent. The high numbers of all four countries might be caused by enterprises that have confused electronic banking with electronic payments.

Table 4.2 suggests that national characteristics in the usage of Internet will not change much. The relative number of Swedish enterprises that receive digital products seems to remain higher than in the other Nordic countries. In 2000 71 per cent of Swedish enterprises expected to receive digital products via the Internet while the numbers for enterprises in Norway, Denmark and Finland were 64, 57 and 36 per cent. Over half of all Danish and Swedish enterprises with Internet access expected to make electronic payments via the Internet in 2000. That number was higher than in the other Nordic countries. In respectively Denmark, Sweden, Norway and Finland 53, 52, 44 and 36 per cent of the enterprises expected to do electronic payments in 2000.

**4.3. The enterprise as supplier**

By the end of 1999 about half of all enterprises with at least ten employees in Denmark, Finland and Sweden had established a home page while about one third of all Norwegian enterprises had one. Everywhere large enterprises operated home pages more often than small ones. Business services in Sweden had the highest share of enterprises with home pages while the share was lowest among Norwegian Retail trade enterprises.

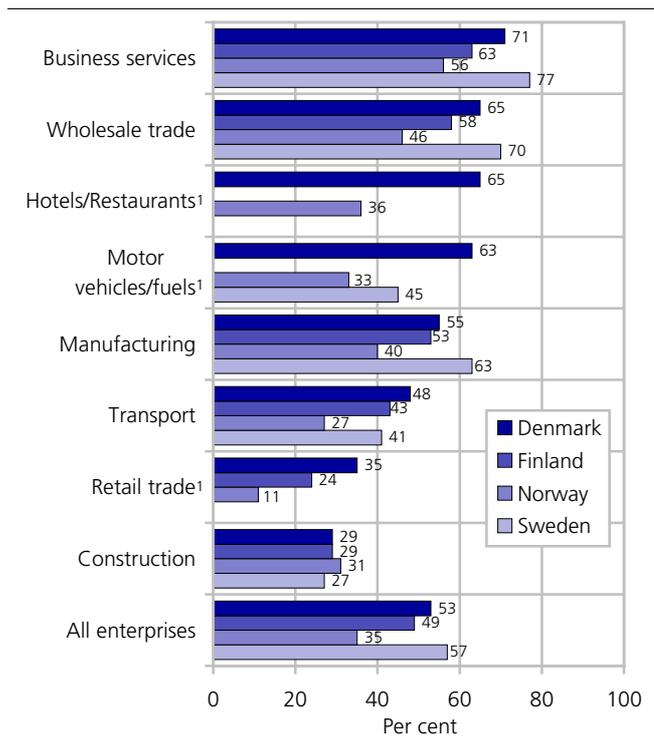
The distribution of home pages was most frequent in Sweden. 57 per cent of all Swedish enterprises with at least ten employees had established a home page by the end of 1999. In Denmark, Finland and Norway 53, 49 and 35 per cent of the enterprises had home pages.

**Figure 4.4. Share of all enterprises with home pages. Distributed by employment. 1999. Per cent**

According to the enterprise's expectations 2000 will experience a sharp increase in the number of home pages. Over 70 per cent of the enterprises in Denmark, Finland and Sweden expected to have a home page by the end of this year. Enterprises in Norway were less optimistic. 57 per cent of Norwegian enterprises with at least ten employees expected to establish a home page by the end of 2000 (see figure 4.3).

Figure 4.4 shows that the distribution of home pages varied a lot with the size of the enterprises. The relative number of enterprises with home pages was higher in the largest enterprises than among the smaller ones everywhere. In Sweden the share of enterprises with home pages was high in all size groups. By the end of 1999 48 per cent of Swedish enterprises with 10-19 employees had a home page against 43, 39 and 26 per cent of similar enterprises in Denmark, Finland and Norway. Among enterprises with at least 100 employees there also existed national differences. In Sweden, Finland, Denmark and Norway respectively 83, 77, 75 and 64 per cent of all enterprises with at least 100 employees had home pages.

Table 4.3 suggests that national characteristics in the distribution of home pages will not change much soon. By the end of 2000 over 70 per cent of all Danish, Finnish and Swedish enterprises with at least 10 employees expected to have a home page. Norwegian enterprises were more pessimistic. Less than 60 per cent of all Norwegian enterprises expected to have a home page by the end of 2000.

**Figure 4.5. Share of all enterprises with home pages. Distributed by area of industry. 1999. Per cent**

<sup>1</sup> Due to a low number of responses Finnish figures are not presented for Hotels/Restaurants and Trade with motor vehicles and fuels, and Swedish figures are not presented for Retail trade and Hotels/Restaurants.

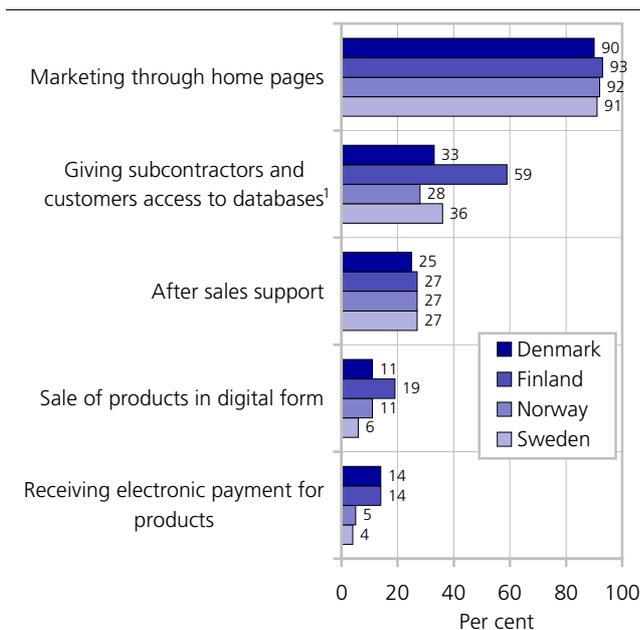
**Table 4.3. Enterprises with home pages. Distributed by employment. Expectations for 2000. Per cent**

