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Federal Ministry of
Education and Research

Innovation and Jobs

in the Information Society
of the 21st Century



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Action Programme by the German Government

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Summary

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Taking advantage of the change to the information society to promote innovation and employment

The German Government has entitled this action programme "Innovation and Jobs in the Information Society of the 21st Century", for combatting unemployment, and securing a high and sustainable level of employment, are the decisive challenges facing politicians in the Federal Republic of Germany at the start of the new century.

But unemployment can only be combatted if we succeed in mastering the transition from the industrial to the information society in our country. At present only temporary additional employment is being created in many sectors of the economy, stable employment is mainly to be found in the services sector. Here the modern information and communications technologies are among the driving forces. The opportunities offered by the information society must be utilised more consistently for the production and use of knowledge, and to increase employment. Germany must make better use of its knowledge – for new products, new services and new opportunities on growing markets. The conditions are good. Now joint efforts by politicians, employers and unions are needed to gather our forces and set the necessary actions in motion.

The digital age will change every aspect of life

There can be no doubt that the modern information and communications technologies will have a lasting and stimulating effect on the economy as a whole and on employment policy. The direct availability of information, independent of location, and the facilities for the rapid exchange of information and the renewal of knowledge are now of crucial importance for employment and growth. The developments stimulated by the new information and communications technologies will open up new opportunities in many areas of life. Increasing use is being made of modern IT facilities in health care, for instance. These technologies will also bring far-reaching changes in the transport sector; they will ensure mobility, direct traffic flows and support lasting environmentally-friendly developments in our society through better means of processing information and data.

The modern information and communications technologies are opening up new opportunities to provide the individual with an optimal range of basic, further and advanced training. This will promote independent self-organised learning on individual responsibility. It will also help the individual to adjust to a range of rapidly changing occupational requirements. Network-based learning is breaking open the traditional teaching structures and providing a better combination of the contents and organisation of basic occupational training and the later advanced training. So it is an essential building block in lifelong learning, leading to independent learning on individual responsibility and in new forms of cooperation.

Far-reaching changes are taking place in the economy. Sectors that have so far been separate, like telecommunications, information technology and the new media are growing closer together. The dynamic expansion of the Internet is giving companies chances to achieve growth in productivity that has never been possible before, particularly in electronic business, and opening up new markets.

Nowhere is globalisation so evident as on the Internet and the markets and products of the media and communications industry. Their development and spread are not only the expression of globalisation, they are its main driving forces. No country can take it for granted that it can keep the position it gained in income and employment in the industrial age in the information age. Knowledge and innovative ability are the decisive production factors now. To utilise these to create new scope for employment is the central task for the 21st century.

A good starting position for Germany in many sectors

In our country the information industry is already one of the most important for growth and employment in the economy. It now employs 1.7 million people. The sector is expecting further growth in demand for 1999, with an increase in the market for information and communications technology from DM 191 billion in 1998 to DM 206 billion in 1999, that is, an increase of 7.8 %. If so, this would put this sector ahead of the automotive industry for the first time. The growth in

employment for 1999 over 1998 is expected to be 3 %, again considerably exceeding the growth rate of the previous year. It is estimated that about 350,000 additional jobs could be created in this sector in Germany by the year 2002, if the appropriate conditions are created and further clear progress can be made in all the relevant fields of action.

The social climate is favourable. There is consensus in broad sections of society that the change to the information and knowledge society can only be achieved if the state and the private sector develop and implement a joint strategy. The initiative "Germany 21" by the private sector to plan and implement concrete public relations projects and actions in public-private partnerships points in that direction, and it has the support of the German Government.

In many sectors the technical conditions are excellent, as in parts of the telecommunications and IT infrastructure. Over 230,000 km of fibre glass cables have been laid, so increasing the data transmission capacities many thousand fold, especially over long distances, compared with the traditional copper networks. The German Research Network is the fastest scientific data autobahn in the world. Germany occupies a leading position worldwide in research and development in optical networks and mobile communications.

The Information and Communications Services Law was the first step to a reliable legal framework for the use and application of the new media, and it is meeting with growing recognition on European and international level. That also applies to the freedom of registration for multimedia services, the regulations on data protection on networks and the voluntary self-control for youth protection. The liberalisation of the telecommunications markets since January 1, 1998 has helped to bring about a drastic reduction in prices and so an effective increase in the competitiveness of German companies. The Regulatory Authority for Telecommunications and Postal Services has issued more than 500 licences for speech and telephone networks alone since liberalisation started.

The need to eliminate present weak spots

However, we must point out that so far other countries are ahead of us in the spread and use of the Internet and modern multi-media applications. In the United States more than 30 % of the population use the Internet, in Germany just on about 9 % so far, despite considerable growth rates. Moreover, the information sector is developing at a dynamic rate worldwide. Traffic on the Internet is growing at between 10 % and 20 % a month, and the prognoses for growth in electronic trade are breathtaking. Internet transactions like electronic commerce are not subject to shop closing times, nor are they dependent on a city location. Anyone who provides complete electronic shopping, on-line up-to-date product information, and so creates market transparency, is intensifying competition and opening up new fields for business. New markets, and so options for growth and employment, are being created and distributed all the time. There has certainly been an upswing in the use and spread of modern information and communications technologies in Germany too in recent months, and the number of users is growing all the time. But fewer and fewer technological innovations in this sector are "made in Germany".

Modern information and communications technologies are still not having a sufficiently broad effect in German companies, especially small and medium-sized firms, and Germany's position on international bodies in the IT sector is still weak. We have too weak a research basis on subjects specific to the Internet, and insufficient use of the Internet and multi-media in all our educational facilities, from the schools through vocational training to the universities.

The German economy suffers from a considerable lack of suitably qualified IT staff. At present the German labour market is short of 75,000 specialists in information technology and the media, and demand for highly trained staff in this field is expected to grow further over the medium term. Joint efforts are needed here by the German Government, the employers and unions, and agreement has been reached to tackle the problem through the Alliance for Jobs, Training and Competitiveness.

Germany's aim: a leading position in Europe's information society

The accelerated use and spread of modern information and communications technologies has priority for the German Government in economic, research, technology and education policy. It is our task to help shape the change to the global information society and advance the accelerated use and spread of modern information and communications technologies in industry and society. This will require promoting the ability of society to adjust and the competitiveness of the private sector and so helping to open up new and sustainable employment potentials. The German Government's vision for the future is to put Germany in a leading position in the information sector in Europe. This will affect nearly every policy area. In addition to the legal conditions, the infrastructure, research and technology, the modernisation of our education system is a central focus.

The general aims

The German Government's action programme "Innovation and Jobs in the Information Society of the 21st Century" covers the activities needed to launch our move into the information age. The main aims are:

1. to increase the spread and use of modern information and communications technologies in every sector of the economy and society with the aim of achieving a leading position internationally within the next five years. This will require the entire available potential skills of men and women to be mobilised and utilised.
2. To ensure that all social groups are involved and that men and women have equal chances in the comprehensive use of modern information and communications technologies. Groups that have so far been under-represented and disadvantaged should be given easier IT access.
3. To safeguard the interests of the general public and protect human dignity, especially to ensure the protection of children and young people, to protect consumers, ensure each individual's right to self-determination in information and provide sufficient means of protecting sensitive information.
4. The thorough modernisation of school and vocational training systems with the aim of giving every pupil and student a basic knowledge to enable them to handle the modern information and communications technologies responsibly; to give teachers the requisite knowledge of the multi-media facilities.
5. To maintain and expand the high level achieved in basic research and the development of new IT applications in order to make optimal use of the possibilities for innovation and growth within Germany and join the front rank internationally.
6. To expand the IT infrastructures in order to maintain our present international lead in telecommunications.
7. To increase the spread of innovative forms of work and corporate organisation, in order to enable the potentials of information and communications technologies to be utilised to strengthen the innovative ability, flexibility and productivity of companies. The skills and motivation of the employees must be able to develop in flexible forms of work organization.
8. To make full use of the potentials offered by the development and introduction of the new technologies for ecological modernisation oriented to the model of sustainability based on AGENDA 21 of the Rio Conference.
9. To achieve comprehensive use of the information and communications technologies in every area of the public sector and so increase the efficiency of the public administrations. The aim is to provide up to date and transparent information for the general public and to simplify communication between individuals, companies and the administration.

10. To promote cooperation in Europe and on international level, in order to remove existing obstacles and avoid new barriers on the way to the global information society.

Concrete targets up to 2005

To ensure that Germany achieves and holds a leading position in the digital age joint efforts are needed by politicians, employers and all the major groups in society to reach the following concrete targets within the next five years:

- an increase in the share of Internet subscribers in the total population from 9 % in 1999 to more than 40 % by the year 2005. Special efforts will be made to encourage more women to use the Internet.
- Sustained development of the legal framework for information, communications and the media, while observing the competences of the Federal Government and the Länder.
- To equip all schools, vocational training centres, general and occupational advanced training facilities with multi-media PCs and Internet connections by the year 2001. A leading position worldwide in education software by the year 2005.
- To ensure that all universities use networked computers for taught units and independent study. To integrate the new media in the changing forms of lifelong learning.
- To double the number of multi-media companies from the present c. 1,500 by the year 2001. To increase the share of small and medium-sized firms using external networks to a level comparable with that of larger firms.
- To expand the volume of training in the new IT occupations to 40,000 places by the year 2003. To increase the supply of skilled personnel for IT work by around 250,000 by the year 2005, and in doing so clearly increase the share of women in IT vocational training and on informatics courses.

- To develop a modern IT strategy for the Federal administration by the summer of 2000 and ensure the broad use of modern information and communications technologies in the public administration.
- To introduce electronic tendering and contracting for public works, and achieve the use of electronic tax declaration across a broad front in the financial administration from the year 2000.
- To expand the German Research Network (DFN) to the high-speed network in the gigabit sector by the year 2000.
- To develop pure optical networks by 2005 – fibre glass cabling for every household by 2010. To develop new broad-band mobile communications systems with access to multi-media services at all times and in every location, and cable-free Internet access from 2003.

Strategic field of action

To achieve these aims concrete action will be needed in the following strategic fields:

Ensuring broad access to the new media and providing media competence

The acceptance of the information and communications technologies in society is the key to their broad use in the economy. In Germany, however, there are considerable shortfalls here at every level of use – private households, small and medium-sized firms, the public sector and education. So broad sections of society must be given more encouragement to use the information and communications technologies. Access to the Internet must be made possible for every group in the population and they must be helped to acquire media competence.

To achieve the objective of better access to the new media and strengthen media competence the following actions will be carried out:

- The Federal Government will work to make the Internet accessible to a broad section of the population as part of an information and demonstration campaign entitled "The Internet for All". It will launch initiatives to ensure that men and women have equal shares in shaping the information society. The Information Society Forum will be an important platform for this. The Federal Government will work for partnership in innovation between the private sector and politicians and support private initiatives.
- The Federal Government will launch initiatives jointly with the Länder and the employers in order to improve the equipment of schools, vocational training centres and universities with computers and networking. It will promote this modernisation campaign as part of an overall strategy to develop high quality learning and teaching software and set up a computer exchange for schools.
- In conjunction with the private sector and the employers and unions the Federal Government has agreed measures that should rapidly eliminate the shortage of skilled personnel in the information sector and enable the growing demand for highly qualified IT personnel in the next few years to be met. This will include support in building up a further education system specific to IT and the media, expanding the supply of advanced training offered through the Federal Employment Institute and supporting the training fund, which is designed as a public-private partnership.

Increasing the confidence of suppliers and users with security legislation

An essential prerequisite for the economic and technological development of the information society is confidence on the part of all involved – suppliers, users, state supervisory authorities and data protection control offices – in the security of the technical systems and the means of protection against their misuse through illegal and harmful action. It is crucial for Germany on entering the information age to have a framework of legal regulations that will prove

viable for the future with the increasing convergency of telecommunications, the media and information technologies. Here too it must be said: firms can only grow and provide permanent jobs for the future if the legal framework is secure and reliable and does not restrict competition.

To achieve the objective of a legal framework that is secure and will promote confidence the following actions are being started:

- The Federal Government will begin talks with the Länder in order to work out joint proposals for a viable development of the general regulations on information, communications and the media, while observing the competences of both sides.
- By continuing and intensifying the campaign "Security on the Internet" the Federal Government will strengthen the sense of security in broad sections of the population. The measures on crypto-policy decided at the beginning of the year are to be implemented rapidly. The use of digital signatures will be supported with pilot applications and initiatives on legislation and standardisation on national and international level.
- The Federal Government will start a thoroughgoing redesign of the Federal data protection legislation, in which the principles of the Tele-services Data Protection Law will be the general principle; this will slim down the regulations in this field and improve transparency.
- The Federal Government will soon present draft legislation to set an adequate legal framework for consumer protection. The main focus will be on implementing the European directive on consumer protection in long-distance sales.
- The Federal Government will continue to play an active part in the creation of internationally accepted conditions for the global information society. It will focus particularly on regulations that will promote competition, i.a. in the taxation of Internet-based transactions, and work to achieve effective protection for consumers and users.

Securing and expanding our leading position in technological development and infrastructure

Compared with the industrial society, the information society needs a new infrastructure – above all, it needs efficient information networks. The strong growth of Internet transactions and the need to transport growing quantities of data over longer distances and in shorter times require even faster and more efficient communications networks. Technological conditions have to be created for new network generations, which will enable transmission speeds into the terabit area, i.e. 1,000 gigabits per second. Broad-band mobile communications networks are needed which give access to multi-media services at any time and in any place, so providing a cable-free Internet service.

In order to achieve the objective of securing and expanding our worldwide leading position in technological development and infrastructure the following actions are being carried out:

- The Federal Government is pursuing a modern telecommunications policy for the provision of innovative broadband transmission techniques. This includes accelerating the transition from analogous to digital radio transmission and the rapid introduction of the third generation of mobile phones (“the Internet on your mobile”).
- The Federal Government will promote the development of the technologies necessary for the next generation of networks and their testing under realistic network conditions, and the development of broadband mobile communications systems with access at any time and in any place.
- The Federal Government will support specific Internet technologies, like mobile agents, software developments and network-related applications and start pilot projects to develop means of secure communication in open networks and the software and hardware platforms necessary for mobile multi-media equipment.
- The Federal Government will expand the German Research Network into a high performance network for all scientific institutions.

Opening up innovative applications

The Internet and the new information and communications technologies offer a wide range of applications and employment. These include electronic commerce, tele-work, the construction of virtual corporate structures, multi-media public information systems for local councils, parliaments and governments, digital libraries, greater use of telematic transmission systems and the use of multi-media for ecological modernisation and the sustainable development of our society. In the case of the new multi-media applications the small and medium-sized German suppliers in particular need to position themselves appropriately, for new markets are being created and occupied now. The public must be made more aware of multi-media applications, and these need to be demonstrated and distributed.

In order to open up new fields of multi-media application and hence opportunities for additional employment the Federal Government is starting the following actions:

- The Federal Government will give financial support to the regional competence centres for electronic commerce up to mid-2001. The centres should provide a comprehensive network for issues related to electronic commerce (electronic platform, joint events on specific themes like digital signatures, electronic payments procedures)
- The Federal Government will support the creation of jobs in the multi-media field by specifically promoting new technology-based firms, i.a. through the “Competition for Founders of Multi-media Firms”.
- The Federal Government is starting initiatives to expand tele-work in our society and enable this to be arranged to suit the family better. An Internet exchange for tele-work is being set up in conjunction with private companies.
- The Federal Government will start initiatives to open up new fields of application and employment and contribute to the ecological modernisation and sustainable development of society

through the use and distribution of modern information and communications technologies in telematic transmission, health care and the services sector.

Promoting state modernisation

The public sector should become the general driving force for accelerated application of the new information and communications technologies, by itself acting as model for exemplary initiatives and by providing the electronic networking for individuals and firms. In establishing electronic commerce particularly it can act as interface for important corporate areas and play a promoting role. The projects outlined below will serve to increase the transparency of the public administration and improve the service for individuals and firms. At the same time these projects will perform a pilot function in collecting practical experience of the possibilities and opportunities offered by information technology in the public administration.

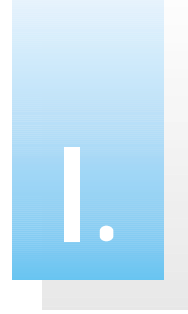
- The Federal Government will develop a comprehensive IT strategy for the public administration with modern bases for the information services offered by the Federal administration by the year 2000.
- The Federal Government will adapt the core regulations in the legislation on tendering for public contracts to the new possibilities for electronic tendering by the end of 1999, so that in future offices giving public contracts will be able to use electronic tender procedures.
- The Federal Government and the Länder are working to make it possible for income tax declarations to be submitted electronically from January 2000. This will be extended to other types of tax.
- As part of its "Employment Office 2000" project the Federal Labour Office will modernise and expand the processing of information. The quality of its services is to be improved and where possible these are to be offered from a single source. This will entail making information

available independent of location, and this will be achieved by computerising all the workplaces in the Labour Office.

Shaping change together

This account of the "Action Programme for Innovation and Jobs in the Information Society of the 21st Century" gives a full presentation of the actions and objectives of the Federal Government to ensure that Germany has a leading position in Europe in information and communications technologies. But it is more than a Federal Government action programme, it is an offer to all groups in society to help shape the information society. The action programme is not intended to round off the discussions that have now been started with the Länder, the employers, researchers and the unions or the relevant talks in the Alliance for Jobs, Training and Competitiveness, it should stimulate further meetings and joint measures.

Germany enters the Information Age



1. Opportunities and Challenges

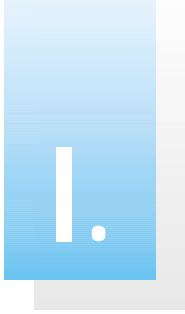
On the threshold to the 21st century Germany is in transition to the information society. The developments stimulated by the new information and communications technologies will bring changes in every area of life, some of which will be fundamental. Hardly an aspect of private life or the world of work will be unaffected. In health care, for example, the possibilities offered by tele-medicine are being used with growing frequency. In universities and research establishments computerisation and communication through networks has been part of the normal procedure for scientists and research workers for many years now. More and more of our schools are linking up to the network and starting to use multi-media technology in their classrooms. In business and industry, too, far-reaching changes are taking place. Sectors that used to be separate, like telecommunications, information technology and the new media, are growing ever closer together. The advance of the Internet is an impressive example of the dynamic rate of these developments. In 1993 there were just 130 websites offering products on the Internet. Only three years later there were 100,000 and now there are several million. The Internet is opening up possibilities for companies to achieve dramatic growth in productivity, e.g. through business-to-business electronic commerce. Electronic business is becoming the epicentre of the changes in our economy. Globalisation is lifting international competition and international cooperation quasi on to a new level, and at the same time the global information networks are making the world an electronic village. Against that background no country can take it for granted that it will be able to maintain the position in incomes and employment that it achieved in the industrial age in the information age. Knowledge and the ability to innovate are the decisive production factors today, and they created Germany's prosperity in the century that is now coming to an end as well. To develop these further and create new scope for employment is our central task in the 21st century.

Federal Chancellor Schröder made the importance of the new media and the information and communications industry for the Federal Government's policy clear in his first statement as Head of Government on 10 November 1998. A responsible media policy, he

said, would be of "central importance". The Federal Government's policy was intended "to accelerate the use and spread of modern information and communications technology in our society". All the groups in society must be involved, and efforts made to ensure that men and women are treated equally, socially and at work. The aim is to ensure that Germany has a leading position in Europe on the way to the information and knowledge society.

Shaping the way into the information society and utilising the chances offered by the new media is at the top of the political agenda for the industrial countries all over the world. Some, like Great Britain, France, the United States and Japan, have evolved national action plans to advance the intensive use of the modern information and communications technologies. Some of the objectives are very ambitious. The Blair Government, for instance, wants to double the number of small and medium-sized firms that are using the new information and communications technologies to increase their competitiveness by the year 2001. By 2002 25 % of the state-run services in Great Britain are to be available electronically. In France the Jospin Government put forward an action plan in January 1998, one of the main features of which is to initiate measures to encourage the use of IT in the education service and the public administration. All official forms, for example, are to be made available on the Internet, and by 1999 companies are to have the choice of submitting their social security declarations electronically. In all these countries the initiatives are based on the expectation that the modern information and communications technologies will have a lasting and stimulating effect on society and the economy as a whole and on employment policy.

In the Federal Republic of Germany combatting unemployment and ensuring a high and sustainable level of employment – while pursuing ecological modernisation in the form of sustainable development – is the decisive challenge for policy at the end of the 20th century. Hence, the Federal Government made clear in its statement on 10 November 1998 that reducing unemployment is the most important objective for this legislative period.



Germany enters the Information Age

This objective can only be achieved if the transition from the industrial society to the information society is mastered. So developing a modern information industry in Germany that is competitive worldwide, and creating optimal legal conditions and the appropriate infrastructure, has priority for the Federal Government in economic, research, technology and education policy. The Federal Government sees its task today as playing an active part in shaping the change to the global information society and accelerating the use and spread of modern information and communications technologies in the economy and society.

In this process it must be ensured that the potentials of the information and communications technologies benefit all members of society. A split into an "information elite" and a less well-informed section of society must be avoided. It would not only be unjust, it would be highly inefficient, as beside capital, the intellectual and creative resources of people are the main production factor in the information society. So Germany's competitiveness will depend even more than in the industrial age on whether the people in our country are qualified in handling the new information and communications technologies and can make creative use of them.

The present action programme formulates the objectives of the Federal Government to shape the information society; it also gives a survey of the state initiatives to increase access to the new media, strengthen media competence in every section of the population, provide a firm set of regulations, further develop the technological base, build up the infrastructure and ensure social participation. The programme builds up on numerous activities in recent years in parliament and by the executive. Among the most important of these are the analyses and recommendations by the Commission of Enquiry into "The Future of the Media in the Economy and Society", the activities of the Council for Research, Technology and Innovation on "The Information Society – Opportunities, Innovations and Challenges" and the Report by the Federal Government's Forum Info 2000, "Germany's Way into the Information Society 1996/1997". Further stimulus in shaping the information society has been provided by the Telecommunications Law and the Law on Information

and Communications Services, and from the promotion of IT research and development, on which the Federal Government has spent about DM 1.1 billion p.a. in recent years.

1.1 The dynamic expansion of the information society

The use of the modern information and communications technologies is already having a considerable influence on the development of the economy, and it is having a lasting influence on corporate processes and structures. That has been the case for big firms for many years, for they networked their national and global activities at an early stage using information technology systems. The new feature is that all the other firms, especially small and medium-sized firms, can profit from this development as well now. The open standards of the Internet and the lower prices for Internet software mean that using the global data networks is no longer the exclusive preserve of big concerns.

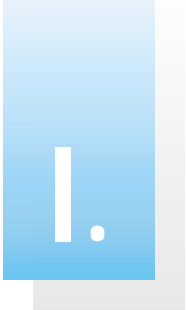
Largely through the development of business on the Internet the information and communications technologies are now one of the most important driving forces for growth in the German economy. In 1998 alone turnover in Germany rose by 6.5 % to DM 191 billion, and the sector is expecting further growth for 1999, which would bring the IT market above the DM 200 billion mark (see Fig. 1)¹⁾. It would also bring the IT market above the level of the automotive market.

The dynamic tempo of this development is evident from the speed with which use of the Internet is spreading compared with other communications technologies. Whereas television took 13 years to acquire 50 million users, and the PC around 16, the Internet achieved that figure in around 4 years.

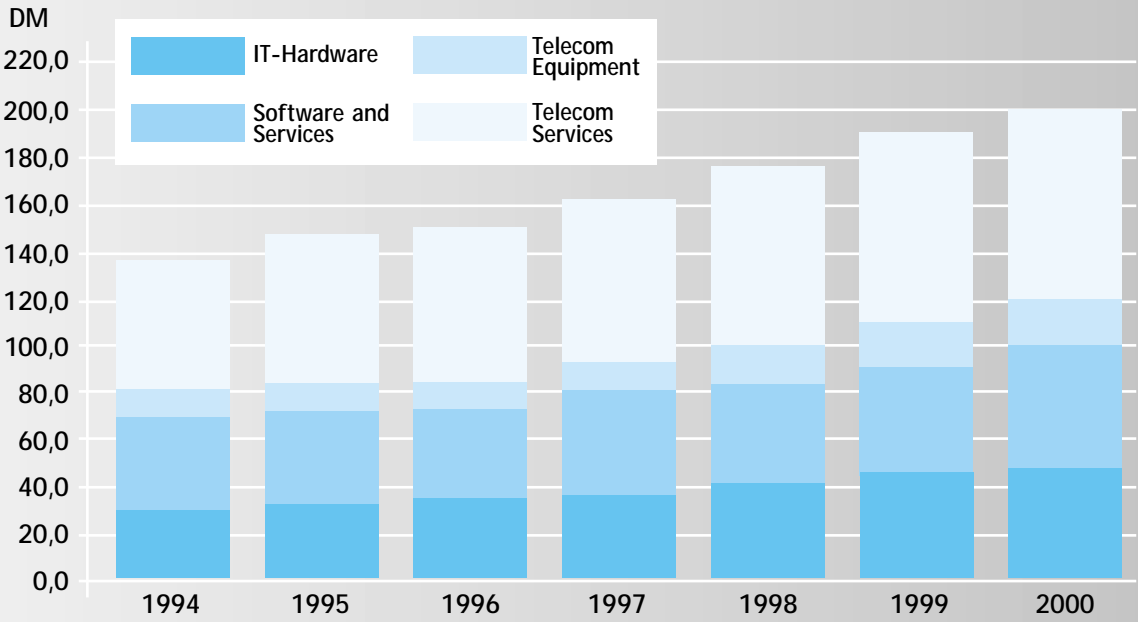
It is foreseeable that new fields of application for information and communications technologies, like electronic sales and business transactions, will show a

¹⁾ For international comparability this diagramm is based on figures from the European Information Technology Observatory (EITO). These do not accord with national surveys in every case (e.g. those by the Regulatory Authority for Telecommunications and Postal Services).

