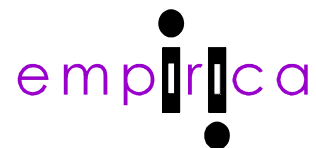




## CONDITIONS FOR THE DEVELOPMENT OF NEW WAYS OF WORKING AND ELECTRONIC COMMERCE IN GERMANY

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# 1. Executive Summary

Over the past two years the telecommunications landscape in Germany has – due to strong liberalisation efforts - developed to a fast growing and more and more competitive one. Germany now belongs to the top group in the world with respect to telecommunications infrastructure quality, penetration and use. It is moving in the same direction with respect to telecommunication prices mainly due to the heavy competition in this market resulting from the market liberalisation and subsequent emergence of many competitors to Deutsche Telekom. Finally, free internet access is starting to become more widely available in Germany. Today, Germany offers very good infrastructure prerequisites and preconditions for electronic commerce and new forms of work such as telework.

In Germany, Federal and Federal state governments have, over the past years, heavily invested in awareness raising and funding programmes to improve the diffusion and penetration of electronic commerce and telework and initiatives to pave Germany's way towards the information society. The intention is to continue with these activities addressed to industry, public administration and the general population during the next years. In addition Federal government has announced a number of specific programmes to reach different set targets (cf. below). Government will be supported by emerging private sector initiatives namely the probably most relevant one called Initi@tive D21.

So far, Germany has been rather slow in moving towards the information society, something very typical for Germans in the early stages of newly emerging developments. However, it appears as if the country is starting to increase speed now. It is hoped that Germany will in the not to distant future be able to gain the benefits from all these investments and activities and develop – at a higher speed than so far - to one of the world's leading information societies in the world.

In order to achieve this objective some recommendations for further procedure are given.

## 2. Introduction

Political, economic, social etc. conditions are of crucial importance for the diffusion of new ways of working and business. Governments on different levels can impact these by means and programmes of different types (e.g. awareness raising initiatives, investment programmes, competitions for best-practice examples, information society initiatives), which more or less directly address the subjects of "electronic commerce" and "new ways of working".

Also the role and policies of the – due to deregulation - growing number of telecommunications network and service providers need to be considered since their policies for instance with respect to tariff structures and prices as well as services offered can have significant impacts, too. The same holds true for initiatives started by industry, trade unions or the social partners, as well as industry associations.

The objectives of the present country report are to:

- Identify and analyse the conditions for the development of new ways of working, especially telework and electronic commerce in Germany
- Compile an overview of policy, regional development and economic measures and activities and assess their applicability for goal achievement and success.

The data upon which the assessment of conditions for the development of new ways of working and electronic commerce have been gathered using desk-research and interview techniques.

## 3. The Policy Background in Germany

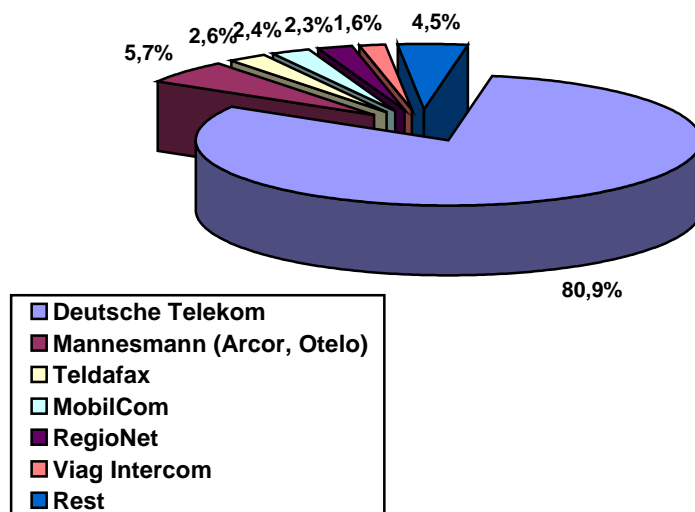
### 3.1 Telecommunication liberalisation, tariffing, availability, etc.

#### 3.1.1 Liberalisation in fixed networks

Liberalisation in telecommunications has gained speed and momentum in Germany over the past years after the official opening of the German telecommunications market on 1<sup>st</sup> January 1998. Since then telecommunication network are no longer the sole domain of Deutsche Telekom. In the meantime more than 100 organisations have asked for a licence to operate voice communication over networks. More than 60 of these are actively present in the market mainly offering long-distance calls via call-by-call or preselection services. Less, around 40, also provide network access to customers and offer local calls (cf. WIK Newsletter, Nr. 36, September 1999). Companies such as Arcor and o.tel.o (mother company is Mannesmann), Viag Intercom (mother company is an electricity provider) etc. are building and offering their own networks for voice and data communication, many others (e.g. TelDaFax, MobilCom) buy network capacity from Deutsche Telekom and sell it to private and business customers at very competitive prices. In addition regional and even local network providers have and still are emerging (e.g. netcologne, ISIS, HeliNet) offering special services mainly to customers from their cities and regions. Some of these providers are now starting to join forces to strengthen their position in the market.

In the long-distance call area Deutsche Telekom has dramatically lost market shares to the above competitors but has managed to still keep around 80% of the market for herself. The following figure illustrates the current situation.

Market shares in the German fixed telecommunications networks area August 1999



Source: Company figures, estimates, Pica Marktforschung

The Deutsche Telekom competitors have constantly reduced their prices over the last years and months. Deutsche Telekom had to follow with the same strategy. In the end voice and data communication are at a historical low in Germany. Compared to early 1998, long-

distance calls have dropped in price by more than 50%. However, in the local call arena – still dominated by Deutsche Telekom with hardly any competition - everything still remains as before.

### 3.1.2 Liberalisation in mobile networks

In the mobile network area competition is as fierce as in the fixed network area with four digital cellular radio networks (GSM standard) in operation in Germany (D1, D2, e-plus and VIAG Interkom) plus the old analogue cellular radio network C-Netz. D1 (run by Deutsche Telekom) and D2 (run by Mannesmann) are currently the major players in the market with a total of more than 14 million subscribers. E-plus (recently sold to France Telecom) follows at some distance with almost 3 million. Price battles initiated by providers (e.g. MobilCom, TelDaFax, debitel, Talkline etc.) also buying mobile network capacities from the large operators, have resulted in dramatic price reductions and an ongoing mobile communications boom in Germany. Subscription figures are still steadily increasing at high speed. Over the past four years the number of mobile phone subscribers has increased six-fold.

Number of subscribers to mobile phone networks in Germany 1995 – 1999\*)

Year:	No. of subscribers in million:
1995	2.754
1996	4.900
1997	6.860
1998	10.640
1999	17.335

\*) July figures

Source: <http://www.andreas-prange.de/x-de/TELECOMMS/mobil-22htm>

In comparison to other European telecommunications markets Germany is among those moving ahead fastest. However, Germany is still rather low when it comes to the number of subscribers per 100 inhabitants. Even in absolute terms the Italian subscriber base is higher than in Germany (24 million compared to 17 million in Germany).

European cellular-telephone subscribers: no. of subscribers in % (July 1999)

Country:	No. of subscribers per 100 inhabitants (%):
Austria	36.54%
Belgium	21.21%
Denmark	43.97%

Finland	61.87%
France	23.15%
Germany	20.18%
Greece	26.89%
Italy	41.40%
Luxembourg	38.31%
Netherlands	29.17%
Norway	54.83%
Portugal	36.41%
Spain	23.18%
Sweden	51.90%
Switzerland	30.94%
United Kingdom	27.57%

Source: Mobile Communications July 8, 1999, pp. 8-9

### 3.1.3 Liberalisation, competition and growth in fixed networks in Europe (Mannesmann Index MAX)

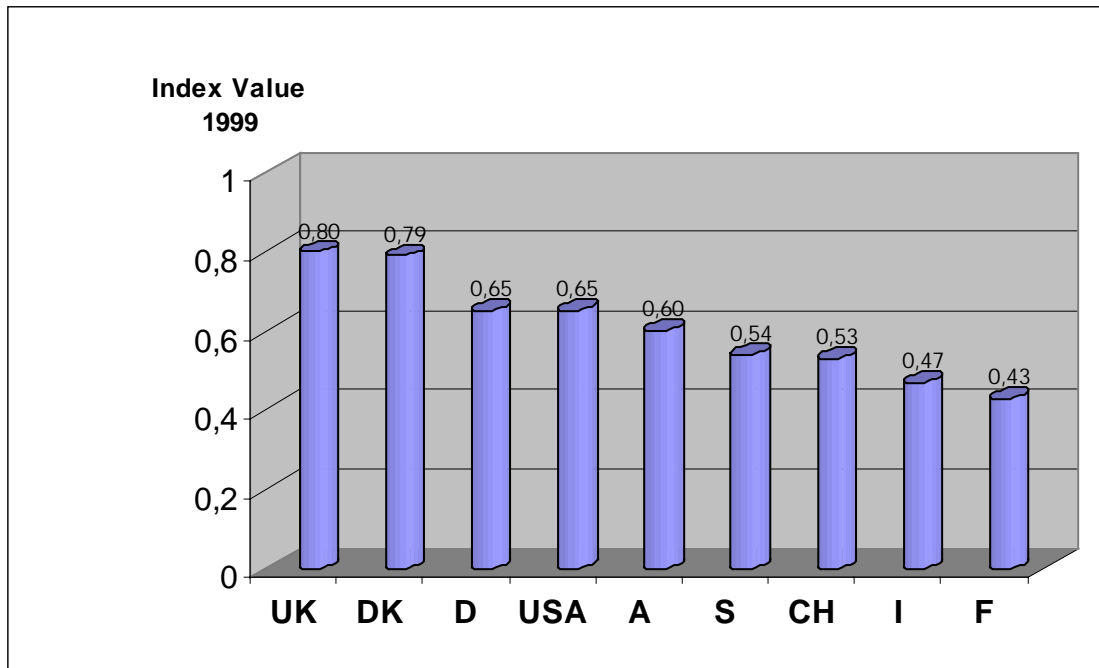
In the meantime Germany also ranks among the top ones when it comes to liberalisation and competition in telecommunications. In order to measure the stage of development and performance of telecommunications markets Mannesmann has developed the so-called Mannesmann-Index (MAX). Mannesmann has only recently and for the first time published the MAX-results for eight European countries and the USA. The intention is to continue with this activity every year. So far MAX only focuses on the fixed network market and leaves aside the mobile telecommunications market. MAX is composed of three sub-indexes covering the issues of:

1. liberalisation
2. competition and
3. growth.

The arithmetical average of these sub-indexes is used to generate the Composite-MAX which evaluates the potential market development (liberalisation) on the one hand and the real market development (competition and growth) on the other.

According to MAX, liberalisation is most advanced in the UK and Denmark. Germany follows in third place together with the USA. Countries like France and Italy can be found at the bottom. The rather low index value for the USA comes as a surprise. Some European countries are ahead and more advanced here.

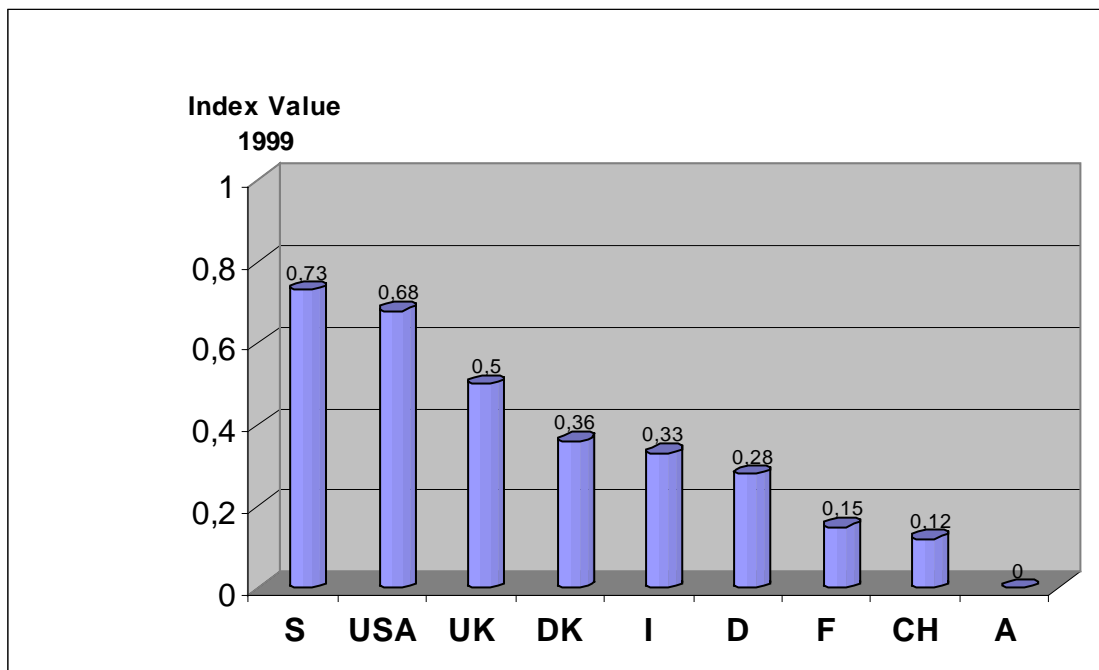
Liberalisation in fixed networks in 1999



Source: Mannesmann

However, Europe is far away from real and complete competition in the telecommunications market with the exception of Sweden which ranks top and even ahead of the USA. Germany can be found at the bottom. Only France, Switzerland and Austria show lower levels of competition.