	Denmark	Finland	Norway	Sweden
All enterprises	71	76	57	73
Employees				
10-19	63	68	48	64
20-49	77	80	64	81
50-99	86	88	74	88
100+	90	95	81	92

Figure 4.5 shows some clear national differences in the distribution of home pages in Nordic industries. Still, the distribution of home pages was everywhere most frequent in Business services. Within the industry Trade with motor vehicles and fuels Danish enterprises were the most progressive. In this industry 63, 45 and 33 per cent of the enterprises in Denmark, Sweden and Norway had home pages. The differences were largest in Retail trade. In Danish retail trade the relative number of enterprises with home pages was more than three times the figure of the Norwegian Retail trade. The share of enterprises with home pages in the Retail trade in respectively Denmark, Finland and Norway was 35, 24 and 11 per cent. Variations in the response rates between the industries create uncertainty.<sup>4</sup>

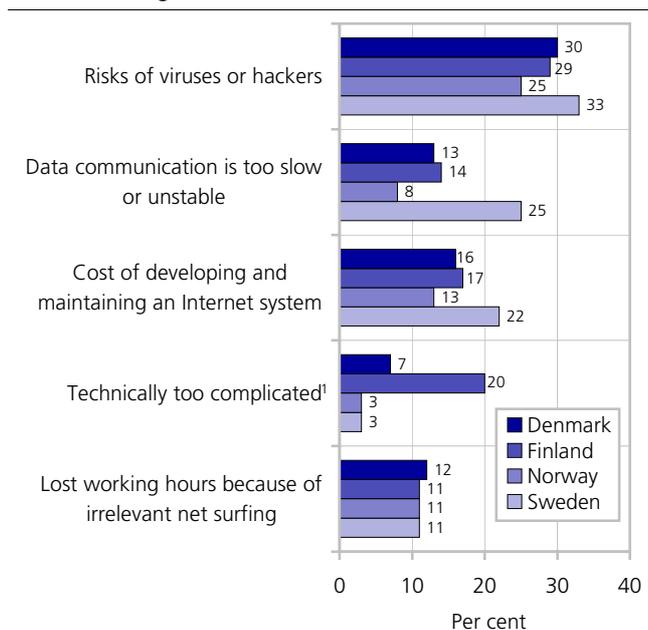
<sup>4</sup> Due to a low number of responses Finnish figures are not presented for Hotels/Restaurants and Trade with motor vehicles and fuels, and Swedish figures are not presented for Retail trade and Hotels/Restaurants.

**Figure 4.6. Use of home pages. Enterprises with home pages. 1999. Per cent**



<sup>1</sup> The Finnish survey asked, "giving the customers possibility to browse e.g product catalogues of the enterprises."

**Figure 4.7. Constraints with much significance on Internet usage in general. 1999. Per cent**



<sup>1</sup> In the Finnish survey "Technically too complicated" was implemented as "Level of IT-skills too low among personnel."

**Table 4.4. Enterprises with home pages. Distributed by area of industry. Expectations for 2000. Per cent**

	Denmark	Finland	Norway	Sweden
All enterprises	71	76	57	73
Industry				
Manufacturing	74	78	67	80
Construction	49	58	57	61
Trade with motor vehicles and fuels	86	:	65	71
Wholesale trade	88	85	69	79
Retail trade	52	63	25	:
Hotels, restaurants and catering	70	:	52	:
Transport	61	65	47	61
Business services	87	87	73	90

**Table 4.5. Usage of home pages. Enterprises with home pages. Expectations for 2000. Per cent**

	Denmark	Finland	Norway	Sweden
Marketing through home pages	93	93	98	96
Giving subcontractors and customers access to databases <sup>1</sup>	52	66	44	45
After sales support	40	43	43	37
Sale of products in digital form	18	25	19	8
Receiving electronic payment for products	24	22	15	10

<sup>1</sup> The Finnish survey asked, "giving the customers possibility to browse e.g product catalogues of the enterprises."

The national characteristics in the establishment of home pages will not change soon. By the end of 2000 only 25 per cent of the enterprises in the Norwegian Retail trade expected to have home pages while the corresponding figures for Finland and Denmark were 63 and 52 per cent. Within Business services about 90 per cent of the enterprises in Denmark, Finland and Sweden expected to establish home pages by the end of 2000 (see table 4.4).

Figure 4.6 shows that everywhere the most important area of use was marketing. By the end of 1999 9 out of 10 enterprises in the Nordic countries used their home page for this purpose. In respectively Sweden, Denmark and Norway 36, 33 and 28 per cent of the enterprises gave subcontractors and customers access to databases via home pages by the end of 1999.<sup>5</sup>

Chapter 5, which discusses electronic commerce, will present the enterprise's use of home pages to receive orders.

By the end of 2000 enterprises in all the Nordic countries expected to use home pages more frequently for giving subcontractors and customers access to databases. Everywhere over 40 per cent of the enterprises expected to give subcontractors/customers access to databases via their home pages (see table 4.5).

#### 4.4. Constraints on Internet usage

The enterprises, both with and without Internet, were asked to evaluate the importance of different constraints on the usage of Internet.

Everywhere enterprises regarded viruses/hackers as a serious problem. Figure 4.7 shows that the risk of viruses or hackers was considered a severe obstacle for usage of Internet in all the four countries. 33, 30, 29 and 25 per cent of the enterprises in Sweden, Denmark, Finland and Norway respectively considered this a constraint with much significance. Swedish constraint figures dates from 2000 while this information about the three other countries describes the situation in 1999.

<sup>5</sup> The Finnish survey asked, "giving the customers possibility to browse e.g. product catalogues of the enterprises."