Germany enters the Information Age



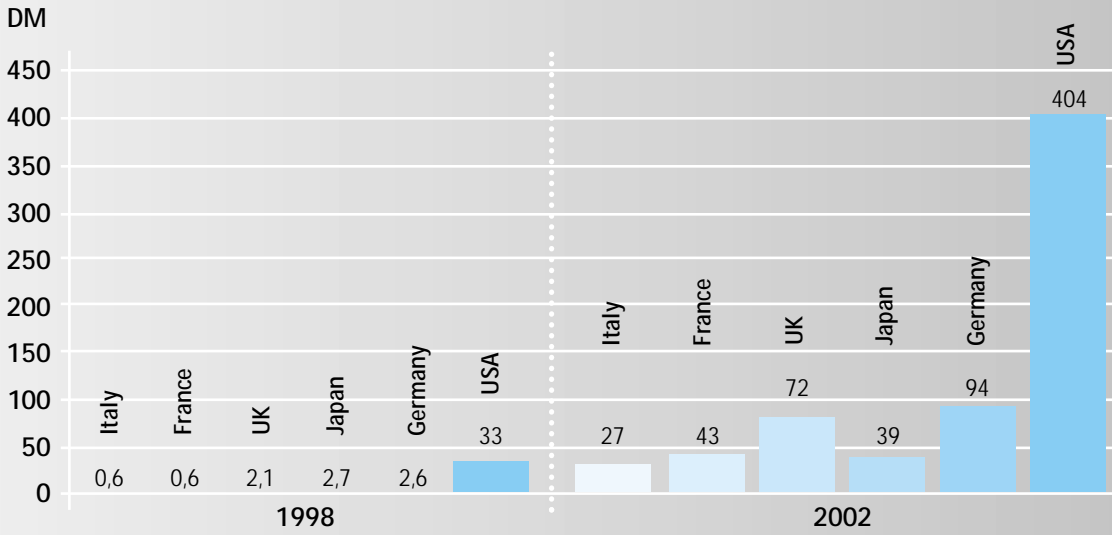
The Development of the IT Market (DM billion)



Source: EITO

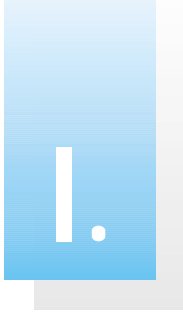
Fig. 1

The Total Market for Electronic Commerce in the G 7 Countries 1998–2002 (DM billion)



Source: Booz, Allen & Hamilton 1999, IDC

Fig. 2



Germany enters the Information Age

similarly rapid development. The market as a whole for electronic commerce (business-to-business and business-to-consumer) is expected to grow to around DM 679 billion by the year 2002 in the G7 countries alone (without Canada), according to the compilation by Booz, Allen & Hamilton (see Fig. 2).

That corresponds to an average annual growth rate of nearly 90 %. It may be assumed that Germany will have an above-average share of the European market as a whole (Fig. 3).

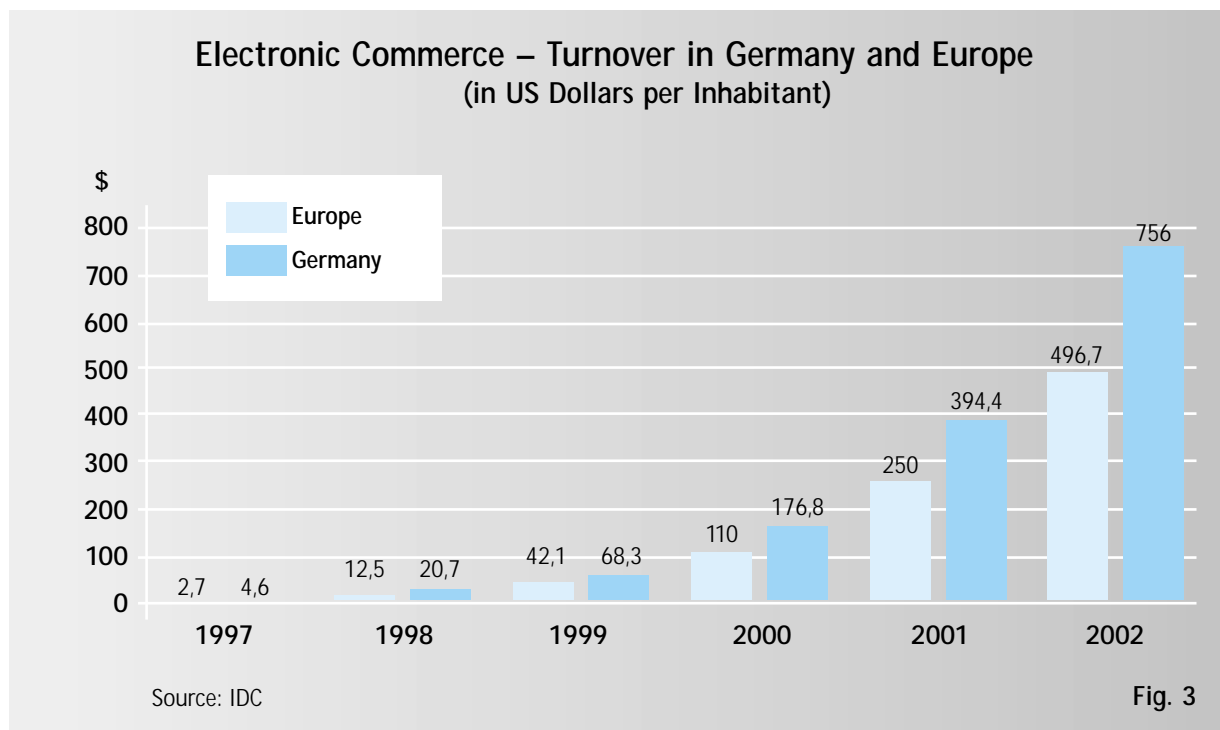
But action in economic and technology policy is needed if the opportunities offered by electronic commerce are to be utilised. Firstly, the technological base and the infrastructure need constant adjustment and improvement, to meet the requirements of high-quality multi-media services. Secondly, small and medium-sized firms and new technology-intensive firms need special promotion and advice on financing, planning and implementing multi-media projects. Many do not have the necessary capital or the commercial know-how to succeed as a new technology-based firm. Even if the prospective entrepreneurs have a promising idea for their company it

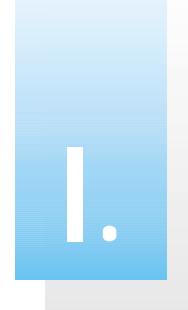
is often still relatively difficult to obtain capital in our country, although the market for venture capital has grown considerably and new general conditions have been created, in particular a stock exchange for rapidly growing technology-based firms (the New Market). There is also need for action in research and economic policy to create innovative regional network structures which will help activate the employment and innovation potentials on regional level.

1.2 Employment potentials in the information sector

At present 1.7 million people are employed in the information sector in Germany (Table 1)¹⁾. They include software engineers and specialists in telecommunications, as well as media designers and employees in the electronic entertainment sector. In

¹⁾ Data from the Information Technology Association (Fachverband Informationstechnik) in the VDMA and the ZVEI (FVIT). The information industry includes the hardware/software sector, information technology, telecommunications, electronic elements, electronic entertainment equipment, trade and the media.





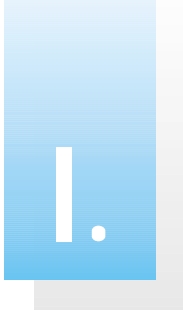
In addition, according to estimates by the Information Technology Association (FVIT), there are about 300,000 IT specialists working with users in a wide variety of sectors and the administration. But the development in every other area of the economy depends to a decisive degree on the spread of information and communications technologies. These are affecting the labour market right across the board, as almost every workplace is influenced by progressive informatisation.

One example of the dynamic that is being caused by the growing penetration of society by information and communications technologies are the many new occupations that have been created, like IT systems sales personnel and electronics experts, or specialists in informatics, all of whom are profiting from the victorious progress of the Internet. In 1998 alone nearly 14,000 training contracts were signed for the new IT occupations, although women are still under-represented, accounting for just under 25 %.

Table 1: Number of Persons Employed in the Information Sector

Area	Employed Persons 1997	Employed Persons 1998	Employed Persons 1999*	98/97	99/98*
Hardware, software & Services	973.500	1.001.500	1.037.420	3 %	4 %
Information technology	379.000	396.000	433.160	4 %	9 %
Office machine and EDP equipment	147.000	128.000	135.680	-13 %	6 %
Software und IT-services	232.000	268.000	297.480	16 %	11 %
Telecommunications	322.000	338.000	338.000	5 %	0 %
Production of technical news equipment (1)	101.000	101.000	101.000	0 %	0 %
Telephone services	221.000	237.000	237.000	7 %	0 %
Electronic elements (2)	83.500	83.500	81.500	0 %	-2 %
Entertainment electronics Trade & distribution*	41.000	36.000	35.280	-12 %	-2 %
Media	692.000	691.020	698.690	0 %	1 %
Publishing	222.000	217.000	219.170	-2 %	1 %
Printing	285.000	284.000	284.000	0 %	0 %
Film/Video production, distribution, sales, cinemas	24.000	32.000	32.640	33 %	2 %
Radio/TV, programme production	72.000	62.000	65.100	-14 %	5 %
Correspondence/news, agencies, freelance, journalists	38.000	44.000	45.760	16 %	4 %
Book, magazine and music trade*	51.000	52.020	52.020	2 %	0 %
Total	1.665.500	1.692.520	1.736.110	2 %	3 %

Source: Information Technology Association in the VDMA and ZVEI; Federal Statistical Office; (1) Communications Technology Association; (2) Construction Elements Association; * Estimated



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There are considerable further employment potentials that have so far not been fully exploited. This is evident from the high number of vacancies, now estimated at about 75,000¹⁾. It is believed in the sector that the shortage of skilled personnel is not likely to be reduced even after the computer problems entailed in the change in the date to 2000 are overcome. Indeed, the shortage is rather expected to grow over the medium term. A new study by the International Data Corporation forecasts that around 600,000 jobs for network skills are likely to be vacant in the European Union as a whole by the year 2002. The shortage in Germany is expected to be about 180,000.

In addition to the acute shortage of skilled personnel in the IT and multi-media sectors there is a considerable shortage of personnel in general education, which is making it difficult for the employment potentials to be fully exploited. There are not enough students in the technology-oriented courses. Only about 5,000 students a year qualify in informatics in Germany, while the market could absorb around 15,000 new specialists in this field a year. The share of women in these courses has fallen again compared with the eighties, and is now only 12 %; a lasting improvement is needed here. Employers object that students spend too long at college or university, and that the courses take insufficient account of practical requirements. The vocational schools do not always meet the needs of work in practice. Many of the general schools do not have teachers qualified to handle the new media. And it is evident that even among boys and girls who have chosen mathematics, physics and informatics courses that whereas 38 % of the boys are interested in computer technology and chip development, only 8 % of the girls are (Source: VDE Jugendstudie 1998). Changes in direction are needed here to prepare girls as well as boys for the information society at an early stage and give them better access to occupations with good future prospects.

In addition to programmes to train IT specialists and in the education sphere generally, measures to achieve further improvement in the framework conditions for the use and spread of the information and communications technologies, to open up new applications and improve the technological base will

play a decisive part. There is consensus that the objective of a powerful growth in employment in the IT sector can only be achieved through a combination of short, medium and longer term measures. As well as the Federal Government, the governments of the Länder and the participants in the Alliance for Jobs, Training and Competitiveness, i.e. the labour administration, the employers and associations, will have an essential contribution to make.

The Federal Government expects that if suitable measures are implemented (e.g. eliminating the shortage of IT personnel, improving the conditions for persons setting up in business, application of innovative technologies in telecommunications) around 350,000 new jobs can be created in the multi-media sector alone in Germany by the year 2002²⁾. But this potential can only be exploited if Germany achieves further clear progress in all the relevant fields of action and makes good use of the high level of skills of men and women equally.

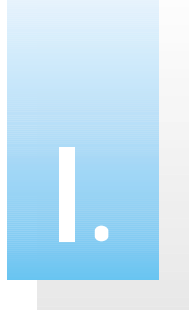
1.3 The political and economic position today

This programme of action builds up on numerous activities by Parliament and the executive. As the 13th legislative period of the Federal Parliament came to an end the Commission of Enquiry on "The Future of the Media in the Economy and Society" also concluded its work; it presented its final report "Germany's Way into the Information Society" on 22 June 1998. Primarily addressed to the Federal Government, the report makes policy recommendations on relevant sectors that are affected by the changes in the media and where there is urgent need for state action.

In advance of the work of the Commission of Enquiry the Federal Government held consultations with a number of high-level experts from the private sector,

¹⁾ Source: The Alliance for Jobs, Training and Competitiveness assumes a figure of this order in its dialogue between experts on "Employment Potentials in the IT Sector".

²⁾ This is the conclusion reached in the study by Booz, Allen & Hamilton, "Fortschreibung der Ermittlung und Prognose von Multimediämärkten" (Projection of the Calculation and Prognosis of Multi-media Markets). 1999



research, the unions and political life. The analyses by these experts are reflected in the recommendations by the Council for Research, Technology and Innovation, "The Information Society – Opportunities, Innovations and Challenges" of December 1995. Thereupon the Federal Government decided its political concept in February 1996, presenting the report "Info 2000: Germany's Way into the Information Society". The report describes the current situation in Germany and outlines political fields for action. Further liberalisation in telecommunications and the creation of uniform national legal conditions for the supply and use of new information and communications technologies played a key role.

Policy has already instigated decisive changes in direction in recent years in order to ensure that Germany is competitive on the way into the global information society. Opening the telecommunications markets since 1998 has made an effective contribution to increasing the competitiveness of German firms. At the same time the range of choice for consumers has been greatly widened through the faster introduction of new services and end-user equipment. The Regulatory Authority for Telecommunications and Postal Services has already issued more than 500 telecommunications licences since liberalisation started. Telephone charges have fallen with the opening of the market and the costs of access to the Internet have gone down accordingly. In the tele-

communications sector costs – beside the adjustment of qualification structures – must be regarded as one of the most important driving forces to accelerate the spread of IT use in the economy and society. For that reason – and not least as use of the Internet is still not widespread in Germany – viable competitive structures need to be promoted to ensure that prices are oriented to costs.

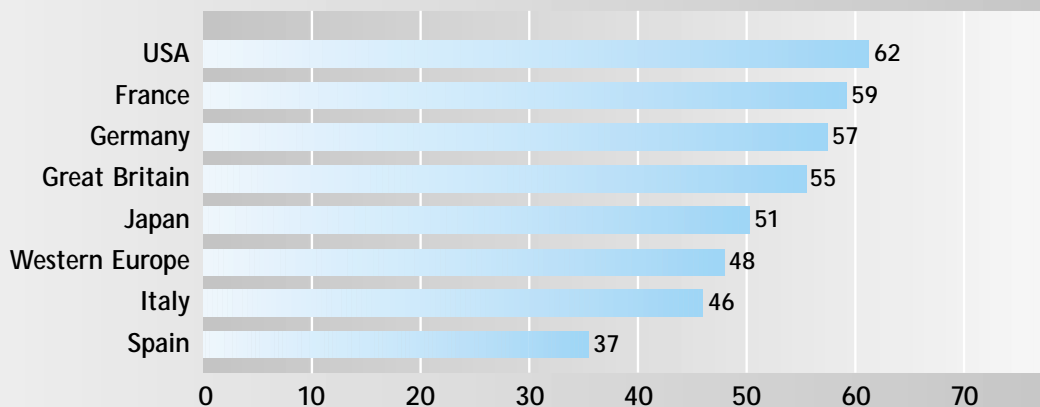
In the Law on Information and Communications Services Germany has a legal framework that is meeting with increasing acknowledgement on European and international level as well. That applies to the freedom of admission for multi-media services, for example, the regulation of data protection in the networks and voluntary self-control in youth protection. But it is also clear that purely national regulations are not sufficient for the global information networks, and further progress is needed here on EU, OECD and WTO levels.

Germany occupies a leading position in many major infrastructure areas. It appears favourably on an international comparison in the digitalisation of the telephone network, for example (Fig. 4)¹⁾.

Progress has also been achieved on the user side. Sales of PCs, for instance, rose last year by around

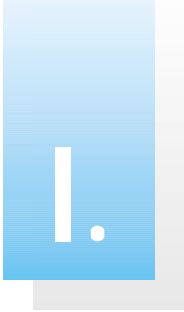
¹⁾ All data from FVIT 1999.

Digital Main Telephone Connections per 100 Inhabitants in 1998

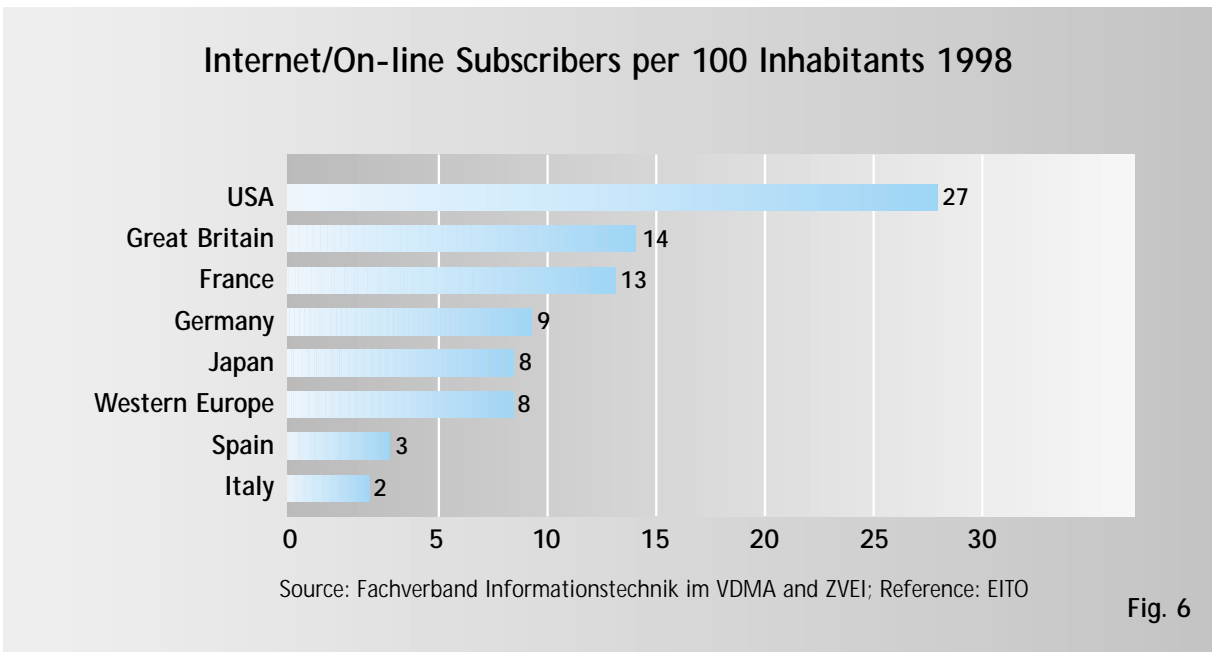
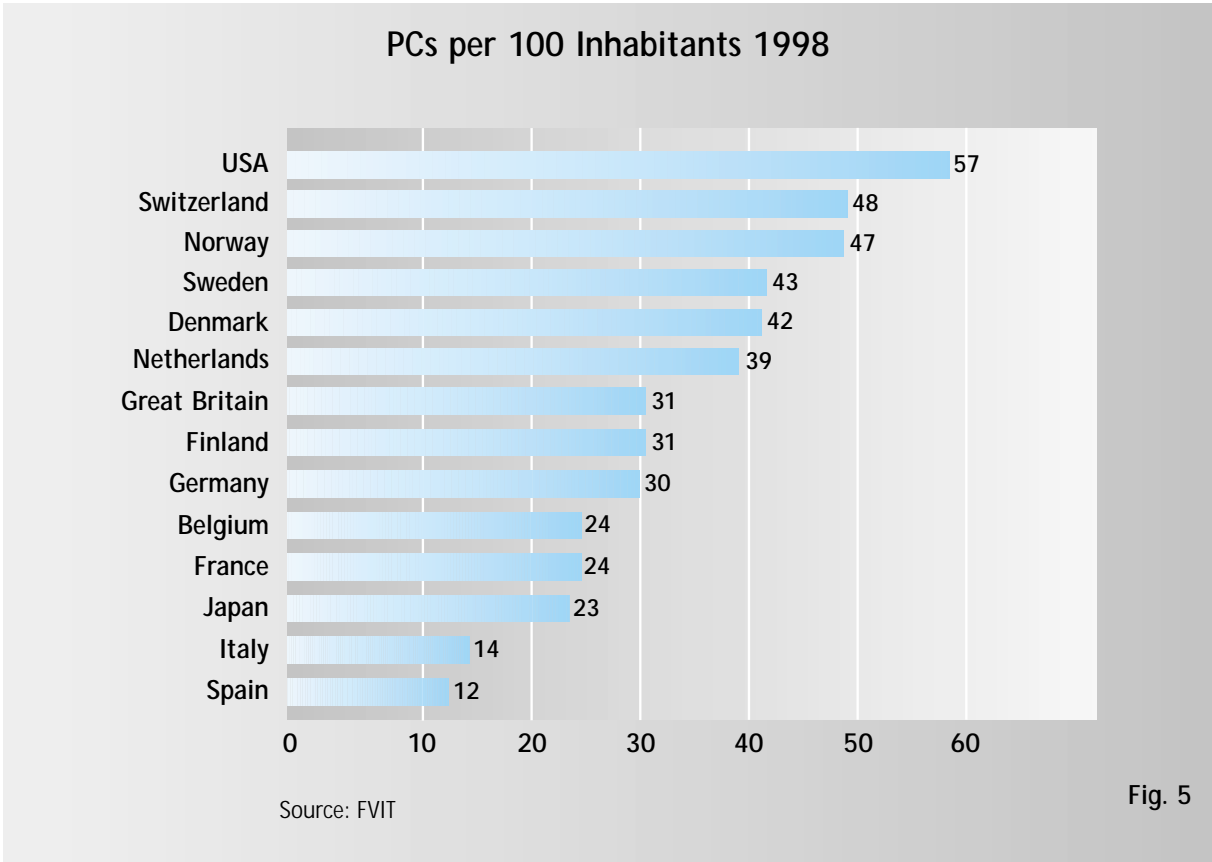


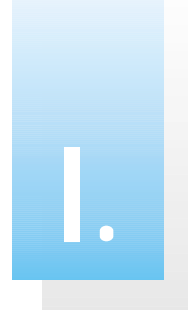
Source: Fachverband Informationstechnik im VDMA and ZVEI; Reference: EITO

Fig. 4



Germany enters the Information Age





19 % to around 5.5 million, bringing the number of PCs and mobile phones sold to the same level as the number of television sets sold for the first time, while the number of mobile phones sold actually exceeded it. At the same time the number of new subscribers to the Internet rose by 32 % to around 9.9 million. Despite these considerable successes it must be said that on an international comparison Germany is still not among the leaders in many areas. The number of PC users in the United States and some Scandinavian countries has grown even more strongly than in Germany and Germany is now only in the middle field here (Fig. 5).

Small and medium-sized firms particularly are slow to use external networking and electronic commerce on the Internet. The gap between Germany and other countries, particularly the United States, in Internet and on-line connections has widened further, despite the strong growth here compared with the United States (Fig. 6).

Numerous discussions held by the Federal Government with experts, like the Workshop "Internet 2005" in August this year, have clearly shown that a considerable spectrum of tasks related to the use and spread of the Internet have not yet been adequately addressed in Germany. In Internet-specific technologies and applications (e.g. routers and Internet records) there is a risk of falling behind internationally.

Other indicators also point to a rather moderate competitive position for Germany on an international comparison in modern information and communications technologies. The share of venture capital, for instance, flowing into new, information-oriented sectors of the economy is still lower than the comparable figure for the United States.¹⁾ Pioneer firms from Germany in the IT sector are still rather the exception.

The opportunities offered by the new information and communications technologies, particularly for the creation of new jobs, are not nearly fully exploited yet. Identifying the deficits and working out suitable measures to develop the potentials is the task for this action programme.

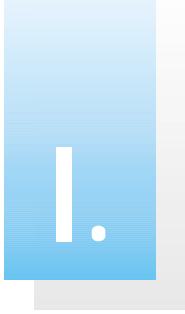
2. Tasks and Objectives

2.1 General targets

The information and communications technologies are the key technologies of the 21st century, and they will be the biggest growth market for the foreseeable future. They will cause very rapid changes in our society. Digitalisation, and the ensuing standardization of data transmission, will lead to the progressive technical convergence of the various information and communications media. Packets of digital data will not be tied to a network. Terrestrial radio, satellite, fibre-glass telephone and cable networks and possibly soon electrical networks will be available as alternatives from which to choose for data transfer. This will firstly create more competition, but it will also bring sectors closer together, with lasting effects for national and international media regulations, the economy and not least the labour market. That will face the state with new tasks in policy-making. The entire potential of the information and communications technologies must be utilised for innovation and jobs, while freedom of opinion and variety of opinion must be ensured and supported with concrete measures for the fields of action described. In this programme of action the Federal Government is pursuing the following basic aims:

1. To increase the spread and use of modern information and communications technologies in every area of the economy and society, with the aim of taking a leading position internationally within the next five years. This will require the entire available skills potential of men and women to be opened up and mobilised.
2. To ensure that all social groups participate and that men and women have equal opportunities in the comprehensive use of modern information and communications technologies. Groups in the population that have so far been under-represented and disadvantaged should have easier access to modern facilities.

¹⁾ See the European Privat Equity and Venture Capital Association Yearbook for 1999.



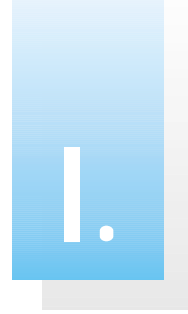
Germany enters the Information Age

3. To preserve the interests of the general public and protect human dignity, especially to guarantee the protection of children and young people, adequately to protect consumers, to protect the right for each individual to decide on the acquisition of information and ensure that sensitive information can be adequately protected.
4. To achieve thorough modernisation of school and occupational training systems with the objective of giving every boy and girl a basic knowledge to enable them to handle the modern information and communications technologies responsibly; to enable teachers to acquire multi-media knowledge.
5. To preserve and expand the high level of basic IT research and the development of new applications; to make optimal use of the possibilities for innovation and growth within Germany and join the front rank internationally.
6. To build up the IT infrastructures, in order to maintain the leading position Germany now holds internationally in telecommunications.
7. To increase the spread of innovative forms of work and corporate organisation, in order to enable the potentials of the information and communications technologies to be used to strengthen the innovative ability, flexibility and productivity of firms. The skills and motivation of the employees must be able to develop in flexible forms of work organisation.
8. Fully to exploit the potentials for ecological modernisation that are contained in the development and introduction of the new technologies based on the sustainability model in the international AGENDA 21.
9. To make full use of the information and communications technologies in every area of the public sector and so increase the efficiency of the public administration. The objective is up to date and manageable provision of information for the general public and the simplification of communication between people, companies and the administration.
10. To promote cooperation in Europe and on international level to remove existing obstacles and avoid new barriers on the way to the global information society.

