

**The information society : opportunities, innovations and challenges :
assessment and recommendations / Council for Research, Technology and
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Council for Research, Technology and Innovation

THE INFORMATION SOCIETY

Opportunities, Innovations and Challenges

Assessment and Recommendations

December 1995

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THE INFORMATION SOCIETY

Opportunities, Innovations and Challenges

Assessment and Recommendations

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Opportunities, Innovations and Challenges

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The General Introductory Remarks (Chapter 0) were formulated by Prof. Dr. Jürgen Weitzel. He also undertook the final editing of the report.

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On this Report

The Council for Research, Technology and Innovation has been charged with the task of providing a comprehensive overview of applications, problem areas and spheres of activity in important fields of innovation and to make recommendations on that basis. The deliberations take place on an interdisciplinary and interdepartmental basis.

The following is taken from the 1994 report by the Federal Government on intensifying the dialogue between industry, science and the state concerning research, technology and innovation (Drs. 12/6934):

"The basis of the discussions is the complete safeguarding of the relevant original competences and the self-responsibility of the participants in the discussions. The goal of the discussions is for the Council members to reach agreement on potential improvements in the relevant areas of competence. The Council will be composed of the persons invited by the Federal Chancellor to join. The composition of the Council can be changed by the Federal Chancellor according to the topics under review.

The Federal Ministers for Research and Technology, for Economics and for Education and Science will be permanent members. The Federal Chancellor's office will be in charge of the meeting, while the Council's business will be managed by the Federal Minister for Research and Technology". (In the interim the Ministry of Education and Science and the Ministry for Research and Technology have been merged).

At the first session of the Council on 22 March 1995 it was decided that the first topic to be handled would be "The Information Society". The Council sat on this topic on 15 May 1995, 5 July 1995, 29 September 1995 and 21 December 1995. On 15 May 1995 three working groups were set up ("Research, Technology, Applications", "Legal Framework" and "Social and Cultural Challenges").

On the basis of the discussions of the working groups, Chapter 1 was formulated by Prof. Dr. Eberhard Witte, Chapter 2 by Prof. Dr. Wernhard Möschel (preparatory work was done by Prof. Dr. Reinhart Ricker, Prof. Dr. Gerhard Schricker and Prof. Dr. Spiros Simitis), and Chapter 3 by Prof. Dr. Wolfgang Frühwald.

The General Introductory Remarks (Chapter 0) were formulated by Prof. Dr. Jürgen Mittelstraß. He also undertook the final editing of the report.

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The Information Society

Opportunities, Innovations and Challenges

Assessment and Recommendations of the Council for Research, Technology and Innovation

0. General Introductory Remarks

Information lends wings to knowledge and society. Modern society is finding itself in the middle of a third technological revolution, which in the form of new information and communication technologies encompasses every sphere of life, primarily science, industry and politics, but also the social and communications spheres. Social and economic competition takes on new forms. Anyone wishing to be successful here will have to think of something new, be ready to part with familiar structures and procedures, and turn the thrust towards modernization, which is linked to the new technologies, into a motor for their own development. This also applies at the national level where it constitutes a significant contribution towards modernization and securing Germany's continued attractiveness as an industrial location.

The term "information society" describes an economy and a society in which the acquisition, storage, processing, transmission, dissemination and utilization of knowledge and information, including the ever-growing technical possibilities inherent in interactive communication, play a decisive role. The significant factors in this development are technology - e.g., in the form of

the building and extension of information transmission networks (the infobahns or information highways) and the development of user-friendly man-machine interfaces -, industry - e.g., in the production and service sectors (multimedia) -, and the world of work - e.g., in the form of changing professional and occupational activities and the emergence of new forms of work ("telecommuting") -, and furthermore all forms of culture in society, e.g., in the spheres of education and cultural facilities as well as the environment, living and transport. Thus, from a political point of view the information society must remain a *democratic* society, from an economic point of view it must considerably increase *economic capabilities*, and from a cultural point of view it must become a *knowledge-based* society with a corresponding information and media culture.

The information society will usher in a new age, the Information Age. The way we work and live is changing fundamentally compared to what it seems to be today to many people; the world is changing, not only in its technological structures, but also in its economic and cultural framework. As a result of the increasing networking of these structures, spatial and temporal boundaries in the world become blurred, living and working are combined in new ways (with the corresponding consequences for architecture and urban planning), and the transport of many types of physical goods in time and space will become superfluous. Virtual neighbourhoods will bring to life the global village. The computer will become a part of individual and communal life, the Internet and multimedia are everywhere. However, just as photography did not replace painting, just as radio did not replace opera, or television oust radio, these new media will not replace books and other traditional media, but will simply add their new individual capacities.

0. General Introductory Remarks

In the following we shall therefore not merely note and analyse developments, but above all provide a clarification and elaboration of the major opportunities that lie ahead for society in the new information and communication technologies. The possible dangers that can grow out of this technology and the fears associated with it will also be considered. In any case it is necessary to point out the strengths and weaknesses resulting from the current position of Germany in the face of this development, and to develop strategies that will enable Germany to successfully emerge from international economic and cultural competition, thus also contributing to modernizing and securing the future of Germany as an industrial location.