# 5. Internet commerce

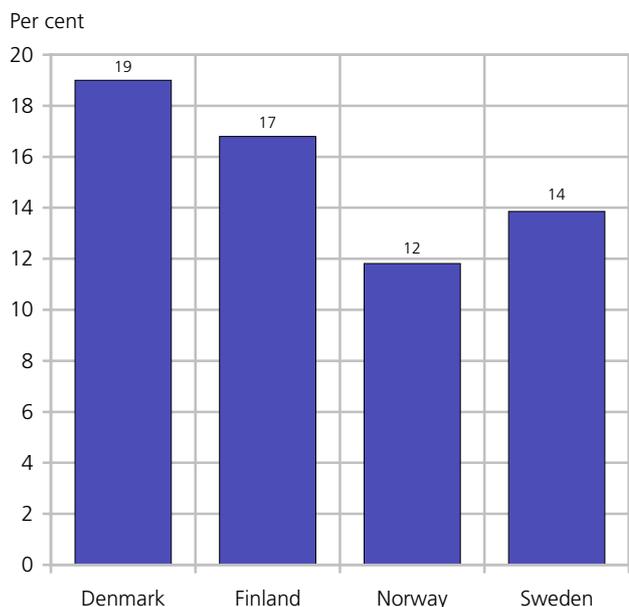
Chapter 5 and 6 will present some of the differences between Finnish, Danish, Swedish and Norwegian enterprises concerning the use of e-commerce. In chapter 5 we are dealing with e-commerce over the Internet. In chapter 6 e-commerce by use of EDI is described.

## 5.1. The use of homepages for receiving orders

Internet e-commerce has in these surveys been defined as receiving orders through Internet home pages. Thus, all the enterprises with access to Internet in 1999 were asked whether they had a homepage they used to receive orders from customers. Figure 5.1 shows that roughly one out of six enterprises in Denmark and Finland had a homepage with this possibility in 1999, while it was about one out of seven in Sweden and one out of eight in Norway.

The share of enterprises with the possibility to use their home page to receive orders can be broken down to

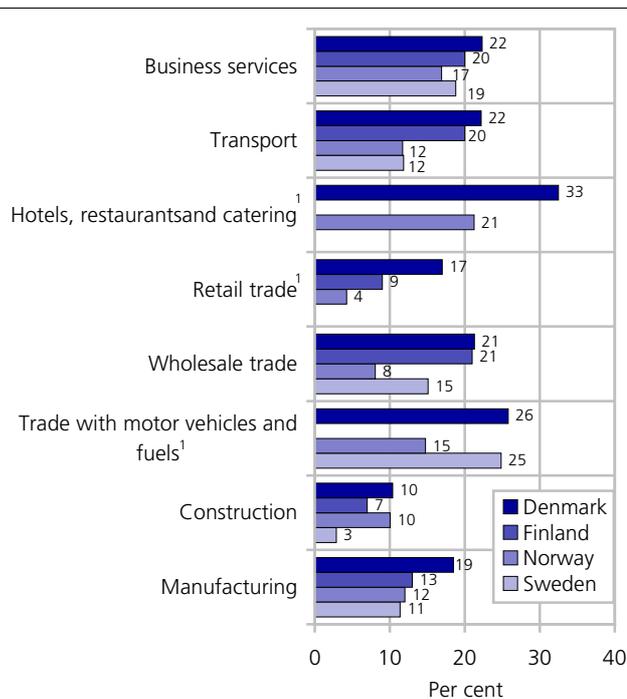
**Figure 5.1. Share of all enterprises that could receive orders through their homepage in 1999. Per cent**



show the distribution by industry. Figure 5.2 reveals that the Danish enterprises, which had the highest total share in figure 5.1, was slightly ahead in all the industries even though the level is quite similar in many industries. In Denmark and Norway the highest shares of enterprises with the possibility to receive orders through their homepage were found in the hotel and restaurant industry. In Finland three industries had approximately the same level, while trade with motor vehicles and fuels was the industry with the highest shares in Sweden.

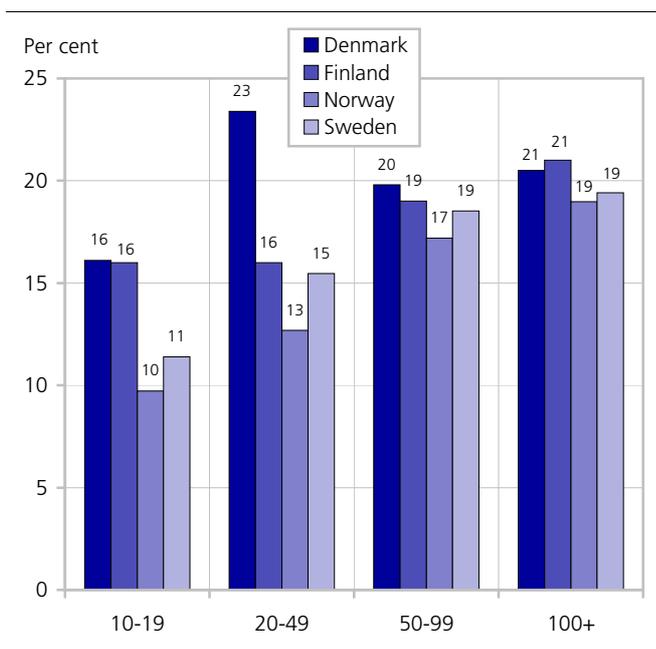
Figure 5.3 shows the share of enterprises that could receive orders through their homepage distributed by the size of the enterprise. As one probably could expect

**Figure 5.2. Share of all enterprises that could receive orders through their homepage in 1999 distributed by industry. Per cent**



<sup>1</sup>Due to a low number of responses Finnish figures are not presented for hotels and restaurants and trade with motor vehicles and fuels, and Swedish figures are not presented for retail trade and hotels and restaurants.