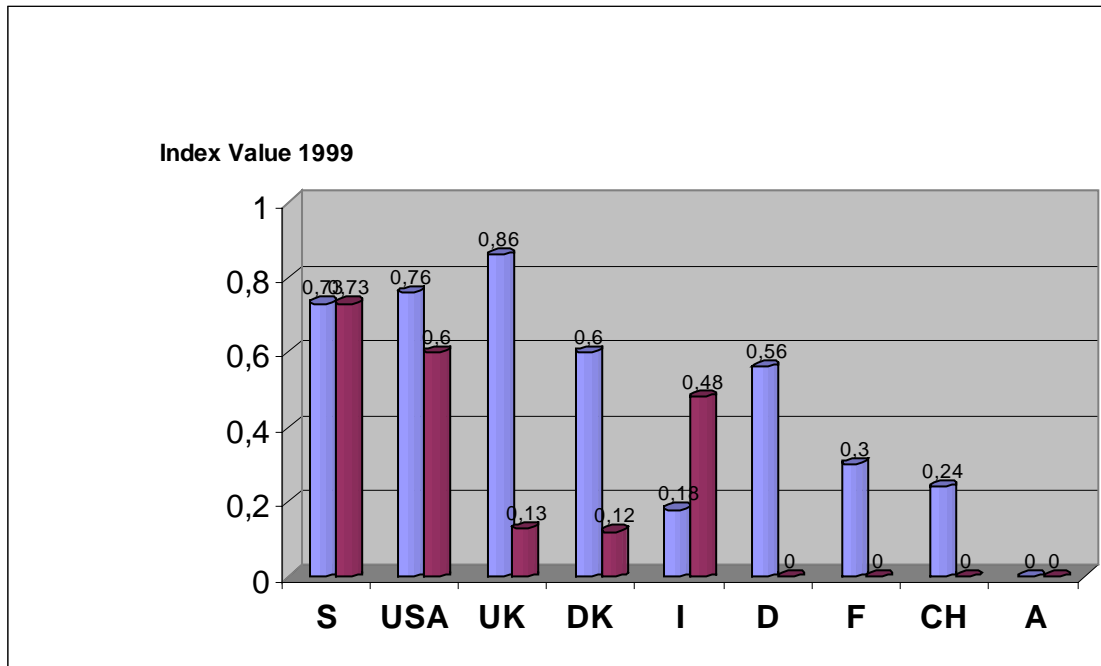
Competition in fixed networks in 1999



Source: Mannesmann

The low index values for European countries can in most cases be explained by the very low or not existing competition in the local-call area.

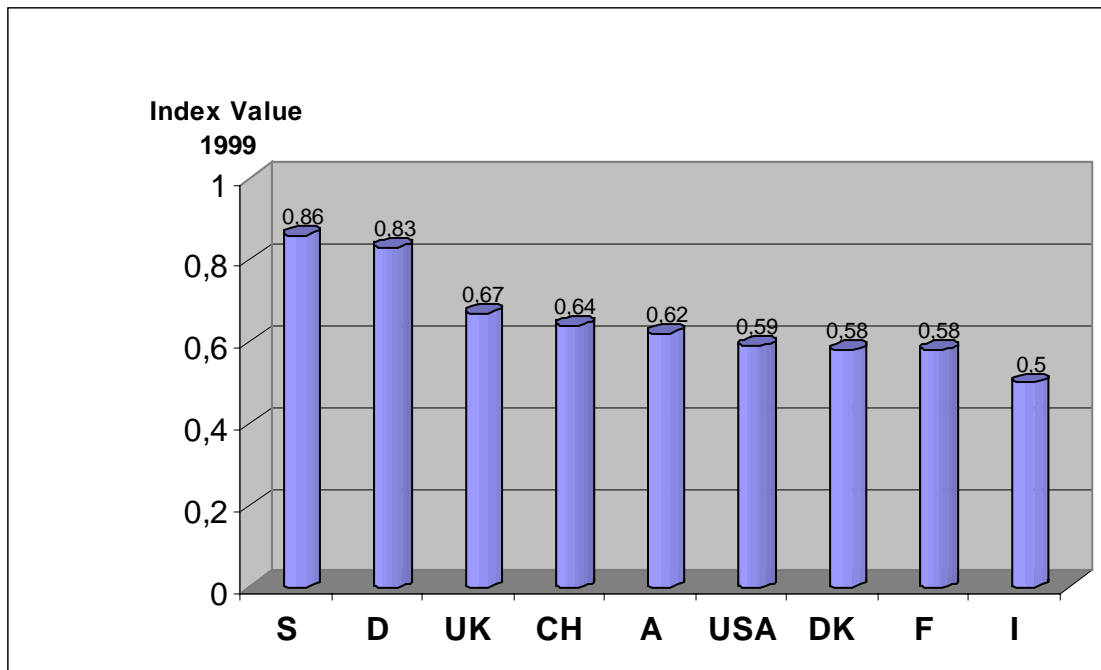
Competition in fixed networks (long distance calls vs local calls) in 1999



Source: Mannesmann

Growth dynamics is high throughout the countries with Sweden and Germany ranking top. The USA can be found in the lower mid-field only.

Growth dynamics in fixed networks in 1999



Source: Mannesmann

When compiling the Composite-MAX Germany finds itself at a rather good fourth place with only Sweden, the UK and USA ahead. Sweden is the clear number one.

## Mannesmann Index (MAX) 1999

	S	UK	USA	D	DK	CH	I	A	F
Liberalisation	0,54	0,8	0,65	0,65	0,79	0,53	0,47	0,6	0,43
Competition	0,73	0,5	0,68	0,28	0,36	0,12	0,33	0	0,15
Growth	0,86	0,67	0,59	0,83	0,58	0,64	0,5	0,62	0,58
<b>MAX</b>	<b>0,71</b>	<b>0,66</b>	<b>0,64</b>	<b>0,59</b>	<b>0,58</b>	<b>0,43</b>	<b>0,43</b>	<b>0,41</b>	<b>0,39</b>

Source: Mannesmann

## 3.2 Internet access policies and tariffs

Similar to countries like the UK and in Scandinavia, free internet access is also emerging and becoming more and more popular and available in Germany. It is now increasingly being offered by telecommunication network providers like MobilCom etc. or internet service providers, large sales chains, wholesalers and retailers etc. Accordingly, Germany has started to make some progress with respect to the number of internet subscribers. However, in 1999 internet use by the population in Germany is still below the European average. For further details also see the chapters on "The main ECATT findings" and "Telecommunication liberalisation, tariffing, availability, etc.". One can expect this situation to change over the next years with the wider penetration and access to free internet services and the advent of public awareness raising programmes by governments at all levels (cf. below). It is an explicit goal of the German Federal government stated in their "IT-Aktionsprogramm" (cf. below) to quadruple internet use in Germany by 2003.

## 3.3 Specific telework and e-commerce policies

### 3.3.1 Federal level initiatives and policies

In the second half of the 90s telework as well as e-commerce have become key policy topics at Federal as well as Federal state level in Germany.

#### 3.3.1.1 Telework and new ways of work

Different telework and e-commerce policies have been implemented in Germany at Federal as well as Federal state (Bundeslaender) level. At Federal level these date back to 1996 when the Federal Ministry for Economics and Technology together with the Federal Ministry for Labour and Social Affairs started the "**Telework Initiative of the Federal Government**" ("**Initiative Telearbeit der Bundesregierung**"). The activities started focussed on awareness raising and included the development, publication and wide distribution of a 60-page brochure on telework (in 1997) and a comprehensive guide to telework implementation (in 1998). The Federal Ministry of Education and Research published an electronic guideline on telework ("**Elektronischer Leitfaden zur Telearbeit**") on the website <http://www.iid.de/telearbeit/leitfaden> as a further awareness raising activity.

In 1997 the same ministry together with Deutsche Telekom launched the initiative **“Telearbeit im Mittelstand” (Telework in SMEs)** trying to motivate SMEs to implement telework supported by some (rather small) public funding provided by this initiative for each participating SME with a total budget of 20 million Deutsche Mark (approx. 11 million Euro). Around 500 SMEs received funding and successfully implemented telework in their organisations. After the general Federal elections in 1998 the ministry department dealing with this initiative moved to the federal Ministry for Economics and Technology where it started another telework initiative called **“Datensichere Telearbeit in kommunalen Verwaltungen (DATEL)” (Secure Telework in Public Administrations)**. Out of the total of telework proposals submitted by public authorities 50 were selected for funding and are now (December 1999) in the process of developing their telework concepts for implementation in 2000. This initiative is part of the **“IT-Aktionsprogramm”** of the Federal government from September 1999 (cf. below). It is accompanied by a project called **“Telejob-Boerse”** which was set up as a telework job and contract exchange.

In parallel, all Federal ministries mentioned above have started their own telework pilot projects already some years ago to get their own hands-on practise.

### 3.3.1.2 Electronic Commerce

The BMWi (Federal Ministry of Economics and Technology) initiative **“Elektronischer Geschäftsverkehr” (Electronic Commerce)** started under the former minister Dr. Günter Rexrodt in 1996 with a Status Report **“Info2000”** in 1996 a follow-up report in October 1997, followed by a **G7 conference on “A Global Marketplace for SMEs”** in April 1997, a Ministerial conference in June 1997 and the Forum Info 2000, the first information society initiative on Federal level (cf. below). Most of these activities aimed at the creation of an increased awareness on the possibilities of e-commerce, others intended to impact international policy developed in certain key areas (e.g. cryptology, security, tax) of electronic commerce.

As part of the activities of the **Forum Info 2000** (cf. below) working group on electronic commerce a (the first in Germany) **competition on “Electronic Commerce for SMEs”** together with the Federal Ministry of Economics and Technology and sponsored by a number of larger and smaller organisations from industry (IBM, Microsoft, SAP, Lufthansa, etc.) was organised. The objective of this competition running from September 1997 to March 1998 was two-fold: firstly, it was seen as a stock taking exercise to find out more about the current practice of electronic commerce in Germany and thereby identifying areas where policy could help to remove barriers. Secondly, it was seen as an instrument to make other companies, particularly SMEs, aware and familiar with this topic since the whole competition and the best-practice examples which received awards achieved high levels of media presence.

In 1998 the Federal Ministry of Economics and Technology established a **network of 24 Electronic Commerce Competence Centres in all regions of Germany**. The objective was to offer regional information and consultancy services to SMEs in these regions and to make them aware of and familiar with the possibilities and opportunities offered by electronic commerce. The development of a common information platform was another objective which the initiative wanted to achieve. The initiative is planned to run for three years with public funding which should pay for additional staff expenses. In the recent **“IT-Aktionsprogramm”** by the Federal government (September 1999) funding via the Federal Ministry for Economics and Technology up until mid 2001 has officially been declared.

Within the “IT-Aktionsprogramm” by the Federal government (September 1999) further activities aimed at e-commerce implementation by SMEs in the area of craft as well as further ones aimed at an improved knowledge transfer between research and industry were announced for product data standards development.

The action plan is also designed to ease Germany's high unemployment rates, which are still at around 10 percent.

Some of its goals are to bring the latest technology and internet connections to Germany's schools by 2001, to train 40,000 new IT employees by 2003 and to increase the number of women employed in the IT industry by 40 percent during the next five years.

Specific activities will support the creation of new establishments (new start-ups) in the area of multimedia. The objective is to double the number of German multimedia companies by 2001. In addition the Federal Ministry for Education and Research states that it will support telecooperation networks especially of SMEs in the services sector and the creation of new enterprises by women.

The most recent activity on Federal level is an initiative of the Federal Ministry for Economics and Technology (BMW) called “Modellvorhaben zur Foerderung des elektronischen Geschaeftsverkehrs im Mittelstand” (Pilot projects fostering electronic commerce applications in SMEs) announced on 1<sup>st</sup> October 1999. This initiative is a funding programme where the Ministry financially supports SMEs in the development of specific b2b solutions in the areas of electronic data exchange in the area of customer and supplier relationships, the development and implementation of new business models in the area of electronic commerce and the application and use of digital payment and cryptology procedures as well as the digital signature. The maximum funding per company is 500,000 DM per year (approx. 250,000 Euro) with a funding period of three years. The companies applying for these funds have to cover a minimum of 25% of the overall cost.

### 3.3.2 Federal State level initiatives and policies

At Federal State level almost each of the German Federal states has either started a telework, an e-commerce or a multimedia initiative in recent years. The most popular ones include “**media NRW**” (Northrhine-Westphalia), **Bayern Online** (Bavaria), **medi@** (Baden-Wuerttemberg), **Hessen media** (Hessen), **rlp inform** (Rheinland-Pfalz) and **inforegio** (Saxonia-Anhalt). Most of the activities started include awareness raising campaigns plus some programmes providing smaller funding schemes for the establishment of telework, e-commerce, etc. Some initiatives, especially those run by the larger Federal states, include special activities with joint projects – sometimes of a rather large scale – carried out in form of public-private-partnerships with industry (e.g. BMW, Deutsche Telekom, Brokat etc.). For more details cf. annex.