Under the heading of "information society", the Council for Research, Technology and Innovation identified three central tasks to be tackled, namely (1) research, technology, applications, (2) the legal framework and (3) social and cultural challenges, and has established that there is an acute need for action in these areas. It is necessary not only to set up and expand a modern information infrastructure and a reliable foundation for the associated investment and innovation, but also to bring about an expansion and intensification of cooperation between science and industry in the area of information technology-oriented basic research and the provision of media capabilities in the sphere of education. This depends significantly upon an entrepreneurial spirit and a willingness to take risks in the development of technologies and applications. The legislature could also encourage this willingness by introducing the necessary legislation generally only after a pilot phase ("piloting before regulating"). The tasks in all the fields listed cannot as a rule be settled independently. For this reason a comprehensive national initiative is necessary, one which does not lose sight of international developments (e.g., the results of the G7 conference on the topic of "The Information Society" in Brussels on 25/26 February 1995) while drawing on

the various competences and responsibilities of science, industry and government.

The Council for Research, Technology and Innovation deliberated on the topic of the information society on 15 May 1995, 5 July 1995, 29 September 1995 and 21 December 1995. It set up three working groups, whose reports were part of the deliberations. These reports thus form the basis of the following assessments and recommendations. The members of the working groups are listed in the appendix.

1. Research, Technology, Applications

1.1 Introductory Remarks

The information society provides an opportunity to overcome the dependence of information on time and space by the use of telecommunications and information processing. Information and communication technologies provide a basis for decentralized forms of organization in government, industry and society. They will greatly reduce the pressures on traffic and the environment by reducing congestion in terms of space and time. The information and communication technologies offer the advantage of using energy economically.

1.2 Research and Technology

Technical knowledge is available internationally. Research, development and production have reached a high level of sophistication in Germany; this can be increased further. The great dynamic inherent in the development of the information and communication sectors requires an intensification of research in the basic technologies (microelectronics, user interfaces, voice-operated control of systems, intelligent networks, software, etc.) as well as in application-oriented processes (a concept for the virtual company) and development tools (standards for data exchange and cooperative work, client-server systems, workflow management, "smart cards", etc.).

The telecommunications network (telephone network) that is generally available can cover use over a narrow bandwidth (speech, text, data). Broad-bandwidth systems exist in the form of the cable TV networks. A combination of the advantages of the switched telecommunications network (star structure) with the high capacity of the cable TV network (tree structure) would lead to the setting up of up a switched broadband network (information highway). The associated investments, of the order of a hundred billion, will not show an appropriate amortization until fields of application with multiple capabilities and with high volumes of use are attained.

E 1 The emphasis of the policy on innovation should be on developing new and meaningful fields of application of the information and communications technologies. Demand will develop from the application itself and lead to a continuing extension of the infrastructure. Government should render cooperative assistance in

distributing information by the means inherent in these information and communications technologies and help bring together innovators (innovative alliances). This requires legislation that is conducive to innovation, in the form of deregulation and the removal of barriers to innovation (see also chapter 2). Meeting the needs of the future requires promotion of research in the areas of the basic technologies (microelectronics, user interfaces, voice-operated control of systems, intelligent networks, software, etc.) as well as in application-oriented processes (a concept for the virtual company) and development tools (standards for data exchange and cooperative work, client-server systems, workflow management, "smart cards", etc.).

1.3 Applications

The need for action is particularly strong in the application fields of

- **industry and the service sector:** an increase in productivity,
- **private households:** meeting the communication needs of the public; making access to information easier for everybody,
- **education:** creating powerful telesystems and software for research and education,
- **public administration:** increasing efficiency, flexibility and user-friendliness of services,
- **telemedicine:** improving health care including preventive health care, and
- **telematics for traffic control:** guaranteeing mobility by ensuring a safe, economical and environmentally-friendly flow of traffic.

Industry and the service sector display the most significant potential for innovation in terms of productive cooperation among decentralized units, whether between individual workplaces or entire companies and branches of industry. This concerns, for example, administrative tasks, such as telelogistics, teleengineering, telemaintenance and telemarketing. Tremendous possibilities exist in information and communication technologies in the areas of banking and insurance, commerce and tourism. New types of jobs will appear. The allocation of work in time and space (telecooperation) will bring private households, satellite offices, outlying company offices or operations and mobile workplaces into the productive work process.

E 2 *Productivity of wealth-creating chains in industry and the service sector should be strengthened by branch-specific solutions, model applications of broad effect (telelaboratories modelled on the CIM technology transfer centres) and introduction concepts for small and medium-sized companies. Cooperation between users, producers of software and hardware, network operators and research organizations should be encouraged (cooperative research projects). Opportunities for setting up new companies should be supported effectively (for example, by reinforcing capital liability through concessions on income and inheritance taxes) to unleash a wave of startups.*

Telephones (also faxes) and radio and television programmes are generally available to *private households* (15 million cable TV connections and 8 million satellite receivers). In addition, there are already more than 6 million personal computers (PCs), but barely one million are attached to a telecommunications network. They are used for individual data communication with other private partners (e.g., via the Internet), to call up

information databases (on-line services), for on-line games and telefacilities (telebanking, teleshopping, etc.). The narrow-bandwidth networks available now are adequate for these applications (if only with restrictions for teleshopping). A data transfer method with a larger bandwidth (higher bit rate) will only be necessary when moving images are involved.

Private households can be the training ground for the information and communication technologies that will be required as interactive services in telecommuting and in telecooperation at work.