**Figure 5.3. Share of all enterprises that could receive orders through their homepage in 1999 distributed by size. Per cent**



the larger enterprises in the countries had the highest share of enterprises with the possibility to receive orders through their homepage. The only exception was the group with 20-49 employees in Denmark, reporting the highest share of all.

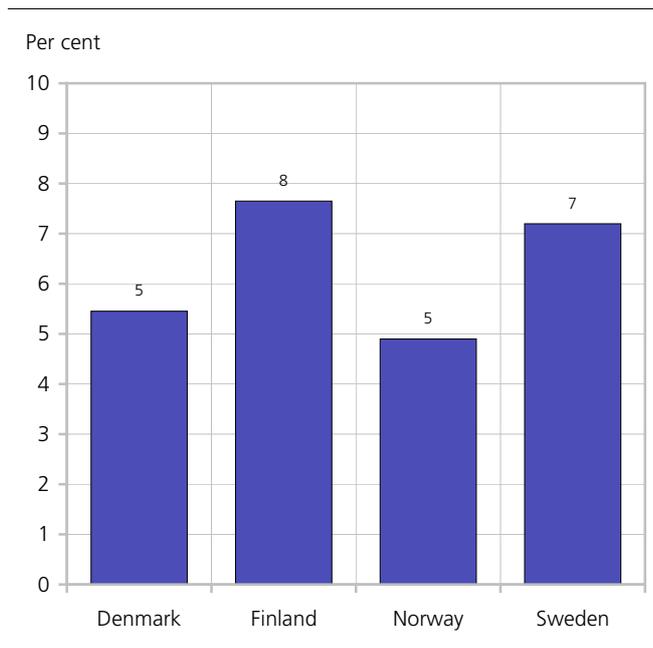
**5.2. Turnover from Internet**

As shown in the previous paragraph, the share of enterprises in the Nordic countries that was able to conduct electronic commerce through their homepage was relatively high in 1999. The percentage of all enterprises in the four Nordic countries having at least 2 per cent of their turnover from orders received through the Internet in 1999 is shown in figure 5.4.

The analysis is focusing upon the enterprises with 2 per cent or more turnover because this was looked upon by the countries as the common minimum limit of e-commerce at a significant level. Note that different approaches used on this question could explain some of the differences in the results<sup>6</sup>. With this in mind, the reported turnover from Internet e-commerce should be interpreted with caution, and used as indications only.

From figure 5.4 it can be seen that the share of all enterprises with turnover from e-commerce was relatively low in all the countries compared to the share of enterprises stating that they received orders through their homepage, but there was some minor

**Figure 5.4. Share of all enterprises with at least 2 per cent turnover from e-commerce. 1999. Per cent**



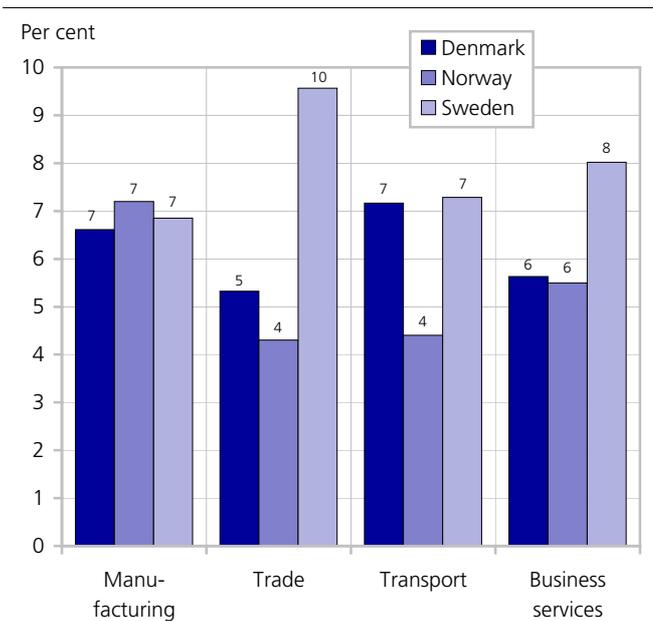
differences between the countries. Finland and Sweden had the highest share of enterprises with e-commerce. Almost 8 per cent of all enterprises in these two countries had at least 2 per cent of their total turnover from orders received through the Internet in 1999. Approximately 5 per cent of the enterprises in Denmark and Norway had turnover from e-commerce in 1999. Thus, it seems like quite a lot of the enterprises that reported to have the possibility of receiving orders, was in fact receiving orders with an unknown or insignificant turnover in the very low range below 2 per cent.

The results from asking the enterprises for their expectations concerning e-commerce turnover in 2000, suggests that e-commerce will have a fast growth in all the Nordic countries.

The spread of e-commerce can be analysed further by industry of enterprises. The share of all enterprises with 2 per cent e-commerce in Denmark, Sweden and Norway, distributed by four aggregated industry groups: Manufacturing (Nace 15-37), trade (Nace 50-55), transport (Nace 60-63) and business services (Nace 70-74) are shown in figure 5.5. Again, the numbers presented in this figure should be interpreted with great caution, since the numbers are based on relatively few observations in each aggregated group, which leads to a high margin of random error. In Sweden there were most enterprises with turnover from e-commerce within the trade industries, closely followed by the three other industry groups. The transport and manufacturing industry had the highest share of enterprises with turnover in Denmark, with the two other industries right behind. In Norway the highest share of enterprises with turnover from Internet orders was found in the manufacturing industry.