## 3.4 Information society initiatives

The most popular information society initiatives have been started and run by the Federal government. Some of the above initiatives run by Federal states have also been started under the “information society” label but described here in the present report under die headings “telework” or “e-commerce” since the bulk of activities carried out come from these two topical areas.

The German Federal government started its information society initiatives in 1996. **Forum Info 2000** "Germany's Way Towards the Information Society" was the first such initiative of the Federal government run by the Federal Ministry of Economics and Technology together with the Federal Ministry of Education and Research. The project was running from September 1996 to January 1999 under the responsibility of empirica where the Forum Info 2000 office was located. The topics of this forum were:

- Electronic commerce
- New ways of working
- Environmental care and sustainability
- Education and training
- Elderly
- Multimedia applications in cities and regions
- Health and Tele-Medicine
- Culture and Art
- Women.

The Forum Info 2000 managed to create a high level of awareness of the topics and issues around the above topics in industry, among the social partners, in research and scientific institutions, in associations and many other institutions which also act as multiplier. In total it managed to include approx. 1,000 decision makers from the above institutions and actively involved most of them in the workshops relating to the 9 different topics. In many respects the Forum achieved the objective of "training-the-trainers", i.e. informing and training the above multipliers concerning the above topics, formerly hardly known to them. At the end of the Forum, most of them were in the position to be experts concerning these topics themselves and enabled to train members of their associations, colleagues in their companies etc. This is now helping in creating further awareness among even broader groups of people. The means employed to achieve this were working groups meeting at regular intervals, workshops, conferences, the creation of brochures and publications as well as delphi expert surveys. The experts of these working groups were also successfully used by the above ministries as a think tank to support them in decision-making processes and giving advice. In so far the Forum as also influenced policy decisions.

In the "IT Aktionsprogramm" the government announced the continuation of the work of the "Forum Info 2000" (cf. above) by the "**Forum Informationsgesellschaft**" ("**Forum Information Society**"). Key topics to be addressed are:

- Education
- Sustainable development
- Democracy and administration
- Art and culture
- Elderly
- Women.

Currently (December 1999) the "Forum Informationsgesellschaft" is in its constitutional phase.

## 3.5 Significant private sector initiatives

### 3.5.1 Init@tive D21

The most important private sector initiative dealing with the whole topic of "information society" but especially the aspects of "education", "e-commerce" and "new ways of work"

has been initiated by some key organisations from the IT industry and some other industrial sectors in mid-1999 under the name of Initi@tive D21. In the meantime (December 1999) more than 100 companies and institutions have joined D21 and financially contribute to it either as supporter or member. D21 understands itself as an open platform for policy, industry and society supporting the transformation of Germany towards an information and knowledge society. The intention is to develop and put into practise a sustainable strategy for Germany's way towards the information society jointly with German Federal government. The high-level objectives are:

Development of more suitable framework conditions in Germany to better compete with other leading world economies

Enabling government and governmental institutions to act as a shining example with respect to the use of new information and communication technologies

Adaptation and further development of the current systems of education and training - including the wide use of PCs and internet as integral part of the educational system - to better cope with the emerging developments

Improvement of technology acceptance by way of best practise demonstrations, improvements in software ergonomics and awareness raising activities.

Initial D21 projects include "D21 Internet Klassenzimmer" ("Internet classroom") and "Marktplatz für Schulen" ("Marketplace for schools") an attempt to equip German schools with PCs no longer used or needed in organisations from industry run by the Federal Ministry of Education and Research and the GMD (National Research Institute). The "D21 Ambassador" project is in preparation. The intention is to run projects as public-private-partnerships to support the faster and wider penetration and use of new information and communication technologies in Germany.

D21 has organised itself in working groups with the following topics:

**AG 1: Regulatory framework**

**AG 2: Governmental institutions as frontrunner**

**AG 3: Education and training**

**AG 4: Women and information and communication technology**

**AG 5: Business start-up initiative/offensive**

Top-level representatives from the member companies currently lead by organisations like IBM, HP, Cisco etc. and German Federal and Federal state government levels are actively participating in these working groups.

### **3.5.1.1.1**

#### **Resume**

D21 continues the work started by the Forum Info 2000 from 1996 to 1998 but with a much stronger industry involvement. Its goal is to closely cooperate with government in public-private-partnership projects to bring Germany forward on its way towards the information society at a faster speed. For Germany such an initiative is exceptional and worthwhile mentioning in so far as it was originated by industry and was not started by government. However, it remains to be seen whether and to what extent German industry will invest here in joint projects with Federal government ministries but also in projects purely run by industry.

### 3.5.2 Baden-Wuerttemberg Connected e.V.

In the Federal state of Baden-Wuerttemberg an association called **Baden-Wuerttemberg Connected e.V.** (<http://www.bwcon.de>) has been established in 1997 by a network of industrial corporations. The objective of this association is to develop Baden-Württemberg to the leading German internet economy region. Members of this association get the opportunity to be included in the development and design of newly emerging, innovative projects. Focal points of its activities are projects in the areas of e-business, online education and training and digital public administration. This initiative is complementary to the one run by the Federal state under the name of medi@. Members of Baden-Wuerttemberg Connected e.V. include corporations like Alcatel, Brokat, Deutsche Telekom, Hewlett Packard, IBM, SAP but also many publishers, banks, insurance companies universities.

### 3.5.3 Others

Initiatives like the **"Transatlantic Business Dialogue (TABD)"** by the European and US industry and **"Global Business Dialogue for Electronic Commerce"** by the CEOs of large international corporations, where large German corporations are also involved, have been set up by industry and industry associations in the world as global initiatives to develop recommendations, measures and appropriate actions to impact political as well as industrial developments in the area of electronic commerce in a positive way.

## 3.6 Educational initiatives

In the recent **"IT-Aktionsprogramm"** of the **Federal government** a target was set for all schools in Germany to be equipped with PCs and internet connections by 2001. Today around 12,000 out of a total of 40,000 schools are equipped in such a way. Moreover, the Federal Ministry for Education and Research has declared to invest 100 million DM (approx. 50 million Euro) in the development of teaching and training software and the development of multimedia-based information sources and content for schools during the next 5 years.

These objective and various others will to some extent be achieved as part of the ongoing initiative **"Schulen ans Netz"** (**"Schools to the net"**). **"Schulen ans Netz"** (<http://www.san-ev.de>) is the major technology-related educational initiative in Germany a joint activity of the Federal Ministry for Education and Research and Deutsche Telekom which started on 18<sup>th</sup> April 1996. The objective of this initiative was to equip 10,000 German schools with PCs and internet access by mid-1999. Deutsche Telekom invested 36 million DM (approx. 18 million Euro), the ministry 23 million DM (approx. 12 million Euro). A further 100 million DM will be invested from late-1999 onwards. 60 million DM are provided by Deutsche Telekom, 40 million DM by the ministry. By way of these investments all German schools shall get internet access. Further major sponsors of this initiative include Apple and the German magazine STERN. Smaller sponsors are numerous and range from AVM to SUN. In parallel to the above investments more than 1000 activities are aimed at the necessary further education of teachers ("Teach-your-Teacher").

### 3.7 Other initiatives

The trade union advisory service **TELEWISA** "<http://www.telewisa.de/>" is aimed at waged and salaried employees, part time workers, independent and freelance workers and the self employed who do telework. The initiative has been started by the Deutscher Gewerkschaftsbund Forum "Sozialverträgliche Technikgestaltung" in Baden-Württemberg. It is up and running as a website.

The "**Online-Forum-Telearbeit**" (**OnForTe**) "<http://www.onforte.de/>" serves employee oriented advice on telework. OnForTe was set up by the Deutsche Postgewerkschaft (DPG) (Postal Union) with support from Deutsche Telekom and the Federal Ministry of Education and Research. It has been established as a virtual network of consultants located at different places in Germany offering their services free of charge to the calling teleworker. OnForTe can be reached throughout Germany under a single 0180 telephone number connecting the calling person to a call centre from where the calls are routed to the expert responsible for the required topic area. OnForTe has developed a number of publications and brochures and compiled these into an information package which interested people can purchase at moderate costs. Members of DPG get as special discount of almost 50%.

## 4. Electronic Commerce and Telework Penetration and Trends: The Main ECATT Findings for Germany

### 4.1 Electronic Commerce

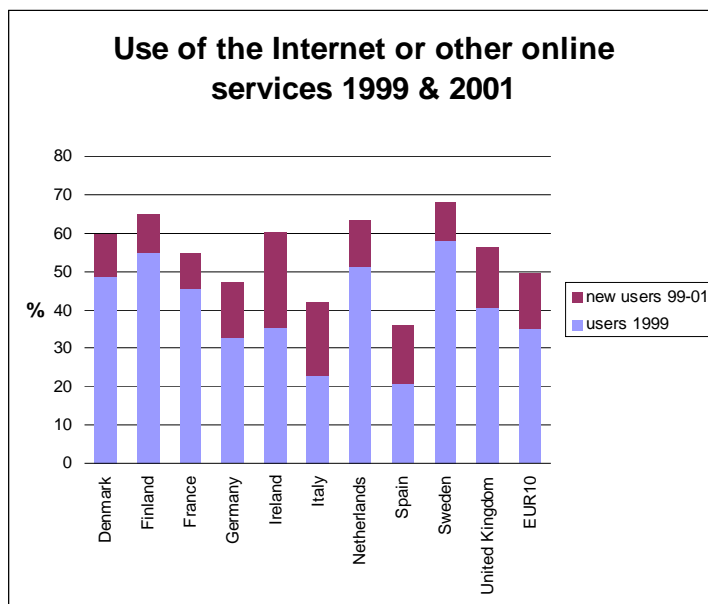
#### 4.1.1 PC and e-mail usage, internet and online services access and use by the population

*Germany being well equipped with telecommunications and PCs almost finds itself among the European laggards when it comes to the use of e-mail, internet and other online services*

In Europe, Germany is best equipped in terms of telecommunications infrastructure and among the best with respect to PC penetration and use in private households. 52% of the German population have access to a PC at home, whereas the European average is 46%. However only a rather small share of the population have internet access and ever used the internet (33%) or are regular internet users (20%). The same holds true for e-mail use, with just 17% of the German population being e-mail users with a European average of 18% and 40% of the Swedish population (being more than twice as much as in Germany) using this means of communication. With these figures Germany finds itself at a very low rank 8 and rank 7 respectively in Europe. The situation is not likely to change dramatically over the next two years. Although Germany accounts for very high growth rates in all above areas it will nevertheless not change its rank and position within the European context.

<b>Use of Internet or other online services 1999 and 2001 (in %)</b>						
	Users 1999	New users 1999-2001	Users 2001	Growth 1999-2001	Ranking 2001	Ranking (Growth)
Denmark	48,5	11,2	59,7	23,1	5	6
Finland	54,9	10,1	65,0	18,4	2	9
France	45,5	9,3	54,8	20,4	7	8
Germany	32,9	14,2	47,1	43,2	8	4
Ireland	35,6	24,6	60,2	69,1	4	3
Italy	22,7	19,1	41,8	84,1	9	1
Netherlands	51,1	12,0	63,1	23,5	3	6
Spain	20,7	15,5	36,2	74,9	10	2
Sweden	57,9	10,2	68,1	17,6	1	9
United Kingdom	40,6	15,5	56,1	38,2	6	5
<i>EUR10</i>	<i>35,2</i>	<i>14,4</i>	<i>49,6</i>	<i>40,9%</i>		

*base: all respondents (n= 7.700) © empirica 1999*



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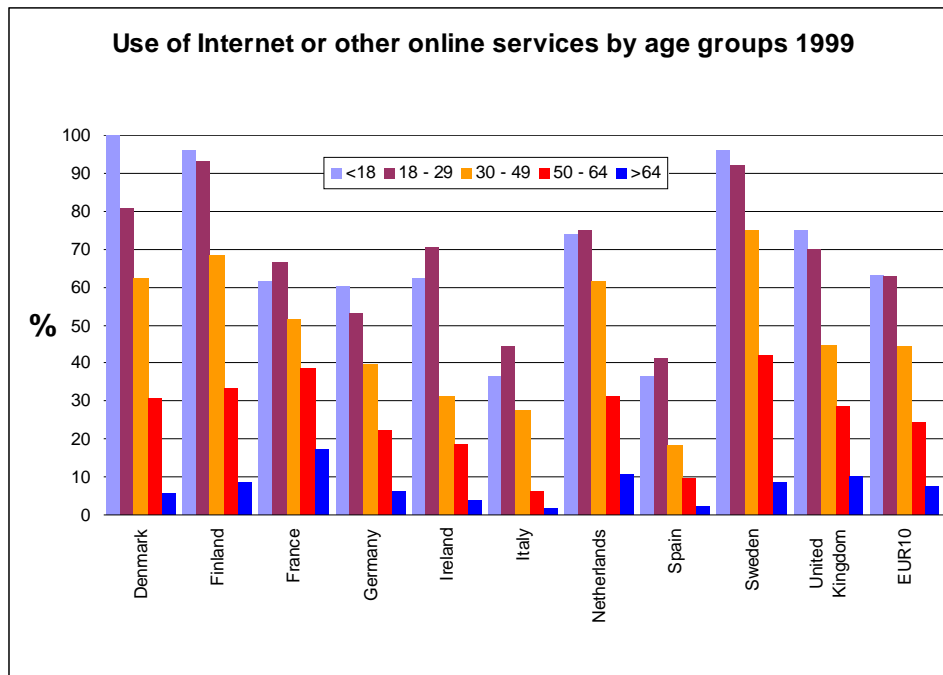
***The internet in Germany as well as in Europe is still a male phenomenon, hardly used by the elderly beyond 50 and mainly restricted to the group of the better educated***

**and qualified. However, these boundaries are starting to blur in the frontrunner countries to which Germany does not belong.**

In Germany the internet is still a male phenomenon. The situation is slightly different in the internet frontrunner countries (Scandinavia, Netherlands) where the gender gap is slowly narrowing and will be almost closed in about two years time.