A further impulse towards innovation is provided by the digitalization of television. End-user equipment for digital broadcasts is about to be introduced in Germany. Remote access to video databases (information, education, culture, entertainment) and also to teletext and databases will turn the TV connection into an instrument for individual communication. The return channel required can be provided either by using the telephone network or by adding on equipment to the existing cable TV network. Access to TV and PC applications (including CD-ROM) can be achieved via a combined infrastructure. Experience gained from a number of ongoing or planned pilot projects is not available yet.

E 3 *The still existing restrictions on communication facilities for private households should be abolished soon. Test applications, viability calculations and pilot projects should establish whether this is to be brought about by expanding the telephone network to become a fully digital text, data and image communication system, or else by the individualization of radio and TV systems. This will require the cooperation of all those involved, including collaboration between the Federal Government (commercial law) and the German Länder*

(broadcasting law). Joint supporting research is recommended for the planned pilot projects. It will yield results for comparison and be conducive to the mutual exchange of experience as well as the use of experience gained on an international level (clearing house). The development of on-line services requires user-friendly (perhaps optional) telecommunication charges, especially for local calls during the afternoon and evening (PC traffic). The release of the DECT standard for public use as a radio link for private users could stimulate competition and reducing costs.

The sector of education is dependent on powerful and future-oriented means of information and communication (see chapter 3.2). This applies to a particular extent to higher education institutions and research institutes, and to an increasing extent to general education and vocational schools, as well as to continuing education institutions in industry and administration. The road to the information society and the corresponding jobs must not be imperilled either by an inadequate infrastructure or by a lack of training in the use of modern information and communication technologies. Competence in the use of media and media ethics form an essential basis for the information society.

E 4 A start should be made with the setting up of a high-speed network (155 Mbit/s as a backbone and 34 Mbit/s for local connections) for universities and research institutes. At the same time, the network should be opened to schools (64 Kbit/s). Industrial research institutes can be brought in to carry out joint projects provided they contribute towards the costs. In this way pilot experiments and test runs for applications will be made possible, to be continued later in the commercial sphere. The academic and scientific sector is to be

provided with an adequate amount of high-performance computing capacity.

Public administration comprises the authorities at the Federal, Länder and local levels. Decision-making and administration processes can be made more efficient and more flexible, and dialogue with the public intensified.

Smooth cooperation among administration units spatially and temporally remote (dislocated) could be considerably improved and simplified by the use of modern information and communication technologies. The Berlin-Bonn Information Association (IVBB) provides a model that could be adopted also for other parts of the administration. The solutions developed and experience gained also give a competitive edge to industry at the international level.

E 5 *The information and communication technologies should be used as a key to reforming the administration, and in this context the Berlin-Bonn Information Association (IVBB) provides a model for an innovative form of administration that deserves special attention. Even before the German Bundestag and parts of the Federal Government move to Berlin, the authorities should have well-proven information and communication systems in place, so that they can work together without relying on their partners' physical presence at a particular place and time. In order to achieve this on a medium-term basis, a comprehensive concept must be drawn up for all sections of the official administration. When awarding public contracts, government agencies should provide access to relevant information by electronic means. It should also be possible on a medium-term basis to receive tenders by electronic means. This presupposes a change in regulations for*

awarding contracts. Also, the contents, organization and procedures for European and international setting of standards must be adapted to meet the new requirements of the information society. However, the proven consensus-building procedures and the voluntary principle in the application of standards should be retained. When making public procurements, government agencies should require adherence to European standards on the basis of definitions adopted by the international community.

Telemedicine permits remote access to data on health care including preventive care. This makes it possible to give patients a comprehensive diagnosis and reliable therapy, while limiting costs.

E 6 *The opportunities for applying information and communication technology in the field of medicine must be analysed by collaboration between all the institutions responsible for the health sector, with the goal of elaborating recommendations for action. It should be examined in this context whether high-speed networks should be set up in the health sector, especially for cases where it would be necessary to transfer data and images.*

Telematics for traffic control offers mobility to society by ensuring a safe, economical and environmentally-friendly flow of traffic. It is primarily based on networks developed specifically for traffic and could bring about a more even usage of the traffic infrastructure while linking the various means of transport.

E 7 *The use of systems for telematics for traffic control should be promoted and the development of software concepts for automatic traffic data capture should be stressed. In addition, the political and legal prerequisites for a comprehensive implementation of the systems should be created.*

2. Legal Framework

2.1 Introductory Remarks

A modern industrial society can only maintain its position at the top in international competition if, on the one hand, it does away with unnecessary obstacles on the road to the information society, and if, on the other hand, it exerts a positive guiding influence on this development, where appropriate.

2.2 Basic Regulatory Approach

The legislature's basic approach should not be to set concrete industrial policy objectives for the social development that carries the label of the information society, but rather to create a legal framework for viable competition. If competition and the market are significantly more powerful than the government's planning figures, this is particularly so in economic sectors with an accentuated dynamism of change - and more especially in

2. Legal Framework

the new media. This does not exclude projects in the sphere of publicly provided infrastructure (see also E 4 and E 5). Strategic alliances can perform a useful function in this context provided they do not distort competition.

E 8 The lawmaker should primarily create a regulatory framework for undistorted competition in the information and communication technologies and their corresponding services.

From this follows the overriding significance of the imminent restructuring of telecommunications markets. European Community law forces national legislatures anyway to act by 1 January 1998 at the latest. They should therefore be forward-looking and go all out for a competitive approach.