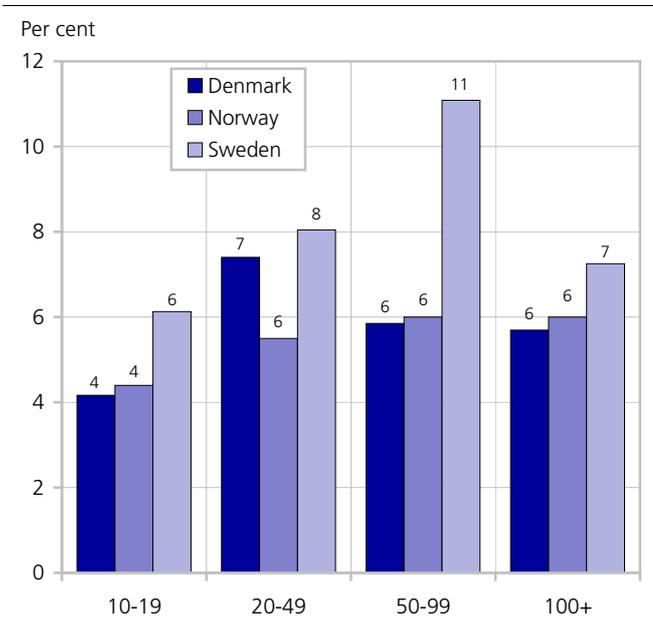
<sup>6</sup> Denmark and Norway were asking for the exact percentage of turnover, while Finland and Sweden used a scale with tick boxes. Also, in Sweden e-commerce was defined as receiving orders by forms on homepages, while the other countries didn't give any precision. This may explain the low numbers for Sweden, as ordinary e-mails or fax-messages might be included in the figures from the other Nordic countries as well.

**Figure 5.5. Share of all enterprises with 2 per cent turnover or more from Internet orders distributed by industry. Per cent<sup>1</sup>**



<sup>1</sup>Numbers not available from Finland.

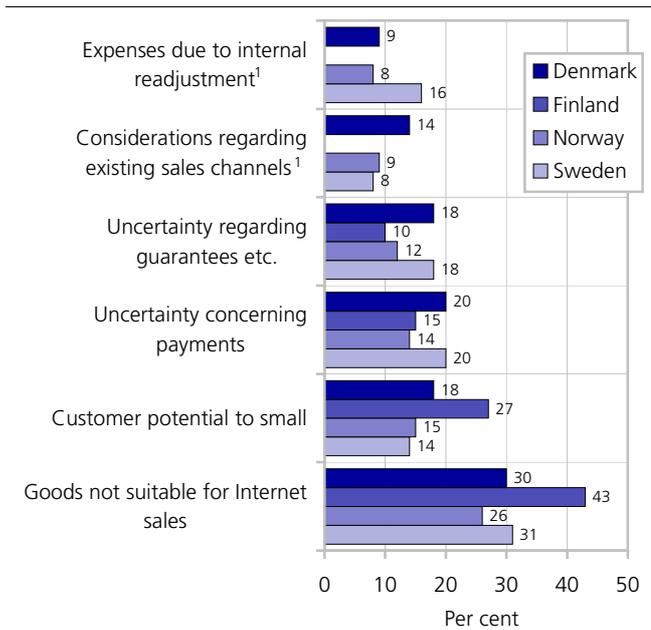
**Figure 5.6. Share of all enterprises with 2 per cent turnover or more from Internet orders distributed by size. Per cent<sup>1</sup>**



<sup>1</sup>Numbers not available from Finland.

In figure 5.6 the distribution of all enterprises with turnover from e-commerce is distributed by the size of the enterprises, measured in number of employees. The main pattern in the figure is that there were small differences between the countries, with an exception for the group with 50-99 employees. The differences between the size groups within each country were also rather small.

**Figure 5.7. Constraints of much significance regarding electronic commerce. Per cent**



<sup>1</sup>Finland has used two slightly different phrased questions.

Enterprises with turnover from electronic commerce were additionally asked to report which customer groups who were of great importance for the enterprises concerning e-commerce. Even though this question was phrased differently in the Danish questionnaire where they only asked for the most important customer, and it was asked to a different selection of enterprises in Finland, the overall conclusion is still the same. The Nordic enterprises report that other enterprises were the most important customer group overall.

**5.3. Motivations for and constraints on e-commerce**

Questions about motivations for conducting e-commerce and the relevance of barriers regarding electronic commerce were also asked in the surveys. The enterprises using ICT technology were asked to evaluate the different motivations and constraints in terms of having "Much", "Somewhat" or "No significance". The barriers related to e-commerce refer to the population of all enterprises with ICT.

The two motivation factor most Nordic enterprises reported to be of much importance with respect to electronic commerce was "improved customer serviced and flexibility", and "getting new/more customers". The factors fewest enterprises thought was important were "access to new suppliers" and "reducing cost".

The most severe barrier concerning electronic commerce was that the enterprise goods were not suitable for Internet sales (see figure 5.7). This was the most significant barrier in all the Nordic countries and it especially applied to the Finnish enterprises, where four out of ten

enterprises considered this to be a barrier of much significance. Too small customer potential was the second most important barrier in Finland and Norway, while the Danish and Swedish enterprises rated uncertainty concerning payment second.

## 6. Electronic Data Interchange (EDI)

Electronic Data Interchange (EDI) is electronic transmission of data in a structured form between an enterprises own computer system and a remote computer system, based on a defined standard. In this surveys the use of EDI based upon the EDIFACT standard have been examined.

The total number of all enterprises in the Nordic countries using EDI in 1999, and the expected figures for 2000 are shown in figure 6.1. Denmark was the country where EDI was most common among the enterprises. Nearly one out of three Danish enterprises had access to EDI. Norway and Finland came second with about one out of five enterprises. While in Sweden EDI was found in one out of ten enterprises in 1999.

Denmark is predicted to have the highest number of enterprises using EDI in 2000 with around four out of ten enterprises having access according to plans. However the strongest relative growth in the use of EDI is expected to be in Sweden. In Sweden the share of enterprises with EDI is predicted to grow relatively by almost 60 per cent, resulting in one out of six enterprises having EDI in 2000. The growth rate in Norway is about 50 per cent, while in Finland and Denmark the expected growth rate from 1999 to 2000 is approximately 40 per cent.