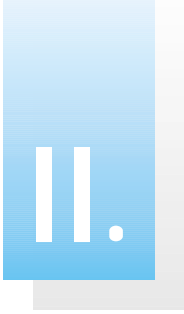
2.2 Concrete targets by the year 2005

In order to ensure that Germany has a leading place in the digital age joint efforts by politicians, employers and all the main social groups are needed to achieve the following concrete targets within the next five years:

- To increase the share of Internet subscribers in the total population from 9 % in 1999 to more than 40 % by the year 2005. To increase the share of women using the Internet.
- To develop further the legislative framework for information, communication and the media, in a way that is viable for the future and while observing the competences of the Federal Government and the Länder.
- To equip all schools, vocational training centres and advanced general and vocational training facilities with multi-media PCs and Internet connections by the year 2001. To achieve a worldwide leading position in education software by the year 2005.
- To ensure that all universities use networked computers in their taught units and for independent study. To integrate the new media in the changing forms of lifelong learning.
- To double the number of multi-media firms from the present 1,500 by the year 2001. To increase the share of small and medium-sized firms using the techniques of external networking to a level comparable with that of larger firms.
- To increase the share of women setting up in business from the present c. 30 % to at least 40 % by the year 2005, mainly through new businesses in the IT sector.



- To double the number of tele-workplaces from the present c. 800,000 by the year 2002.
- To expand the volume of training in the new IT occupations to 40,000 places by 2002. To increase the supply of skilled personnel for IT work by a further 250,000 by 2005.
- To achieve a clear increase in the share of women in IT vocational training and on informatics courses.
- To develop a Federal Government IT strategy on a contemporary basis for the Federal administration information services by the summer of 2000. To achieve widespread use of the modern information and communications technologies in the public administration.
- To introduce electronic tenders and contracting for public orders from the year 2001.
- To introduce electronic tax declarations across a broad front in the financial administration from the year 2000.
- To build up a nation-wide high voltage network for all scientific and research establishments by January 2000, with a worldwide pioneer function through the Associated German Research Network (DFN).
- To develop purely optical networks by 2005 – fibre glass connections for households in 2010.
- To develop new broadband mobile communications systems with access to multi-media services at all times and in any place by 2005. Cable-free Internet access from 2002.



The Way to a Leading Position in Europe in the Information Society

1. Wider access to the new media

Acceptance of the new information and communications technologies in society is the key to their widespread use. International comparison shows that a culture open to IT can be regarded as one of the major driving forces to a broad use of the new multimedia services. In Germany there is still a considerable way to be made up here in every group of users – private households, small and medium-sized firms, educational facilities and the public sector. The aim is therefore to make the advantage of using information and communications technologies clearer than hitherto to broad sections of users.

1.1 Action “The Internet for Everyone”

An analysis of the position today shows that the number of people using the Internet and on-line connections here is growing, but Germany is still only in the middle field on an international comparison. Moreover, the use of the new information and communications technologies is concentrated on a few social groups.

That opinion on the information society among the general public today is divided is evident in that only 45 % of Germans take a positive view of the trend to the information society.¹⁾ And only 35 % of women believe that the modern information technologies will make their lives simpler, while 52 % of men are convinced they will. In the group aged up to 34 the positive view predominates at 52 %, but in the group aged 35 to 54 it falls by 6 percentage points. Only 38 % of those aged over 55 still take a positive view.

With its action “The Internet for Everyone” the Federal Government aims to create a broad base on which other initiatives can build. The target group are those users who need to be persuaded to use IT in their daily lives. Information technology as it is today was developed by specialists, and it is evident that much more attention must be paid to the needs, thought processes and behaviour patterns of people in general if its use is to become widespread. The technique of using the new media must not be designed only for technical experts, it must be such

that people without specialised knowledge can use it too – after all, they are the majority of buyers and users. Technology must adapt to people, not vice versa. Our action “The Internet for Everyone” is concerned above all to give people who have not yet become familiar with the new information and communications technologies access to the Internet. For this purpose measures that are already running or are planned by the Federal Government and other organisations, particularly the employers, unions and other social groups, are to be combined and further measures set in motion.

Users need to be made aware of the real possibilities offered by the new information and communications technologies and how to take advantage of them. One example of this is the Senior Info Mobile, a bus travelling around Germany making Internet presentations. The practical demonstrations are meeting with a very positive response, and this shows that it is very important to give people the opportunity to look at the Internet directly and try it out.

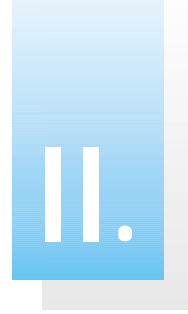
Action:

The Federal Government will work to make the Internet accessible to as wide a group in the population as possible, through an information and demonstration campaign entitled “The Internet for Everyone”. For this purpose it will endeavour to build up a partnership for innovation between the private sector and politicians, and support private initiatives.

1.2 Increasing the share of women

The information society is changing the way we work and live in all areas. These structural changes are offering enormous opportunities to achieve social equality and solve the tasks we face with men and women in partnership. Worldwide the development

¹⁾ Source: A Study by the Technical and Scientific Association of the Electrical Engineering Industry “Elektronik, Informationstechnik” (Electronics and Information Technology), Oktober 1998.



of information technology, and above all, use of the Internet, is enormously strengthening the economic independence of women, indeed, their independence generally. Now women account for 50 % of Internet users in the United States, while in Germany the figure is only about one third. In our country most of the women who are familiar with the new technology now use it at work.

It is the aim of the Federal Government to give women an equal share in the development and design of the information society. In the programme it passed in June 1999, "Women and Work", the Federal Government therefore supported implementing the strategy of "gender mainstreaming", which is also anchored in the Amsterdam Treaty of the European Union. Equality of opportunity must be integrated as a general and major principle in all fields of policy, in all programmes and measures.

Our programme should help to improve the vocational training opportunities for young women, particularly in the future-oriented occupations in the information society, to give women better chances of finding a job and achieving promotion, reduce the disadvantage of women setting up in business, promote the means of combining a family and a job, counteract the discrimination of women in wages and salaries and increase the share of women in research and teaching.

In addition, the Federal Government, with the support of the Federal Labour Office and Deutsche Telekom AG, has launched an initiative "Women give new Impulses to Technology". The aim here is to increase the share of women on every level of technical training and in technical jobs. To this end it is utilising the knowledge worked out nation-wide in the Women and Technology Networks and combining it for targeted action in schools, basic and advanced training, industry and research. The Federal Government is providing information on IT occupations and forms of work (tele-work), and providing material on exemplary developments nationally and internationally, like measures to reform courses of study designed to increase the share of women on engineering or informatics courses. Associations, universities, research facilities, politicians and

employers are to be informed and motivated to give more support to outstandingly qualified women in technological work (Information <http://lovelace.fh-bielefeld.de>).

A main focus of the Federal Government's initiatives is the action "Women on to the Network", which was launched in 1998. The aim of this initiative is to ensure that as well as women in working life who are well trained, women with less easy access to technology, women with family responsibilities and women with few opportunities on the labour market recognise the advantage of the Internet and make meaningful use of it for their education, and in shaping their lives and leisure activities. A central Call Center will receive registrations for the free lessons on how to start using the Internet, run by women trainers. And the brochure "Internet Courses for Women and Girls throughout Germany" is intended to give an overview of the more advanced courses now available for various target groups (Information from <http://frauen-ans-netz.de>).

Action:

- The Federal Ministry of Education and Research is extending the action "Women on to the Network" to 100 cities throughout Germany in autumn 1999, in cooperation with the magazine "Brigitte", the Federal Labour Office and Deutsche Telekom AG/T-Online.
- The Federal Ministry of Education and Research will launch a general information campaign in autumn 1999, in conjunction with employers and associations, to increase the share of women on engineering and informatics courses; models and innovative courses are to be publicised.
- The Federal Ministry of Education and Research will spend around DM 6 million this year and next year to promote the International Womens University for Technology and Culture as part of Expo 2000; this is to publicise the achievements of women in shaping the information society.



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- The Federal Ministry of Education and Research will start building up a tuition programme in informatics for women at the end of 1999, in cooperation with the Summer University for Women in Informatics (Informatica femminile).
- The Federal Ministry of Education and Research is expanding its focus on "Women setting up in Business"; the use of the Internet is playing a major part here.
- As part of the "Initiative for Germany 21" a pilot project will be started with the promotion of jobs for women in the information society as its main focus.

1.3 The Information Society Forum

Building up on the experience gained with the Info 2000 Forum the Federal Government wants to reach certain groups in the next few years who cannot keep pace with the general development. It also wants to move socially significant applications in the non-commercial sector into the public eye. The "Internet for Everyone" action is a general focus of the Forum. This initiative should increase public awareness of the new information and communications technologies, and it will be supported with concrete examples and activities. The Forum is to provide information and stimulus, develop models and above all create a platform for broad social discussion in which the opportunities and challenges of the information age can be openly considered.

Action:

The Federal Government will continue the Info 2000 Forum that was set up in October 1996 in a new organisational framework entitled "The Information Society Forum". Initially it will concentrate on target groups and the subjects of women, senior citizens, education, sustainable development, democracy and the administration, and art and culture.

1.4 The Initiative "Germany 21 – Entering the Information Age"

The initiative "Germany 21 – Entering the Information Age" is a cross-sectoral initiative by employers to promote change from the industrial to the information age, accompanied politically by the Federal Government and the Länder. Federal Chancellor Gerhard Schröder is chairing the political advisory council to the initiative, which is a combination of the "D 21" initiatives, a grouping of more than 70 companies from various sectors, the employers' initiative "Fit for the Information society" under the patronage of the former Federal President Roman Herzog and the initiative "Alliance for Education".

Action:

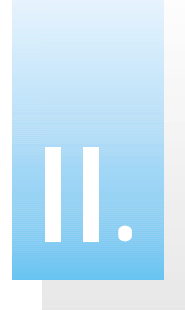
With the participation of the Federal Government the initiative "Germany 21 – Entering the Information Age" is developing projects and actions with public relations effect to accelerate the spread and use of the modern information and communications technologies in Germany, in the form of a public-private partnership.

1.5 The Internet Prize

In order to promote the use and further development of the Internet and stimulate broadly effective Internet applications the Federal Government intends to award an Internet Prize annually. The prize is to be awarded jointly with sponsors from the private sector in a public-private partnership.

Every year a new focal theme will be chosen for the candidates (e.g. electronic shopping, security procedures, multi-media end-user equipment, learning software, Internet tools etc), to promote the use of the Internet in a specific field. Products by small and medium-sized firms that are available on the market, that may be expected to have a broad effect and have proved particularly valuable in use will be selected.

An independent jury will be set up to decide on the focal themes and selected the ideas submitted. The



Federal Government's Internet Prize is to be awarded for the first time on the occasion of CeBIT in 2000; the intention is to award it every year for the next five years.

Action:

The Federal Ministry of Economics and Technology, in conjunction with employers from the private sector, will award an Internet Prize every year for the next five years at CeBIT. The focal theme will vary each year and the prize is to be given for the first time in the year 2000.

2. The Need to Promote Multi-Media Technology in Education

Growth, prosperity and employment depend to a decisive extent today on the competent and purposeful handling of information and its transformation into knowledge. The high speed at which knowledge is increasing and its explosive growth are characteristic of society today. In technical disciplines one fifth of the knowledge available can be expected to be obsolete within a year. In a few years processing information will be the core task for 80 % of all people at work. Similarly, the Internet and multi-media applications are now determining wide areas of leisure pursuits. At work and at home using the Internet and multi-media equipment is increasingly becoming the norm. It is a fundamentally new cultural technique, the provision of which is a central task for all our educational facilities.

The knowledge society can only be mastered with the appropriate technical equipment and a networked infrastructure, together with a command of the modern information and communications technologies. Throughout the education sector there are still shortfalls here. The general and vocational schools often lack teachers trained in handling the new media and the basic IT, as well as educational software that is flexible and suits their needs. In addition, every type of school is insufficiently equipped with

modern information and communications technologies and their networks.

The need to promote the broad use of multi-media in education is facing the tutors in the training centres and the trainers in firms, particularly small and medium-sized firms, with growing challenges. Teachers are always learning themselves in the knowledge society. Individuals will have to see learning as a lifelong task. For the state and employers the need is to create conditions and structures that will promote individual learning and a constant process of further and advanced training at work.

The Federal Government sees the broad use of IT in education and the use of multi-media technology in teaching as offering the opportunity

- to prepare young people better for the challenges posed by the information society at home and at work,
- to help people in employment adapt better to changes in the firm and on the labour market,
- to promote self-determined learning, independent of location, from which particularly men and women can profit who want to learn at home for reasons of age, ill health, because they are bringing up children or owing to other circumstances,
- for new cooperative forms of teaching and learning.

Hence the Federal Government is promoting the improvement of multi-media equipment in every type of school, and the development of suitable teaching and learning material, through projects and initiatives in coordination with the Länder and jointly with employers. It is also supporting the recommendations of the Conference of Ministers of Economics of the Länder in June this year, intended to bring sustainable improvement in IT and media qualification structures in the education service. These recommendations provide particularly for the modernisation of the tertiary sector (universities, vocational academies) e.g. through modular courses,



obligatory practical courses, sponsorship contracts between companies and students, practical advanced training for vocational school teachers and trainers in firms, the provision of didactic media competence in general schools by firms and greater support for the chambers and specialist associations over approval for training in the firm and in vocational training within the firm.

2.1 Linking schools to the net and providing learning software

Networking all the schools

Equipping schools with modern information and communications technologies is one of the central tasks for education policy. As before, there is still some way to be made up here, on an international comparison as well.

In our country many schools still have neither computers nor access to the Internet. Of the 40,000 general schools more than 12,000 currently have computers and Internet access, and now the need is to equip all the general schools, and maintain that level. The municipalities, who are responsible for the schools, bear a particular responsibility for equipping them with computers.

The rapidity with which information and communications technologies become obsolete and the high costs of access to the network, compared with other countries, are facing the education authorities with difficult financial, personnel and organisational problems. Only if the Länder and education authorities act jointly and incorporate private commitment will these challenges be met effectively. Beside the initiative "Schools on to the Network" started by the Federal Government in conjunction with Deutsche Telekom in 1996 other initiatives are needed, in which the private sector should play the main part, both in designing them and in sponsoring them. Appropriate initiatives are being discussed now with the Länder and employers. The main objectives are:

- To equip all schools with computers and Internet access. By the year 2001 all schools should have

access to the network. Every boy and girl should have the opportunity to work on computers.

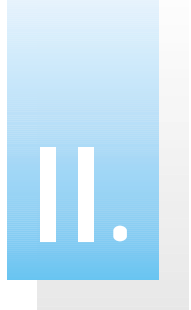
- New public-private partnerships should be organised, like companies sponsoring schools, donations of suitable PCs, special offers for schools buying equipment, free information from companies, and on-going initiatives should be accelerated wherever possible.
- It is not enough for schools to have the technical infrastructure, software of high specialist and didactic quality needs to be developed as well. The objective is to integrate the use of the new media in everyday school work as teaching and learning material in general use. For this the teachers also need to be trained in handling the new media and the basic IT technology.
- The broad use of modern information and communications technologies in educational institutions will require the teachers to be appropriately trained.

The need to provide high quality learning software

School textbooks are still the main teaching material, accounting for a market volume of about DM 1 billion a year, while the market volume of the software used in teaching is at present less than DM 12 million. But outside schools turnover is about DM 150 million and rising. This shows the potential market for multi-media teaching and learning software.

The provision, processing and transmission of knowledge through high quality educational software must suit the specific needs of schools, teachers and pupils. So multi-media educational material has to be useful across a broad front. Instead of computerised teaching material that reproduces a lesson, we need flexible software that both teachers and learners can adapt to their needs. The objective is the full integration of digital material in teaching.

Hence the Federal Government will promote the development of the technical aids that are needed for self-organised learning, so that information from

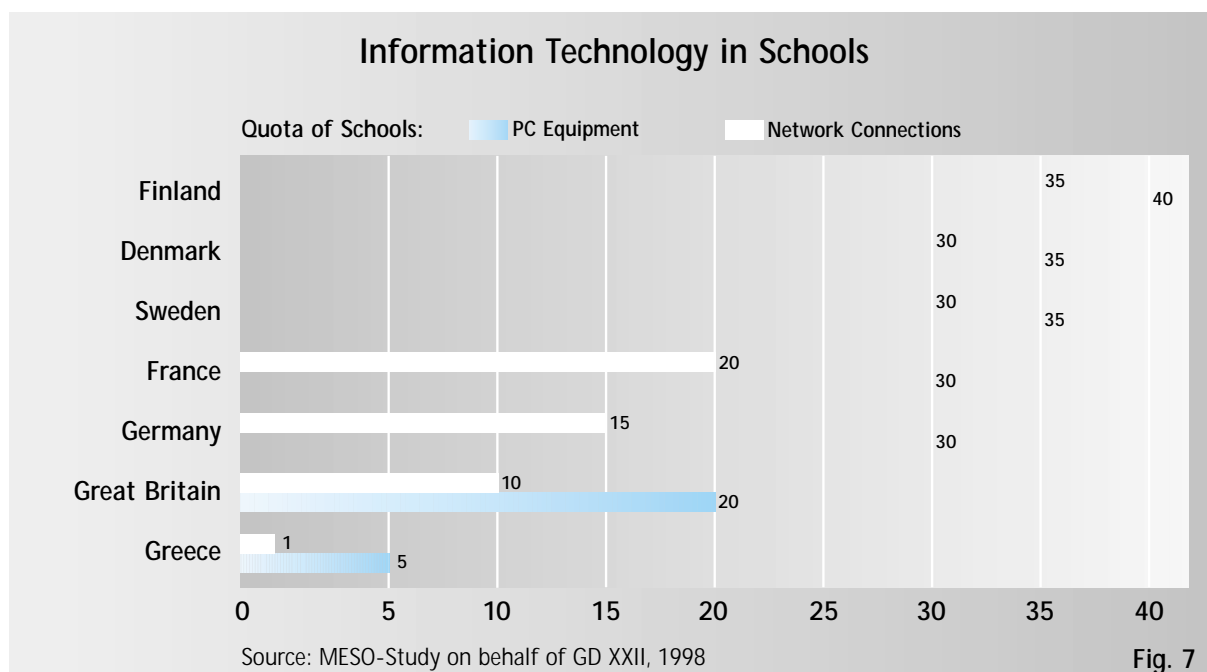


open sources can be used beside structured information in closed and virtual learning groups. In addition to this, aids are needed to organise virtual information rooms, and information sources need to be evaluated in regard to the needs of individuals or a group. In promoting educational software for schools the Federal Government is aiming to put Germany in a leading position worldwide in computerised teaching and learning.

Specific measures for women teachers and schoolgirls

Even on school level adjustments in direction are needed to make more girls take the Internet for granted. There are still considerable shortfalls here. There is still a shortage of basic and advanced teacher training material for Internet use on subjects and themes that take sufficient account of girls' interests in computers and the Internet, which are application-oriented. Hence, apart from the low share of women informatics teachers, too few women teachers are reached. That is also evident from the share of women teachers in the "Schools on to the Network" action, which is still too low.

The objective of the Federal Government's activities is to improve use of the Internet by women teachers and girl pupils as part of the "Schools on to the Network" action, with specific offers of advanced and further training for women teachers, by strengthening the competence of girls in using the Internet and by creating a network on the Internet. By building up an information, service and working network (LISA-N@t) for women teachers, that is operated as part of the "Schools on to the Network" action, an information pool and communications network is to be created that will strengthen the participation of women teachers and their function as models in using the Internet. As a flanking measure women teachers are to be given start-up courses in use of the Internet, in cooperation with the initiative "Women providing new stimulus for Technology". In cooperation with the persons in charge of women's affairs in the job centres and the "Women and the World of Work" offices offers of training in using the Internet for girls are to be expanded to supplement school teaching. The work of building up the competence of girls in accessing the Internet is to be supported through the Girl@Net network, where girls can create their own websites and take part in competitions.





InfoSCHUL – the use of electronic, multi-media information sources in schools

Electronic and multi-media information sources, that is, the free web, and commercial suppliers of information marketing their services on-line or on CD-ROMs, should be such that meaningful use can be made of them in teaching and when pupils are working independently. They should help to ensure that the ability to handle scientific literature, data and facts independently from electronic sources as well forms part of the university entrance qualification and is an integral part of pupils' independent processing of knowledge.

InfoSCHUL is a special promotional measure in the "Schools on to the Network" initiative. It is designed for Secondary Stage II and provides a bridge to measures already carried out and now running in universities, research establishments and the private sector.

The projects started for the 1999/2000 school year are intended to develop and test teaching concepts and series that integrate electronic and multi-media teaching material systematically into teaching. The results are to be documented, with the aim of making the material as easy as possible to transmit and distribute. By forming associations of up to three schools, basic and advanced training institutions and suppliers of information the base for InfoSCHUL activities is to be broadened and a "snowball" effect achieved.

Action:

- The Federal Ministry for Education and Research will provide altogether DM 100 million during the next five years for the development of school teaching and learning software, for the acquisition and use of multi-media information sources for teachers and pupils and to build up a computer exchange for schools. In addition, considerable expenditure, some of which is already firmly committed, will be made by companies that will help to provide multi-media equipment for schools in public-private partnerships.

- The Federal Ministry of Education and Research is promoting the new focal area "Women Teachers and Girls on to the Network", as part of the "Schools on to the Network" action.
- In order to orient potential users to the available multi-media technology the Federal Government, in conjunction with the Länder, will promote the work of building up a national education server, to access existing reservoirs of information by the year 2005. On international level this will be done through participation in the European School Net initiative.

2.2 Computer networking in the universities

The use of computers and computer networks has been an essential part of scientific research and scholarship for many years. As numerical methods penetrate ever more disciplines it is also becoming a normal part of subjects that used to be regarded as typical book learning. Moreover, universities and research establishments are playing a big part in developing computers and network technologies, and they are also pacemakers in the use of top performance computers in many areas of application.

Equipping the universities with computers and computer networks

The Federal Ministry of Education and Research, in conjunction with the Länder under the Joint Task for University Construction on the basis of Article 91a of the Basic Law, is financing the Computer Investment Programme, the Workplaces for Researchers Programme and the expansion of communications networks in universities. The Federal Government and the Länder have invested DM 723 million in recent years, half each, in building up internal computer networks in universities, and under the 28th Framework Plan DM 151 million is to be provided for this purpose in 1999, with a further c. DM 323 million in the next 4 years.

Top performance computers

Under the Joint Task for University Construction top performance computers are being acquired for research purposes. It has been decided to set up a top performance computer at the Leibnitz Computer Centre in Munich, with an output of more than one terFlop and at a cost of over DM 60 million. The decision will be taken shortly on whether to equip another centre in North Germany. The Science Council has set up a working group at the request of the Federal Government and the Länder to make recommendations on the optimal provision of top performance computers for research.

The new media in university teaching

Networking multi-media compatible computers will provide the technical basis for new departures in academic teaching. Information and communications technologies will not replace the traditional forms of teaching, but they will enrich them with new forms. The relation between taught units and independent study with pre-programmed information, teaching and learning modules will undergo far-reaching changes through the new media. New forms of long-distance learning will supplement teaching through personal contact and for some courses it will become the dominant mode in the process of lifelong learning.

The virtual university, or the virtual lecture theatre, are terms for particularly ambitious projects to reorganise the learning process through the new media. Despite a number of interesting experiments so far very few German universities are offering multi-media teaching. And there are still courses at German universities – particularly in the humanities – where a student can complete his studies without having to show that he has any basic knowledge of computers at all.

The Federal Ministry of Education and Research, jointly with the Länder under the Special University Programme III, will spend a total of DM 240 million by the year 2000 to promote the use of the new media in teaching. The promotion of long-distance courses under a pilot programme run by the Federal

Government-Länder Commission for Education Planning and Research Promotion is increasingly concentrating on the promotion of digital technology. In addition, the Federal Ministry of Education and Research is promoting two key projects. A virtual technical university is being built up in a North German federation for two subject areas, with comprehensive multi-media support for personal teaching in basic chemistry. The Federal Ministry of Education and Research is promoting both projects with funds totalling DM 80 million over a period of 5 years. Other projects to promote teaching and learning at universities are being supported by the German Research Network Association (DFN).

Action:

- The Federal Ministry of Education and Research will work to ensure that all scholars and scientists have access to networked computer workplaces with the latest state of technology under the Joint Task for University Construction.
- The universities should have sufficient networked computer workplaces for their students and network connections for their notebooks, to enable them to participate in the new forms of teaching.
- The Federal Ministry of Education and Research will support a new concept to ensure that German research is regularly equipped with the latest generation of top performance computers.
- As a follow-up to the promotion of the new media at universities under the Special University Programme III the Federal Ministry of Education and Research will start a new promotional programme from the year 2000, with funding on a rising scale between DM 40 and DM 50 million a year.
- The Federal Ministry of Education and Research will continue to cooperate with the Länder in the Special Commission on "Long-



distance Courses and the New Media in Teaching" set up by the Federal Government-Länder Commission for Education Planning and Research Promotion, and promote the development of long-distance courses at universities.

2.3 New information technologies in basic and advanced vocational training

Multi-media forms of learning in vocational training

The rapidity of technological change and the explosive increase in knowledge mean that the individual needs an optimum of different basic, further and advanced training opportunities if he is to meet the many and rapidly changing challenges of working life and be able to learn independently and on his own responsibility. Only in this way can individuals' ability to remain employable, flexible and able to participate in social, economic and social processes be ensured and strengthened. Network-based learning is breaking open the structures of traditional teaching and combining initial vocational training and the later further training more strongly than before, in both contents and organisation. The new information and communications technologies will fundamentally change long-distance teaching. Tele-learning is growing. Virtual learning worlds and courses on the Internet will become available and enable individuals to learn on their own responsibility in new forms of cooperation. The availability of suitable teaching and learning software and their widespread use is crucial for the use of multi-media in basic and further vocational training and in schools.