Altogether around 22 million Germans (out of a population of around 80 million) have ever been in the internet, 13 million are regular internet users. It is striking that internet usage drops dramatically among the population of more than 50 years of age and again even more among those being older than 65. Just 6% or in absolute numbers, 750,000 Germans out of almost 13 million of the age of 65 and more have ever used the internet. This phenomenon is not restricted to Germany but can be observed throughout Europe.

<b>Use of Internet or other online services (all users) according to age (in %)</b>					
	<b>&lt;18</b>	<b>18 – 29</b>	<b>30 - 49</b>	<b>50 – 64</b>	<b>&gt;64</b>
Denmark	100	80,7	62,5	30,9	5,9
Finland	96,1	93,2	68,6	33,3	8,5
France	61,5	66,5	51,6	38,6	17,2
Germany	60,2	53,2	39,7	22,3	6,0
Ireland	62,5	70,5	31,1	18,7	3,8
Italy	36,4	44,4	27,7	6,1	1,9
Netherlands	73,9	75	61,6	31,3	10,7
Spain	36,4	41,3	18,2	9,5	2,3
Sweden	95,9	92	74,8	42	8,6
United Kingdom	75	69,8	44,7	28,7	9,9
<i>EUR10</i>	<i>57,2</i>	<i>57,7</i>	<i>40,9</i>	<i>22,8</i>	<i>8,0</i>
<i>base: all respondents (n= 7.700) © empirica 1999</i>					



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The higher a person is qualified, the more likely s/he will be an internet user. This situation is very marked in countries like Germany, Spain, Italy and France. In the Scandinavian countries and the UK the share of access to the internet by less qualified people is already much higher and reaches figures which are at least three times as high as the German ones.

#### 4.1.2 Online activities with relevance for electronic commerce: online shopping and banking by the population

*Online shopping and banking still live in the shadow in Europe not only in Germany but also (at least to some extent) in those countries known as frontrunners. However, the growth rates show some signs of (slow) change.*

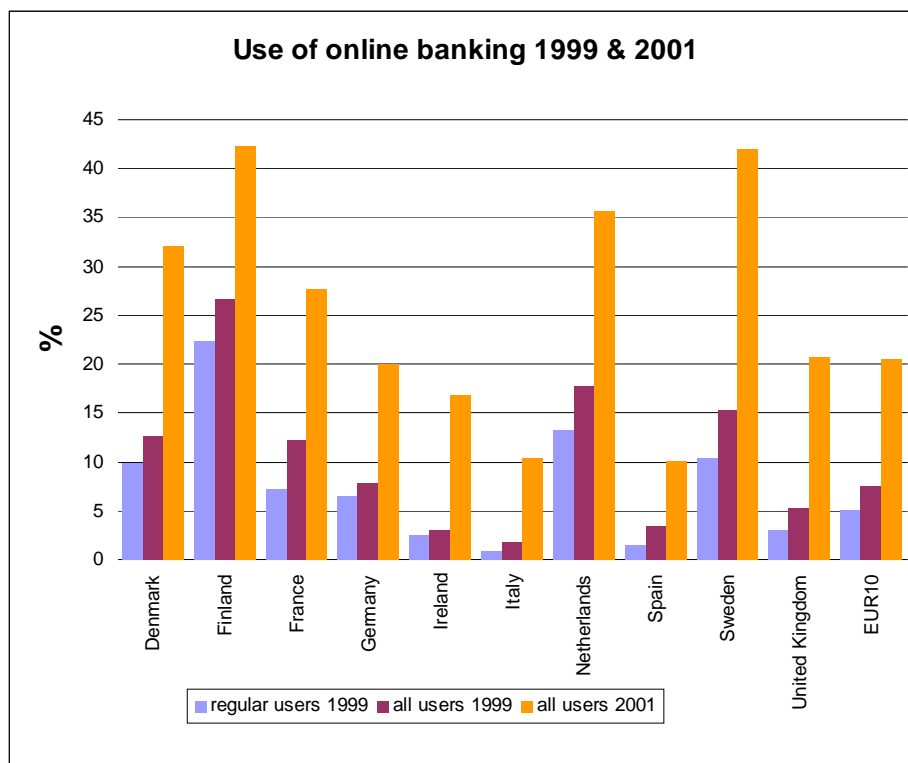
In 1999 only a small share of the European population is actively engaged in online activities relevant for electronic commerce varying between 2% (ordering groceries) to 14% (supplier information search). When analysing the purposes of use of online services and the internet it becomes apparent that these are mainly used for information search activities followed by game playing and registering as website user. Online activities like making payments online and the different online shopping activities rate low. Even ordering of books, CDs and videos only reach figures of less than 5%. Making payments online achieves very low 4% with the extremes being 1% in Spain and still rather low 7% in the UK. Europeans throughout the countries show an extreme caution when it comes to making payments online.

Growth rates for the next two years will be impressive if the plans of the interviewees become reality. The result will then be that a quarter of the European population will be active with online information search activities and around 15% using the internet for online shopping of various goods. Many of the Europeans also expect secure and usable online payment facilities to be in place in 2001 since an average of 10% indicates that it

would make use of these by then. The extremes again are between Spain (6%) and the UK (18%).

The figures for Germany are – with respect to all items – almost identical to the ones from the European average. Interestingly enough the lead of the frontrunner countries such as Finland is not that dramatic as it is with respect to internet use etc. It is striking that even in these countries online shopping will only grow moderately from a base in 1999 which is not very much above the European average. However, Scandinavians are almost twice as active in online information search activities and these figure will reach beyond the 40% in 2001. Online shopping will on average be carried out by 25% of the Scandinavians as opposed to 15% being the European average.

Use of online banking (in %)							
	Regular users 1999	Occasional users 1999	All users 1999	New users 1999 - 2001	All users 2001	Ranking 1999	Ranking 2001
Denmark	9,9	2,8	12,7	19,4	32,1	4	4
Finland	22,5	4,2	26,7	15,6	42,3	1	1
France	7,2	5,0	12,2	15,5	27,7	5	5
Germany	6,5	1,3	7,8	12,2	20,0	6	7
Ireland	2,6	0,4	3,0	13,9	16,9	9	8
Italy	0,9	0,9	1,8	8,6	10,4	10	9
Netherlands	13,3	4,4	17,7	17,9	35,6	2	3
Spain	1,5	2,0	3,5	6,6	10,1	8	10
Sweden	10,4	5,0	15,4	26,6	42,0	3	2
United Kingdom	3,0	2,2	5,2	15,6	20,8	7	6
EUR10	5,1	2,4	7,5	12,9	20,4		
<i>base: all respondents (n=7.700) © empirica 1999</i>							



© empirica 1999

Online banking is seen as a “killer application” for electronic commerce. However, the share of online bankers among the population is still rather low with a European average of 7% out of which just 5% account for regular users. Germany shows an average performance whereas in Finland already a quarter of the population practise online-banking. Italy and Spain are lagging behind with just 2% and 4% respectively. The expected growth rates are high and it can be expected that by 2001 the figures in Germany will have gone up threefold and reach 20%. However, this will not change the situation where Germany will only reach average European figures and still lag behind the European frontrunners with a percentage of online banking users being twice as high in 2001 and around 40%.

#### 4.1.3 Barriers to online shopping

*Germans but also Europeans in general are cautious when it comes to online shopping mainly because they do not see a need for it.*

The key barrier to online shopping is the perception of around 1/3 of the population that there is no need for it. ¼ indicate a lack of technical ability in their homes to access the internet as a barrier. Product characteristics, i.e. the product can not be touched or tried on, are mentioned in third place. Dangers of fraud and those relating to privacy and data security are mentioned by less than 10% as a barrier. However, in frontrunner countries this figure reaches up to 18%. This is probably an indication for an underestimation of the related problems by those not so much acquainted with online shopping yet. Again, the figures for Germany are almost identical to the European average figures.

#### 4.1.4 Advantages of online shopping

*Convenience is seen as the key advantage of online shopping.*

Europeans believe that online-shopping will involve less effort (68%), one gets products faster (59%) and it bears the potential that one finds more interesting things to buy (59%). 1/3 believe online shopping saves money. The biggest online shopping enthusiasts in terms of interest can be found in Ireland and Spain. Again, Germany represents the European average.

#### 4.1.5 E-mail usage, internet and online services access and use by establishments

*Almost 2/3 of German establishments already use e-mail. However this only accounts for rank 8 among the European countries.*

Top figures are achieved by the Scandinavian countries ranging from 80% to 90%. Despite high growth rates, Germany will continue to remain in its low current European position.

*German SMEs are laggards in e-mail and internet use.*

Only ¼ of those with up to 10 employees use e-mail, those with 10-50 employees reach 50% and those up to 200 employees 75%. Among the very large establishments with more than 500 employees the 100% are almost achieved. Despite high growth rates in all size groups the situation in Germany will be rather far away from the one for instance in Finland and Denmark where in 2001 an e-mail account will be almost as self-evident as a telephone even in SMEs.

**Use of e-mail, internet und intranet in German establishments according to size of organisation in 1999**

	0-9 empl.	10-49 empl.	50-199 empl.	200-499 empl.	>500 empl.	Average
e-mail user	24%	50%	76%	93%	97%	61%
Internet-user	35%	53%	82%	94%	97%	67%
Intranet user	11%	21%	38%	41%	66%	31%
© empirica 1999						

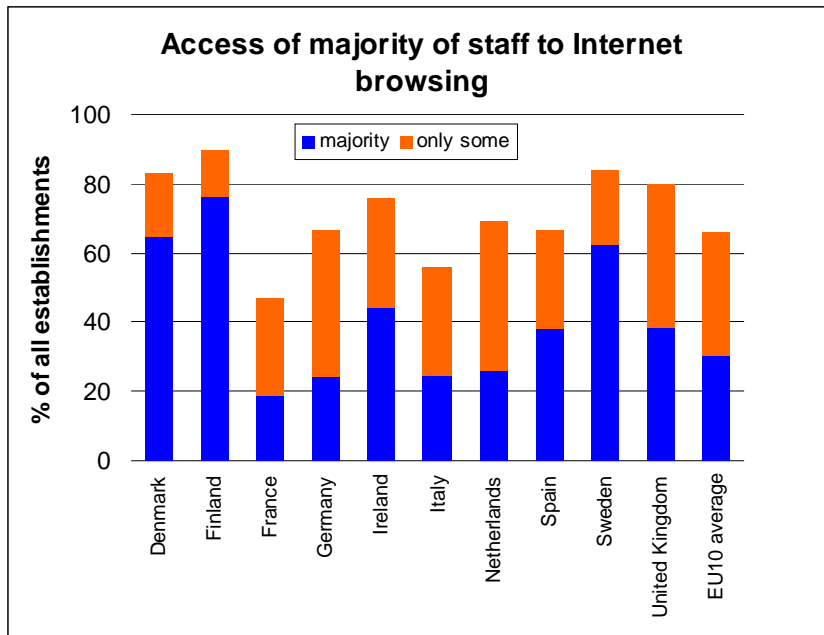
A similar picture emerges concerning the use of the internet: 66% of the German establishments have internet access as opposed to for instance 90% in Finland. Even the European average is already at 70%. Those establishments with less than 10 employees only reach a figure of 35%

#### 4.1.6 E-mail and internet “censorship” in German establishments

Only 38% of German establishment allow a majority of their workforce access to e-mail compared to a European average of 50% and the European leader Finland with 80%. Among the SMEs (up to 10 employees) this figure just reaches very poor 20%. It is against this background that many German employees are effectively excluded form the possibilities and advantages of using an effective communications tool as constituted by e-mail.

The situation is pretty much the same with respect to internet access. Just 36% of those having an internet access allow a majority of their employees to use it. Among those with less than 10 employees the figure not even reaches 20%.