E 9 With the imminent reform of the regulatory framework for telecommunications, legislators should resolve to pursue a competitive approach.

The constitutional mandate of Article 87 f of the Basic Law, which requires the Federal Government to guarantee adequate and sufficient services nationwide can very likely be realized under a competitive system in a fairly evenly populated area such as Germany. Only when individual regions are in fact threatened by undersupply should the regulatory mechanism drafted for this purpose be imposed. This mechanism should not consist in the setting up of a relevant fund. Rather, the provision of universal services should be left to tendering in such regions. The contract should be awarded to those suppliers who apply for the lowest subsidies. It is desirable that in the long

2. Legal Framework

term Telekom AG be treated no differently from any other private joint stock company.

E 10 *With regard to the guarantee of universal services nationwide, a wait-and-see attitude is initially recommended. Only in the presence of concrete demand should the supplier with the lowest subsidy needs be located by means of a call for tenders.*

The free use of public land, ground, air and water space for the operators of telecommunications networks is a prime prerequisite for the growth of the telecommunications market. A toll for the use of public rights of way would create a market entrance barrier resulting in increased investment and network costs.

E 11 *The use of public rights of way should be made available free of charge to all licensees to permit a maximum of competition.*

Of primary importance for generating competition on the network level is to give economically well-performing enterprises access to the market. This means utilities, among others. However, as most of them are publicly owned, or at least subject to considerable influence from regional and/or local authorities, there is the risk of a "renationalization" of telecommunications. A similar risk exists when regional and/or local authorities enter the telecommunications market. Privatization, as stipulated in Article 87 f of the Basic Law, could thereby be changed to the opposite. Moreover, it must be considered that revenue generated in the utility sector, which is protected by a monopoly, could then be transferred to the telecommunications sector and

act to distort competition. However, when energy markets are opened up to competition and the commercial participation of public authorities in utilities (also through the exercise of voting rights) is ended, these reservations no longer apply.

E 12 The Federal Government is requested to examine by which method undesirable effects on competition from utility companies or from firms with a majority of publicly held shares can be prevented on the telecommunications market. The possibility of limiting shareholdings is also a consideration.

2.3 Regulatory Framework for the Media

The technical changes caused by the digitalization and networking of information and communications technologies will in the near future bring radical changes to the media and their uses. In addition to today's audio broadcasting programmes, a large number of different specialty programmes will appear, which may, in principle, differ in content from what is currently the norm and instead provide uses of other kinds. As an increasingly stronger economic factor, dial-up services will play a very important role. Telebanking, teleshopping and video-on-demand are other examples by which the imminent change can be described in rough outline.

Information is a production factor enjoying ever greater significance in the international competition between various locations. To enable Germany to retain, and expand, its competitive position in the future, the rapid unfolding of market forces is imperative in the new multimedia services. Potential investors in these new markets require uniform and reliable basic conditions.

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Otherwise, there would be a risk of these new services relocating abroad and being offered to Germany from there.

E 13 To permit the free unfolding of market forces in the new multimedia services and to avoid putting German suppliers at a disadvantage in international competition, a uniform national regulatory framework for the media should be introduced. Regulation should be restricted to the absolute minimum.

The existing legal framework must be matched to the new technological possibilities. Against the background of a basic regulatory approach allowing for the free unfolding of market forces, legal certainty in the form of practical and adequate regulations and their corresponding interpretation is also needed.

It is undisputed that services catering to individual communications are not subject to broadcasting regulations. This applies to telelearning, telebanking, booking services, databases, video telephones, video conferencing, electronic mail, faxing, teleworking, remote control, telemetering and telemonitoring. As the communications content is not predefined, interactive online services such as teleshopping or video-on-demand must also be considered as individual communications. These are economic activities comparable to shopping or rentals for example. The aim is not to set up a general opinion forum but merely to exercise influence on the services and goods market. This should also apply to many new services which will be developed shortly and whose spectrum is not yet known today.

As a result of the acceleration of technological development, the definition of broadcasting is in need of greater clarity to enable selectivity and the

2. Legal Framework

adequate delimiting of the new services from broadcasting. When classifying the multimedia services, the definition of broadcasting should be reduced to the function of broadcasting as per Article 5 of the Basic Law, which guarantees freedom of expression. Services without a publicity effect should not be considered broadcasting from the outset.

A fragmentation of legal provisions would have adverse effects on Germany's international performance level and competitive ability. This is why a uniform regulatory framework should be created for multimedia services in Germany. Within this framework, regulations on data protection, protection of intellectual property, protection of consumers and adolescents, penal law and data security provisions would have to be adapted and defined more precisely. Thus, in the area of multimedia, separate protection of adolescents is not available up to now.

E 14 We suggest that it be examined whether a regulatory framework should be created on a federal level to provide unambiguous criteria to delimit the new services from broadcasting. In this connection, individual provision governing data protection, the protection of intellectual property, the protection of adolescents and consumers, penal law and data security should also be adapted to meet the new specific needs.

What is paramount for a pluralistic mass media market is adequate regulation of concentrations in broadcasting. The current provisions of the interstate agreement on broadcasting fail to live up to this purpose. The limitation of shareholdings creates unhealthy economic structures that cannot meet the challenges of the new technologies. Moreover, the obligatory recourse to tendering obstructs competition because potentially

competing enterprises are required to compromise to put up a joint programme. What would be desirable is a stronger orientation towards the proven provisions of the general antitrust law.