In the key project "Lifelong Learning - Further Education as a Basic Need" the technical building blocks, contents and concepts needed for further vocational training are being developed and tested in learning centres. The aim of the project is to enable teachers to prepare contents on a multi-media basis and try out an infrastructure for further training with which

students can work successfully in their occupational environment, at home or in learning centres.

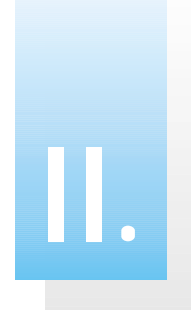
Network-based learning in SMEs and the public administration

Current studies show that new forms of learning based on multi-media technology may be expected to be more successful than traditional learning methods. But whereas network based multi-media learning methods have already become established in large firms, the breakthrough in the SME sector and the public administration is still to be made. There is considerable need for action here.

The LERNET competition is intended to stimulate small and medium-sized firms, and offices in the public administration, to seize the opportunities offered by the multi-media at an early stage and make use of them, both as suppliers of learning services and software programmes and as users of these services. Of particular importance here is the development and testing of new learning services and technologies, like user-friendly navigation systems and interactive tools. Basic knowledge and technologies from different disciplines, ranging from informatics through cognitive science to education, are to be combined in innovative programmes for network-based learning. The opportunities this will create, particularly for small and medium-sized firms, are to be made clear using current solutions to problems as examples. A project to analyse the promotional field of LERNET, which is a major focus, is currently in preparation, and the first results will be available at the end of 1999.

Action:

- The Federal Ministry of Education and Research is spending a total of DM 100 million over the next five years to promote new multi-media forms of learning and the development of teaching and learning software in vocational training. In addition, an information system is to be built up for innovative multi-media applications in vocational training.



- The Federal Ministry of Economics and Technology intends to hold a competition for the development and testing of network-based learning in small and medium-sized firms and the public administration in the year 2000. The ten best ideas for projects will receive financial support.

2.4 Increasing the supply of skilled personnel in the information sector

The Alliance for Jobs, Training and Competitiveness

At present the information sector worldwide is suffering from a considerable shortage of skilled personnel and this is threatening to inhibit economic growth. The German labour market is currently short of 75,000 media and IT specialists. In addition, considerable employment potentials exist in the information sector which have so far been only insufficiently exploited. The Federal Government has therefore agreed a number of measures with its partners in the Alliance for Jobs, Training and Competitiveness, that is, the business associations and the unions.

- To increase the volume of training for the new IT and media occupations to 40,000 places in three years. In particular, the share of women in IT training places is to be increased. The Federal Government and the social partners will intensify regional and national information and advertising campaigns and support the training of vocational trainers and teachers in vocational schools.
- To build up an IT and media-specific further training system as has already been started by the specialist associations and the unions, with financial support for the work of developing contents and to accelerate the examination of any education policy consequences which may arise.
- To build up regional networks to train and attract skilled personnel, to analyse requirements, exchange experience and for joint ventures. In particular, link-ups between companies for the purposes of basic and further training are to be encouraged or arranged and monitored by co-ordination offices or key firms with the involvement of education services personnel. In this way altogether a further 2,000 SMEs are to be attracted to provide training places.
- To expand the further training offered by the Federal Labour Office from the present 30,000 places to 35,000 places for the years 2000 to 2003, with the main focus on medium and long-term measures. This could enable c. 98,000 skilled personnel to be trained, taking into account current absorption rates. As in basic training women are to receive special consideration, as there are good employment prospects for them in IT and the media sector. More efforts are to be made to draw the attention of small and medium-sized firms in particular to new approaches in labour market promotion and the concept of job rotation, as well as the need to utilise the occupational experience of older unemployed personnel.
- To set up a training fund run by companies in the information and communications sector. The Alliance partners welcome the training fund, which is designed as a public-private partnership and is open to further partners. It is to finance the following measures:
 - the expansion of new courses for vocational training academies, technical universities, universities and similar establishments. University graduates from subjects outside information and communications technology will be offered the opportunity to acquire an additional qualification. Standards in contents will be defined jointly by companies and the educational service.
 - To promote specialist and general further training; outside the further training measures run by the Federal Labour Office an additional 30,000 skilled personnel could be trained under the IT sector's offensive.



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- An exchange of personnel with research establishments
- Scholarships for IT students.

Altogether these measures are intended to achieve a growth in the total number of skilled personnel by 250,000 by the year 2005. This could remove the present bottleneck and secure a further growth in employment of about 150,000 jobs.

In addition to these measures, which were agreed in the Alliance talks to increase the supply of IT skilled personnel, the Federal Ministry of Economics and Technology is currently examining the possibility of launching a loan programme in conjunction with Deutsche Ausgleichsbank to promote further training in the information and communications sector.

Action:

The Federal Government will speedily implement the measures agreed in the Alliance for Jobs, Training and Competitiveness, in particular:

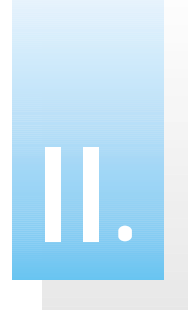
- support for building up an IT and media-specific further training system, which also includes promoting teaching and learning software for the advanced training of IT specialists and side-entrants.
- Expanding the supply of further training courses offered by the Federal Labour Office.
- Support for the training Fund, which is designed as a public-private partnership.
- Increasing the share of women in IT occupations through joint information campaigns on new IT careers.
- In addition, the Federal Ministry of Economics and Technology is examining the possibility of a loan programme to promote further training in the information and communications technologies sector.

2.5 Information technology and the media in new and modernised occupations

The structural change in the economy, particularly the growing importance of the information and communications technologies and the relevant integrative programmes for almost every area of work are also affecting the development of training professions. Information and communications-supported services like telecommunications, the media and data banks are playing an essential part in every area of working life.

Rapid structural changes and the ensuing and growing challenges at work require rapid reactions in training personnel. As a consequence, the procedure for working out new occupations and modernising existing ones has been greatly shortened; it is now at most one year.

The first step towards meeting the demand in the economy for skilled personnel was taken as early as 1997 when four new occupations were established in information and communications technologies: IT systems electronics specialist, specialist in informatics, IT systems sales person, informatics sales person. Their acceptance in the sector is evident in that around 14,000 young people are now being trained for these new careers. More than 2,000 firms have actually started vocational training now for the first time. Over the medium term a potential of 40,000 training places is expected. With the three new training occupations that are now established, audiovisual media sales person, media and information services clerical staff and media designer for digital and print media, the need for action in basic company training has now been met, in the view of the employers and unions. The dual system of vocational training in Germany (partly in the firm and partly in a vocational school) has thus made an important contribution to economic structural change, and successfully passed an important test in the transition to the information society. To ensure that the shortage of skilled personnel evident today does not jeopardise competitiveness tomorrow skilled personnel need to be trained for this area, which is of such importance for competition and our future prosperity. To ensure that sufficient newcomers are trained for the new



and sustainable careers in the information society the companies must create the appropriate conditions to ensure an adequate supply of training places and jobs. This applies particularly to companies that are not yet offering training because they lack the basic facilities or because they are not yet familiar with the dual system of vocational training.

Action:

- Under its competence to issue ordinances on basic and advanced training the Federal Government will continue to ensure that teaching material on handling the modern information and communications technologies is included in state recognised basic and advanced training regulations to an extent appropriate to these occupations. So in connection with the competence to act, that is competence for subjects, methods and social issues, media competence is to be given stronger support. As far as is necessary new occupations for initial in-house training will be created in joint action with the employers and unions.
- The Federal Ministry of Education and Research is supporting the project "New Occupations for Women in Europe", which is networking activities to increase the share of women in new IT training occupations and opportunities for further training in some European countries; it is being carried out in cooperation with Austria and France and includes a data bank to provide information on new training offers for women, quality criteria and women experts.

3. A better Legal Framework to Strengthen Confidence and Security

For the economic and technological development of the information society in Germany and worldwide all those involved – suppliers, users, state supervisory

authorities and data protection control bodies – must have confidence in the security of the technical systems and feel sure that they are protected from abuse through illegal and harmful action. That can mainly be guaranteed by creating suitable legal conditions.

With the Information and Communications Services Law on Federal level, and the Media Services State Treaty on Land level, the legislature in Germany has taken the first step in this direction by providing legislation that is forward-looking, both for technological development and for the economy as a whole. It has also redesigned the media regulations. The Information and Communications Services Law is particularly intended to accelerate innovative developments in IT services. The Federal Government's evaluation report on this law outlined the effects of this initiative in the first two years after it came into force and also pointed the way to expanding and optimising the legislation in future.

Beyond IT security and protection for consumers and data it is important to create reliable general conditions in other areas too, like the taxation of Internet transactions and labour and social law.

The decisive factor is for Germany to develop a framework of regulations for the 21st century that will prove sustainable in the global Internet age and with the growing convergence of telecommunications, the media and information technology. It is this convergence of the end-hardware and networks that makes the fragmentation of the regulatory and supervisory structures, which is the predominant mode in Germany now, seem less and less viable. The following are some of the bodies with competence for radio, for instance: the European Union, the Federal Cartel Office, the Regulatory Authority for Telecommunications and Postal Services, 15 Land media offices, the Commission to Establish Concentration in the Media Sector, the supervisory bodies of the radio corporations and the Commission to Establish the Need for Funds for Public Radio Corporations. It is the aim of the Federal Government to intensify cooperation with the Länder and achieve more transparency and ultimately a competitive framework of regulations for the information, communications and media sector.



3.1 The legislative framework for information and communications

The digitalisation of the transmission channels will change the face of the information and media landscape. It will make a wide range of new channels available and end the shortage of transmission routes for a long time to come. In addition, as the telecommunications sector, the media and information technology grow closer together fundamentally new chains for value creation and strategic corporate alliances will be created on international level. These processes will reach deep into economic and social processes. In its Green Paper on the convergence of the telecommunications, media and information technology sectors (KOM (97) 623, 1997) the European Commission has dealt in depth with the legal effects of this trend.

In the Federal Republic of Germany the fragmentation of the supervisory authority structure, which has historical roots, as in the telecommunications and media sectors and youth and data protection, is an obstacle to these developments. The fragmentation derives from a condition in the Basic Law that the Federal Government has regulatory competence for telecommunications and economic law, while the Länder are responsible for radio. However, the differentiated system of our supervisory structures appears to lack transparency and looks impracticable, as the media are converging, technically and economically, and have to maintain their position in international competition.

In the infrastructures where convergence has already taken place the main concern is to find horizontal, cross-sectoral approaches, as have already been implemented in the telecommunications law. General approaches will be needed in the infrastructure sphere in future as well. In the joint initiative by the Federal Government and the Länder "Digital Radio" (see Chapter 5.4), the Federal Government has embarked upon a comprehensive dialogue with the Länder, the associations and employers to develop approaches to solving these political tasks, particularly with the coming digitalisation of the transmission channels.

The framework of regulations on the information, communications and media sector has been given a new orientation in Germany with the Information and Communications Services Law and the State Treaty on Media Services. This is reflected in the division into information and communications services (tele-services, media services) and radio, which has created a pragmatic course that is open to development and will enable the particular requirements of a changing media landscape to be met. Nevertheless, it is foreseeable that the new and much wider range available in the media with the progressive economic and technological development will raise new questions. These questions need to be tackled and solved by the Federal Government and the Länder jointly, in the interests of Germany's economic future. The Federal Government will therefore enter into discussions with the Länder on the structure of future cooperation. The objective is to work out joint proposals for a sustainable development of the national framework regulations, taking account of the economic, technological and international development.

Action:

The Federal Government will start talks with the Länder on future cooperation to develop the framework of regulations on the information, communications and media sector. The aim is to work out joint proposals for a sustainable, comprehensive legal framework, taking account of the economic, technological and international development, and observing the competences of both sides.

3.2 Telecommunications

Telecommunications is one of the key technologies for the transition to the information society. Efficient telecommunications infrastructures and low-cost telecommunications services are essential if the potentials for growth and employment inherent in the information and communications markets are to be fully exploited. With a telecommunications policy directed to opening markets, privatisation and sector-



specific regulation the necessary changes in direction have already been instigated.

- The former monopolies in telecommunications have been completely removed (the network monopoly in 1996, the speech telephone monopoly in 1998)
- the former telecommunications administration has been changed into a joint stock company conducted entirely according to commercial principles
- telecommunications suppliers with dominant market positions have been made subject to sector-specific regulation oriented to economic criteria.

The results so far of competition in telecommunications have been positive for the economy as a whole. The economic costs of communications have fallen markedly. The consistent policy of opening markets very quickly removed the disadvantages which Germany suffered in competition with the United States, for instance, Great Britain and Japan, who opened their telecommunications markets a few years earlier. Opening the market created new fields of operation for innovative companies. Since 1992 the number of suppliers of telecommunications services has increased sixfold, and it is now about 1,700 companies. The new competitors will invest DM 4 billion this year in expanding their fixed network infrastructure. With a growth in employment of more than 30 percent in this year alone they are helping to ease the situation on the labour market. Massive price reductions for telecommunications services are helping to foster use of the Internet and the development of electronic commerce.

Against the background of the positive development in telecommunications and in view of the processes of globalisation and convergence that are observable the Federal Government sees the main objectives of telecommunications policy in future as continuing to promote or secure viable competitive structures in this sector, opening foreign markets for German firms and supporting innovative processes.

Action:

- The Federal Government will undertake a reappraisal of the legislative framework on telecommunications by the year 2001. The main concern will be whether and to what extent sector-specific regulatory intervention on national and European level can be reduced, in view of the growing intensity of competition, or replaced by the general legislation on competition.
- To supplement the full opening of the market in Germany, where no distinction at all is to be made between national and foreign firms, the Federal Government will press for a reduction of barriers to market access and restraints of competition for German firms abroad.
- The Federal Government will support innovative processes, not solely by promoting efficient competition but also directly. In this connection it will continue the initiative "Digital Radio" started under the direction of the Federal Ministry of Economics and Technology to accelerate the transition from analogous to digital transmission; it will also press for the rapid introduction of the third generation of mobile phones (UMTS, "The Internet on Your Handy") and use its frequency policy to ensure that sufficient frequencies are available for new technologies and innovative services.

3.3 Competition and cartel legislation

It is the task of competition policy to create general conditions for an innovative process of growth and employment that can only come from dynamic and open markets. The legislation on competition must be defined so as to take full account of the new technologies. It must be ensured that on principle all companies, independent of their size and market position,



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have opportunities to be innovative. Innovation processes should not be stifled at an early stage, and to prevent this the instruments of misuse and merger control must be applied in a way that is adequate to the problems. In applying competition law the particular economic features of innovative products and services, and especially the development cycle of new markets, have to be borne in mind.

The worldwide liberalisation of the telecommunications markets has proved an impressive example of the power of competition to promote innovation in Germany, too. Opening the market for telecommunications services has helped to lower the transmission costs for speech, data etc. to a level that is competitive on international comparison, in relation to the United States as well. New jobs for skilled personnel are also being created through the demand from a growing number of innovative small and medium-sized firms who are using the new products (servers/routers, network technology, software) and services (value added services, Internet services).

So far Germany has been able to meet the requirements of the new information and communications services through a graduated model with special regulations. These include the Information and Telecommunications Services Law passed by the Federal Government and the State Treaty on Media Services of the Länder. To remove obstacles to the development of competition and increase the market orientation of the relevant sections of the legislation any projects planned need to be closely coordinated between the different competences. The general regulations must be kept to what is absolutely necessary. An extension of the list in Article 91a of the Basic Law to create a new joint task is not regarded as necessary by the Federal Government, as the statement on the Twelfth Main Report by the Monopolies Commission in 1996/7 makes clear. Problems that arise in delimiting relevant markets, possibly through the increasingly virtual corporate structures, can be solved under the current legislation on competition. But keeping standards open will be of growing importance, in order to prevent restrictions to market access for new firms.

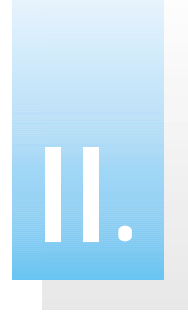
If the convergence in the technical sphere of the media continues this will have consequences, espe-

cially for the regulation of radio and media services. Making payment of a licence fee dependent on having a set capable of receiving the broadcasts, as is still the case today, will not be appropriate over the long term. Undesirable developments, like obligatory fees for PCs that can link up to the Internet, should therefore be excluded.

Action:

The Federal Government will work to establish the following points of approach for competition policy for the promotion of new technologies:

- Every company in Germany must be able to use the telecommunications infrastructure, including the Internet, if it is to remain competitive internationally. The price regulation by the Regulatory Authority for Telecommunications and Postal Services, which must adhere to the principle of cost-orientation, should therefore aim at a price level for telecommunications that is internationally competitive.
- In order to keep the technical standards for transmission technology open to innovation restrictions to market access, through either state or private action, must be avoided for technological applications.
- Special legislation on competition applying to sections of the ordinances on the information society is not needed, apart from the regulations on telecommunications. The general legislation on competition is making an important contribution to ensuring competition in electronic services and the markets upstream and downstream through the general claim of competitors to have access to essential facilities (§19, Para. 4 Law against Restraints of Competition) created in the 6th Amendment to that law.



3.4 Data Protection

In a networked world and with the enormous mountains of data that are being created and accumulating in private hands the protection of personal data is of fundamental importance. If new services are to meet with acceptance in the information society it is essential to ensure that personal data will be handled responsibly. So ensuring efficient data protection is also an important competition factor for the suppliers of these services.

In the Law on Information and Communications Services the legislature has already brought into force pioneering data protection regulations for teleservices through the Teleservices Data Protection Law. The new Ordinance on Telecommunications Data Protection makes further progress on the way to modern data protection legislation. This legal framework will be optimised on the basis of the experience gained so far.

The legislation on data protection, particularly some special sections, are complex and characterised by a high density of regulations. The need for the general legislation in this field (the Federal Data Protection Law) and the legislation on specific areas of data protection to be simplified and slimmed down thus deserves support on principle. The aim is to achieve greater transparency in the individual laws.

Data processors' own responsibility for data protection is to be strengthened by the introduction of a data protection audit, where suppliers can have their data protection concept and technical facilities examined and evaluated by independent experts, on a voluntary basis; they will also be able to publish the results of the examination. This should stimulate competition and ensure continuous improvement of data protection and data security by the firms involved.

In view of the global character of the networks data protection is an international task. The objective is to guarantee an appropriate level of data protection worldwide. The EC Directive on Data Protection is already having a successful effect here by awarding privileges to third countries that have the appropriate regulations. Moreover, the German Law on Informa-

tion and Communications Services has stimulated international discussion by offering a concrete regulatory model.

Action:

The Federal Government will put forward proposals for the step-by-step amendment of the legislation on data protection in the current legislative period.

- In the first stage, in addition to the measures needed to implement the EU Data Protection Directive, the principles of the Teleservices Data Protection Law on systems data protection and avoiding and economising with data, anonymity and pseudonyms are to be adopted in the Federal Data Protection Law as general principles. This will slim down the Teleservices DP Law accordingly.
- In the next step the Federal Government will prepare regulations for employee data protection and examine in how far further modernisation of the Federal DP Law is necessary.
- The voluntary data protection audit is to be laid down in law.
- The Federal Government will play an active part in future too in working out and projecting international framework conditions for data protection.

3.5 Consumer Protection

Consumers are still rather reserved towards the information society. To change that, consumer confidence in the new information technologies needs to be strengthened. Consumers need to be assured that when using these facilities their economic and legal interests are protected as well as in traditional shopping and other transactions.

The questions to be dealt with here are mainly those concerning the transparency of suppliers, products



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and services and the conditions for electronic contracting. The observance and implementation of fair practices by suppliers in advertising, designing their offers, drawing up contracts and handling these must be ensured as must the security of payments systems and the reliability of declarations given electronically. The legal position of consumers must be clear in electronic commerce as well. So in cross-frontier electronic transactions in particular the regulations on the applicable national law and the place of jurisdiction must be clear, practicable and consumer-friendly.

Ministers Conference in Ottawa in October 1998 laid down that this should be completed by the end of 1999.

3.6 Youth Protection – Protecting Human Dignity

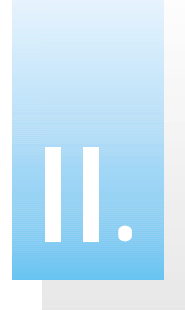
Protecting human dignity during use of the Internet and in view of its rapid spread is a central political and a general social task. The main concern is to protect young people and take the necessary steps to reduce the distribution of written material and media contents that constitute a danger to them. In addition, the Internet is increasingly being used to display violent pornography and organise the trade in women. Infringements of the human rights of women on the Internet must be avoided as far as possible.

The Information and Communications Services Law has introduced important regulations on Federal level for the protection of young people in the new media. Of particular importance are the new regulations in the Law on the Distribution of Written Material and Media Contents Dangerous to Young People. Changes have been made here to the concept of written material, the ban on distribution and advertising and the right of procedure. Furthermore, it has been made obligatory for suppliers of electronic information and communications services to appoint persons responsible for youth protection or join a voluntary self-control organisation. Against the background of a continuous rise in criminal child pornography the amendments introduced with the Information and Communications Services Law for youth protection on the Internet deserve special mention.

However, national regulations will only have limited effect with the global nature of the new medium, and there is an urgent need for them to be flanked with European and international agreements. The Federal Government is taking part in all the European and worldwide initiatives by the most important international organisations to improve youth protection on the Internet, chief among which are the activities of the European Union (the recommendation by the

Action:

- The Federal Ministry of Justice will shortly present draft legislation to set an adequate legal framework for consumer protection. The main item is the implementation of the European directive on consumer protection in long-distance sales.
- The Federal Ministry of Justice will work in the current European legislative projects to achieve consumer-friendly regulations on certain legal aspects of electronic commerce and long-distance sales of financial services; it will also undertake the necessary adjustments in national legislation, for example in the regulation on supplier transparency under the Teleservices Law.
- The current regulations on price transparency must also be observed in electronic commerce. Prices must be stated truthfully, fully and so that they are easily recognised. The Federal Government will observe the practice of suppliers and insist on better observance of the existing regulations in the electronic environment.
- In a global information society internationally comparable standards of consumer protection are necessary. Within the OECD the Federal Government is playing an active part in developing OECD directives on consumer protection in electronic commerce; the OECD



Council of Europe on "Youth Protection and Protecting Human Dignity in Audio-Visual and information Services" and the decision by the Council on the acceptance of a multi-year action plan by the Community to promote the safe use of the Internet) and UNESCO (the Infoethics 2 Forum).

Action:

- The Federal Government is endeavouring to reduce suppliers' uncertainty in regard to the supervisory and responsibility structures. Coordination between the various offices in charge of youth protection, like the criminal prosecution service, 'jugendschutz.net' (youth protection net) and the Multi-media Voluntary Self-Control organisation is to be improved in conjunction with the Länder.
- The Federal Ministry of Family Affairs, Senior Citizens, Women and Young People has set up a national working group on trade in women. It will examine possible ways of effectively stopping such infringements of women's human rights on the Internet and having the perpetrators prosecuted. The Federal Government will continue to take part in all the European and worldwide initiatives by the most important international organisations to improve youth protection on the Internet.
- In developing further the Law on the Spread of Written Material and Media Contents Dangerous to Young People the Federal Government will also consider simplifying and concentrating the supervisory and administrative structures for youth protection on Federal and Land level.

3.7 IT Security

As the output of data on worldwide telecommunications networks grows IT security problems are also increasing markedly. Better security for IT applica-

tions and products, and protection on the network, are thus important if confidence in the information and communications technologies and data networks is to be created and maintained. The widespread use of IT is increasing the networking of very different infrastructure systems, and every area of life – for companies, private individuals and the state – is exposed to risk, not only from deliberate attack but simply through the complexity of its IT facilities. The official statistics on computer crime are showing year-on-year rates of increase of up to 50 %, and this does not include Internet crime or crime with computer viruses.

The worldwide network is also opening up entirely new dimensions of business and competitor espionage. The means of manipulating information or IT services is also growing rapidly. The methods are being increasingly perfected and refined, while the cost of manipulation is falling steadily. Lack of security in information technology is causing damage worth billions every year at the expense of our economy and jobs. In electronic commerce as well, more crime may be expected in the form of tax evasion, fraud or electronic theft, and this must be prevented. Works under copyright but available electronically will be exposed to greater risk of piracy. The losses to the owner of the copyright and to the state in the form of lost tax revenue need to be prevented. As the new information and communications technologies penetrate ever further into every area of life entirely new dangers are being created, not only for the individual and for companies, but for the state as well. There are dangers to critical infrastructures in high-tech countries, on the integrity and availability of which essential functions are increasingly dependent in the information age. Attacks may be launched to disrupt or destroy the ability of civil and military communications and management systems to function, and this raises fundamental tasks for technology policy in building up an IT security infrastructure in Germany and develop cyber-space security strategies.

So it will depend on the degree of security available whether users trust the information technologies and exploit the new possibilities for legal and commercial transactions, and for private communication. A large number of studies have now shown that lack of



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confidence in security is one reason why many users hold back from using IT for commercial transactions. Security in information technology will be a key issue in the further development of IT applications.

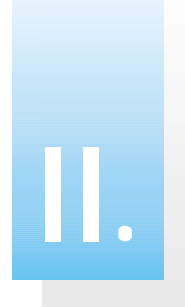
Security in information technology covers a wide range of necessary tasks, from protection against unauthorised access to hardware and software components, through protection of data during transmission over worldwide communications networks to the use of adequate ciphering techniques. Protecting transmitted data against forgery and physical security for computer centres and their staff are also aspects of IT security. So IT security must be seen as a separate technical component of equal importance to other similar factors like functionality, and it must be an integral part of technology. The quality of the security provided must form a major part of the competitive advantages of hardware, operating systems and applications software. The Federal Government will therefore work to make IT security a development objective of German IT products and services.

Electronic signatures also play a key function in IT security. They are the basis on which secure legal and commercial transactions can develop. The possibilities opened up by legal recognition of digital signatures will enable paper documents to be largely replaced by declarations given electronically, and this in turn will open up a considerable potential for rationalisation in the economy and in companies. The Federal Government intends to promote the use of digital signatures with pilot applications in the public sector, like security passes for government buildings and contracts for public works (see Chapter 6). This will require the amendments now proposed by the Federal Government to private and public law on the legal recognition of digital signatures.

Another important objective of the Federal Government is to strengthen the efficiency and international competitiveness of German crypto-producers, who will intensify their efforts in view of the growing demand on their market. The further opening of the EU internal market will be beneficial here.