<b>Staff access to Internet browsing (in %)</b>				
	<b>(1) Majority have access</b>	<b>(2) Only some have access</b>	<b>Ranking of (1)</b>	<b>(1) as % of all user establish- ments</b>
Denmark	64,9	18,2	2	78,1
Finland	76,3	13,4	1	85,1
France	18,6	28,4	10	39,6
Germany	24,2	42,3	9	36,4
Ireland	44,4	31,6	4	58,4
Italy	24,5	31,5	8	43,8
Netherlands	25,7	43,7	7	37,0
Spain	38,1	28,6	6	57,1
Sweden	62,3	21,7	3	74,2
United Kingdom	38,5	41,6	5	48,1
<i>Total Sample</i>	<i>39,1</i>	<i>31,0</i>		<i>55,8</i>
<i>EU10 average</i>	<i>30,5</i>	<i>35,4</i>		<i>46,3</i>
<i>Base: All establishments (n=4.158) © empirica 1999</i>				



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Comparable figures can be revealed from the analysis of the data relating to the intranet in operation in slightly less than a third of German establishments.

With the above figures and in a European context Germany brings up the rear (has got the “taillight”) when it comes to the use of e-mail, internet and intranet. It appears as if German companies mainly rate issues like cost control at the workplace higher than more long-term oriented objectives such as the increase in independancy and media competence of their workforce.

***Large companies have jumped on the internet and electronic commerce train, SMEs have a hard time.***

Especially establishments in Germany with more than 500 employees seem to be well prepared for the information age: 97% use e-mail, also 97% the internet, and 2/3 use an intranet. SMEs are less well prepared, particularly those with up to 10 employees: just ¼ of them use e-mail, a third the internet and only slightly more than 10% an intranet.

#### 4.1.7 Online and electronic commerce activities by establishments

***German establishments have identified the advantages associated with an information offer and a presence in the internet and have started appropriate actions.***

Already 47% of German establishments have an own internet presence. Here the gap to the frontrunner countries has become rather small. Sweden, Denmark and the UK reach figures only around 10% above the German one. Finland with its 2/3 of the establishments already present in the internet is an exceptional case in Europe. Germany will have reached the same level in about two years.

***However, the internet presence mostly is of a passive nature.***

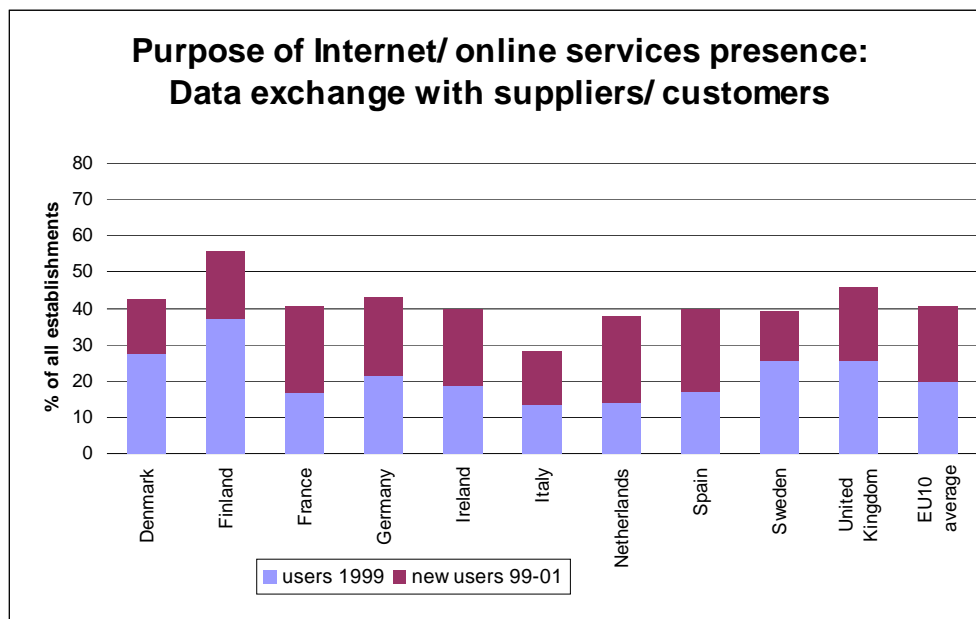
Most websites provide simple information offers and are only used for advertising and marketing purposes. Only 1/5 of the establishments in Germany with an internet presence provide online sales possibilities. In countries like Finland this figure is more than twice as high.

**The German strength in Electronic Commerce is in the business-to-business area.**

Almost ¼ of German establishment, which are almost half of those with an internet presence, already practise an electronic data exchange with suppliers and business partners using the internet. The figure will increase to more than 40% in 2001.

Purpose of www activities: Data exchange with suppliers/ customers (in %)					
	Users 1999	New users 99-01	Users 2001	Ranking 1999	Ranking 2001
Denmark	27,6	14,9	42,5	2	4
Finland	36,9	18,9	55,8	1	1
France	16,6	24,0	40,6	8	5
Germany	21,6	21,5	43,1	5	3
Ireland	18,9	21,0	39,9	6	6
Italy	13,4	14,7	28,1	10	10
Netherlands	14,0	23,7	37,7	9	9
Spain	17,1	22,7	39,8	7	7
Sweden	25,4	13,7	39,1	4	8
United Kingdom	25,6	20,2	45,8	3	2
Total Sample	21,1	19,7	40,8		
EU10 average	19,9	20,5	40,4		

Base: All establishments (n = 4.158) © empirica 1999



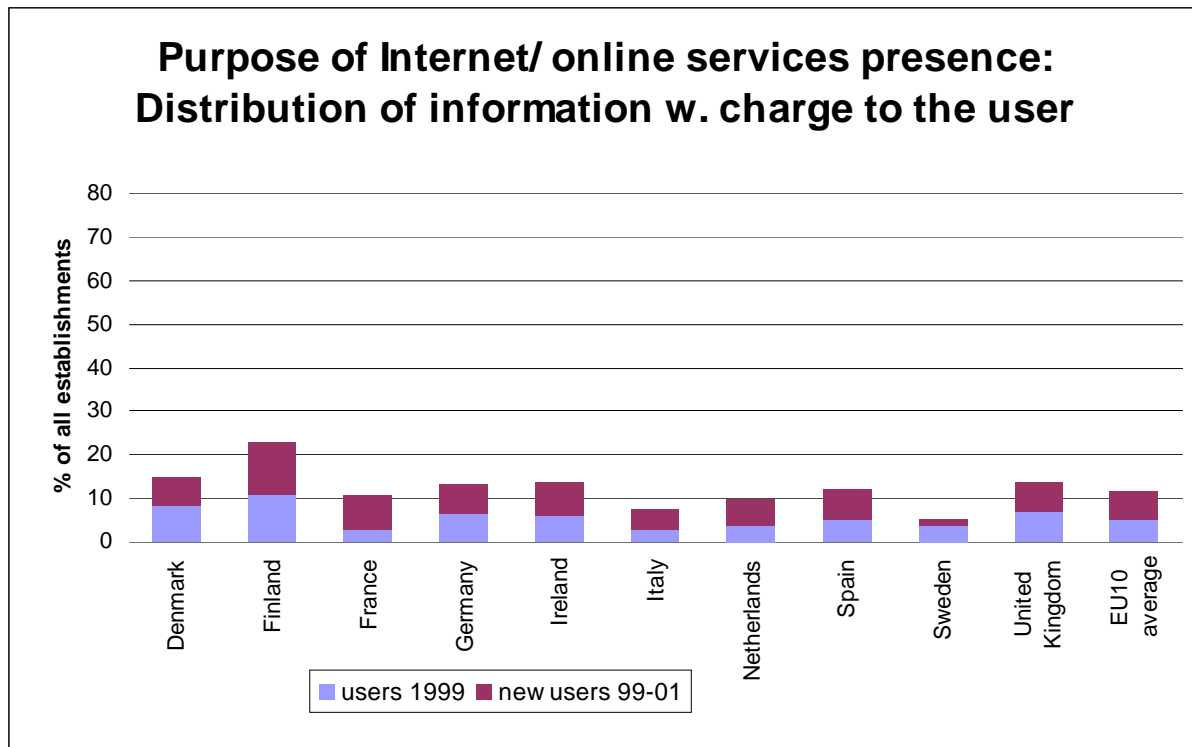
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A similarly positive picture becomes apparent when looking at the online procurement activities: today ¼ of German establishments and in 2001 around 50% will be active here. The same holds true for the implementation of joint business processes with partner organisations over the internet. In the year 2001 1/3 of the German establishments will have implemented these. Only the three Scandinavian countries show an even better performance. Consequently and in the business-to-business area Germany has moved into the group of European leaders with these figures.

***Germany is a slow starter in the area of online sales (business-to-consumer)***

The opposite becomes apparent when looking at the business-to-consumer area. Just 10% practise online sales. This amounts to 21% of those establishments with an online presence. Germany will continue to rate below the European average here, despite some rapid growth over the next two years.

<b>Purpose of www activities: Distribution of information with charge (in %)</b>					
	<b>Users 1999</b>	<b>New users 99-01</b>	<b>Users 2001</b>	<b>Ranking 1999</b>	<b>Ranking 2001</b>
Denmark	8,6	6,3	14,9	2	2
Finland	10,8	12,0	22,8	1	1
France	3,0	7,9	10,9	9	7
Germany	6,4	6,7	13,1	4	5
Ireland	6,1	7,4	13,5	5	4
Italy	2,8	4,8	7,6	10	9
Netherlands	3,7	6,0	9,7	7	8
Spain	5,1	7,0	12,1	6	6
Sweden	3,5	1,9	5,4	8	10
United Kingdom	6,7	7,0	13,7	3	3
<i>Total Sample</i>	<i>5,5</i>	<i>6,7</i>	<i>12,2</i>		
<i>EU10 average</i>	<i>5,1</i>	<i>6,6</i>	<i>11,7</i>		
<i>Base: All establishments (n = 4.158) © empirica 1999</i>					



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Not only in Germany, but hardly any organisation in Europe (only 6% on average) is offering information in the internet with charge to the user. This figure will double by 2001 but with the exception of Finland (more then 20% in 2001) nowhere will there be a more widespread offer.

#### 4.1.8 Barriers to online sales and online procurement

*Many German but also European establishments do not see the need for online sales or are sceptical about its usefulness.*

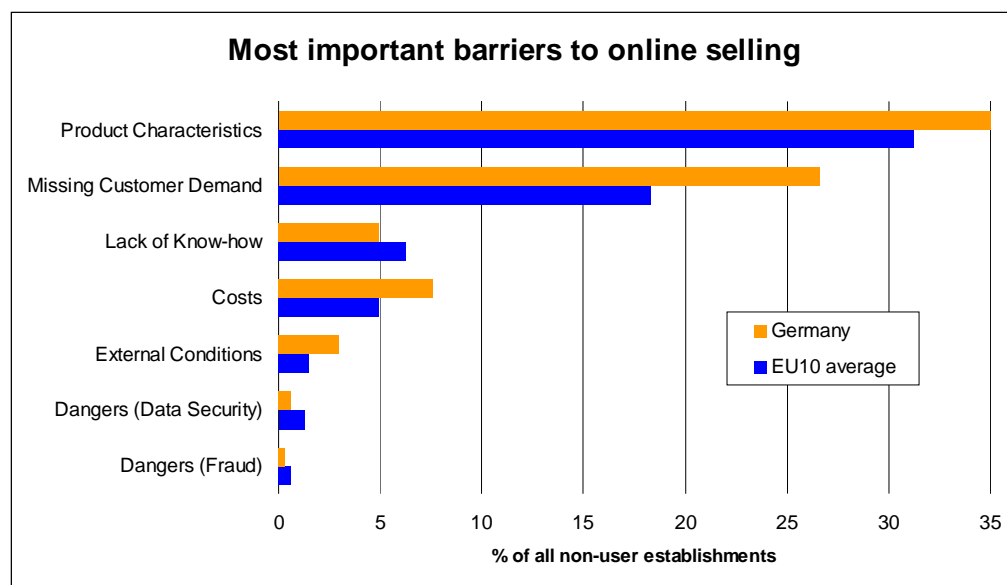
There appears to be consensus among many organisations in Europe as to the need and usefulness of online sales in so far as around 40% of those currently not offering online sales to not want to deal with that subject. Further reasons given for not starting online sales activities include (in the sequence of relevance) product characteristics (products are not suitable for online sales) and the expectation of a missing customer demand. Dangers related to privacy, data security and fraud do not rate very high and it appears as if these are not the decisive factors when it comes to decide for the pros and cons of online sales.