E 15 An amendment of regulations on concentration in broadcasting is required, following the categories of the antitrust law more closely.

2.4 Protection of Intellectual Property

The protection of intellectual property is an indispensable prerequisite for the unfolding of the new information and communication technologies. The 1965 Copyright Act (German acronym: UrhG) and related property rights in principle also cover the digital processing of protected works and services. Here, the Federal Republic of Germany fulfills its obligations under international treaties. In view of the new forms of processing, some adaptations and developments of the Copyright Act will be required; its basic principles should not, however, be violated. The goal should be to protect and support the owners and intellectual property representatives on the one hand, while interfering with the applications of new technologies as little as possible on the other.

E 16 With regard to the digitalization of works and services, the exclusive rights of authors and of holders of related property rights must also be preserved and if necessary extended.

The moral rights of the author, which are based on Article 1 and para. 1 of Article 2 of the Basic Law, in particular the right to acknowledgment of the source and the protection of the integrity of the work, require special

2. Legal Framework

attention in view of the inroads made by new processing technologies. Provision should, however, be made for a holder of a copyright to agree to certain processing steps if it is in his/her interest.

E 17 The area of legal transactions involving authors' moral rights, for which no legal provisions have been made up to now, should be regulated in the sense of licensing concretely defined steps to end legal uncertainty.

Whether the individual transmission on demand of works and protected services to the screen falls under the right of public reproduction is doubtful; the term "public processing" (para. 3 of section 15 of the Copyright Act) requires a "number of individuals" to be the recipients. Protection in this regard is, however, required.

E 18 The term "public" as defined in paragraph 3 of section 15 of the Copyright Act should be amended to the extent that a transmission to several unrelated individuals is public also when only one person is reached in each case.

With new, e.g. digital, technologies for the processing of protected works and services which interfere with the exclusive rights of copyright holders and performing artists, the processors face the difficulty of subsequently having to acquire the rights for the additional, new form of utilization. An example is the publication on CD-ROM of back copies of trade magazines. On the other hand, the claim of authors and performing artists for adequate remuneration also for any additional, new form of utilization of their works and services is equally justified. Thus, solutions must be found that meet the interests of both parties.

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E 19 *For the benefit of authors and performing artists it must be assured that they collect an adequate remuneration from the processors contractually tied to them also for any new forms of digital use of their works and services. At the same time, it must be assured that processors are enabled to use these products in digital form on a more secure legal footing.*

Sections 45 et seq. of the currently valid Copyright Act limit the exclusive rights of authors and holders of related property rights by permitting the use of works and services even without the approval of the copyright holder. In many cases, it is not clear whether these limits also apply to digital utilization, or whether they are necessary, adequate and reasonable. Examples are the provisions governing press reviews (section 49 of the Copyright Act) and graphic reproduction for private and other internal uses (sections 53, 54 of the Copyright Act). Section 45 et seq. of the Copyright Act must therefore, where necessary, be amended. When amending sections 45 et seq. of the Copyright Act, it must be ensured that they neither interfere with normal processing of the works nor violate the legitimate interests of the author or of other copyright holders to an unreasonable degree (para. 2 of Article 9 of the Amended Berne Convention and Article 13 of the TRIPS Agreement (Agreement on Trade-Related Aspects of Intellectual Property Rights Including Trade in Counterfeit Goods)). The interests of all parties involved (authors and holders of related property rights, processors of works and industry) must be taken into account.

To strengthen Germany's attractiveness as an industrial location by preventing putting German industry at a competitive disadvantage, the Federal Government is requested to ensure uniform provisions throughout the EU as soon as possible.

2. Legal Framework

E 20 *The legal provisions governing the limits of the Copyright Act and of related property rights (sections 45 et seq. of the Copyright Act) must be examined as to whether they are also applicable to the digitalization of works and services, and whether they are necessary, adequate and reasonable for this purpose. If sections 45 et seq. of the Copyright Act are amended, it must be ensured that neither the normal processing of works nor the legitimate interests of the authors or of other copyright holders are violated beyond reasonable measure.*

The new digital information and communication technologies lend themselves particularly well to being used on an international scale. When reviewing and adapting the copyright law to digital technology, the examination and codesign of European and international copyrights must be given special attention. Thus, in international communications, it is very important to know which national copyright law is applicable in each case. Up to the present, the valid though unwritten territorial principle ensures that authors and holders of related property rights can invoke their rights in any country in which their works and services are used. For satellite broadcasts on the other hand, an EC directive of 27 September 1993 introduced the principle of country of origin, according to which only the copyright law of the country of origin applies regardless of where a broadcast is received. Seen as a trend, this represents a substantial and disturbing undermining of the copyright holder's legal position.

E 21 *When adapting the Copyright Act to new digital technologies, examination and codesign of European and international law should be given special attention. Legal solutions should be found which on the one hand do not obstruct international communication while on the*

2. Legal Framework

other hand assuring optimum protection for authors and performing beneficiaries.