Action:

- The Federal Government will continue to promote security consciousness in broad sections of the population by expanding the campaign "Security in the Information Society" which was launched in April 1999. This will be done with press releases for target groups, participation in trade fairs, presentations at association and professional conferences and expanding the website www.sicherheit-im-internet.de.
- It is a central concern of the Federal Government to protect German users of worldwide information networks by improving the use of secure cryptographic processes. Hence the Federal Government made clear in its "Key Points on German Crypto-Policy" of 1 June 1999 that in Germany ciphering processes and products may be developed, produced, marketed and used in future too without restriction.
- In conjunction with its European partners the Federal Government has abolished intra-Community export controls on cryptographic mass products, under the first revision of the EC regulation on dual use. The possibility of simplifying the export control procedure is also being examined in conjunction with the Federal Export Office; this should make German crypto-producers more competitive internationally.
- The Federal Government will create a basis of trust for secure ciphering technology in Germany. This will include testing, evaluating and certifying the security of ciphering mechanisms and procedures, a new task that has been entrusted to the Federal Office for Security in Information Technology (Bundesamt für Sicherheit in der Informationstechnik, BSI).
- To prevent crime on the Internet the Federal Ministry of the Interior, with the Federal



Criminal Investigation Office and the BSI, will take suitable steps to prevent crime (appropriate technical procedures) in order to create a safe and stable environment for the application of the new technologies and so achieve positive economic development and acceptance.

- The Federal Government will rapidly implement in national law the EU directive on the harmonisation of electronic signatures, which may be expected to come into force at the end of 1999. It will support standardisation measures on digital signatures in the national and international spheres, to ensure the interoperability of different software products, with the global use of digital signatures on the Internet.
- The Federal Office for Security in Information Technology (BSI) will develop its range of services under the BSI Law into a platform on "IT Security for Everyone". The BSI is the central IT security facility of the Federal Government and it will therefore vigorously expand its range of information and support.
- The Federal Ministry of Justice will play an active part in the negotiations within the Council of Europe on internationally coordinated adjustment of protection under criminal law against infringements of data security in a Cyber Crime Convention, and in the G8 on coordinated international rules for the prosecution of crimes on the international computer networks.
- The Federal Government has set up an interministerial working group to analyse the potential threat to critical infrastructures, identify IT weak spots and work out proposals to improve IT security. The working group will present a "sensibilisation report" with proposals for further action by the end of 1999.

3.8 Copyright

Innovations in the information society depend largely on the effective protection of intellectual property. To promote cultural and scientific innovations copyright and other rights must give the holders the means of making proper commercial use of their works and offer them the incentive to further intellectual achievement. At the same time the growing need of the modern information society for rapidly available information and a wide range of cultural products needs to be met.

In addition to the growing need of society for information technical developments are creating every greater challenges for copyright. The digitalisation of works enables them to be reproduced and transmitted with minimal loss of quality and it also enables access to specific individual parts of a work once this is stored and can be downloaded. Interactive communication and multi-media uses are also opening up entirely new fields for the utilisation of intellectual property. The better means of using works offered by this technical progress have also made it easier to pirate rights and increased the danger of the manipulation and distortion of works. It must therefore be examined in how far legal steps are needed to maintain the level of protection offered by copyright in the new technical conditions as well, and at the same time enable users of intellectual property to profit to an appropriate extent from the technical possibilities while observing the due rights of the producers of such works and the holders of such rights. Among other things this will affect digital reproduction for private purposes, public performance of digitalised works, the electronic transmission of works in on-line services and the introduction of electronic extracts from the daily press.

The distribution of works across frontiers, especially through on-line services and by cable and satellite radio and television is causing growing global use of intellectual property. A considerable part of the efforts to develop copyright further will therefore be directed to the appropriate harmonisation of copyright law within the European Union and the worldwide improvement of protection under copyright within the World Intellectual Property Organisation, WIPO.



Action:

- The Federal Ministry of Justice will work for a speedy conclusion to the consultations on a directive by the European Parliament and the Council of Europe to harmonise certain aspects of copyright legislation and related laws in the information society; i.a. this should lead to amendments to reproduction, distribution and public performance rights.
- To supplement this work the Federal Ministry of Justice will represent the Federal Government and work with the World Intellectual Property Organization on further contracts to ensure better worldwide protection of intellectual property, in accordance with the WIPO Copyright Treaty (WCT) and the WIPO Treaty on Performances and Radio Transmission (WPPT).

3.9 Taxation and Customs and Excise Duties

Taxation

The expected rapid growth in worldwide trade in purely "virtual" digital goods and in transactions on the Internet, which are de-materialised and can cross any frontier, are raising fears in many quarters that the present approaches to and methods of taxation can no longer be applied in the digital world. The Federal Government tackled this question at an early stage and initiated the examination of what adjustments may be needed in tax law on national and international level. The question of taxing the Internet is on the programme agreed in October 1998 at the Conference of OECD Ministers in Ottawa.

The objective of this programme is to create regulations that will neither privilege electronic commerce over comparable conventional transactions, nor discriminate against it. In particular, no additional taxes (bit taxes) are to be charged on electronic

commerce; this applies assuming that present mechanisms of taxation continue to be applicable.

In regard to consumer taxation there is agreement in the OECD and the EU that turnover tax revenue from trade in digital products should accrue to the country in which these goods are being used or consumed (the country of destination principle). Questions of taxes on earnings – in particular in regard to the problems of production sites, the classification of income and the calculation of transfer prices – are still largely in the discussion stage.

In view of the framework conditions for the taxation of electronic commerce attention must be drawn to the many different interactions between tax and other aspects of electronic commerce. For example, the regulations on digital signatures or the issue and administration of domain names could have considerable effects on tax collection, as they will decisively affect the possibility of putting transactions on to digital networks. As the tax implications of electronic commerce are not yet fully clarified intensive coordination will be needed to prevent the principles established for electronic commerce from being overturned by regulations outside the field of taxation.

Action:

- To prepare suitable regulations both market trends and taxation practice need to be observed on the basis of current legislation. The Federal Ministry of Finance will therefore intensify the monitoring that has already started, in conjunction with the fiscal departments of the Länder and the Federal Fiscal Office. The dialogue with companies and associations on this subject will also be continued.
- The Federal Government will continue to play an active part in international organisations to work out internationally accepted regulations for the taxation of electronic commerce. In particular, it will work within the OECD, in cooperation with the other EU member states,



to implement taxation models that are non-discriminatory.

- The Federal Government will continue the exchange with the Global Business Dialogue on Electronic Commerce on questions of taxation as well.
- On national level the Federal Ministry of Finance will continue to examine the need to adjust existing legislation (laws, ordinances, administrative regulations) to the requirements of electronic commerce.
- Other measures: Greater use should be made of the scope offered by IT to improve the "customer service" of the tax offices, e.g. electronic registration, electronic tax declarations (see Chapter II.6), provision of information and offers of assistance on the Internet, and to improve administration, e.g. technical equipment for company audits and tax searches. The company audit services need a legal basis expressly to access company EDPs.

But if goods are ordered on the Internet from outside the European Union and then delivered physically into the Community customs area they are subject to import charges, customs duties, EU tax and any special consumer taxes, and the bans and restrictions under the general customs and tax regulations have to be observed. There are no special regulations on handling imports of goods ordered through electronic commerce. The amount of imported goods of this kind is growing noticeably, owing to the rapid development of the electronic network.

Action:

The Federal Government will continue to work in international bodies, particularly the World Trade Organisation (WTO) to ensure that electronic deliveries are not subject to customs duties. The moratorium on charging customs duties agreed by the WTO in 1998 should therefore be prolonged for an indefinite period at the next WTO Ministerial Conference in December 1999 in Seattle.

Customs and excise

In the view of the EU and its member states, electronic transactions are not subject to customs and excise duties because they are services and as such are subject to the relevant tax laws. Only goods are subject to Community (and national) customs and excise duties, and this means physical goods. Digital transactions are services, and they include what are known as "virtual" goods, that is, goods that are supplied electronically but are not physically palpable (e.g. electronic transmission of the contents of books or software supplied by data servers, or transmissions through data routes from countries outside the European Union). All transactions in digital form that are regarded as services in this definition are not subject to customs or excise duties.

3.10 Civil and criminal law

General conditions in civil law

The developments in modern information and communications technologies mean that declarations of every kind can be sent along a worldwide network in the briefest time and on principle without loss of quality. Worldwide communication in legal business is also gaining in importance as a result of the progressive globalisation of trade. In this situation the formal requirements in civil law are no longer adequate to modern legal business. The need for written documents is often preventing rapid action using modern technology.

The Federal Government intends to take action to improve this situation. It will present draft legislation to adapt the formal requirements to modern facilities for legal business and start the legislative procedure



on this. The Federal Ministry of Justice has worked out a draft discussion paper and sent this to the relevant professional circles and offices for comment. The legal requirements for written documents need to be changed so that on principle the same needs can be met solely with the use of electronic media. Firstly, a new and viable instrument, the text form, is to be entered in the Civil Code and replace the need for written documents in many cases. This easier form will not require a handwritten signature, requiring only a declaration fixed in letters. The text form can be filled out both in the traditional way, on paper, and as electronic declaration. Secondly, a new electronic form is to be made available as an option to the statutory written document. The electronic form will require electronic signature to the document and this will comply with the requirements in the Signature Law.

In the great majority of cases where business partners wish to agree on a contract in a certain form – independent of any legal requirements regarding the form – the Civil Code will provide a practicable alternative intended to strengthen confidence in electronic transactions. The proposals will open up the possibility for legal transactions to move successfully into the next millenium.

Action:

- The Federal Ministry of Justice will incorporate draft legislation to adapt the formal requirements to modern practices for legal business in the legislative procedure. Formal legal requirements are to be changed so that they can on principle be met solely through electronic media as well.
- Parallel to the work in civil law the Federal Ministry of Justice will work out proposals for amendments to civil procedure. In particular uncertainties that have persisted so far over the use of modern information technology for written communication with the courts are to be removed.

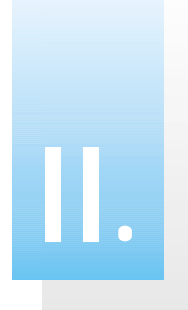
Joint stock law

Our present legislation on share dealing and the practice at annual general meetings has so far been entirely dependent on paper, written forms and personal presence at the AGM. Under the influence of modern telecommunications media this will change drastically in the next few years. The following are the concrete modernisation projects:

- electronic transmission of annual general meetings proceedings (in addition to personal presence) on the Internet or by television channel
- annual general meetings held in different places at the same time (maybe even on different continents)
- information for shareholders on agendas, annual reports etc. on the Internet
- exercise of voting rights by shareholders directly to the company or channelled via the Internet by a deposit bank

Action:

- In order to adapt Germany as a financial centre to the needs of the information age the Federal Ministry of Justice will present draft legislation to simplify company law; i.a. this will remove the requirement for written forms and permit electronic declarations and statements.
- In view of the considerable cross-frontier importance of the issue, the Federal Ministry of Justice will launch an initiative on EC level to remove obstacles in EC company law to electronic communication and adapt the regulations on voting and information for shareholders.



Patent law

Last year the legal conditions were created for the introduction of electronic patent applications and the registration of utility models. On the basis of these amendments, which came into force on 1 August 1998, regulations on the form of the applications can now be issued by legal ordinance. The technical conditions necessary to accept patent applications electronically are now being created in the German Patent and Trademark Office.

In the field of patents the German patent information system DEPATIS is contributing to Germany's ability to attract inward investment. It is the electronic research and archive system in the German Patent and Trademark Office, and it specialises in research into technical data. The archive currently holds around 20 million patent documents and a version is to be made available to the public on the Internet. The archive offers comprehensive information throughout the entire range of technical data, and it will also be of value to schools. As it will on principle be accessible to everyone on the Internet it will then do even more to make technical subjects easier for broad sections of the population to understand, and so help to counter the sceptical attitude to technical developments which is still sometimes evident. The availability of DEPATIS on the Internet should stimulate interest in technical subjects and so also create one of the conditions for more inventive activity.

To achieve these objectives it is essential for DEPATIS to be an Internet service available free of charge. It will not only give users access to German information, it also holds the documents of practically all the main inventor nations. In addition to this, DEPATIS will be the German contribution to the publicly available Internet Association of Patent Offices in the European Patent Organisation, and it will also represent Germany in the global WIPOnet of the World Intellectual Property Organisation, WIPO, as the German digital library. Patent offices worldwide present their documents on the WIPOnet for exchange and use, and this will give the developing countries full access to technical information for the first time.

Action:

The Federal Ministry of Justice is examining the possibility of issuing an ordinance to enable patent applications to be made electronically. The German information system DEPATIS is to be available on the Internet.

3.11 Labour and social law

The rate of progress in modern information and communications technologies will be dynamic in future as well, and it will bring changes to human actions and thought, in both the work process and private life. The changes in the world of work are evident now, i.e., in the rising trend in employment in the services sector, the growing share of information jobs and the accelerating change in the nature of jobs. Not only are jobs changing, corporate work structures are changing too. Two trends need special mention:

- Work organisation is changing towards flatter hierarchies, decentral decision-making structures and loose networks held together by tele-cooperation (the best known of these is tele-work); "virtual" companies are being created.
- Many jobs are not permanent now, nor are they oriented to the classical workplace within the firm. Mixed forms are developing, between full employment in the traditional sense, part-time work, employment for a limited term and freelance work.

These trends can pose new challenges for labour and social law. But first it must always be examined to what extent solutions can be found in the form of collective agreements or plant agreements. These must have priority. Moreover, when legislation is being prepared it must be ensured that the development of successful forms of independent economic activity is not impaired in any way.



Tele-work

The Federal Government holds the view that a special law on tele-work is not necessary to respond to the challenge of informatisation in the world of work. Such legislation would place tele-workers in a special position and mark them off undesirably from other persons in employment. Where the special features of tele-work cannot be covered by collective or plant agreements they should be covered by the legislation governing other labour issues, like defining the term "person in employment".

Nevertheless, the Federal Government is committed to making tele-work more attractive as a different way of working and increase acceptance of it among employees and companies. Attention should be drawn to the brochure "Telearbeit" (Tele-work) issued by the Federal Government in 1998 with the support of Deutsche Telekom.

Data protection for employees

The Federal Government regards legislation on data protection for employees as necessary; this will require considerable action in the political and technical fields. Regulations on data protection specific to individual areas should

- establish an adequate balance between the justified interests of the employees (protection of personal rights) and the employers (need for information)
- make the legal situation clear to both employers and employees and be transparent and understandable for those affected
- make technology more acceptable to the employees.

Non-genuine freelance work and defining the "person in employment"

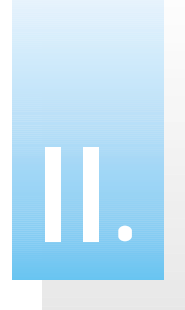
The spatial (and organisational) separation of the physical workplace and the firm, which modern IT is facilitating, can lead to claims to be working free-

lance although these persons are actually in employment, according to the criteria established by the judiciary for distinguishing between freelance work and dependent employment.

To facilitate identification of such undesirable cases a regulation has been introduced in social legislation (Social Code, Book IV), according to which employment can be judged to be paid work on which statutory social insurance contributions are due, unless there are grounds to refute this, if two of the four criteria laid down in the regulation (no employees liable for social insurance, regularly only working for one client, no marketing, performing work typical of persons in dependent employment) are found to apply. This regulation is appropriate for a tendency that is becoming evident in the transition to the information society for traditional conditions of employment to be dissolved. It is a regulation under social law and as such has no direct legal effects on the concept of the person in employment under labour law. It remains to be seen to what extent the new regulation under social law will help to reduce the grey area between dependent employment and freelance work, and to reduce the problems of non-genuine freelancing. It must also be borne in mind whether and how the changes in social insurance law will affect practice and jurisdiction in labour law.

Action:

- A pilot project entitled "Telejob Exchange" funded by the Federal Ministry of Economics and Technology is to test during the next two years how and with what complementary measures the new medium of the Internet can be used to establish contacts between the supply and demand for jobs and parcels of work in communications-supported fields (tele-work, tele-service, call centers).
- The Federal Government will present a concept for legislation on employee data protection that will adequately protect the private sphere and the right of employees to determine what information should be given in our



modern information and communications society.

- The Federal Government will examine the proposals put forward by the Commission on Non-Genuine Freelance Work, as soon as these are formulated and presented, and introduce supplementary and clarifying measures in labour and social law on the basis of these.

4. Creating Innovative Jobs – Promoting New Applications

The internet and the new information and communications technologies offer a wide range of possible applications, and so they also offer opportunities for new products and jobs; but they are also changing our forms of work and organisation. Electronic commerce is one of the most important applications for the new digital information and communications technologies, covering all business transactions carried out electronically as well as actual shopping. In particular, the possibility for global communication over worldwide information networks is opening entirely new prospects for business, and they will bring fundamental changes in the structures of markets, the world of work and companies.

Other possible applications for the new technologies are tele-work, building up virtual corporate structures, multi-media public information systems for municipalities, parliaments and governments, digital libraries and greater use of telematic systems in transport. But in many cases there are obstacles to the actual application of the new facilities. Many small and medium-sized firms have little experience in using external networks. As well as the need to train staff direct consultancy can often be of valuable assistance here. Tele-work is relatively slow to become established in Germany although, as an international comparison shows, there are still extensive possibilities for it here. Some initiatives have already been started on

regional level to exploit the potential of tele-work more thoroughly. The Baden-Württemberg Tele-work Users Platform initiated by the German Trade Union Federation in Baden-Württemberg and Deutsche Telekom is being sponsored by around twenty other partner organisations. Its objective is to spread tele-work through a solution-oriented exchange of experience between firms, backed up with consultancy and demonstrations. The Federal Government can lend effective support to such initiatives with its own activities.

Altogether the Federal Government regards it as necessary for the public to be made more aware of the many new possible applications; these need to be demonstrated and their use encouraged. This is essential if they are to penetrate fields throughout the economy and help to promote innovative jobs. Promotional initiatives are needed for electronic commerce, to encourage new businesses and the development of new IT applications.

4.1 Electronic Commerce

Electronically supported commercial activities offer companies a wide range of opportunities to improve their competitiveness. They can lead to progress in productivity and cost savings, and enable companies to react faster and more flexibly to customer requests and market changes. Global information networks are opening the way to markets abroad not accessed before, and "global marketplaces" are replacing local or regional markets. Changing forms of interaction between companies and their customers are bringing new sales and purchase structures; new products and services are being created and innovative companies are being built up.

Electronic commerce on the Internet is one of the dynamic areas of the economy. According to estimates by Forrester Research Inc. world turnover on the Internet could grow from about US \$ 80 billion in 1998 to US \$ 970 billion in 2001. According to EITO Europe is experiencing an explosive growth in electronic commerce applications. At the end of 1999 nearly 50% of European companies are expected to be engaging in Internet transactions.



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So use of the electronic networks is becoming a decisive factor in competition. But although there is a clear rise in overall use in Germany there is still a gap, especially among small and medium-sized firms. So the Federal Government still sees a need for action here. Initially the aim is to make small and medium-sized firms more aware of this potential business and induce them to use the facilities. The Federal Ministry of Economics and Technology has been sponsoring altogether 24 regional competence centres for electronic commerce since 1998. The purpose is to motivate SMEs and craft firms to use the new facilities and give them concrete and expert start-up assistance. The business potentials are to be made clear and questions related to electronic commerce answered, possible solutions indicated and present reservations in SMEs towards these technologies overcome.

In addition, it is important to provide models for small and medium-sized firms that suit their needs and will enable them to adopt specific applications as quickly as possible and on a broad basis. The integration of electronic communications in business processes can also be improved by standardising information (e.g. product descriptions); this will help to improve the position of the SME supplier industry particularly.

Action:

- The Federal Ministry of Economics and Technology will give financial support to the regional competence centres for electronic commerce until mid-2001. The work of the centres is to be further improved with a comprehensive network to deal with enquiries (an electronic platform, joint events on specific subjects like digital signatures and electronic payments procedures). The network is also to be used for public relations campaigns to encourage wider use of electronic commerce.
- The Federal Ministry of Economics and Technology will promote model projects in electronic commerce to provide small and medium-sized firms and craft firms with concrete

solutions for applications adapted to specific sectors across a broad front.

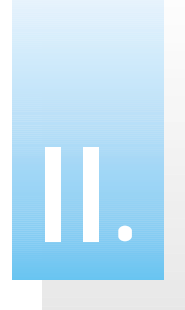
- The Federal Ministry of Economics and Technology will support activities by private companies and research establishments to improve access to technical and financial information for SMEs and their use in business and production processes. Among other things planned are measures to standardise product descriptions and for the application of product data norms.
- The Federal Ministry of Education and Research is promoting pilot projects intended to realise virtual companies and cooperation networks in the services sector, and in particular to help small and medium-sized services firms and very small firms open new markets by providing electronic support for joint ventures.

4.2 New innovative businesses

The multi-media sector is still young and it is mainly composed of innovative SMEs. Innovative new businesses play a particularly important part in the advance of technology and markets. So far, however, the dynamic in Germany in founding such businesses leaves something to be desired.

That is particularly the case with new businesses founded by women. The aim is therefore to achieve a marked increase in the share of women setting up new businesses, from the present 30 % to 40 % in the next few years. The new information and communications technologies need to be the driving forces in encouraging more women to set up in business.

The Federal Government has launched a number of activities to give sustained encouragement to new innovative businesses. They include the "New Multi-Media Business Competition", which will be held annually. Up to 100 of the best ideas for a new multi-media business will be selected and rewarded. So this



will provide an important incentive for prospective entrepreneurs in the phase before the business is actually founded. The prize-winners will be given easier access to venture capital, and investment forums will be held to encourage investors to enter into financial commitments to the new firms. The target group are persons resident in Germany who want to set up a multi-media business in Germany.

The prize-winners will be chosen in open competition so that their objective, to set up their own business, can be implemented. Flanking activities like full press releases on the competition and the prize-winners, and an offer to those entering to present their products and their firm at trade fairs will round off the competition.

Action:

- The Federal Ministry of Economics and Technology will sponsor the annual New Multi-Media Business Competition to the amount of c. DM 2 million a year for the next three years. The number of multi-media firms in Germany is to be doubled by the year 2001. It is also intended to build up a virtual investment forum to give all the prize-winners the opportunity to obtain private capital through the Internet.
- The Federal Ministry of Education and Research is expanding its work on Women setting up in business". The main measures are to network women setting up in business through a national competence centre with a data bank on women entrepreneurs, and awards for the "Most Promising Region for Women setting up in Business" to be selected by competition. DM 2 million has been earmarked for the start-up phase.

4.3 Digital library

Building up a digital library

A major task for research and education policy is gradually to build up an Internet-based digital library which will facilitate access to scientific information worldwide. The availability of electronic information everywhere will enable global competition between suppliers of information, but it will also induce the state-funded information facilities, like libraries and specialist information centres, to a greater division of labour and coordination. The present situation, with the same information available in several places at once, will not be sustainable with the new technical facilities and in view of the limited financial resources.

The objective is to support the change to a structure for the provision of scientific information that is as efficient as possible and operates at favourable cost. Hence the activities of the Federal Government will be concentrated on developing an Internet-based information structure by the year 2005. The individual steps will be:

- Gradually to build up national associations of specialist information centres, libraries and other suppliers of services that can organise a national supply of the relevant electronic information for their specialist field, with division of labour and coordination. The objective is to support the work of building up electronic document delivery services with suppliers of information working in coordination.
- To expand the electronic information services and further develop electronic document delivery services for the scientific libraries.
- To develop further electronic and multi-media publications and to create the necessary technical tools for this, e.g. intelligent user systems, search processes, archive systems that will remain stable for a long period.
- To promote more strongly the competence to research and use electronic information.



SUBITO – The electronic library document delivery service

SUBITO is a cooperative electronic document delivery service used by German libraries, and it was set up by the Federal Ministry of Education and Research together with the Länder under a Federal Government-Länder initiative to speed up the literature and information services. It is an important step on the way to the Internet-based digital library. The objective is to enable direct and rapid on-line access, independent of location, to the stocks of libraries in Germany. The process of ordering and delivering literature electronically will be implemented in several stages. Even now almost any printed magazine article can be downloaded (<http://www.subito-doc.de>). The next stage is to build up a delivery service for books on loan, and this will start with a pilot phase in the autumn of 1999. The books available to lenders in selected lending libraries with SUBITO facilities can then also be ordered on the Internet. The longer-term aim is to include practically every book available to lenders in scientific libraries in the service.

A large number of scientific libraries are already offering periodicals electronically, but owing to licence regulations they are mostly only available to the small circle of users of the library, e.g. students and staff in the university in question. SUBITO can only be expanded gradually for electronic publications. The appropriate projects are already being implemented in a number of places, e.g. the virtual specialist library is being expanded under the direction of the German Research Society. Any future national SUBITO service for full electronic texts will build up on the experience gained with these individual projects.

Action:

- The Federal Ministry of Education and Research is providing c. DM 115 million by the year 2003 to expand digital libraries and electronic document delivery services.

4.4 Tele-cooperation and tele-work

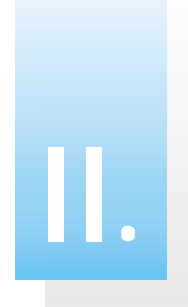
The Internet Exchange for Tele-work

As early as 1998 the Federal Government – with the support of the Federal Labour Office and Deutsche Telekom – issued a brochure entitled "Tele-Work". Now an Internet Exchange for Tele-work is to be set up to enable supply and demand for tele-work to operate on the Internet; this should help to increase employment.

The potential for tele-work is still far from being fully exploited in Germany. So far there are only about 800,000 tele-jobs, while the total potential is estimated at 2 to 4 million. According to a study by the Fraunhofer Society, tele-workers only account for 2.2 % of the potential labour force, compared with 14 % in Great Britain/Ireland and 8.7 % in USA/Canada. Here, too, the share of women is disproportionately small at only about 40 %.

The demand for tele-work in the labour force is strong, but so far employers have been hesitant to offer it. So there is need for targeted information campaigns on the advantages of tele-work and how obstacles can be overcome within the firm. Information also needs to be provided on the new means of advertising tele-work and handling applications in the media. The "Internet Exchange for Tele-work" initiative run by the Federal Ministry of Economics and Technology is tackling these issues. Like the competition "Data Security in Tele-work in the Municipal Administrations (DATEL)" the Internet Exchange for Tele-work is based on the promotional scheme "Tele-work in SMEs" that has been successfully concluded. It created around 1,700 telejobs in small and medium-sized firms, of which around 500 were new.