The share of enterprises using EDI in 1999 distributed by industry in the Nordic countries is shown in figure 6.2. Denmark, who had the highest average use of EDI in all enterprises, also had the highest share of enterprises using EDI within each industry with one exception for retail trade. EDI was most commonly used within wholesale trade and this industry had the highest share in all countries. In Denmark, Finland, and Sweden about one out of three enterprises within wholesale used EDI, and in Norway one out of four. In Finland retail trade had the same share of EDI users as wholesale trade. In Denmark business services had about the same share of EDI users as wholesale did. The industry with

the greatest differences between the four countries were business services where it was found high shares of use in Denmark, but this industry had relatively low shares in Finland, Norway and Sweden.

Analysing the use of EDI by the size of enterprises (see figure 6.3) measured in number of employees shows a rather excepted picture. The use of EDI was least common in the smaller enterprises with 10-19 employees and most common in the biggest enterprises with 100 or more employees. Among the big enterprises (100+) we found that approximately half of the enterprises had EDI in Denmark and Finland, and one out of three in Sweden and Norway. This reflects EDI as a relatively investment expensive technology and the advantages are expected to rise with the number of EDI-documents exchanged.

Figure 6.1. Share of all enterprises using EDI. 1999-2000. Per cent

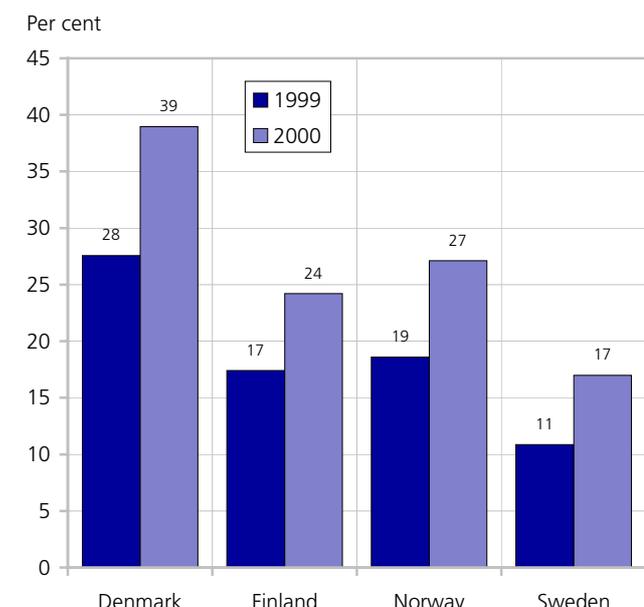
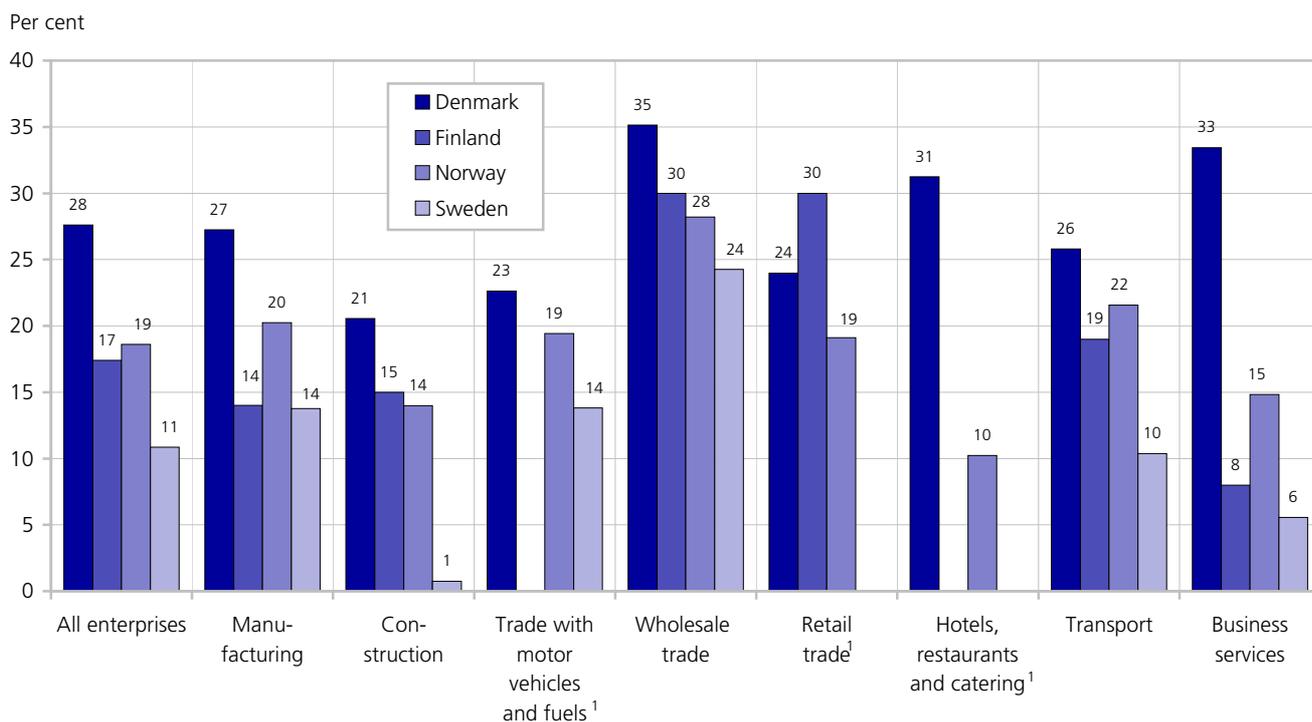


Figure 6.2. Share of all enterprises using EDI distributed by industry. 1999. Per cent



<sup>1</sup> Due to a low number of responses Finnish figures are not presented for hotels and restaurants and trade with motor vehicles and fuels, and Swedish figures are not presented for retail trade and hotels and restaurants.