2.5 Data Protection and Information Technology

The existing data protection laws were written against the background of the now largely obsolete technology of the 1970s whose consequences for the processing of personal data could be handled primarily through legislation. The development of the information and communication technologies does not, of course, alter the principles rooted in constitutional law and enacted in legislation, but it does shift the focus of their realization more and more away from a purely normative approach to the use of a specific technical infrastructure. The new information and communication technologies are marked by networking and by decentralized applications and uses. Data protection has traditionally been designed on a normative footing and must therefore be supplemented by data protection technology. Its task will be to guarantee self-determination in the information media in ways that are adequate to the technology and the risks involved. The more completely this objective is achieved, the greater should be the readiness to make use of the information and communication technologies and benefit from their advantages. Seen in this light, consistent data protection is one of the central prerequisites of acceptance in the information society.

For a domestic data protection technology to be developed, data protection laws have to be amended. In any case, existing regulations must be amended due to the recently adopted data protection directive of the European Union. However, general data protection laws must continue to

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make only general provision, which will then have to be specified e.g. for telecommunications, the health sector or payment transfers.

E 22 *The Federal Data Protection Act should be amended as soon as possible on the basis of the technological changes that are characterized by networking and decentralization. The imminent application of the recently adopted data protection directive of the European Union should be used as an opportunity to do so. In this context, the current provisions governing data security, in particular section 9 and the annexes to the Federal Data Protection Act should be adapted to the requirements of the modern information and communication technologies.*

The binding normative requirements of data protection involve in particular the obligation to avoid the processing of personal data whenever possible and to limit the processing of data to specific purposes known to and approved by the data subject and to make the processing transparent to such an extent that the latter may at any time inform him/herself of the handling of his/her data, so that checks on the processing can be guaranteed by an independent body. Derived from this procedure, the task facing us is to develop a basic standard for organizational and technical safety measures. Priority must be given to procedures which give the subject a maximum of anonymity vis-a-vis network operators and service vendors. Thus, payment for services can be ensured, e.g. in the form of prepaid cards or by a fiduciary model. Preference should moreover be given to procedures which allow the party affected the option to permit or stop the processing of its data.

2. Legal Framework

E 23 It is recommended that a basic standard of organizational and technical safety measures is drafted and defined which offers the parties concerned a maximum of anonymity with respect to network operators or service vendors.

Among the necessary technical safety measures will also be the use of encryption in which digital signature processes guarantee the authenticity and source of documents while encryption procedures guarantee their confidentiality. When developing and implementing such procedures it must be borne in mind that in connection with police activities and in particular criminal proceedings, it must be possible for government authorities to decrypt individual documents.

E 24 For the decryption of documents by government agencies, legal provisions should be made describing the criteria of decryption authorization and unambiguously regulating access to documents.

The use of encryption procedures in open networks must be tied to the development and statutory regulation of a security infrastructure, in which e.g., industry-specific trust centres are established as trusted third parties which guarantee the quality of encryption procedures and the allocation of the keys to the holders. When using virtual money ("cybermoney"), a security infrastructure is also required. In this context, it is necessary to clarify the technical requirements for ensuring the trustworthiness of monetary transfers and documents as well as the question of liability. The liability risk could possibly also be regulated by modifying the tort principle.

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E 25 *A security infrastructure is required to secure encryption procedures in open networks, e.g. by incorporating trust centres, which should, if possible, be organized and set up separately from official bodies. The requirements to be met by, and the licensing of trust centres must be regulated by law. The conditions which guarantee the equivalency of proof of electronically signed and conventional documents in paper form should also be regulated by law.*

The aspects of internal security and crime prevention (data protection, security of information technology, etc.) in connection with communications networks and new services must be taken seriously. However, a new balance of interests between utility in crime detection and the introduction of new technologies and innovations may become necessary. Also, the experience of the last two decades has shown clearly that statutory regulation frequently lags behind the information and communication technologies. The efficacy of requirements to be met in the processing of personal data is thus undermined and the development of new types of processing jeopardized. A possible solution could be an experimentation clause which suspends certain security regulations for specific applications for a set period (e.g. three years) so that experience in the new technology can be gained. The "piloting-before-regulating" principle applied in the USA should also be introduced in Germany so that technical breakthroughs will not be obstructed by excessive regulation.

E 26 *The legislature should, within the constitutional framework, permit experimentation with new technical and organizational security measures in clearly defined applications and for a clearly specified period of time.*

2. Legal Framework

Not least in view of the data protection directive of the European Union, international transfers of personal data must be permitted only if the information receiver is subject to regulations which satisfy the data protection principles to be observed in the European Union.

The processing risks inherent in global telecommunications can lastly be contained only with the help of a data protection technology that is also effective globally. In the last 25 years, the Federal Republic of Germany has influenced the development of data protection far beyond its national borders. If Germany intends to continue to play a leading role in the future, the extension of data protection technology must be undertaken with the same level of intensity with which the legal foundations governing the processing of personal data were set up in the past. Only then could it be possible in the future, in cooperation with the other member states of the European Union, to comply with the requirements for international data transfers formulated in the data protection directive of the European Union.

E 27 *International cooperation is desirable for guaranteeing data protection and security in information technology. The European Union should play an important role in this effort.*

3. Social and Cultural Challenges

3.1 Introductory Remarks

The future of the information society will be based on a networked multimedia world in which television, personal computers, fax machines, telephones, radios, etc., are brought together in a single overall media configuration based on a corresponding user-friendly design. This world will affect individual and social life profoundly; cultural change will be accelerated. While this is an optimistic vision for many people, it is a development also beset with fears for many others.