The "Internet Exchange for Tele-work" pilot project is designed to set up and test an electronic platform for telejobs supply and demand, and to establish contacts between employers and potential employees. In addition, specific information, consultancy and motivation will be given to encourage companies, particularly SMEs, to offer more tele-work. The Federal Labour Office, the Economics Ministry in Hesse and the Land Labour Office in Hesse are participating in the current project.



Tele-work and the family

As early as October 1997 the Federal Ministry of the Family, Senior Citizens, Women and Young People commissioned a study on "Telework and the Family". It focussed mainly on the experience gained by employees and firms with tele-work, especially in coordinating this with family obligations and the requirements of the firm. As part of the study the Institute for Development Planning and Structural Research (ES) at the University of Hanover carried out extensive surveys in firms and among tele-workers. These were supplemented with talks between experts and representatives of the employers and trade unions, the chambers, researchers, trade supervisory organs and family planning organisations.

Tele-cooperation between virtual small and medium-sized firms

In Germany the formation of virtual firms is still in its initial stages. General awareness of the great opportunities offered by virtual firms still needs to be created. There is also need for action to develop the necessary technological basis further, to improve standardisation and create the necessary legal conditions. This is the background to the competition FABNET. The objective is to facilitate and accelerate the formation of virtual firms, that is, networks based on information and communications technologies between firms that are otherwise operating independent of each other. For small and medium-sized firms particularly a flexible link-up to form a virtual firm for a limited period of time can be of great advantage; it may enable them to carry out large and complex orders in competition with big firms.

The main focus of the FABNET competition, which is organised by the Federal Ministry of Economics and Technology is to develop and try out new technical, organisational and legal concepts for tele-cooperation between virtual small and medium-sized firms. Among other things this will require complex dialogues and steering of work processes, and user-friendly computer-supported cooperative work (CSCW) systems to support joint work on documents, the coordination of deadlines, project

management etc. In this connection activities to standardise computerised methods and processes, and so enable them to spread rapidly, are being accorded particular priority.

Business TV for SMEs

Business TV is shifting inhouse corporate information, communication and interaction processes on to the digital network. The contents range from pure information and further training for the staff, through tele-cooperation to marketing and sales. Huge distances can be bridged by satellite. Information logistics in companies is being made more efficient, productivity is rising and costs can be lowered. That will increase the competitiveness of firms and secure employment and growth.

In Germany business TV has so far been used mainly by large firms and major banks, like the HypoVereinsbank, Deutsche Bank, Bausparkasse Schwäbisch Hall, Deutsche Post, Deutsche Telekom, Kaufhof, Volkswagen, Daimler-Benz, Allianz and Gerling. The breakthrough into the SME sector is still awaited. Most small and medium-sized firms still lack the knowledge and experience necessary to operate business TV, as well as the necessary infrastructures. There is need for political action here.

The objective of the Federal Government's promotional activities in business TV is to accelerate the entry of small and medium-sized firms into this new area of multi-media applications and open up more new groups of users, like craft firms, freelance workers and the public administration. The evaluation of technologies and new concepts in advanced training for small and medium-sized firms will play a large part. The results are to be made accessible to a broad range of users.

As the first step the Federal Ministry of Economics and Technology has issued a brochure "Business TV – New Ways of Corporate Communication", jointly with the Confederation of German Industry. It is an important orientation aid for firms wishing to embark on business TV and it will provide small and medium-sized firms in particular with the necessary competence.



Action:

- The Federal Ministry of Economics and Technology is providing a total of DM 500,000 to promote the "Internet Exchange for Tele-work" pilot project. This will examine how the Internet can be used to establish contacts for communications-supported activities (tele-work, tele-service and call centres). If the pilot phase is successful the Internet Exchange is to be extended to the whole of the Federal Republic of Germany as a telejob service and incorporated in the Federal Labour Office's electronic job service.
- The Federal Ministry of the Family, Senior Citizens, Women and Young People has commissioned a study on "Tele-work and the Family". The first interim report is to be discussed with a group of experts in the autumn of 1999. The project is to be concluded in March 2000. It should indicate the scope for tele-workers and give advice for its use.
- The Federal Ministry of Economics and Technology intends to start the FABNET competition in 2001. The ten best project ideas are to receive prizes.
- The Federal Ministry of Education and Research will promote associate projects for employers and research establishments to develop software, organisation models and legal solutions for tele-cooperation between services firms.
- The Federal Ministry of Economics and Technology is planning to promote a project for the use of business TV in advanced company training. The aim is to create a business TV platform for SMEs, explore the possibilities for SMEs to use business TV and test these in a pilot firm.

4.5 Information and communications technologies in the services sector

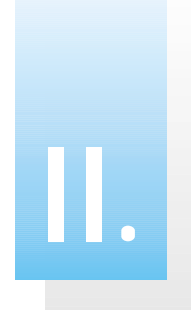
For decades the services sector in the industrial countries has been creating employment worldwide that has replaced the jobs being lost through structural change in industry and agriculture. It has also involved more groups in the population in working life.

Since the early nineties Germany has encountered growing difficulties in utilising these opportunities. Unlike other countries, the growth in employment in the services sector is now insufficient to compensate for the job losses in industry. Germany has lost world market shares in services that are growing in major fields, like legal and corporate consultancy, engineering or advertising and the media, and in some cases developed a negative trade balance. Analyses show that this is due both to

- insufficient exploitation of the international market opportunities for high quality services and highly skilled services work and
- a relatively low level of employment in the simpler services areas.

With the new information and communications technologies and against the background of the globalisation that is affecting the tertiary sector as well, services today need to be just as cost-conscious, efficient and high quality as the material goods sector has long needed to be. Only in this way can the new market and employment potentials inherent in this sector be realised and existing jobs secured over the long term.

This challenge also affects education and research policy. The Federal Government is pursuing the aim of strengthening knowledge-based services and improving the cooperation, which has so far been only weak, between research and the services sector, particularly in the new information-intensive areas. Special importance is attached to the research concept to be presented at the end of this year on advanced training in the services sector.



Action:

- The Federal Ministry of Education and Research will provide up to DM 30 million p.a. in the next few years to develop knowledge-based services on the basis of the information and communications technologies and to modernise the classical services areas using the new IT facilities.

4.6 Telematics in transport

Transport telematics – systems and services

In the transport sector the use of the new information and communications technologies, that is, transport telematics, is creating new and growing employment potentials, firstly in the producing industry and services, and secondly in transport itself, as the effects of reform of the rail system have shown.

Road transport

The roads are still the most heavily used transport mode, and the development and use of telematic systems and services will initially be concentrated primarily on this sector. The road transport telematics systems that have been introduced include dynamic traffic control equipment on main roads, which will automatically register the density and speed of the traffic and switch on warning signals; it will also help to keep traffic flowing by imposing speed limits appropriate to weather conditions and the volume of traffic.

Telematics systems and services for personal transport

Industry and business have recognised the potentials of offering telematic systems and services. Three out of four new private cars in the upper range now have their own independent navigation systems that work in conjunction with vehicle sensors, satellite navi-

gation and digital road maps to plan routes and reach a particular objective. A growing number of middle class models are being similarly equipped. The first individual up to date information services offered by private suppliers are already on the market, and a growing number of private firms are offering services, like customer-oriented response to automatic emergency calls, assistance on breakdowns and the prevention of car theft.

Driver-assistance systems take the strain off the driver on routine journeys and make traffic safer. Individual vehicle-related applications, like electronic distance warning systems to reduce the risk of pile-ups and driver-support systems when turning off or changing lane, are already being developed by the automotive industry and are being supported by the Federal Government.

Moreover, since the autumn of 1997 the automated traffic warning service using RDS/TMC has been transmitted throughout Germany by the radio corporations. This radio service enables up to date traffic reports to be received in digital form. The driver can listen to the reports for the region or stretch of road he needs (in future in a language of his choice), without the radio programme having to be disrupted. Sets that can receive these signals are already on the market and competition between the first suppliers is growing.

Telematics systems and services in public transport

Computerised steering and operating systems are in use in every area of public local transport to ensure that rail traffic runs smoothly. Priority signalling for buses and trains at lights makes local transport faster and so more attractive. These telematic applications are supported by electronic timetable and traffic information and cashless payment facilities.

With the national German electronic timetable information system DELFI the Federal Ministry of Transport, Building and Housing is promoting the development of an innovative technique to link existing timetable information systems for all public transport. It will link up all the transport organi-



sations and Deutsche Bahn AG, the German railways. The introduction of DELFI has already started in some regions. The architecture of the system is open and it can be extended to other regions in Europe. Qualitatively it can be extended to include seat reservations, through ticket purchases and dynamisation to provide information about any deviations from published timetables; it can also be transmitted through any media.

Telematic systems for general transport mobility

Pilot schemes to instal and test services to ensure general mobility of transport, based on modern information and communications technologies and used in areas of particular density, are the subject of key projects on "Mobility in Densely Populated Areas". They are being promoted by the Federal Ministry of Education and Research. The systems that are being developed and installed include personalised and collective information systems to provide travel information, and transport management systems. Priority is being given to solutions that are independent of platforms, wherever possible.

Air traffic

The information and communications technologies in use in air traffic will undergo fundamental change and renewal in the new few years. In future air traffic control and flight equipment will combine navigation applications with a data communications component to meet the need for an intelligent and efficient navigation and piloting system. The future air traffic control and automatic coordination of flights will make high demands on automated, self-organising data radio networks on board aircraft. With the expected increase in air traffic communication will play a decisive part in enabling the volume of traffic to be handled speedily.

So air traffic offers the opportunity for innovation and new jobs in this sector. If German industry is to participate successfully it needs to be incorporated in the definition and standardisation phase as early as possible.

Waterways

Transport telematics is essential to improve the competitiveness of the German harbours and so secure jobs or create new ones. It will enable ships to dock and sail quickly, increase the efficiency of harbour management and achieve stronger links between the individual transport modes. Hence it will support the formation of intermodal transport chains, enabling the waterways infrastructure to be used efficiently. It will also serve to make inland shipping more economical and safe.

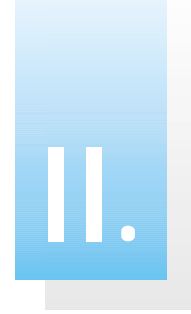
Telematics in transport and logistics

Small and medium-sized firms in the transport sector are least well equipped to meet the challenges of the information society. The willingness to invest in new technologies, information media or competences is clearly lower here than in large firms.

It is therefore the aim of the Federal Government to support SMEs in the transport sector that are willing to start using the new information and communications technologies, in order to stabilise the competition situation for these firms and the jobs they have created. The plan is to use regional competence centres under the "Electronic Commerce" initiative to improve knowledge of electronic commerce in small and medium-sized firms.

Companies in industry, trade, transport and the other services sectors complain of considerable problems in attracting young people to train in logistics. To achieve better utilisation of the employment potentials in this field and meet the need for skilled personnel the Federal Government intends to start a "Logistics Training" initiative. The aim is to establish, in conjunction with companies, researchers and training centres, how the general conditions can be improved and more logistics personnel trained to meet current needs.

Altogether the use of transport telematics could provide an optimal combination of the cost advantages of the various production locations, from the development of a product through transportation to marketing. Germany has the industrial areas needed



to bring suitable products to the market. According to a market study, the cumulative turnover in road transport telematics in Europe will reach between DM 80 and 120 billion between 1997 and 2010. This will provide clear stimulus for the labour market. The first positive effects are already evident, as companies specialising on individual telematics products and services are being set up and more jobs created.

Action:

- The Federal Ministry of Transport, Building and Housing will continue the dialogue with the private sector in the Transport Telematics Forum.
- The Federal Government will provide c. DM 90 million p.a. in the next few years for measures to influence traffic on the Federal autobahns and main roads.
- In DELFI, the national German electronic timetable information system, the Federal Ministry of Transport, Building and Housing is promoting the development of an innovative, highly complex technique to link existing timetable information systems for all public transport, covering all the local transport networks and the German railways, Deutsche Bahn AG.
- As part of the "Electronic Commerce" initiative run by the Federal Ministry of Economics and Technology small and medium-sized firms in the transport sector are to be encouraged to use the regional competence centres and learn more about electronic commerce.
- The Federal Ministry of Transport, Building and Housing is launching a "Logistics Training" initiative in conjunction with companies, researchers and training centres to extend the facilities and train more skilled logistics personnel to meet current needs.
- The Federal Ministry of Education and Research will provide about DM 187 million by the

year 2003 to promote telematics systems for general transport mobility and telematics in the transport and logistics sector. This should achieve a better division of labour and networking of transport modes for goods transport, and increase the use of environmentally-friendly transport modes (shifting transport). It should also enable transports to be handled rationally, with higher utilisation of capacities and fewer empty journeys (avoidance of transport).

4.7 Satellite navigation

Reliable satellite-supported positioning and navigation systems are essential for European and global telematics services. They are increasingly becoming a key element in building up a general transport infrastructure for every area of application in air traffic, shipping and land transport. A knowledge of the exact position of a vehicle and the means of interactive communication open up entirely new possibilities for modern transport management that can be used across a wide variety of fields.

In particular the interaction of terrestrial and space-supported infrastructure will open up prospects for user-oriented applications and multi-value services, e.g. in combination with digital geodata, the commercial effects and economic importance of which can only begin to be estimated today. Satellite navigation is also becoming more important in other areas of society and the economy (e.g. geodasy, agriculture and leisure pursuits).

The two satellite navigation systems now in use have given impressive demonstration of the possibilities for using this technique, and they have given rise to numerous civil applications all over the world. However, both systems are controlled nationally, they were developed firstly for military purposes and financed from the national defence budgets. The basic requirements of continuity, integrity and precision needed to ensure safety and enable sovereign application are not guaranteed. Even if the military



The Way to a Leading Position in Europe in the Information Society

restrictions are further reduced these systems will not meet the institutional and technical requirements for civil use. They are not powerful enough to be used in fields where great exactitude and reliability are required, like fully automated precision landing of aircraft, train driving and supervision systems for rail transport, tracking containers worldwide or collision warning systems for aircraft.

Therefore, the European Commission is aiming to build up a global, civil satellite navigation system that is up to the latest state of technical development and includes terrestrial infrastructure (Galileo). The definition phase, up to the end of the year 2000, should yield utilisable results on the feasibility of the project and a viable concept to finance it, largely from private sources. The project is to be ready for operation from the year 2008.

Galileo will enable Europe to make itself independent of nationally controlled systems and so open up scope for application in critical areas of security and sovereign tasks. It will also make European industry more competitive in this promising market. The European Commission is talking of a GPS equipment market of c. US \$ 350 million in Europe now, and market growth to US \$ 960 million by 2004. The possible world market volume for applications is put at c. 40 billion euro by 2005. According to estimates by the European Commission the provision of the infrastructure for satellite navigation will secure 20,000 jobs and its operation 2,000; by 2008 around 100,000 jobs will have been created in applications (hardware and services).

So the Federal Republic of Germany is committed to playing a long-term part in European work in this field. In its competence for the main users of satellite navigation systems the Federal Ministry of Transport, Building and Housing has been participating since 1997 in the European Space Agency (ESA) programme, with a total of DM 75 million for 5 years. The programme is carrying out application-related research on satellite navigation for the European Commission. German industry is also heavily engaged in the current work, both with funds and equipment and with concepts. So European and national, state and private activities are joining forces to ensure that satellite navigation, which is an indispensable build-

ing block in transport telematics, can be improved and secured over the long term.

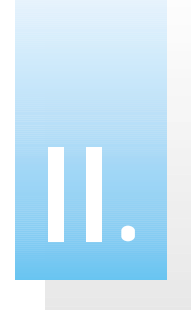
Action:

- The Federal Government will continue to support the European Commission over the long term in building up a global civil satellite navigation system.
- The Federal Ministry of Transport, Building and Housing has been participating since 1997 in the programme of the European Space Agency ESA, with a commitment of DM 75 million over five years; the programme is carrying out application-related research on satellite navigation for the European Commission.
- The Federal Ministry of Education and Research is promoting work on satellite navigation under the national space programme. Up to DM 15 million a year is being committed for pilot application projects to open up new fields of use for satellite navigation, for technological developments in the space and control segment and to develop receiver technology and equipment.

4.8 Health

A better service for the public and patients

The advance of network technologies and telematics in the health system has opened up new opportunities to improve communications routes in recent years, and it will cause considerable changes in the health system. The status report on "Telematics in the Health System" commissioned by the Federal Government, the special report by the Council of Experts on Concerted Action and the recommendations of the Working Group on Health in the Info 2000 Forum all show the growing importance of electronic information and communications technologies in providing better patient care, ensuring quality control and



making the health service generally more efficient and economical. They will also help to meet the needs of public and patients better and strengthen their relevant rights. Moreover, they will enable more integrated health research to be undertaken.

These expectations arise against the background of the experience with pilot experiments on European and international level (G8), which yielded the following results. By interlinking ambulatory and in-hospital care with the help of IT technology, and by creating chains of supply, diagnosis and treatment data can be made readily available. Quality control is possible. Diagnoses can be made and patients' files transferred by tele-medicine, so enabling tele-consultations and second opinions to be easily obtained. Emergency cases can be dealt with better through integrated information and communications systems linking the emergency doctor, the emergency centre, the hospital, the blood bank etc. Multi-media teaching programmes now present systematised versions of the rapidly increasing volume of medical knowledge. They are improving the level of training and advanced training of doctors. Internet technology is making this knowledge available at all times, and during treatment it can quickly be linked up with the patient's data (guideline oriented knowledge-based decision aids).

By integrating fragmented patient data and creating an integrated electronic patient file, which can be made available faster and in more complete form, doubling of examinations can be avoided (and the strain on the patient reduced). Treatment can be given with tele-supervision, at less expense and in a more patient-friendly way (home care/tele-monitoring). In research the big quantities of data in clinical studies can be processed faster and more efficiently. Easier data exchange will support both cross-sectoral and inter-disciplinary research and increase cooperation between practising doctors and university clinics. Evidence-based medicine and guidelines for diagnosis and therapy based on this will be possible.

All these telematic applications need data protection, that is, the use of the new technologies must take account of the special need to preserve the confidentiality of medical information and patient data. However, these technologies will not only give rise to

new risks and problems, they will also make protection easier (e.g. through the use of cryptographic ciphers and digital signatures). The change in the paradigm in medicine outlined here will create an additional need for personnel trained to handle information technology, and so it will also involve new training courses and a qualification offensive for those already working in the health service.

Health Information Network

On-line supplies of health information and systems are being created by private initiative, by corporations and by state initiative. But using them not only creates opportunities for experts and lay users, it also entails risks. As the supply of information grows rapidly in the health sector the flow of information that is false, of inadequate quality or not scientifically proven is also increasing markedly. Lay users are even less able than professional users (like doctors) to tell when information offered on the Internet is accurate, complete and up to date, or to make proper use of sources of information that are available but widely dispersed. Moreover, neither group is always in a position to judge accurately the reputation, seriousness or competence of suppliers.

The Federal Ministry of Health, in conjunction with the Länder and third parties (the health insurance institutes, associations, independent initiatives and self-help groups) is therefore aiming to initiate a decentral health information network that will provide quality control and can be used by experts, interested laymen and other groups. It will collect and supply health-related information, so making the German health service more transparent. This type of information system, developed in cooperation with various bodies, should help to make the public and patients better informed. It will also be able to build up on existing supplies of information, for information and documentation systems have already been developed, in environmental medicine and the field of allergies, for instance, as in the project "Health Reporting", to make existing data available to the general public on the Internet.



Electronic prescription

The traditional procedure for writing out prescriptions ensures that patients act on their own responsibility and it also meets data protection requirements, but it does not utilise the potential for qualitative improvements and easier accounting which the introduction of electronic prescription would offer. Media breaks in the procedures for prescribing, dispensing and the ensuing accounting will be avoided with electronic prescription. Integrated processing may be expected to lead to more up to date drug control data, cost savings and greater security in procedures. However, this presupposes the introduction of user-friendly procedures with data protection, which induce doctors and chemists really to make use of electronically processed information on drugs.

Cards in the health system

With the present technology and growing networking, and the need for control in the health system, a more advanced concept would be appropriate for the use of cards. This would also avoid possibilities for misuse that have existed so far. When cards were introduced for persons with health insurance the creation of a certificate showing the right to claim services that could be read electronically was the main concern. Now, however, further information is to be incorporated and transmitted and integrated better between the various occupations in health care (in combination with electronic health professional cards). To ensure the desirable and necessary data protection these cards are to employ cryptographic ciphers and digital signatures.

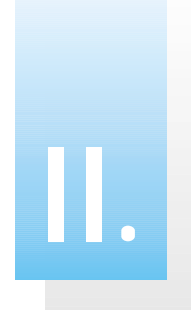
A telematics platform in the health system

If they are to be of mutual benefit essential telematics applications need to be interlinked. For example, electronic prescription will combine elements of data processed patient files with drug information systems and technical procedures that will simplify the administration. The creation of uniform and binding standards, the coordination of important infrastructure components like multi-media patient files and organisational interlinking are becoming

increasingly necessary. Unnecessary and costly parallel developments need to be avoided.

Action:

- The Federal Ministry of Health, in cooperation with the Länder and third parties (health insurance institutes, associations and private initiatives, self-help groups) will initiate and support the work of building up a decentrally organised health information network to provide quality control for experts and interested laymen.
- The Federal Ministry of Health will sponsor pilot experiments in electronic prescription.
- The Federal Ministry of Health will monitor and support the development and introduction of a new, functionally extended generation of cards in the health system.
- The Federal Government will promote the work of the Telematics Action Forum, which it proposed, in the health system and it is willing to cooperate in working out consensus-oriented recommendations to create a joint telematics platform for the health service.
- The Federal Ministry of Education and Research will set up a "Telematics Platform for Research Networks (TMF)" as part of the health promotion programme, with the aim of laying down uniform and binding standards and general conditions for the use of telematics in medical research. As these research networks involve national interdisciplinary cooperation between basic research through clinical medicine to out-patient treatment this "from the ground up" approach can be expected to stimulate the realisation of a uniform telematics platform in the health system in future. The Federal Ministry of Education and Research will provide c. DM 150 million in the next few years to promote the "Competence Network for Medicine (MedNet)".



4.9 More use of multi-media technology for environmental protection and sustainable development

A model for sustainable development

By 2025 the world population is expected to have grown from just under 6 billion today to 8.5 billion. Against that background sustainable development is directed to improving the development chances for every country on earth while also preserving the natural bases of life for the very much larger world population of the future. The information society can make an essential contribution to sustainable development by making the inter-connection of problems more transparent, developing solutions that will take account of ecological resources and helping to avoid the creation of new strains.

Improving the energy and resource efficiency in production processes and products

Modern micro-systems technology, control technology and information technology offer potentials to develop products and consumption to lessen the specific use of energy, raw materials and ground space and reduce the use of harmful substances. Suitable political conditions need to be set to provide incentives to make more efficient use of energy, raise the share of renewable energy consumption and reduce the amount of waste and harmful substances entailed in production processes and products. Examples are reform of ecological taxation and charges, and the regulations in the law on the economic cycle.

A well functioning environmental management in firms will help to recognise the potentials for cost-saving through investment in environmental protection and optimise production processes. Information technology is an essential condition for this. The commercial advantages of efficient environmental management are now undisputed. The voluntary environmental company audit is meeting with a high level of acceptance in Germany.

Environmental monitoring and reporting

Worldwide IT-supported communication is essential if the dangers to the environment are to be recognised and strategies for solutions developed. One example is climate change, the extent of which can be estimated by satellite monitoring and the available climate models and evaluation systems. Information and communication are also essential if worldwide awareness of the global challenge posed by the environment and development is to be increased and the international community is to work together on questions of the climate, biological variety and protecting the tropical forests, soils and seas.

Environmental compatibility and sustainability using IT equipment

In Germany alone around 1.5 million tonnes of electronic waste are created every year. They include white goods (large household appliances), brown goods (electronic entertainment equipment) and information and office equipment. The manufacturers and retailers of IT equipment introduced a voluntary system in 1995 in which the final owner is entitled to return old equipment free of charge, because a disposal charge was already paid when the equipment was bought new. This system is to be flanked with a legal ordinance, and the draft of the Old IT Equipment Ordinance is now being debated in the Upper House (the Bundesrat). It is the aim of the Federal Government to achieve a comprehensive regulation for the entire field of electrical waste in this legislative period.

Environmental information, transmission, consultancy and education

Sustainable improvement to the overall ecological situation will depend to a considerable extent on the effective transmission and implementation of knowledge that is already available. The transmission of information to which as many people as possible have access in various ways, and environmental consultancy for target groups, will be of particular importance. In addition to making information easier to understand and processing it in a more differentiated



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and didactic way, it is necessary to utilise new and hitherto little used possibilities and media for the transmission of environmental information and to increase environmental awareness.

The Federal Government and the Länder have a wide range of up to date environmental information that is quality controlled in their ministries and subsidiary organs. Much of this is not sufficiently accessible, either to the public or the representatives of authorities outside the government departments. For that reason the Federal Ministry of the Environment has initiated a project, GEIN2000, to lay the foundation for the German Environmental Information Network and open up existing stocks of information and make these available.

The first stage of the German Environmental Information Network will be developed by the Expo 2000 in Hanover. This will give a good overview of the high quality environmental information available in Germany, firstly worldwide on the Internet, and secondly, depending on the final design of the German pavillion, in Hanover. The project will be continued after Expo 2000 as well and the GEIN will be expanded further.

Action:

The Federal Ministry of the Environment will start initiatives fully to exploit the potential of the information and communications technologies to improve environmental protection and ensure sustainable development. The focus is on

- setting general political conditions for sustainable development (e.g. ecological taxation and charges reform, Ordinance on Old Electronic Equipment)
- building up IT-supported environmental information systems on Federal level. These will include the environmental planning and information system UMPLIS, the landscape information system LANIS and the integrated measurement and information system for the supervision of radio activity in the environment IMIS

- building up GEIN2000, the German Environmental Information Network
- setting up new information structures and using modern computer techniques and information systems for the transfer of knowledge, changing information systems into a user-friendly, Internet-compatible format,
- promoting IT projects in environmental education, e.g. innovative projects and actions for the environmental education of children and young people (e.g. "The Nature Detective on the Internet").