Figure 6.3. Share of all enterprises using EDI distributed by size. 1999. Per cent

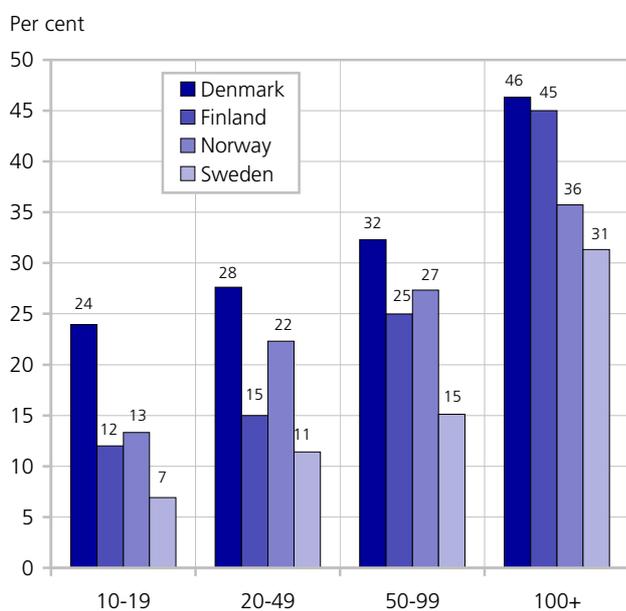
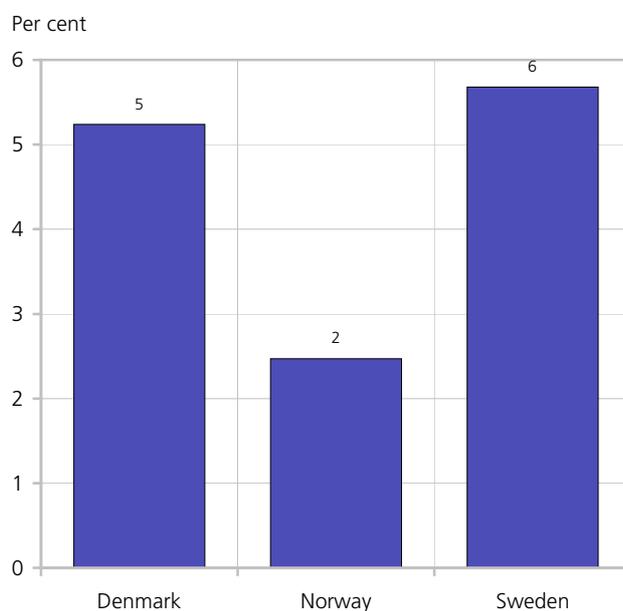


Figure 6.4. Share of all enterprises having at least 2 per cent turnover from EDI orders. 1999. Per cent<sup>1</sup>

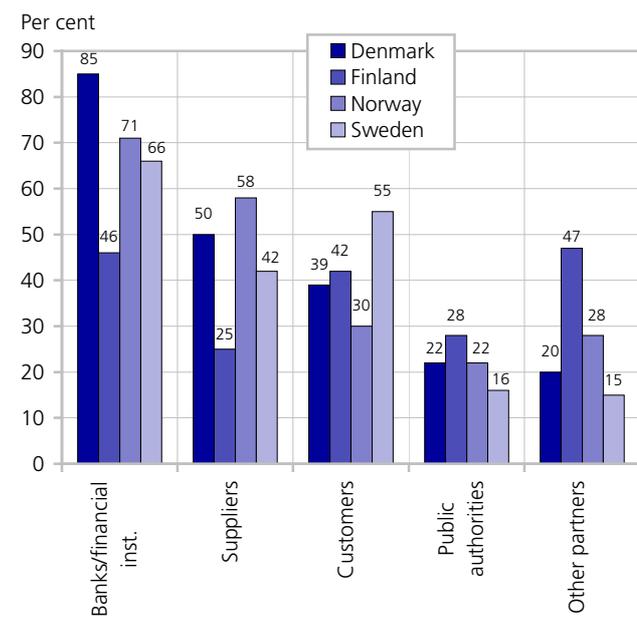


<sup>1</sup> Numbers not available from Finland.

Enterprises using EDI in 1999 were asked to report whether they had turnover from the orders received through the use of EDI. Figure 6.4 shows that close to 6 per cent of all Swedish enterprises had 2 per cent of their total turnover or more from EDI orders in 1999. Compared to the share that had turnover from e-

commerce using Internet (see figure 5.1) the EDI level is slightly higher in Denmark and Sweden, while it was half as many having turnover from EDI in Norway. The number of enterprises with turnover from EDI in Denmark and Norway was approximately 5 per cent and 2,5 per cent respectively.

Figure 6.5. EDI communications partners in 1999



The enterprises using EDI were also asked to report which customer groups they used EDI communication with in 1999 (see figure 6.5). The most common communication partners were banks and financial institutions in Denmark, Norway and Sweden. In Finland other partners was the most commonly used communication partner, but banks and financial institutions closely followed this group. It was somewhat surprising to find the differences in the use of EDI towards suppliers. This was the second most important group in Norway and Denmark while it was the least common group among the Finnish enterprises using EDI. In Sweden customers was the second most important communication partner, which confirms the relative large share of Swedish enterprises with turnover from EDI.

## Background information on the surveys

### The data collection

The data collection of the ICT usage was carried out as postal surveys on a voluntary basis with one reminder in three countries, and two reminders in Sweden. In Denmark in October 1999, in Norway December 1999, in Finland at the beginning of 2000 and in Sweden in May 2000.

### Constructing new samples

The original samples differed somewhat in terms of activities and size classes covered due to country specific preferences. In order to make country comparisons, all countries provided a subsample in accordance with agreed criteria. The industries cut-off in some of the four countries were extraction of crude petroleum and natural gas, mining, electricity supply, the financial sector, telecommunication, radio and television, and other service activities. Another result of the cut-off was that only enterprises employing 10 or more persons are covered.