**Barriers to online selling (in %)**

	Missing Customer Demand	No Need	Costs	Lack of Know-how	Dangers (data security)	Dangers (Fraud)	Product characteristics	External Conditions	Others
Denmark	38,0	48,6	3,5	9,6	0,0	0,0	1,5	0,0	0,0
Finland	15,1	30,0	2,3	0,0	1,9	0,7	42,3	0,0	4,9
France	15,6	48,4	5,7	9,5	1,4	0,4	26,7	1,5	0,7
Germany	26,6	42,8	7,6	4,9	0,6	0,3	35,0	3,0	0,0
Ireland	20,9	50,8	2,6	2,0	0,4	1,7	15,8	0,2	16,9
Italy	13,7	53,1	2,0	4,3	1,1	0,4	24,2	0,0	1,0
Netherlands	16,5	14,2	3,7	4,1	3,7	2,8	53,7	5,5	4,1
Spain	9,2	29,7	3,1	9,7	2,7	0,8	39,1	0,7	5,5
Sweden	8,7	35,0	1,2	4,2	1,8	1,3	40,6	1,1	0,8
U.K.	18,1	49,7	5,3	6,6	1,3	0,4	26,0	0,5	3,5
<i>Total sample</i>	<i>17,9</i>	<i>41,7</i>	<i>3,9</i>	<i>6,0</i>	<i>1,4</i>	<i>0,8</i>	<i>29,9</i>	<i>1,2</i>	<i>3,3</i>
<i>EU10 average</i>	<i>18,3</i>	<i>43,6</i>	<i>4,9</i>	<i>6,3</i>	<i>1,3</i>	<i>0,6</i>	<i>31,2</i>	<i>1,5</i>	<i>1,9</i>

Base: Establishments neither using nor planning to introduce online selling (n=2913)

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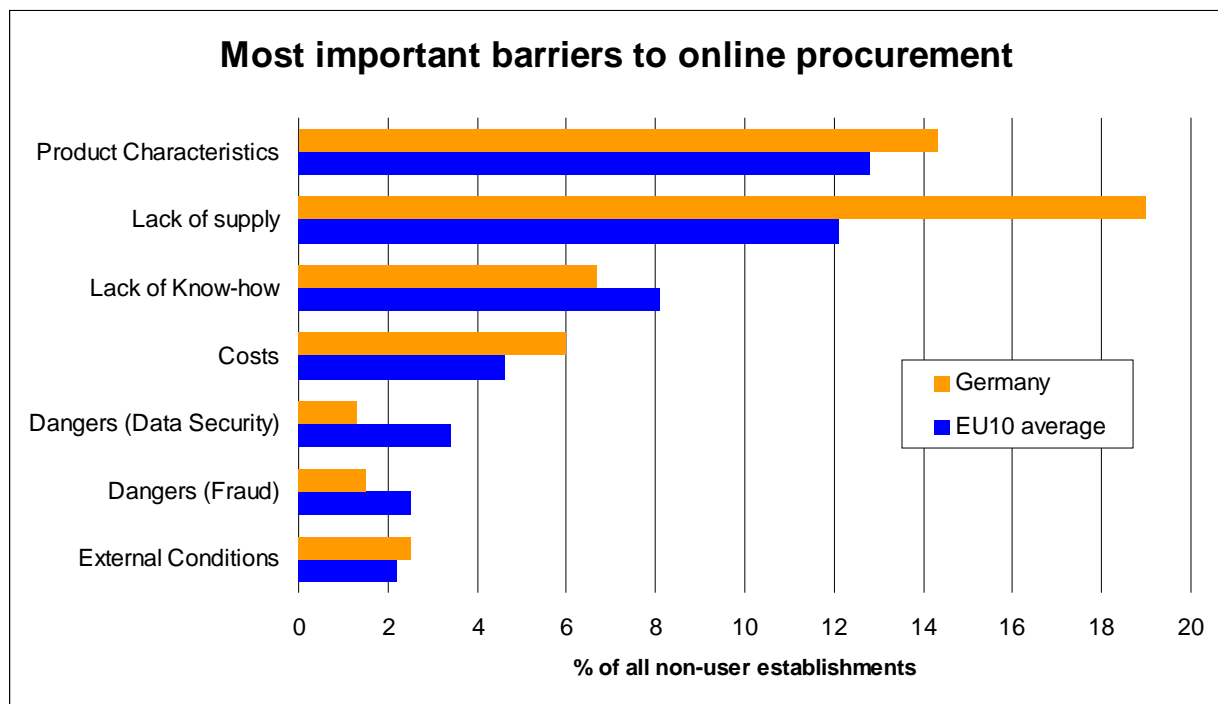
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***Lack of need and supply of online offers by suppliers etc. are seen as key barriers to a wider spread of online procurement.***

A very high over 50% of those establishments neither using nor planning to introduce online procurement do not see a need for this. Further important reasons include product characteristics (i.e. products do not lend themselves to online sales) and a lack of supply of online offers by suppliers, which gets remarkably high ratings in Germany. It appears as if there is a wide field for clarification and “market education”.

Barriers to online procurement (in %)									
	Lack of supply	No Need	Costs	Lack of Know-how	Dangers (Data Security)	Dangers (Fraud)	Product Characteristics	External Conditions	Others
Denmark	18,4	67,1	3,0	10,9	0,0	0,0	0,2	0,0	1,0
Finland	14,7	48,5	1,6	0,4	2,8	2,8	9,2	0,2	2,9
France	9,3	52,4	7,6	13,3	5,2	6,4	10,6	3,4	1,8
Germany	19,0	57,8	6,0	6,7	1,3	1,5	14,3	2,5	0,6
Ireland	12,0	63,5	3,3	4,3	6,9	0,2	5,6	0,1	12,1
Italy	10,4	67,7	2,1	4,5	1,7	1,1	9,0	0,4	0,0
Netherlands	5,6	24,9	2,8	5,6	4,5	1,1	26,0	4,5	18,6
Spain	9,0	43,1	1,0	9,5	2,6	0,9	24,1	3,7	10,4
Sweden	6,0	47,4	1,1	7,6	2,3	1,3	14,5	3,3	0,8
U.K.	10,8	60,8	5,3	9,0	6,9	3,1	8,3	1,0	3,2
<i>Total sample</i>	<i>11,5</i>	<i>54,4</i>	<i>3,7</i>	<i>7,7</i>	<i>3,4</i>	<i>2,1</i>	<i>12,4</i>	<i>2,0</i>	<i>4,6</i>
<i>EU10 average</i>	<i>12,1</i>	<i>55,8</i>	<i>4,6</i>	<i>8,1</i>	<i>3,4</i>	<i>2,5</i>	<i>12,8</i>	<i>2,2</i>	<i>3,2</i>

Base: Establishments neither using nor planning to introduce online procurement (n=2282)  
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#### 4.1.9 Resume

In sum it can be said that German households as well as the establishments are rather well equipped with information and communication technologies and provided with one if not the best telecommunications infrastructure in Europe. Despite these very good prerequisites for making best use of these technologies, the German population as well as employees are rather poor users of e-mail, internet and intranets. This especially holds true for SMEs whereas large corporations already make intensive use of all these means. The former seem to constitute a problem group in this respect.

A striking feature which became apparent in the analysis is the fact that many German establishments do not enable and / or allow a majority of its employees to freely use the internet or e-mail. German companies seem to exclude their employees from both and rate cost control at the workplace higher than more long-term oriented objectives such as the increase of independency and media competence of the workforce.

The demand for online banking and online shopping among the population is only starting to emerge in Germany which finds itself at European average levels and not more in both areas. Many of the interviewees argue that they do not see a need for neither online banking nor online shopping. Those using it mention the high levels of convenience as the key advantage. Companies themselves are also not very active in offering products online. German organisations are rather slow starters in the area of online sales (business-to-consumer). Their internet offers and websites are mostly of a passive nature, information provision with charge for the user is only provided in very exceptional cases. However, the latter also holds true for the vast majority of European countries. Many German but also European establishments do not see the need for online sales or are sceptical about its usefulness.

The strength of Germany in electronic commerce lays in the area of business-to-business applications. These include data exchange with suppliers and business partners over the internet, joint business processes with partners and online procurement. Here, Germany can be found among the leaders in Europe. German companies would be even more active in this area if more suppliers would provide their offers online.

Quite a few of the German establishments have already reached an advanced stage of electronic commerce in the business-to-business area. It appears that German organisations mainly make use of electronic commerce for rationalisation purposes and to achieve improvements in the efficiency of cooperations with suppliers and other partners in the value-added chain and less for selling to the private customer (business-to-consumer).

## 4.2 Telework

### 4.2.1 Telework penetration and growth

***Telework is booming in Europe and especially in Germany: diffusion and penetration have grown significantly over the past 5 years.***

In 1994 a high level expert group advised the Commission to set a target for Europe of 10 million teleworkers by 2000. New survey results from the ECATT project show that this target will be achieved: there are already 9 million Europeans teleworking.

The figure of 9 million teleworkers covers all kinds of telework, not only those regularly working a day or more per week away from the office at home or on the road using computers and online connections (6 million) but also those who do so less often, the “occasional” or supplementary teleworkers (3 million).

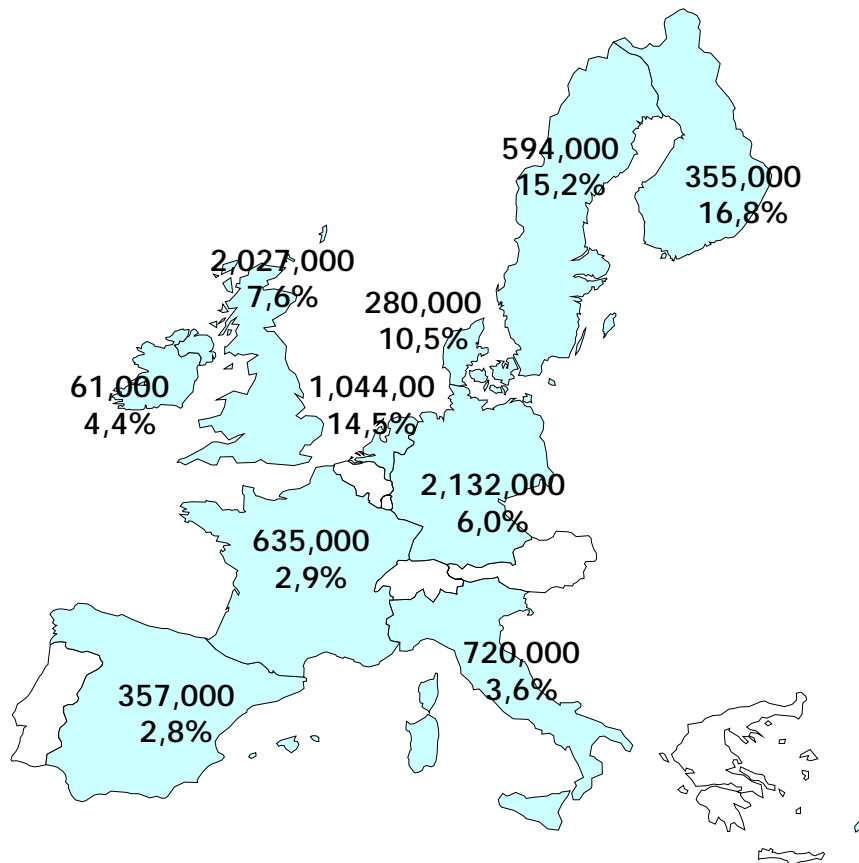
The overall European figure translates into an average of 6% of the European workforce. Here the ECATT survey exposes huge variation across the Member States. Whereas in some countries only half the average has taken up telework to date, in other countries such as Finland a massive 17% of the workforce is already taking advantage of these new techniques.

In Germany 6% of the workforce are teleworkers today. This figure is exactly the European average but still some distance away from countries like Finland and Sweden. This amounts to 2,1 million teleworkers in Germany. These can be classified as follows: 1/3 home-based teleworkers, another 1/3 self-employed in SOHOs and 1/3 being mobile teleworkers.

	<b>Teleworkers</b>	<b>supplementary teleworkers</b>	<b>total incl. supplementary</b>
Denmark	176.000	104.000	280.000
Finland	229.000	126.000	355.000
France	499.000	136.000	635.000
Germany	1.562.000	570.000	2.132.000
Ireland	26.000	35.000	61.000
Italy	584.000	135.000	720.000
Netherlands	593.000	451.000	1.044.000
Spain	259.000	97.000	357.000
Sweden	313.000	282.000	594.000
UK	1.273.000	754.000	2.027.000
<b>Total EU 10</b>	<b>5.515.000</b>	<b>2.690.000</b>	<b>8.205.000</b>
<b>Total EU 15</b>	<b>6.049.000</b>	<b>2.960.000</b>	<b>9.009.000</b>
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Number of Teleworkers in Europe 1999

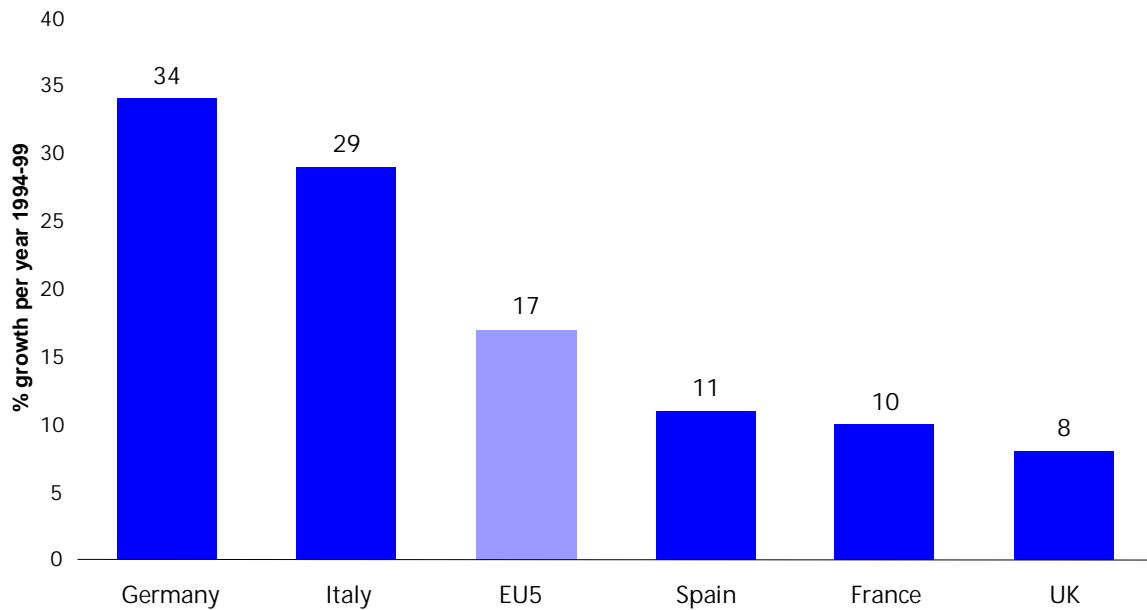
(absolute figures and in percent of labour force)



*The growth rates for telework penetration from 1994 to 1999 have been significant and highest in Germany.*

This variation in penetration across Europe is the result of quite recent trends. ECaTT partners have access to comparable figures from 1994 and further back for 5 countries, and these show how the growth of teleworking has differed over that period, from a modest 8% in the UK - starting from a leading position in 1994 - to a boom in Germany with an average 34% annual rate of growth over the 5 year period. The average annual growth in the number of teleworkers from 1994 to 1999 has been 17%.