5. Taking a Leading Position in Technology and the Infrastructure

The industrial society was mainly dependent on roads, railways and canals. The information society needs new infrastructures – above all, it needs efficient information networks. Germany is in a good position here, and may be justifiably proud of it. The quality of our technical infrastructure and the high level of basic research have in the past assured Germany a place in the front rank of the leading group of industrial countries. Germany has 230,000 km of fibre glass cables, and in the German Research Network we have the fastest scientific data autobahn in the world. Nearly 10 million Germans now have access to the Internet.

Nevertheless, Germany's technological efficiency in the age of the multi-media and the Internet will not be adequately secured in future at the present rate of progress. The strong growth in Internet transactions of 10 % to 20 % a month and the need to transport growing quantities of data in ever shorter times will require even faster and more efficient information networks. Only those economies will be able to maintain their position in international competition that can create the essential conditions for investment in high-quality infrastructures, and so the basis for the information and multi-media services that need



them, through continuous promotion of basic research and a consistent policy of opening markets.

Against that background a modern telecommunications policy which is also an infrastructure policy and a competition-oriented sectoral economic policy will play a central role. The objective is to promote viable competition structures in telecommunications, and support innovative processes in view of the convergence of telecommunications, the media and information technologies. In addition, research and technology policy should support developments that will make using the Internet cheaper, faster, more secure, better and more user-friendly. The German Research Network must be expanded into a national high frequency network for all scientific and research establishments. The technological conditions need to be created for new generations of networks that will enable transmission speeds into the terabit range, that is, 1,000 gigabits per second. Broadband mobile communications networks giving access to multi-media services at all times and in any place – the wireless Internet – must be more than a Utopian dream in our country. The development and use of new multi-media technologies must be advanced, at an even faster rate, and across a broader front, and companies' commitment to this field encouraged. The concern is to create best-practice examples that will stimulate widespread imitation and investment in new jobs, and altogether improve Germany's position in the international competition for inward investment.

5.1 Innovation in telecommunications

The telecommunications infrastructure in Germany has been consistently expanded in recent years, and Germany's position internationally can now be regarded as favourable in many areas. Examples are the high level of provision of ISDN and the high density of broadband cable connections.

Opening the telecommunications market has brought a large number of new suppliers, and they have already started to build up their own broadband infrastructures. Their investment is now greater than that

of Deutsche Telekom AG in some areas. To meet the need for more broadbands and the high quality requirements for services, however, further efforts will be needed.

New access technologies

Potentials are available, firstly in the stronger use of new access technologies like ADSL (asymmetric digital subscriber line), which will enable high rates of data to be transmitted along traditional subscriber lines as well (the normal copper wires) and reach speeds of up to 8 megabits per second, which is up to 128 times the ISDN speed. The introduction of ADSL technology has already started in Germany in some areas. Deutsche Telekom AG intends to extend the availability of ADSL gradually through 1999 to about 40 towns. By the end of 2000 2000 towns and cities are to be linked up. Special telecommunications policy measures to promote the introduction of ADSL technology are not needed; the growing demand for multi-media services will help to accelerate the introduction of this technology by network operators.

Using the electricity grid for data transmission

Another possible way to promote the necessary infrastructure for new multi-media services is to use power line technology, that is, the electricity grid, for data transmission. This will make an additional broadband technology available to overcome bottlenecks, and enable the market to be opened to more suppliers. Further price adjustments and quality improvements could then follow.

Frequency policy

Frequency policy is also an important instrument to support innovative processes to expand the infrastructure. The frequency spectrum is the cornerstone of a large number of commercial activities in telecommunications, radio, transport and research and development. As frequencies are a scarce resource an efficient and innovative frequency policy will be of growing importance.



It is the responsibility of the Federal Government to work for the coordination and harmonisation of frequency policy in worldwide and European bodies – the World Radio Conference (WRC), the European Conference on Postal and Telecommunications Administration (CEPT) and the European Union. This is firstly to meet economic policy objectives and secondly, as part of its regulation of frequencies, to ensure an efficient and uninterrupted use of these. The current fields for action for an efficient and competition-oriented frequency policy are in digital radio and the third generation of mobile phones (UMTS), and the promising fields of wireless access to the local network (wireless local loop, WLL), to digital radio and television and transport telematics.

Action:

- To open up the widest possible scope for the new technologies to develop, but also to ensure that radio services are protected against radiation disturbance from transmission systems, the Federal Government intends to lay down regulations for the free use of frequencies in and along transmission lines. The thresholds for radiation disturbance will be fixed so that on the one hand radio applications are not subject to excessive disturbance under normal conditions and on the other to ensure that new telecommunications processes are not restricted right from the start. Radio services of relevance for security have greater protection requirements and as such will be given special consideration. The Ordinance on the Plan for the Assignment of Frequency Ranges has been agreed between the departments and it covers this issue, among others.
- As part of its frequency policy the Federal Government will ensure that sufficient frequencies are available in good time for new applications, in the interests of Germany's international competitiveness.

5.2 The third generation of mobile phones (UMTS)

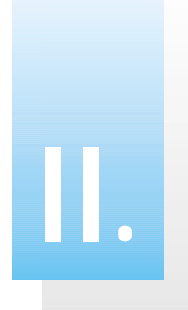
The speedy introduction of UMTS (universal mobile telecommunications systems) is of crucial importance if the mobile phone sector is to develop further. UMTS is a third generation mobile phone system that will give access to new wireless multi-media services. It is clearly superior to the scope offered by the present second generation, like GSM networks (D-networks/E-networks), and it will use both terrestrial and satellite transmission elements. UMTS will enable the mobile use of broadband services like the Internet throughout Europe and so improve the competitiveness of mobile phones compared with fixed lines. The Regulatory Authority for Telecommunications and Postal Services recently introduced the key points in the UMTS licensing procedure and it may be assumed that the new system will be able to start up in Germany in the year 2002, offering marketable services.

Action:

- The Regulatory Authority for Telecommunications and Postal Services is planning to introduce the licensing procedure for UMTS (universal mobile telecommunications systems) in the autumn of 1999 and to start issuing licences early in 2000. This will create the conditions for the rapid introduction of the new mobile standard.
- In addition, the Federal Government will support European efforts to assign suitable extension bands for UMTS through the World Radio Conference in the year 2000, and to lay down worldwide compatible standards (as part of the International Mobile Telecommunications 2000 System family).

5.3 Extending use of the cable networks

The Federal Government welcomes and supports the action by Deutsche Telekom AG in opening the



broadband cable network to private investors by hiving off the cable network and making this the responsibility of several regional companies. It is also to be welcomed that according to statements from Deutsche Telekom AG the new companies are to be independent in regard to their operating concept, their network expansion strategies and the range of services they offer. It is to be expected that new shareholders will exploit the development and innovation potentials in this economic resource, especially to create broadband Internet access, and that the necessary investment will be undertaken rapidly.

Action:

- The Federal Government is working to ensure that the development chances of the regional companies that are to take over the broadband cable network of Deutsche Telekom AG are not restricted by excessive regulation, for example in radio or media law. Fair competition must be ensured for the new multimedia services.
- In particular, the Federal Government will work to ensure that the cable laying rights of the Länder do not disproportionately restrict the use of the cable networks by new multimedia suppliers.

action by member states as far as possible. The German Digital Radio and Television initiative was launched in December 1997. The first step has already been taken and the general strategy fixed – this includes the decision to end analogous TV transmission in the year 2010.

Action:

- The Federal Government is continuing the Digital Radio and Television initiative as a joint activity by the Federal Government and the Länder, with market participants (suppliers of programmes and services, network operators, industry, trade, the crafts and consumers). A new working structure, consisting of five working groups (capacity requirements, scenarios, legal questions, market development and international affairs) will ensure that the many tasks are handled efficiently. The group will have a steering committee and the first results are expected in the first half of the year 2000.
- In addition the Federal Government will press on international level more urgently for joint transition scenarios in order to achieve a homogeneous, digital radio and TV infrastructure in Europe (e.g. in the Digital Radio and Television Conference at Expo 2000).

5.4 Digital radio and television

With its initiative "Digital Radio and Television" the Federal Government is encouraging the transition from analogous to digital radio and television transmission. The digitalisation of radio and television is an essential condition for the convergence of telecommunications, the media and information technology. Digitalisation will provide much better transmission and so offer a wide range of new forms of information, entertainment and services. The Digital Radio and Television initiative of the Federal Government was introduced on European level in the European Union Telecommunications Council on 27 November 1998, and the Federal Government pressed for joint

5.5 The research network of the future

The German Research Network is a broadband scientific network linking all the research establishments and universities in Germany. Technically and economically it is reaching its limits. New applications, like tele-teaching and tele-medicine, meta-computing and virtual reality have higher broadband requirements and guaranteed quality of service. The increase in data transmission over the scientific network requires the existing network infrastructure to be expanded.



The German Research Network Association will therefore build up a national gigabit network for scientific work by the spring of 2000. Initially it will offer transmission bands of 2.5 gigabits per second with guaranteed service quality. Further expansion is planned after two years. The leap in technology that science is making with the transition to the gigabit network will have a lasting effect in stimulating the development of applications and yield more experience of new network technology and services. The expansion of the network will be accompanied by the promotion of projects in network management, new network-related services, like mobile agents, and new applications.

With the gigabit research network science will have taken a clear step ahead of the general market development in broadband applications. That advance in experience should stimulate market and technology developments. It is to be expected that as in the development of the first generation of the Internet, science will also play a pioneer role for the next Internet generation. The Federal Government will therefore give particular support to transatlantic cooperation by the DFN Association as part of the Internet 2 project.

Action:

- The Federal Ministry of Education and Research will provide c. DM 160 million by the year 2003 to build up and expand a national gigabit network and for projects to develop network-related services and applications.

5.6 The next generation of communications networks

Optical networks

The worldwide growth in data transmission is making heavy demands on the network infrastructure, right through into the users' access range. The Internet will be the technical basis of communication in the future

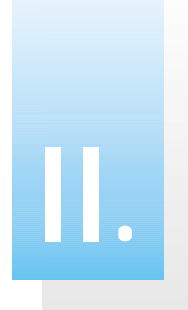
information society, and so it is essential for the efficiency of an industrial nation in global competition. With the strong growth in Internet transactions telephone communications will recede further and further into the background in the next few years in terms of volume, and this will have fundamental effects on network technology.

On a worldwide comparison German industry occupies a leading position in the classical field of transmission and communications technology for speech and in expanding the networks. But the integration of speech and data services in a common network is changing the classical connection-oriented network structure towards one that offers a package. The Internet will gradually replace and absorb the functions of the classical speech communications networks.

Efficient communications networks, adapted to meet the new requirements, are essential if the future interactive multi-media applications are to work. With KOMNET, a main focal area for promotion, the Federal Government is sponsoring the development of the technologies needed for the next generation of networks and tests on them under realistic conditions. The operation and management of a rapid, large capacity photonic network is being examined and tested in the Berlin area and on long-distance routes to Darmstadt and Stuttgart. The aim is to advance into the terabit range (1000 gigabits per second) in transmission speeds by the year 2005. The further development and testing of various technical approaches, network management and contributions to the standardisation of broadband access systems will also be explored.

However, unrestricted access to a broadband Internet, for everyone in any place and at any time, is crucial for the information society of the future. For our network infrastructure this means that fibre glass cables will in future be used not only for long distance networks but will ultimately reach every household.

Accordingly the promotional activities of the Federal Ministry of Education and Research under the KOMNET programme will cover questions of how future networks can be designed, from the regional area to the multi-media end-equipment. The main attention



will focus on the consistent use of photonics, while ensuring compatibility with existing networks.

Radio and TV networks

Broadband mobile communications systems giving access to multi-media services at any time and in any place will be an essential factor in competition for future information and communications services. Germany has outstanding competences in the field of radio and TV networks, and thanks to the success in defining and using the GSM norm (for mobile phones) it is in a good competitive starting position here.

Mobile communications systems today are optimised to provide speech communication. To enable all interactive services to be used on a mobile in future new and efficient concepts for systems, transmission and end-equipment, with the appropriate technologies need to be developed. As it is becoming increasingly difficult to find a harmonised frequency range with sufficient band breadth below 1 gigahertz, even within Europe, owing to the numerous national regulations, ways will have to be found to enable a dynamic allocation of frequency ranges for communications services and enable them to co-exist without mutual disruption. It is an especial challenge to ensure high quality service in heterogeneous mobile networks, and new technical procedures will be needed for this, especially for pre- and post-processing, image and sound compression and the associated transport and signalling records. This should ensure the inter-operability of fixed and mobile lines, and the flexible use of portable and mobile end-equipment.

The objective must be to integrate the spectrum, from narrow-band applications through to mobile broadband multi-media communication in a closed system with high service quality. One of the difficulties is the need to incorporate the entire field, from fixed lines through wireless connections and cellular networks outside and inside buildings to universal, software-based multi-media end-equipment in the system. This will require user-friendly concepts for systems, transmission and end-equipment. The broadband systems of the future will need to be mobile, and offer data and system security and extremely rapid transmission.

Action:

- The Federal Ministry of Education and Research has earmarked altogether DM 400 million for the development of new network technologies in the fields of optical and radio networks by the year 2005.

5.7 Secure and reliable transactions on open communications networks

Whether the potential of the new communications networks can be opened up depends on whether users have confidence in the security of the technologies. The competition VERNET initiated by the Federal Government is to encourage appropriate pilot projects to develop and apply solutions for safe communication on open networks. The main attention is on the four elements "Secure and reliable data exchange between companies, administrations and private individuals", "Security infrastructures and organisational procedures to prevent unauthorised access to information", "Secure and simple electronic payments systems" and "Protecting private networks". Essentially, the concern is to ensure that electronic transactions on open networks remain confidential.

Experts estimate that in only a few years there will be more than one billion networked computers. It is expected that by the year 2002 business transactions on the Internet will have multiplied tenfold, reaching a turnover of \$450 billion. These prognoses will only be fulfilled if the security risks can be largely eliminated. Security technology is already a first-class growth market, and Germany has good prospects in the competition in this field. In particular, the Information and Communications Services legislation, which came into force in 1997, and especially the Law on Digital Signatures, give Germany a clear competitive advantage.

The VERNET project is designed to combine the know-how on security technology in public research establishments with that in companies operating in



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Germany. The promotion will concentrate on security technology for the confidential, integrated and authentic exchange of information, electronic payments systems with verifiable confidentiality and a high acceptance level, and security for mobile autonomous agents or Java Applets. The top level of security is achieved with qualified certificates under the Signature Law.

Action:

- The Federal Ministry of Economics and Technology intends to hold a competition entitled "Secure and reliable transactions on open communications networks (VERNET)" in the year 2000. The main focus is on "Secure and reliable data exchange between companies, administrations and private individuals", "Security infrastructures and organisational procedures to prevent unauthorised access to information", "Secure and simple electronic payments systems" and "Protecting private networks". The 10 best project ideas will be promoted.

of different technologies (Powerline, Ethernet, Bluetooth, Infrarot and others). They can be regarded as direct extensions of the Internet into the home/office/building, but also as communications infrastructures with Internet access for automobiles, for instance. Networks of this kind ensure the transmission of steering, diagnostic and control information within their environment and from/to computers in their networks, and they also serve as information and communications networks for users.

Networking micro-processor controlled equipment and connecting this to open and internal networks, or bus systems, will permit a large number of new applications to be used and offer considerable opportunities for innovation. When innovative IT applications and systems are being developed the services aspect will be of crucial importance, beside the development of conventional hardware and software. Many of the product ideas being discussed today assume the simultaneous development of the technical system to integrate them into a network and build up a service. The basic technologies are to be developed for new applications, e.g. in security, entertainment, trade, tele-diagnostics and analysis, domotics and building management and some are to be tried out as prototypes in pilot projects with the necessary services.

5.8 New network-based applications

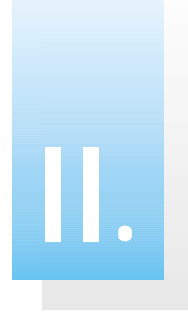
New information and communications applications on the network

Information and communications technology is now an integral part of our society. But it is not only the use and rapid spread of PC systems and the appropriate software that are of importance here, it is also, indeed mainly, the growing use of micro-processors in almost every appliance used in daily life. End-user Internet equipment, as it is today, consists of only about 200 million PCs and workplace computers worldwide. The number of micro-controllers (micro-processors and digital signal processors) in every type of equipment (television sets, microwave ovens, building control equipment, mobile phones etc.) amounts to about 12 billion. The growing networking of these micro-controlled/micro-processor steered systems is creating infra-networks based on a number

New end-equipment for mobile multi-media access

End-equipment is the gateway to the digital network. As the interface between the networks and users it will play a large part in determining the speed of progress on the way to the information society. Multi-media applications will only be used quickly and across a broad front if the end-equipment is easy to use, available at favourable cost and largely excludes risk to the user (e.g. unauthorised access to the private sphere or business transactions). It is also extremely important to ensure that the new equipment is used quickly (time to market) and widely (standards need to be set).

The promotional measures planned by the Federal Ministry of Economics and Technology are intended to tackle these issues. Firstly, the concern is to achieve technical innovation in equipment which will lower



costs, be more user-friendly, secure and reliable, and to accelerate the more widespread use of multi-media technology in business and society. This should clearly improve Germany's competitive position, which is currently in mid-field for end-equipment by international benchmarking, and below the average for Western Europe.

The measures are firstly to promote scientific and technical developments that will be crucial for successful progress in the use of multi-media equipment. They will be concentrated on mobile equipment (incl. wireless data transmission and compression), the integration of functions (i.e. convergence of systems to form hybrid end-equipment that can perform important additional multi-media functions with Internet access, as well as its basic function, e.g. PC, television set or telephone), and intelligent networking (new concepts to network different equipment systems, e.g. for steering and supervision by private households). The main concern is to realise solutions to problems that will accelerate the breakthrough of the multi-media into general everyday use and spark off broadly effective emulation.

Action:

- The Federal Ministry of Education and Research will set up a new focal area to promote research into network-based applications.
- The Federal Ministry of Economics and Technology intends to promote the accelerated development and application of the software and hardware platform needed for mobile multimedia use (e.g. in a key project "The Multi-media Workplace of the Future").

5.9 New technologies for information searches on the Internet

The Internet gives users access to an overwhelming flood of information and also enables them to make their own information accessible worldwide. This creates three problems for the user:

- finding the information he needs
- checking its validity
- securing his own personal data and user profile.

The Government and society also face the question of how illegal contents can be tracked down on the Internet and effective youth protection enforced. Protecting copyright is also of existential importance in the information society. Not all these questions can be solved by technical means alone, but new technologies can help to ensure sustained acceptance of the Internet. Examples are:

- mobile agents, that will collect information at times when the user is not present, according to a particular profile of requirements, and make an advance autonomous assessment of this; they can also protect user data independently
- digital watermarks that will help to protect intellectual property
- the creation of system structures to protect personal data and increase data security for users.

In this context it is important to create technical conditions to increase service quality. Here the aim is to achieve an active "intelligent" network that can recognise whether speech or visual images need to be transmitted instantly, as on the telephone or by television, or whether the transmission can wait a few seconds, as on a fax machine.

Action:

- The Federal Ministry of Education and Research will spend c. DM 100 million by the year 2005 to promote the development of new Internet technologies specifically to improve the search for information and increase the quality of services.



5.10 New developments in software and basic technologies

In Germany and other industrial states the competitiveness of nearly every sector of the economy now depends on software and other basic information technologies. Accordingly, the German market for software and direct related services had already reached c. ECU 23.7 billion by 1998, with annual growth rates between c. 8.5 % and 12.5 % (Source: EITO 99). Today software and related services is one of the fields where new jobs are being created rapidly and in considerable numbers.

The aim of research and development in the promotional field of informatics systems is therefore not only to preserve Germany's technological competitiveness and make it more attractive as a location for business investment but also, indeed above all, to create new jobs and secure existing employment. This is to be achieved by strengthening the scientific and technical basis of German informatics research and accelerating the transfer of new knowledge from science to business. To achieve this association projects are being sponsored to link universities and research establishments; they all also include elements to promote the recruitment of young staff and ease the current shortage of skilled personnel.

In addition to the key areas of informatics, like intelligent systems, and speech and information processing to biological principles, the Federal Government sees the main need for research and development in software technology to make software development processes more efficient and improve the quality of complex systems, in view of the constantly rising share and importance of software in information technology and technical products. There are also considerable potentials in the application of top performance computers and virtual reality. Computer simulations will partly or entirely replace complex, time-consuming and expensive scientific and technical experiments. In addition to creating the technical conditions, access needs to be made available throughout Germany to existing top performance computers, which should be interlinked.

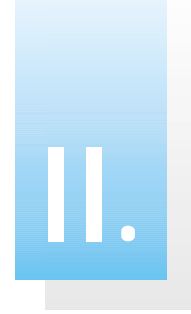
The present information technology was originally developed by specialists for specialists, and it must be

made more suitable for widespread, everyday use in all sections of society and take much more account of the needs and patterns of thought and behaviour of people generally. It must not be designed only for technicians, it must be such that people without technical expertise can handle it – after all, they are the majority of purchasers and users. The technology needs to be adapted to people, not vice versa. The traditional form of access to the network is unattractive precisely for target groups, like older people, who constitute a big potential market. A study by the Society for Consumer Research puts the share of Internet users aged between 50 and 59 at only 10 % of all users, although that age group constitutes 23 % of the total population. But alternative technologies are offering means of winning this and other groups in the population to the use of modern IT equipment and so significantly raising the penetration rate of on-line connections.

That is also the aim of the key project initiated by the Federal Ministry of Education and Research, "Human-Technology Interaction". The future will be determined by modern information and communications technologies systems, which will penetrate the working and private lives of every individual. It will be more important than ever for people to be able to handle the many new products and methods, and the innovative and intelligent technologies they will involve, confidently and without great expenditure of time, to use a menu search, for instance. The systems to be developed must be flexible and uncomplicated, and adaptable to the constantly changing individual needs and requirements of users. Attention must also be given to user-oriented and ergonomic workplace organisation.

Action:

- The Federal Ministry of Education and Research will provide c. DM 500 million by the year 2005 to promote innovative research and development projects in the technology fields "Basic research in software" and "Human-Technology Interaction".



5.11 From the semi-conductor element to multi-media equipment

Micro-electronics, with transmission technology, provides the basic hardware on which information systems can be built up. Its products are the units that process and store information. The objectives of micro-electronics are clearly defined. In addition to creating smaller structures (< 130 nm by 2005) increasing the speed of processing (e.g. clock frequencies > 2 GHz) and reducing energy consumption (e.g. voltages < 1.5 V) are the main concern.

In the next few years the technological and technical conditions will be created for computers, telephones and television sets to integrate to form a universal multi-media piece of equipment. To strengthen German industry in the field of micro-electronic technology the production of circuits on 300 nm wafers will be started in 2001/2002, on the basis of current projects. This will give Germany a leading role in a front-end micro-electronics technology for the first time.

In addition to innovative production techniques "systems on chip" is also a priority area for research and development in micro-electronics. The economic objectives here are to secure or extend production depth and gain shares in the systems market. The technical vision is high-performance one-chip multi-media equipment, which will enable the user to access a variety of networks and the information available in the end-equipment simply, in a user-friendly way and quickly.

Action:

- The Federal Ministry of Education and Research will provide c. DM 350 million by the year 2003 to develop new high technologies in micro-electronics to process and store signals and information.

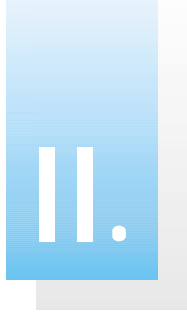
6. Advancing State Modernisation

Cross-section techniques like information and communications technologies are of central importance for the effective performance of public tasks. They are an effective instrument to improve quality and utilise efficiency potentials. The use of information and communications technologies can thus make an essential contribution to ensuring that the public administration works efficiently and economically. In addition, they also help to determine the relation between the public and the state, they open up new opportunities for interaction between individuals, the administration and companies, and create conditions for efficient and user-friendly services by the public authorities. Moreover, they have a democratic potential that needs to be recognised and promoted.

This involves equipping the administration with modern electronic facilities for the conduct of its relations with the public and companies, and utilising the possibilities offered by the network for democratic information, discussion and participation. Innovative forms of public commitment and participation can be encouraged and used for a variety of tasks. All important documents to which the public has access can be made available through open information and communications networks. People should be able to access original documents at any time on-line and perform transactions that are important for their daily lives with the administration via the Internet. The public authorities need to make increasing use of the technical possibilities now available to make their administration work transparent for everyone.

Forms of direct public participation in state decision-making are also conceivable, and should be tried out. In addition to the constitutional admissibility of direct forms of participation, the following conditions must be met: there must be general participation in the networks and procedures must be technically secure and protected against manipulation.

Against that background and in accordance with the concerns in the European Commission's Green Paper "Information in the Public Sector – A Key Resource for Europe" the Federal Government is supporting the efforts on Land and municipal level to make use of the new multi-media facilities to provide public



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information on legal and administrative requirements, tenders, deadlines, publications and for interactive contact. It is setting clear signals by providing sustained promotion for networks that are linking people from every area of society and encouraging social participation.

Altogether, the public sector should become the driving force in the accelerated use of the new information and communications technologies, by itself acting as model with exemplary initiatives and providing the electronic networking for people and companies. It can play a significant part in establishing electronic commerce particularly, as the interface to important areas of corporate activity. The projects outlined below will serve to increase the transparency of the public administration and improve the practical service for individuals and companies. These projects also have a pilot function in collecting practical experience on the scope and opportunities offered by information technology for the public administration.

6.1 The Federal Government's IT strategy

States and governments must cope with the transition to the information society on the threshold to the next century and succeed in modernising their administrations to make them up to date services enterprises. This will require the use of information and communications technologies to be strategically oriented and the technology and organisation departments to be coordinated.

In the information society the public administration will become one information server among others. This will expose it to competition. Markets and competition in the information society will depend very largely on information technology, IT. Handling this technology and the production factor information will thus have strategic importance.

To meet the challenge of this competition the Federal Government will develop a comprehensive IT strategy by the summer of 2000. Among the issues of producing, distributing and marketing the Federal Government's information special importance will attach to

- information management
- the one-stop shop and
- the Federal Government's information association.