1. The change in culture, which is also a social transformation, is already well under way. If meditative private reading, in the form in which it evolved since the end of the 18th century, has been "the royal road to individuality for citizens", then the visualization of entertainment and knowledge — which are closely tied together in the case of entertainment and information — are of decisive importance for culture overall. Throughout media literature "reader" has been replaced by "user", which probably means that intensive use of the new media is supposed to be less personal and more neutral in educational terms than the reading experience. The computer screen is less suitable as a medium for reading than for obtaining information speedily and selectively.

3. Social and Cultural Challenges

2. This medium demands competence not only in the sense that computer literature is a cultural skill; it also demands
 - the ability on the part of the user to select from the abundance of information offered according to the situation and with a sense of responsibility (the prerequisite for this is rapid provision of the required information through personal information management);
 - the ability on the part of the user to understand this language of images (or even to generate it); and it should be noted in this connection that someone is said to have media competence if he/she has reading competence, not merely being able to spell out written texts, but also being able to understand them structurally, analysing them and making active use of them;
 - the availability of options for relevant and context-sensitive use of all media — information media like books, available to the public in media libraries in the same way as in traditional book-based libraries;
 - a significantly greater degree of user-friendliness as a prerequisite for access by many people to a "computer-based culture"; the use of computers will be made significantly easier by the introduction of voice-operated systems.
3. The new media for information and communication open up new forms of access to information of all types in the private as well as in the public sphere, and provide new opportunities for working with information and cultural commodities (e.g., a global telemuseum). They would make possible a new directness of communication, since restrictions on time and space are removed ; the media society will be intercultural. Insofar as the new media are already being used for first

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publications, the time gap between production and availability is being narrowed. The new media offer new possibilities for the use and processing of information for public, private, commercial and industrial purposes, for gaining qualifications, for intellectual development and for communication (locally and worldwide).

Undoubtedly, the new media will also create problems, which include the following:

- technical handling of the end-user equipment and software. These problems not only concern the user-friendliness of the latest combinations of equipment, not only the gulf between a younger generation that is accustomed to computers and an older one that is computer-illiterate, but also the mental and social problems involved in dealing with virtual reality (which only exists as an electronic image). What we are probably heading for is an artificial media world in which fiction, illusion and reality cannot be separated any longer (the computer is not only a tool that enhances mechanical and intellectual abilities, but apparently, the imagination and emotions can also be reinforced and modified by technology)" (K. Mainzer);
- the complications of orienting oneself in a plethora of information;
- being flooded by (unnecessary) information;
- expanded opportunities for initially imperceptible forms of manipulation;
- inequality of opportunity regarding access to the new media (a) between individual citizens, depending on age, qualifications, and financial resources, (b) between individuals and communities on the one hand and public institutions on the other; in the USA the basic

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right of every individual to have free access to information is under discussion;

- passivity (consumption to the point of addiction, television as a "zero medium");
- guarding property rights (e.g., the worldwide transmission of images and text, see section 2.4 above);
- the participation of citizens in political decisions;
- the structure and organization of companies and the relationships between them and their employees.

Out of the multiplicity of possibilities and problems associated with the new media, the sectors of

- education,
- dissemination and storage of knowledge (publishers and libraries),
- politics and
- the world of work

will be discussed. The emergence of new forms of entertainment, and also of promising new forms of art, which are already being developed by the artistic avant-garde and are oriented towards interaction between the work of art and the public, will not be explained here, since this aesthetic culture would require a comprehensive description of its own.

4. If there is a "rhetoric of print" in the sense that the transition from handwritten manuscripts to the printed book brought about a change in the structure of knowledge and science as a result, then structural

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changes will presumably also be involved in the transition to the electronic availability of knowledge, such as

- the possibility to constantly update and amend data and texts;
- the rapid availability of large amounts of data;
- the ability to transfer data, text and moving (coloured) images to any place at any time within seconds;
- the pressure to use the (mainly) English language of science (which has penetrated deeply into the area of normal speech);
- differing production technologies (new combinations of texts using text modules);
- (possibly) better verifiability of news;
- a change in texts towards an "autonomy of the main text" (doing away with footnotes) and
- expanded opportunities for plagiarism, forgery and deliberate confusion (disinformation).

The structure of science was transformed in the transition from handwritten manuscripts to printed matter through the "standardization of the forms of presentation" through expanded opportunities for rationalization, codification, classification, cataloguing and indexing.

The changes in the structure of knowledge in the transition from printed media to data and mass communications cannot be perceived fully as yet. Probably, what will happen is this: a reduction of the demand for perennially valid scientific statements (text communicated electronically currently has the status of "gray literature"); a new (usually collective)

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type of authorship; reinforcement of the elements of orality and worldwide dialogue in scientific and scholarly discourse, which had largely been superseded by the spread of the printed book; the possibility of (and the demand for) total researching and to fill in all the informational gaps in our knowledge (perhaps, ultimately, at the cost of creativity and imagination).

5. Talk of "media ethics" in a computer-based culture is to be understood to mean that working with the new media does not require special ethics for particular professions, but rather the adaptation of "civil ethics" to these enhanced opportunities. Thus schools have the task of instructing the young at an early stage not merely in the technical handling of the new media but also in the latter's responsible use. The violation of the traditional rights of individual liberty is taking place almost unnoticed in the computer-based culture. Education has the fundamental task of directing attention to such risks. An expansion of the experiential world with a common synthesized reality of users requires intensive, and also ethical, training. The process of becoming accustomed to new objective, yet virtual realities must be accompanied by education, training and research.