Annual increase of teleworking population 1994-99 in %



#### 4.2.2 Interest in and potential of telework

##### *2/3 of the jobs in Europe can be performed in teleworking*

The so-called teleworkability of jobs is very high. According to the survey results 65% of the jobs lend themselves to teleworking, i.e., their job owner either works a minimum of 6 hours per week in an office job or at least 6 hours per week they perform tasks carried out at a desk or perform at least 6 hours per week using a computer. In Germany teleworkability almost reaches 70%.

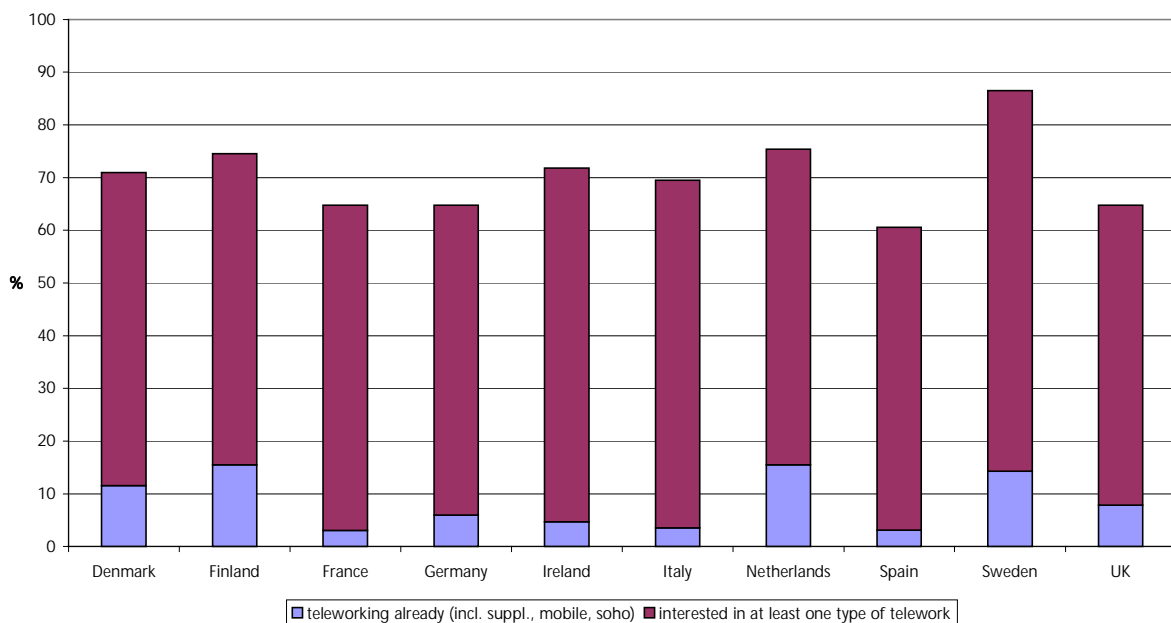
***A large number of individuals is interested in telework, the figures have even increased over the past five years. Interest on the side of decision makers in companies is at a lower level. However, the potential for a further rapid growth of telework is unbroken.***

Interest in telework among the workforce is at extremely high levels. 65% of the workforce in Germany but also in the whole of Europe indicate an interest in practising this new form of work organisation. Compared to the figures from 1994 interest has grown substantially from a former 53% to around 2/3 of the workforce in Germany. On the average European growth in interest has been around 1/3.

Practice and Interest in Telework overall			
in % of workforce			
	Teleworking already (incl. suppl.)	Interest in at least one type of Telework	Total (teleworking already or interested)
Denmark	11,58	59,35	70,93

Finland	15,52	58,97	74,48
France	3,04	61,74	64,78
Germany	5,99	58,76	64,74
Ireland	4,70	67,10	71,80
Italy	3,56	65,92	69,49
Netherlands	15,49	59,86	75,35
Spain	3,10	57,46	60,56
Sweden	14,29	72,18	86,48
UK	7,81	56,94	64,75
<b>Total Sample</b>	<b>7,76</b>	<b>61,26</b>	<b>69,02</b>
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**Interest and Practice in Telework overall:  
In % of Workforce**



Turning towards the interest of decision makers in establishments reveals that 37% are interested. Compared to 1994 interest has become slightly smaller. However, more than half of those companies already active in teleworking are interested in expanding it. German companies seem to have made very positive experiences with telework since these show an even higher interest in expanding telework of around 2/3. It can be expected that teleworking growth will to a significant extend take place via expansion of already existing schemes.

### 4.2.3 Characteristics of telework and teleworkers

***Telework is a male phenomenon and mainly practised by qualified and highly qualified professionals. Self-employed are more widespread among teleworkers than among “normal” workers.***

The average age of a European teleworker is 40. In Germany it is slightly less at 38. The extremes are Denmark (37 years) and Sweden (48 years). 29% of teleworkers are self-employed, i.e. a higher percentage of teleworkers is self-employed compared to those working as “normal” workers in the labour market.

***Telework has developed to a form of work organisation for qualified and highly qualified professions.***

As already seen by the results from the General Population Survey, teleworkers are mainly professionals and even managers. Qualified tasks clearly dominate. The old prejudice of the 80s that telework is a form of work organisation mainly for low qualified females could be disproved.

***Telework is an urban phenomenon.***

Despite a large number of activities and support programmes to bring teleworking to rural regions it still is an urban phenomenon. It is mainly being practised in urban and sub-urban regions.

***The majority of German teleworking schemes has been set up recently.***

In Germany, the implementation of teleworking on a larger scale took place rather recently. 54% of the teleworking schemes in Germany have been set up during the past two years. There is a marked difference towards for instance the UK and France, where most of the teleworking schemes have been implemented some more years ago. This situation could imply that teleworking uptake could become more rapid in Germany than in other countries.

***In those countries with recent support and stimulation programmes on telework a more rapid increase in telework diffusion and penetration can be observed.***

The highest dynamics can be found in those countries with recent support and stimulation programmes on telework. Countries such as the UK and France which terminated their support programmes a while ago show the lowest growth rates.

Years since beginning telework in % of establishments practicing telework 1999								
	less than 1 year	1-2 years	3-4 years	5-10 years	>10 years	don't know	n.a.	total
Denmark	7,50	38,63	16,28	24,99	10,31	1,77	0,52	100,0
Finland	8,82	17,66	17,38	43,08	8,99		4,07	100,0

France	15,00	28,15	19,45	23,04	10,33	0,98	3,04	100,0
Germany	5,10	48,88	17,54	13,93	7,80	3,59	3,16	100,0
Ireland	4,83	35,54	20,41	26,32	8,74	3,88	0,28	100,0
Italy	39,07	35,77	13,15	3,03		8,98		100,0
Netherlands	10,94	42,97	21,09	19,53	1,56	2,34	1,56	100,0
Spain	14,07	50,94	11,51	13,24	1,45	6,20	2,59	100,0
Sweden	3,76	28,71	23,26	30,59	5,65	8,04		100,0
UK	4,79	37,28	20,36	21,36	7,22	8,99		100,0
<b>Total</b>	<b>8,99</b>	<b>35,34</b>	<b>18,75</b>	<b>24,10</b>	<b>6,98</b>	<b>4,43</b>	<b>1,42</b>	<b>100,0</b>
<b>EU10</b>	<b>9,50</b>	<b>38,50</b>	<b>18,70</b>	<b>19,70</b>	<b>6,70</b>	<b>5,40</b>	<b>1,50</b>	<b>100,0</b>
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#### 4.2.4 Telework practise by establishments

*Already 1/3 of European establishments practise one form of telework or another. The figures in Germany a slightly lower and at around 1/4.*

Establishments with telework in % of establishments in Europe 1999				
	supplementary excluded		supplementary included	
	%	Ranking	%	ranking
Denmark	47,16	2	57,88	3
Finland	48,16	1	59,33	2
France	31,69	7	35,00	7
Germany	25,45	8	29,90	8
Ireland	32,60	6	39,09	6
Italy	15,25	10	17,21	10
Netherlands	35,67	5	46,00	5

Spain	17,59	9	20,02	9
Sweden	43,25	4	61,65	1
UK	43,47	3	54,98	4
<b>Total</b>	<b>32,45</b>		<b>39,74</b>	
<b>EU 10</b>	<b>29,70</b>		<b>35,80</b>	
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***Almost all European establishments with more than 1,000 employees practise telework. In Germany the figure is around 2/3. However, the figures are significantly lower among SMEs.***

All the very large establishments almost entirely practise telework, the smaller ones show a much more cautious behaviour. Only 15% of those with up to 10 employees and 25% with 10-50 employees practise telework. The corresponding figures for Germany are even lower – 8% and 14% respectively. Only Spain and Italy show lower figures in this category. It is impressive to see that in Germany telework penetration in establishments with more than 1,000 employees has risen from 10% in 1994 to a situation where almost all practise telework today.

***Supplementary telework, i.e. working from home for less than a full day per week using ICT, has become widespread in Europe.***

Supplementary telework has become very popular and widespread in Europe as a new way of working with already ¼ of all establishments practising it. In Germany the figure is 1/6 whereas in the Scandinavian countries already almost every second establishment employs individuals practising supplementary telework.

<b>Establishments with supplementary telework in % of establishments in Europe 1999</b>	
Denmark	46,12
Finland	43,51
France	14,51
Germany	15,79
Ireland	26,99
Italy	6,18
Netherlands	33,00
Spain	9,71
Sweden	48,56

UK	39,83
<b>Total</b>	<b>25,98</b>
<b>EU10</b>	<b>21,40</b>
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*Telework projects are still rather small in size.*

The size of teleworking projects is mostly between 1 and 9 teleworker per establishment. Only the frontrunner countries show a larger and worth mentioning share of establishments employing larger number of teleworkers. For instance, 6% of the Danish establishments employ more than 100 teleworkers each, in Sweden, Finland and the UK the figure is already beyond the 4% and in Germany at a rather low 0.4%.

<b>Number of teleworkers (incl. supplementray teleworkers) in % of establishments 1999</b>									
	<b>0</b>	<b>1-9</b>	<b>10-19</b>	<b>20-49</b>	<b>50-99</b>	<b>100+</b>	<b>don't know</b>	<b>n.a.</b>	<b>total</b>
Denmark	50,55	21,69	8,89	5,91	5,82	5,80	1,34		100,0
Finland	54,62	25,62	4,38	5,31	2,00	3,47	4,61		100,0
France	78,51	11,61	3,93	1,82	1,81	0,80	1,26	0,27	100,0
Germany	79,03	11,62	2,82	2,88	0,99	0,40	1,79	0,48	100,0
Ireland	69,75	22,16	2,27	1,71	1,48	0,14	2,48		100,0
Italy	91,57	5,97	0,46	0,83		0,07	0,81	0,28	100,0
Netherlands	62,33	20,33	5,00	6,00	3,00	1,67	1,33	0,33	100,0
Spain	86,60	6,83	1,38	1,37	1,08	1,17	1,36	0,20	100,0
Sweden	43,91	32,52	6,27	5,17	3,35	4,28	4,51		100,0
UK	56,27	19,14	7,28	5,82	2,95	4,05	4,43	0,06	100,0
<b>Total</b>	<b>69,75</b>	<b>16,29</b>	<b>4,04</b>	<b>3,41</b>	<b>2,07</b>	<b>1,99</b>	<b>2,27</b>	<b>0,18</b>	<b>100,0</b>
<b>EU10</b>	<b>74,00</b>	<b>13,40</b>	<b>3,80</b>	<b>3,20</b>	<b>1,70</b>	<b>1,50</b>	<b>2,10</b>	<b>0,30</b>	<b>100,0</b>
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***More than half of the establishments practising telework are interested in and plan an extension of their teleworking schemes.***

European organisations seem to be very satisfied with their teleworking schemes, otherwise these high figures would not have emerged. Especially the German establishments seem to have made very positive experiences with telework since 2/3 of them plan an extension of their teleworking schemes. It is not unlikely that a large growth in teleworking will occur strongly emerging from extensions of current schemes in the near future.