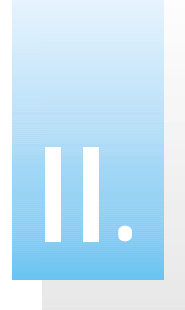
Information management

Information management is the strategic concept for production planning in the general conditions of the information society. Information management develops an overall view of the information provided by an organisation (the organisation's knowledge), it makes it utilisable and productive in fulfilling its purpose (the objectives of the organisation). So far IT has been used in ministerial administration primarily as a purely technical aid, to replace paper and pencil. But the administration can only be modernised if the means of handling knowledge and information are tackled directly. Information is firstly the actual raw material (production factor) of the administration, for production processes in the administration consist essentially of finding and evaluating existing information. On the other hand, information is the product of administration, and it has to be presented with suitable means for the information society and made available for customers.

The One-Stop Shop

The public administration is active as a major producer of information in many areas that are essential for the economy. The competitiveness of the German economy and administration are a major factor in attracting inward investment to Germany. Hence, the public administration can participate in electronic commerce, in order, for example, to provide information on public orders and accept bids.

In addition to this, within the foreseeable future the new technologies will also bring far-reaching changes in the exchange of information, goods and services between customers and suppliers, and in other commercial transactions. They will enable purchases, sales, accounting and numerous other business transactions to be decentralised. The public



administrations can only meet the challenges which these developments will entail if they have a contemporary form of transaction with the public themselves.

It is the strategic aim of the Federal Government to distribute its information products from a single source, the "one-stop shop". This method, which is generally called the electronic counter or electronic office (the "front office") will provide access to all the services provided by the state and replace the personal visit to various authorities and offices.

The federal structure of the administration in the Federal Republic of Germany means that much of the work of dealing with the public is done outside central Government offices. It is the short-term aim of the IT strategy to offer all the services provided by the Federal administration through a one-stop shop. Over the longer term cooperation with the Länder and municipalities should make full permeability through all the levels of administration possible.

The Federal Government Information Association (IVBV)

The link now established between two centres of government, Bonn and Berlin, using the most up to date communications technology, is a unique innovation worldwide. It gives the Federal Government particularly favourable conditions to achieve a leading position in the competition between the European administrations, with

- the use of the new media for direct dialogue with the public, especially on the Internet and
- rationalisation of the work of the Federal Government and the Federal administration with total IT support.

This will require an efficient, contemporary and economical communications infrastructure to be built up, in harmony with other components of the Federal administration's IT strategy, for all offices and Federal establishments. The Federal Administration Information Association (IVBV) is an essential technical basis

for the implementation of the IT strategy. It will give access to places where supply and demand meet in the information society (virtual markets). This infrastructure will therefore be of particular importance when the Federal administration's information products are being marketed.

Action:

- The Federal Government will conclude the work needed to present the IT strategy by the summer of 2000. This strategy will i.a. provide up to date bases for the production, distribution and marketing of information services.

6.2 Pioneering model projects

The Federal Government is running a large number of model projects to identify means of improving access to information and services provided by the authorities for the general public. Striking examples are:

- the electronic application/bid system ("easy" for short) of the Federal Ministry of Education and Research. This offers applicants for promotional funding for research projects the possibility to fill out all the necessary forms, store and amend these and print them out using software. However, for legal reasons the application on paper (the printed-out form) is still essential.
- The German meteorological service provides information for farmers and the Federal waterways and shipping administration, and the Federal Hydrology Institute provides an electronic waterways information system on the Internet.
- The German Patent Office makes information from the DEPATIS patent information system available on the Internet as IPDL (intellectual property digital library), as part of the work of building up international electronic patent libraries.



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- After the move of the German Parliament from Bonn to Berlin modern information technology will be the essential aid in bridging the distance and the division of the work of government between the two cities. The Berlin-Bonn Information Link (IVBB) will ensure that the constitutional organs remain fully operational in both locations. It links the various government offices in Berlin and Bonn to form one "networked enterprise".
- The Federal Administration Information Link (IVBV) is a corporate network linking all the Federal offices, and in future it should make efficient communication and the provision of information possible throughout the Federal administration. The IVBV includes the IVBB, especially access to its central services, and access to central information. The concept involves coupling with the network of the Länder and with European and international partners.
- The Federal administration intends to introduce new personnel passes using multi-functional chip cards. The chips now available will enable the personnel pass to perform functions beyond the traditional one of identification. A digital signature will prove it is genuine; it can authenticate access (e.g. to certain rooms or computers); it can record working time and produce digital signatures (storing and using the private signature cipher); it can be ciphered for e-mail purposes and it can be used on a cash dispenser and prove the right to certain services, e.g. when officials are travelling on government business. Use of these functions will be optional, and the decision can be made by the individual authorities. The Federal Ministry of the Interior (BMI) is carrying out a project to introduce this type of pass and obtain experience for the Federal administration as a whole. A pilot test called SPHINX is now also being carried out to introduce digital signatures and ciphers in the Federal administration. It is directed by the Federal Government Coordination and Consultancy Office for Information Technology in the Federal Administration at the Federal Ministry of the Interior (KBSt) and the Federal Office for Security in Information Technology (BSI). The Federal, Land and municipal adminis-

trations are participating in this trial, together with employers and associations.

Action:

- The Federal Government will build up a comprehensive range of multi-media services as part of its implementation of the IT strategy. It will include the various model projects that are now running.

6.3 Public tenders on the Internet

With more than 30,000 public authorities giving contracts for supplies, services and building work totalling around DM 400 billion a year (c. 7 % of gross domestic product, GDP), public orders are a considerable factor in the economy. The value of orders given by about 500,000 public authorities in the European Union is estimated at c. 700 billion euro a year (corresponding to 11 % of gross domestic product).

The services and work needed by the public authorities are acquired on various markets and on principle there is competition for the orders. Under the regulations governing public orders to date the exchange of information and declarations of will must largely be in writing, to ensure clarity over contract conditions and confidentiality. Bids in particular require a handwritten signature to be acceptable.

In the Information and Communications Services Law the legislature has created an important basis for a digital signature to be used instead of a handwritten signature on documents that are sent electronically. The Federal Government has seized this opportunity to introduce a more efficient procedure in transactions between the state and the private sector, with the support of the European Commission, and will be extending it to the legislation on public orders. Electronic documents used in the public orders system are, in the present plans, initially to be regarded as a supplement to the paper form, which is still binding. The practical implementation of the Digital Signatures law – for example by making Trust Centers

available – will also affect public orders procedure. The general legal conditions will be appropriately adapted. In order to enable companies that have not so far made use of the modern information and communications technologies to continue to take part in the public orders procedure, however, it will not be possible to cease using the paper form altogether in the foreseeable future. Nevertheless, it may be assumed that a parallel tender for public orders on the Internet will have a stimulating effect and encourage firms that have not so far used multi-media equipment to adopt this form of communication as well.

IT in the public order procedure is being promoted by the European Commission and member states through a number of projects. At present, for example, the publication of tenders planned on the Internet is being tested in SIMAP, Système d'Information sur les Marchés Publics. Germany has the largest number within the EU with more than 80 pilot participants. The Federal Ministry of Economics and Technology is directing the German work in this field.

Action:

- The Federal Ministry of Economics and Technology will amend the core regulations on public orders in its area of competence (the Ordinance on Public Orders, the Procedures for Contracts for Public Works, VOL, and the Procedures for Contracts for Freelance Services, VOF) by the end of 1999, so that in future public authorities will have the possibility of using the electronic tender procedure. Pilot projects to test the technical implementation have been started by the Buildings administration, and the results will be available in the first half of 2000.
- Parallel to the national pilot projects brief descriptions of projects put to tender are to be given on the Internet as well as being published in the Official Journal. This is part of the EU SIMAP project (Système d'Information sur les Marchés Publics) and it uses a three-stage model. The project phase has

started. In the second stage tender documents are to be published on the Internet in electronic form for downloading. In the third stage, bids are also to be accepted in electronic form parallel to the written form.

6.4 ELSTER – tax declarations via the Internet

The Federal Government and the Länder are pursuing the aim of enabling tax declarations to be submitted and processed in a way that is more taxpayer-friendly and entails less administrative work, by using modern means of communication. Hence they have developed software that can be used throughout Germany for electronic tax declaration, ELSTER. To make the advantages of electronic tax declarations available to a large number of people as soon as possible a pilot procedure has been in operation in some Länder since early 1999 to enable tax declarations to be submitted via the Internet. Interested software producers can obtain the software needed to print and send tax declarations, the TeleModul, directly from the EDP centre in the head tax office in Munich under <http://www.elster.de> and incorporate this in their own tax declaration programmes. The TeleModul has several functions: firstly it accepts the correct submission of the ciphered tax declaration form, after this has been checked by the taxpayer or his accountant, and deciphers the data received; secondly, it prints out a "compressed tax declaration". This is a new version of the officially prescribed forms in the meaning of § 150, Para. 1 of the Ordinance on Charges. The contents are largely limited to the information needed as a basis for taxation for each individual case, so that less paper will be needed. This will ensure that the data sent by e-mail and the paper tax declaration signed by the taxpayer are the same. The legal conditions for this new procedure will be made clear in the "Principles for the Use of Tax Declaration Forms" and "Principles for the Electronic Transmission of Tax Declaration Data", which will be published in the Official Gazette of the Federal Ministry of Finance.



Action:

- From January 2000 income tax declarations can be submitted electronically using commercial tax declaration programmes and the TeleModul issued by the tax offices. In the course of 2000 advance turnover tax declarations and wage tax registrations will also be accepted electronically.
- The electronic facility will be extended to other types tax (e.g. trade tax). The project phase for these has already started.
- In a later stage the electronic transmission of tax demands and the necessary vouchers (e.g. wage tax cards, balance sheets) and the introduction of a digital signature will be implemented.

6.5 The virtual town: MEDIA@Komm

A growing number of towns and municipalities are setting up websites on the Internet. Nevertheless, the development so far has hardly progressed beyond the level of providing information. The breakthrough to legally binding interaction on electronic networks across a broad front and based on digital signatures is still to come. This will be tackled by the MEDIA@Komm project, which is intended to take Germany much further along the way to electronic administration and business structures. The key objectives are the "virtual town hall" and the "virtual marketplace". That means more services and greater transparency of public authorities for the general public and the other participants in legal and economic activities.

MEDIA@Komm is an entirely innovative approach and it will bring together private individuals, the public administration and companies in the biggest pilot experiment so far by the Federal Government on multi-media technology in urban life. During the project municipal information, communication and interaction processes will be shifted directly on to the electronic network. A central component of the

project is the use of digital signatures, as without them electronic transactions could not be conducted in confidence and with security.

MEDIA@Komm will make the administrations more efficient and public-friendly, and companies more flexible and productive. Working and living conditions for people will improve. For example, the visits to authorities and offices that are necessary in many situations in life and the submission of information on changes can be handled independently and parallel on the network. Digital tenders will accelerate building work and also give greater transparency in the public sector. Electronic students' passes and digital textbooks, combined with payments functions for local public transport, will make everyday life for students easier. Targeted product information and means of comparison will give greater market transparency and more competition. Many services, like on-line ticketing and booking travel tickets can be obtained digitally from the desk at home. The MEDIA@Komm project will promote technological development and application as one unit, it will mobilise companies, while testing the legal conditions and developing these further.

Ten towns and municipalities entered a competition for detailed concepts for the project. An independent and international jury voted the cities of Bremen, Esslingen and Nuremberg the winners and the Federal Ministry of Economics and Technology gave the awards in March 1999. Their concepts will be implemented in the next few years as best-practice examples. They should be widely emulated and give rise to investment in sustainable jobs.

Action:

- The Federal Government will continue to promote the use of the Internet in municipal affairs in the project MEDIA@Komm. To spread the experience and knowledge gained the project is to be accompanied by research and suitable working groups are to be set up. The Federal Ministry of Economics and Technology will provide up to DM 60 million of MEDIA@Komm funds for these purposes.

6.6 Tele-work in municipal administrations (DATEL)

Measures affecting the communications or interactive side of work processes, like tele-work or tele-cooperation, have so far been implemented in only 3 % of the towns in Germany and only 28 % are planning to do so. The use of the new information and communications technologies specifically for tele-work will open up a wide range of opportunities for the municipal administrations to introduce decentral organisation structures across departmental and specialist lines. For the public and the economy this will replace time-consuming handling structures with more efficient services. At the same time the organisation of the workplace will change and work organisation will be improved. Tele-work, which is at present hardly in use at all in municipal administrations, will enable call centres to be created and tele-cooperation to be set up. Using digital files that can be sent along the network the speed of processing and handling a large number of enquiries and applications can be considerably increased, in the interests of individuals and companies. However, the need for data protection legislation and technical facilities to ensure security must be observed.

The DATEL competition will promote the establishment and testing of tele-work with data security in various areas of municipal administration and in companies working with the administration. This should enable the efficient and rapid handling of administrative procedures on municipal level and solutions to problems to be developed that transcend individual offices. DATEL is a continuation of the "Tele-work in SMEs" promotional scheme, which is now successfully concluded. This project ran from early 1997 to early 1999, and it enabled around 1,700 tele-jobs to be set up in the small and medium-sized firms, of which 500 were entirely new.

Action:

- The Federal Ministry of Economics and Technology will provide around DM 2.5 million for a competition to set up and try out tele-work with data security in the municipal

administrations (DATEL). Up to 50 municipalities or companies working with public authorities can receive promotion of up to DM 60,000 each. The main criteria for promotion are the number of new telejobs that will be created and the suitability of the security concept.

6.7 Information services in the labour administrations

Information supplied

Combatting unemployment is the central political task. A well-functioning employment placement service is essential if vacancies are to be filled as quickly as possible. In view of the large number of job-seekers the placement experts in the job centres must be able to concentrate on the cases where specific and personal advice is unavoidable. The straight forward provision of information can be made effectively on the Internet, and the Federal Labour Office is therefore offering information on public networks. Since 1997 a range of information has been available under www.arbeitsamt.de and this is now one of the most-used websites, with up to 200,000 callers a day. The Job Information Service SIS, for instance, enables job-seekers to access vacancies in job centres direct. At present more than 300,000 vacancies in Germany and Europe can be downloaded from this website.

The Employers Information Service AIS gives anonymous access to applicant profiles lodged with the labour office, where the job-seekers have given permission for them to be published. This enables companies to search independently when they have a vacancy, and they can also advertise vacancies and training places direct through AIS. Now the Federal Labour Office has extended its Internet service for employers to include "On-Line Management Placement" (profiles of senior and management staff). The Training Place Information Service ASIS also gives direct access to training places that are still vacant and have been registered with the labour office's vocational training advisory service. In this way the



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Federal Labour Office is also supporting the efforts by the Federal Government under its "Emergency Programme for 100,000 Young People" to enable as many youngsters as possible to have a thorough vocational training.

The Federal Labour Office's IT 2000 concept

As part of its project "The Labour Office in 2000" the Federal Labour Office is aiming to modernise and expand its information processing. The purpose is to achieve lasting improvement in the quality of its services, and to provide all services to the public as a unit and as far as possible from a single source. The decentralisation of a range of services will require all the information to be more easily available independent of location. The growing readiness of customers to obtain information themselves will require interactive information systems to be built up and expanded on public networks.

The aim of the IT 2000 concept is to ensure that in future every member of staff in the Federal Labour office has access to a common data basis, within the bounds of their work, can research electronically stored documents and procedures and use uniform office services to process these and enquiries. Communications services will be available to exchange information with internal and external partners. Legal norms and instructions, handbooks, work instructions, statistics and personal information will be provided in electronic form on the Intranet of the Federal Labour Office and brought up to date daily. The concept has been implemented gradually since the end of 1998. From the autumn of 2000 an IT procedure will be available with an integral programme for job placement and unemployment benefits/assistance. This will reduce the time spent collecting information, make searches more flexible and wider, provide data on jobs and applicants on a national basis, improve the information that can be given without the need to see individual files and provide efficient aids to calculation.

Action:

- The Federal Labour Office will continuously expand and develop its electronic information service to make it more user-oriented and endeavour to achieve national coverage.
- Within the next three years, in the interests of bringing the administration closer to the people, all the staff of the Federal Labour Office, including the local job centres, are to have a networked computerised workplace which will give them access to all the specialist applications, office products and PC applications they need to perform their work.
- As part of its project "The Labour Office in 2000" the Federal Labour Office is aiming to modernise and expand its information processing. The quality of service is to be improved and services for the public are to be provided as far as possible from a single source. The decentralisation of the range of appropriate services will require all the information to be available largely independent of location.

6.8 Elections on the Internet

One of the many facilities offered by the Internet is to support and accelerate democratic decision-making processes. So far little practical experience has been gained with this. The project "Elections on the Internet" which started in the spring of 1999 created the conditions for voting on the Internet, as an alternative to postal voting, for the first time. The large number of elections in Germany on the various political levels makes easier voting very desirable. As the enfranchised public becomes increasingly mobile and older voting on the Internet offers a new alternative, that is both practical and attractive.

In the past there have been two obstacles to using the Internet as an election vehicle - the small number of subscribers and the open nature of the net, which made secret voting, that is, voting anonymously and

with no risk of falsification, practically impossible. But now use of the Internet is sufficiently widespread to make this interesting for a larger number of voters, and secondly, modern software, the use of digital signatures and reliable legal conditions, like the Law on Information and Communications Services, show that the necessary anonymity and security against falsification can be achieved.

The project "Elections on the Internet" is gradually to tackle and solve the technical and legal problems and result in an Internet voting procedure analogous to postal voting. Digital signatures are to be employed, step by step, in conformity with the information and communications legislation. Simulation tests are to yield viable conclusions on further developments. Practical experience is now being gained in the elections for the representatives of the Technicians Health Insurance Institute in the collective bargaining process, in the elections for the works council in the Land Statistical Office in Brandenburg and the elections for the faculty representatives in the University of Osnabrück. Ways of evaluating the economic benefits are also being examined. Other legal appraisals will be needed, especially in regard to ensuring secret voting. In elections to the Federal Parliament the constitutional requirements on secret voting in Article 38, Para. 1 of the Basic Law must be fulfilled, and this will presumably only be possible over the medium term.

Action:

- The Federal Ministry of Economics and Technology is providing more than DM 1.3 million to promote the "Elections on the Internet" project. It is also planning to process the results for wide distribution, i.a. through events and documentation.

6.9 Building up area-related information systems

A sensitive instrument for statistical compilation and analysis that can react rapidly is essential for plan-

ning measures. As part of the current area observation work the Federal Office for Building and Area Planning, which is attached to the Federal Ministry of Transport, Building and Housing, has been running a regional data bank since the mid-seventies. Now the hardware platform and the general conditions for operating, organising and using regionalised data banks have changed greatly, and this will require the entire information management in the Office to be reorganised. The new Strategic Information System, or SIS, which will be introduced will bring better access to information for users, altogether better documentation of data, simpler and easier access to data and area concerns and the development of internal and external reporting systems. They will include multi-media presentation of the results of current area observation using new information techniques and media (e.g. CD-Roms, the Internet).

Geo-information is of considerable importance on every level of the administration, the economy and society in the modern information and communications society, and it is essential for the establishment of new fields of business. Geo-data sets will also constitute a valuable commodity of the first rank in future and if official data is well coordinated and handled it can improve the general conditions for growth and employment.

The Federal Ministry of the Interior has set up a geo-data centre (GDZ) at the Federal Office for Cartography and Geodasy. Access to the geo-information and data, most of which is reserved for the public administration, will therefore in future be very much easier for all users and applications in the administration, business and research if the modern IT facilities are fully exploited.

Action:

- In a test phase lasting several months, and which can also be regarded as the start of converting the system, full operation is to be tested to show in how far the programme chosen, the "SIS Strategic Information System" will meet the specific requirements of the Federal Office for Building and Area Planning.



- To improve coordination of the geo-information system in Germany the Federal Government has set up a Standing Interministerial Committee on Geo-information, IMAGI, directed by the Federal Ministry of the Interior. Its special concern is to evolve a concept for the efficient management of geo-data on Federal level. This will have priority; it will also intensify Federal/Land coordination on questions of compatibility and remuneration, and implement concepts for standardisation and norms.

7. European and International Cooperation

The global nature of the information and communications networks shows how important the general conditions throughout Europe and internationally are to further the development of the information society worldwide. National regulations will not be made superfluous in every case, but they will have to be effectively supplemented by accepted rules of the game and general conditions within Europe and internationally.

7.1 Cooperation within the European Union

On European Union level a number of initiatives have been introduced to harmonise the national legislation and create the right conditions to realise the internal market in electronic commerce as well.

A joint standpoint on the directive on community framework conditions for electronic signatures was passed by the Council of Ministers on 22 April 1999 under the German presidency. The German Signatures Law was the decisive starting point and basis of consultations for the directive. The compromise now found between the security technology requirements for electronic signatures and the flexibility needed by companies is an important basis for the future development of electronic services. The negotiations that

are still needed in the European Parliament will presumably be concluded by the end of 1999.

At present a directive to regulate copyright and related rights in the information society is under discussion on EU level. The concern here is to find an appropriate balance between the interests of holders of copyright in protecting their intellectual property and the greatest possible free distribution and use of contents. To find a solution acceptable to all sides a number of individual questions, like possible obligatory remuneration for private copying and the legislation on technical facilities to protect holders of copyright (like blocks on copying or ciphering) need to be clarified. It is hoped that member states will reach a joint standpoint by December 1999.

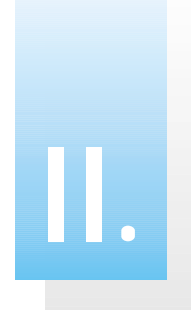
The proposal from the European Commission for a directive on certain legal aspects of electronic commerce on the internal market takes up the core regulations in our Teleservices Law on freedom of admission, responsibility and supplier transparency. This directive will also impose uniform regulations throughout Europe on the conclusion and recognition of electronic contracts. The Federal Government is pressing for the regulations in the Information and Communications Services Law, which are open to development and pragmatic, to be incorporated as far as possible in the European regulations. It will endeavour to ensure that the regulations on advertising in particular are consumer-friendly. The basic condition here is that unsolicited advertising must be clearly and unmistakably identified as such.

A directive on long-distance sales of financial services is to supplement the existing regulations for the protection of consumers here. This is to establish basic regulations for the whole of Europe, like the obligatory information to be provided by suppliers and the right of revocation for consumers.

7.2 International cooperation

Activities in the OECD and WTO

An important initial step on the way to internationally coordinated general conditions was taken with the



Bonn Conference of Ministers on global information networks in July 1997. The tasks and objectives of international coordination were formulated for the first time. The OECD built up on this at the Ministerial Conference in Ottawa in October 1998, and laid down an extensive programme of work on all questions of electronic commerce. The main attention is on consumer and data protection, IT security, responsibility, infrastructure, taxation and the social and economic effects of electronic commerce. The first progress was presented at the OECD Paris Forum on Electronic Commerce on 12/13 October 1999.

On World Trade Organisation (WTO) level Germany will continue to take part, with the other EU member states, in the programme of work on electronic commerce. The objective here is to avoid trade restrictions through new customs or excise duties or other obstacles. Germany will keep to its position that digital transactions should not be classified as goods but as digital services and so on principle are exempt from customs duties. The Federal Government will also present that position at the WTO Ministerial Conference in Seattle in December, and press for full treatment of the legal questions on electronic commerce.

Global Business Dialogue on Electronic Commerce

The Global Business Dialogue on Electronic Commerce (GBD) initiated by the former European Commissioner Martin Bangemann is a link-up of leading multinational companies in the information sector chaired by Time Warner, Bertelsmann AG and Fujitsu. The declared aim is to sound out, in conjunction with international governments, possibilities to create an international cross-frontier framework of regulations for on-line commerce and to formulate positions for companies on which consensus can be reached on the most urgent questions. The participants in GBD also want to put forward proposals for self-regulatory models, in order to keep state regulation to the essential minimum. The following subjects, that are crucial for on-line trade, are being tackled by nine working groups in GBD: copyright, liability, IT security, data protection, taxes and customs duties, information structure, legal competences, contents/adver-

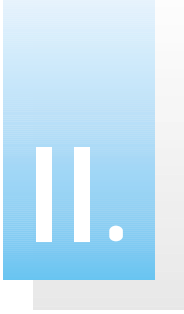
tising and consumer protection. At a conference in Paris on 13 September the GBD put forward the first proposals by the individual working groups and these were discussed with governments and international organisations. The Federal Government is endeavouring to continue this dialogue in partnership, especially in order to exploit the possibilities for self-control and self-obligation by companies.

Internet administration and standardisation bodies

The Federal Government attaches outstanding importance to the new bodies for Internet administration for the development of the global information infrastructure. It welcomes the new organisation ICANN, Internet Corporation for Assigned Names and Numbers, as a politically neutral, independent, regionally balanced and transparent organisation for the advancement of technical standards and the administration of Internet addresses. The Federal Government is playing an active part in the Government Advisory Committee (GAC) of ICANN, which is exercising an advisory function and met in Germany in May this year. The Federal Government regards it as essential for German and European interests to be clearly represented in the ICANN bodies, and in other Internet organisations like the Internet Society (ISOC), the Internet Engineering Task Force (IETF) and the World Wide Web Consortium (W3C), so that their influence on the further development of the Internet can be actively strengthened.

In the International Telecommunications Union (ITU) Germany is working to establish worldwide standards for the design, combination and operation of telecommunications networks and the necessary radio frequency range and satellite positions and the conditions for their use, on the basis of which Internet services can be offered.

Germany is also working in the ITU to coordinate the radio frequencies for mobile phones and satellite systems, and the orbit positions for satellite systems, with the help of which data transmissions can be provided up to broadband multi-media applications for the Internet.



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World Summit on the Information Society

The ITU has been commissioned by member states to examine, in conjunction with United Nations organisations, the possibility of holding a world summit on important questions of the information society. In addition to the ITU UNESCO, the United Nations Development Programme UNDP, the United Nations Environmental Programme UNEP, the International Maritime Organisation IMO, the World Bank, the World Post Organisation, the World Intellectual Property Organisation WIPO and the World Trade Organisation are to take part. All the economic, social, legal and cultural aspects, as well as the development of the technical infrastructure, are to be considered at the conference, which is planned for the year 2002.

The commission to the ITU was given in view of the growing influence of telecommunications on political, economic, social and cultural developments. The Federal Government will cooperate in the comprehensive description of the information society and help to draw up a strategic plan of action for coordinated development. This will define aims, identify the resources needed and outline the tasks of all involved to ensure efficient coordination of all the measures needed to build up and expand the information society in the various countries. It will take appropriate account of the formulated objectives of Federal Government policy.

As part of the activities of the ITU representatives of the Federal Government will play a decisive part – in close cooperation with the Regulatory Authority for Telecommunications and Postal Services and companies – in designing the elements that will determine the information structure of the future.



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