The data presented in this publication should be considered as indicative and cannot be directly compared with the statistical results presented nationally, since this publication uses weighted results and somewhat different classifications than those used in the national publications. One should also consider that the surveys were not carried out at the same time.

### Weighting of the results

Weighting of the results has been necessary for the making of valid comparable figures across the four countries, since the sampling profile and the response rates do vary between the countries. Weighting is also necessary for making comparisons over time, both within one country and across countries, in a later stage. This has been achieved by giving each enterprise answering the survey a specific weight. Each enterprise thereby represents a number of enterprises, which make it possible to calculate estimates for the whole private sector, as accounted for in this report, in the different Nordic countries. To construct the specific weights, the total number of enterprises in the population of each subsample and size class has been used.

### Covered activities

The subsamples consisted of the following NACE Rev. 1 activities:

- Manufacturing (15-37)
- Construction (45)
- Trade with motor vehicles and fuels (50)
- Wholesale trade (51)
- Retail trade (52)
- Hotels, restaurants and catering (55)
- Transport (60-63)
- Business services (70-74)

### Final Sample

The cut-off did not result in reducing the Danish sample, but the Finnish sample was reduced from 1718 to 1655, the Swedish from 2119 to 1901 and the Norwegian sample from 3539 to 2712 observations (mostly because Norway included a subsample of enterprises with 1-9 employees in their survey). The distribution across industries and size classes are together with the total response rates shown in the table below (see table A1). As the table shows there are some differences both in the number of responses and the response rates. The reader should bear in mind that the differences in response rates might influence on the figures reported in this publication.

Table A1. Number of responses and total response rates

	Denmark	Finland	Sweden	Norway
<b>Total</b>	<b>2 440</b>	<b>1 655</b>	<b>1 901</b>	<b>2 712</b>
<b>Industry</b>				
Manufacturing	989	763	1040	849
Construction	361	168	79	236
Trade with motor vehicles and fuels	127	52	70	154
Wholesale trade	384	162	78	288
Retail trade	116	127	65	339
Hotels, restaurants and catering	51	48	68	230
Transport	133	127	190	245
Business services	279	208	311	371
<b>Employees</b>				
10-19	464	334	799	670
20-49	617	364	545	724
50-99	505	290	215	513
100+	839	667	342	805
Total response rate	61%	54%	68%	75%

## The general approach for measuring ICT

### Principles for measuring ICT

The Nordic approach for measuring ICT, which has now been tested in four Nordic countries, can be characterised by the following principles:

- The model questionnaire has been designed to be a flexible tool built up by modules allowing country specific features to be included.
- The model questionnaire can - of the above mentioned reasons - be updated to reflect the rapid changes in IC technology or use.
- The model questionnaire is designed as a general survey tool for all economic activities.
- The core of the model questionnaire is based on a qualitative approach, which is considered to provide the most harmonised basis for country comparisons.

### Flexible approach

A flexible approach was chosen for the questionnaire design as information and communication technologies themselves and the usage are supposed to develop rapidly even over short time periods. Consequently, new areas can be expected to be measured and thus be included in the questionnaire. The model should therefore be regarded as a core model, which will need regular revision in the future.

### Easy to fill in questionnaire

A high priority has been given to construct a questionnaire that is easy to fill in and as a result, in practice most of the questions are designed on the principle of multiple choice. Especially in a complex area such as ICT usage, this was expected to have great impact on the response rate and the quality of the answers - also keeping in mind the purpose of international comparability.

### Standard column variables

The column variables of the questionnaire operate in two main dimensions. Firstly the year of using e.g. e-mail or establishing home pages for the first time was in the surveys conducted in 1999 asked as "1999 or earlier" or "Planned for 2000". For the questions related to barriers, an evaluation of the importance of the barriers was asked by using a scale "no importance", "some importance" and "much importance".

### Applicable for several activities

The questionnaire has been formulated in a general fashion i.e. it would be in principal applicable to any chosen activity in the private sector. The issues on the ICT in general, together with Internet and e-commerce in particular, comprise the core of the questionnaire.

### Only few quantitative questions

It was considered difficult to measure new emerging ICT applications in quantitative terms. However, in the 1999/2000-survey a new module on E-commerce was introduced asking for the share of e-commerce related to total turnover. Finland and Sweden choose to measure e-commerce turnover using a qualitative approach, while Denmark and Norway used quantitative measures. The results from the two approaches to measuring turnover from e-commerce will be reviewed based on this year's experience. Originally also ICT expenditures were included in the Nordic approach. The experiences from the Danish and Finnish surveys clearly show that it is difficult to collect this kind of data in the survey, as the survey mainly covers issues related to IT-managers' or marketing directors' area of responsibility.

### Motivations or consequences

The questionnaire tested in 1998 did not cover e.g. factors related to motivations or consequences of using ICT per se, but this year a motivation question on e-commerce was included. In addition, the model does not explicitly recognise cellular phones or mobile data communication as part of ICT, which might be relevant for future surveys as the information- and communication technologies are increasingly converging.

### Core questions covered in all four countries

The surveys in all four countries included the common core questions, together with country specific ones. The country specific questions are not reported in this publication.

**Tidligere utgitt på emneområdet**

*Previously issued on the subject*

**Norges offisielle statistikk (NOS)**

C 350: Samferdselsstatistikk 1995  
C435: Samferdselsstatistikk 1996  
C483: Samferdselsstatistikk 1997  
C557: Samferdselsstatistikk 1998

**Notater**

98/1: P.Ø. Kolbjørnsen: Statistikk og informasjonsteknologi. Status, behov og utviklingsmuligheter  
2000/24: G.M. Pilskog og E. Sverrbo: Bruk av informasjons- og kommunikasjonsteknologi i næringslivet 1999

**Documents:**

97/6: E.J. Fløttum, F. Foyn, T.J. Klette, P.Ø. Kolbjørnsen, S. Longva og J.E. Lystad: What do the Statisticians know about the information society and the emerging user needs for new statistics?

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