<b>Interest in extending telework in % of establishments practicing telework 1999</b>					
	permanent	alternating	supplemen- tary	exclusive self employed	non-exclusive self employed
Denmark	66,87	65,87	66,24	62,76	45,83
Finland	60,48	41,44	51,18	65,93	57,94
France	16,84	47,15	36,77	23,78	33,67
Germany	83,07	63,13	64,37	58,15	54,73
Ireland	31,76	57,40	45,48	52,86	82,44
Italy	59,71	34,70	39,95	63,63	38,72
Netherlands	40,00	58,33	49,49	33,33	34,78
Spain		56,15	48,90	24,68	59,87
Sweden	54,97	55,68	47,11	22,83	46,85
UK	59,05	44,74	43,71	34,79	40,27
<b>Total</b>	<b>54,78</b>	<b>53,93</b>	<b>50,45</b>	<b>44,30</b>	<b>48,44</b>
<b>EU10</b>	<b>58,70</b>	<b>52,70</b>	<b>49,00</b>	<b>40,20</b>	<b>44,20</b>
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#### 4.2.5 Barriers to Telework

***Data security and lack of management skills pre-dominate the barriers to telework. However, many establishment have identified telework as a means to increase competitiveness.***

Data security problems rank top as constraining factor to telework implementation followed by the problems of managing teleworkers by their superiors. Also still quite a few organisations have doubts as to the productivity of teleworkers and a sufficient quality of their work results. Problems with the trade unions and an expected resistance from the workforce are negligible. Slightly different to other countries German decision makers

seem to show some more conservative attitudes since the reason “We do not need telework, everything went well so far and we do not expect this to change” ranks second.

Problems of the past such as those in the area of access of teleworkers to central computers, telecommunications and the related cost have become almost negligible and only rank seventh in the list of barriers. The rapid developments in the area of e-mail, internet and intranet in the past five years since the last survey was carried out will have contributed to this.

<b>Barriers for telework in % of establishments 1999</b>										
	insuffi- cient know- ledge mana- gers	expen- ses	produc- tivity/ work quality	difficul- ties mana- ging telewor- kers	pro- blems organi- sing commu- nica-tion	health, safety, insu- rance, legal pro- blems	data securi-ty pro- blems	lack of pres-sure for change	emplo- yees would not want	resis- tance from trade unions
Denmark	45,61	46,33	38,22	36,01	36,59	30,34	51,47	31,76	33,46	15,53
Finland	44,45	38,25	39,01	40,73	34,60	22,48	52,96	45,18	23,14	12,34
France	60,69	55,81	66,94	66,92	62,92	52,96	77,12	60,97	50,37	47,44
Germany	37,93	42,26	42,00	41,83	34,72	27,83	52,53	50,11	40,35	13,68
Ireland	68,11	58,26	66,94	66,18	54,63	49,97	63,99	52,55	33,65	25,28
Italy	62,77	39,93	51,94	48,97	41,42	35,10	58,35	42,30	26,18	31,07
Netherlands	51,00	32,67	59,33	50,00	42,33	38,33	54,33	41,00	23,00	18,67
Spain	74,43	65,02	69,70	65,58	59,46	54,18	73,38	57,53	45,70	39,50
Sweden	55,28	47,01	52,75	49,60	37,48	44,64	67,65	39,61	37,15	26,65
UK	55,16	52,38	58,58	58,93	45,78	45,26	61,16	49,19	31,01	15,40
<b>Total</b>	<b>56,24</b>	<b>48,72</b>	<b>55,28</b>	<b>53,40</b>	<b>45,93</b>	<b>40,82</b>	<b>61,96</b>	<b>48,08</b>	<b>35,39</b>	<b>25,59</b>
EU 10	54,1	48,1	54,9	53,5	45,7	40,3	61,8	50,0	37,1	25,4

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#### 4.2.6 Telework potential, trends, prognosis

*Telework will continue to take off and step-by-step become a “normal” way of working for many office workers.*

Given the fact that on average 60% of the workforce and more than 30% of decision makers in establishments in Europe express an interest in telework or already practise telework it can be assumed that there is a large potential for a further (and even more) rapid uptake of telework in the coming years. These figures do not include mobile teleworkers and supplementary teleworkers. Bearing this in mind the potential will be even

higher. There is no doubt that the objective of 10 million teleworkers by the year 2000 will be achievable.

<b>Interest (practice included) in telework in Europe 1999</b>		
<b>(excluding mobile telework and supplementary telework)</b>		
	<b>in % of establishments</b>	<b>in % of workforce</b>
	<b>DMS</b>	<b>GPS</b>
Denmark	48,65	64,7
Finland	55,11	70,4
France	24,86	58,9
Germany	30,59	56,5
Ireland	24,99	62,7
Italy	14,25	62,2
Netherlands	41,00	64,4
Spain	18,98	50,7
Sweden	41,96	74,8
UK	34,98	58,7
<b>Total</b>	<b>31,52</b>	<b>61,4</b>
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#### 4.2.7 Resume

Germany has been faced with a telework boom experiencing enormous telework growth rates over the past five years. Almost all large organisations are already practising telework, the smaller ones are following along the same routes. Despite this growth rate Germany still is not the country leading in terms of telework penetration: Finland, the Netherlands, Sweden, Denmark and the UK all reach even higher penetration rates up to almost 11% of the workforce in Finland as opposed to 4.5% in Germany.

Interestingly, telework has developed to a mode of working for qualified and highly qualified professionals throughout Europe.

Telework potential, i.e., the likelihood for a continuation of telework growth, is high given the fact that interest in and consideration of telework as an option at high levels on both sides, the population and decision makers in establishments. The lower levels of interest among decision makers in companies can be explained by the fact that in 1994, when

telework has not been that popular, it was easy to express an indifferent interest in telework, whereas today, telework has become a very concrete topic and decision makers will have a much better understanding of what it implies and the effort and problems associated to its implementation. It is against this background that they now have begun to take a more differentiated view and become a bit more reluctant in easily expressing an unanimous interest.

Telework growth can be expected via the expansion of existing schemes which are still rather small on average plus newcomers coming from all sectors and companies of all sizes. In addition one should carefully watch the developments taking place in the area of supplementary teleworking. Many of these individuals will become “real” teleworkers in the near future but there will also be a strong growth of supplementary telework in parallel.

Many problems of and barriers to telework have successfully been removed in the past five years. For instance access of teleworkers to central computers, telecommunications and the related cost have become almost negligible as barriers. The rapid developments in the area of e-mail, internet and intranet in the past five years since the last survey was carried out will have contributed to this. Problems with the trade unions and an expected resistance from the workforce are also negligible. With the major exception of Germany one can also observe a decreasing level of conservative attitudes towards telework and a much more open mind towards innovative forms of work organisation as a means for increasing competitiveness.

However, data security problems rank top as constraining factor to telework implementation followed by the problems of managing teleworkers by their superiors. Also still quite a few organisations have doubts as to the productivity of teleworkers and a sufficient quality of their work results. It is high time now that technological as well as organisational solutions with high usability for ensuring data security are developed (or if already existing, better promoted) and find their ways into the organisations.

However, changing manager’s attitudes and behaviours will be much more difficult. The success of telework like with any other implementation of more flexibility into our organisations and the workforce heavily depends on how we manage to solve this problem.



## 5. Conclusions

### 5.1 Telework

- Germany has managed to steadily and at a very high speed progress in the distribution and penetration of telework with the highest annual growth rates in Europe over the past five years.
- However it still finds itself only at the European average. Countries like Finland, Sweden, Denmark, the Netherlands and the UK are ahead.
- The growth rates for the coming years indicate the continuation of a steep uptake of telework in all European countries.
- German Federal and Federal state governments have invested heavily in different telework awareness raising and funding activities aimed to support the implementation of telework in SMEs and in general.
- Obviously these activities had its successes which can be seen from the results of the ECATT surveys of the population and establishments where Germany turned out to be the most dynamic European country over the past five years with respect to telework implementation and penetration.
- Telework no longer lives in the shadow in Germany but has become a key topics in media and the press.
- With its current telework initiative DATEL “Secure Telework in Public Administrations” German government has started to close probably one of the last remaining gaps with respect to telework uptake.
- Union initiatives such as TELEWISA and Online-Forum-Telearbeit (OnForTe) are also positively contributing to the wider spread of telework in Germany.
- It appears as if key players in policy at Federal as well as at Federal state level and among the social partners in Germany have learned their lessons over the past five years and are now constructively and jointly working together to make telework a widespread reality in the country.
- Key ministries at Federal level have developed a joint strategy or are at least cooperating in the area of telework initiatives (BMWi, BMA and bmb+f). However, and in order to make Federal state policy concerning telework even more homogenous and consistent other ministries such as the financial ministry should also be involved to modify some of the existing laws and regulations still negatively impacting the spread of telework, thereby counteracting initiatives run by other ministries. These include for instance the current rules concerning tax deductions of workplaces in private homes and the allowances paid to teleworkers by their employers which are currently taxed at the top rate with social security payments also being paid on this sum. These would be rather minor but nevertheless rather powerful means for speeding up the telework penetration.

### 5.2 Electronic Commerce

- Germany does not rank top when it comes to Electronic commerce uptake in the b2c area. Germans but also Europeans in general are cautious when it comes to online shopping mainly because they do not see a need for it.
- However, the growth rates show some signs of (slow) change.
- A striking feature is the fact that many German establishments do not enable and / or allow a majority of its employees to freely use the internet or e-mail. German

companies seem to exclude their employees from both and rate cost control at the workplace higher than more long-term oriented objectives such as the increase of independency and media competence of the workforce.

- Large companies have jumped on the internet and electronic commerce train. They seem to be well prepared for the information age. SMEs are less well prepared and will have a hard time. Especially those with up to 10 employees: just ¼ of them use e-mail, a third the internet and only slightly more than 10% an intranet.
- German establishments have identified the advantages associated with an information offer and a presence in the internet and have started appropriate actions.
- The strength of Germany in electronic commerce lays in the area of business-to-business applications. These include data exchange with suppliers and business partners over the internet, joint business processes with partners and online procurement. Here, Germany can be found among the leaders in Europe. German companies would be even more active in this area if more suppliers would provide their offers online.
- Quite a few of the German establishments have already reached an advanced stage of electronic commerce in the business-to-business area. It appears that German organisations mainly make use of electronic commerce for rationalisation purposes and to achieve improvements in the efficiency of cooperations with suppliers and other partners in the value-added chain and less for selling to the private customer (business-to-consumer).
- Electronic commerce also has become one of the key topics in media and the press in Germany. It has also – already rather early – found its way into Federal and Federal state policy. However, it has taken quite some time for policy initiatives to be actually started after their announcement.
- The initiative "Electronic Commerce" by the Federal Ministry of Economics and the information society initiative "Forum Info 2000", both started in 1996, have actually started to become active in 1997 mainly as awareness raising activities. These have contributed to increasing public discussion about this topic and enabled multiplier organisations to make themselves familiar with the issues around electronic commerce to better advise their members on suitable electronic commerce strategies to be developed and followed.
- Electronic commerce competence centres in 1998. It is still too early to judge whether these competence centres already had or will have an impact on the further spread and development of electronic commerce in Germany. An appropriate evaluation of this initiative could shed some light on this.
- The same holds true for the initiative of the Federal Ministry for Economics and Technology (BMWi) called "Modellvorhaben zur Foerderung des elektronischen Geschaeftsverkehrs im Mittelstand" (Pilot projects fostering electronic commerce applications in SMEs) announced on 1<sup>st</sup> October 1999.
- D21 started in mid-1999 is a somewhat exceptional initiative since it was originated by industry and was not started by government. The aim is to support the transformation of Germany towards an information society by way of a number of projects set up as public-private-partnerships. Since it already just started a judgement is not yet possible.
- Initiatives like the "Transatlantic Business Dialogue (TABD)" by the European and US industry and "Global Business Dialogue for Electronic Commerce" by the CEOs of large international corporations, where large German corporations are also involved, seem to be an appropriate approach to develop recommendations, measures and appropriate actions to impact political as well as industrial developments in a positive way. However, it is too early to already now judge on their success or failure.
- Initiatives like "Schulen ans Netz" (Schools to the net) are appropriate means to familiarise pupils with PCs and internet. What is missing in Germany are initiatives like the Danish "Home – PC" arrangement to bring both faster also to the employees. The

Danish "Home – PC" arrangement started in 1997. Under this arrangement enterprises can give PCs to their employees under favourable conditions, i.e. full or partwise reduction of the tax value of PCs made available for work purposes at home or training. Some thought should be given to such an initiative to find out whether a similar arrangement could be implemented in Germany since it would probably help to speed up the spread and use of PCs at home for work purposes (telework) and online shopping, banking etc., i.e. electronic commerce.