3.2 Education

The education sector (schools, vocational education and training, higher education institutions, public and private forms of continuing education, including in-firm training) plays a key role in the use of these opportunities and in tackling the problems of the information society. It has the task of

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preparing people for life with the new technologies and to provide individuals with the skill to handle these media thus enabling them to work with the new plethora of information originating from many different cultures in an active and responsible way. The competitiveness of Germany ultimately depends on how quickly and how effectively the separate institutions within the education system are enabled to meet these challenges.

All the institutions within the education sector and the persons active as researchers, teachers and students are being affected directly by the new developments. The new information and communication technologies open up new forms of learning, which are much more varied and up to date than current forms (e.g., classroom instruction and lectures) and media (e.g., textbooks). New ways of teaching are required at all levels of the educational system. A sound and comprehensive general education will continue to be of fundamental importance also in the information society. Educational qualifications, also those of teaching staff, will become obsolete more quickly. This creates a need for life-long learning at all levels. The removal of the old restrictions on access to information and knowledge in terms of space and time on the one hand opens up new instruction methods which no longer require teachers and students to be present in the same place; on the other hand, it also creates a new need for personal interaction, or at least calls for a new definition of this need.

In the short and medium term, we can expect that education and training, higher education and continuing education will be made easier and improve in terms of quality. However, in Germany the relevant technology and infrastructure (such as high-speed networks) is not as highly developed as in the USA and many neighbouring European countries, such as the Netherlands and the UK. On a long-term basis, the structure of qualifications

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and of the way they are earned (new forms of education and training, new certificates, new types of occupations) as well as the education institutions themselves (the ratio between public and private education, increasing specialization) may change; the scale and speed of these changes cannot be predicted yet.

E 28 Germany's current deficit as regards the relevant infrastructure and provision of education institutions with the new information and communication technologies must be remedied quickly. This requires investments in networks, user-friendly hardware and software, and political measures to boost innovation (encouraging investment, defining the regulatory framework for competition, see also chapters 1.2 and 2.2) and in-service training programmes for teachers. The Federal Government, the Länder, local authorities, industry and also, for example, foundations will have to make a joint effort to cooperate on achieving this goal.

E 29 Qualified research on the technological, economic and social consequences of the new information and communication technologies and the new media should be encouraged. Experience from other countries should be incorporated.

E 30 In all areas of the educational sector, pilot experiments should be made with the new information and communication technologies to test them, using the experience gained abroad, and to research their impact. These experiments should be made in collaboration with industry. The school sector will have a fundamental role to play in this process. The proposal to initially connect about a third of all schools to the scientific network with a communications line capable of at least 64 Kbit/s should

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be pursued vigorously. Schools must be provided with the requisite hardware and software. In addition, teaching programmes that make use of the new technologies must be developed for schools; these programmes should also teach people media competence. The same applies to teacher training and in-service training.

E 31 The currently discussed extension of the science network for universities and Fachhochschulen to become a high-speed network should be implemented at once. The computer investment programme (CIP) for university teaching should be continued for several years at the 1990 level and be expanded to become a telecommunications investment programme (TIP) (see also E 4).

E 32 Continuing education programmes, including the corresponding hardware and software, must be developed and made available in collaboration with users, scholars and scientists, and industry. Programme development should be supported with public and private funds.

E 33 Overall, it is necessary to create a climate of open-mindedness towards the new technologies, not least by starting broad-based information, discussion and opinion-building processes. This applies not only to the area of technology but also to the evaluation of the opportunities and risks arising from the new information and communication technologies. This not only affects the educational sector but, in addition, the whole sphere of public life. Encouragement should be given to the establishment of skill training centres, e.g., at schools and higher education institutions at the level of local authorities.

3.3 Publishers and Libraries

Apart from radio and television, publishers and libraries are the main private and public sources for supplying, transmitting and disseminating information. They ensure not only the quality of the items offered, but also plurality, freedom of opinion and free access to information and cultural assets.

Developments within the Internet make it clear that higher education institutes can be regarded as providers of information, even more so than before. Their interface with the publishing sector needs to be redefined. At the same time, the role of publishers and libraries will continue to be just as important as in the past. The new information and communication technologies will be used as tools for providing and using information, thus supplementing the old media, such as books and newspapers, and partially replacing them on a long-term basis due to their high capacities.

To attain or maintain a leading position in the global information market, it is necessary to not just be a user (a paying user, asking for access as it were) of (monopolized) information, but to offer a comprehensive, digitalized body of information, e.g., in the form of a digitalized library.

E34 *Developments in the field of information and communication technology provide publishers with the opportunity and the challenge to comprehensively extend their range of goods with regard to the new technologies. Suitable measures must be taken concerning policies on innovation so that in the publishing sector in Germany with its predominance of small and medium-sized companies the pluralistic structure of the information market is preserved. The new technologies*

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also offer new opportunities for the private appropriation and modification of publicly-available information and cultural assets. Problems of copyright must be taken into consideration (see chapter 2.4). The libraries must be enabled to continue performing their tasks using the latest technologies. Apart from investments in facilities and equipment, it is also necessary to take measures for continuing staff training.

E 35 The supply of digitalized information in worldwide networks requires measures to be taken in research and development. Suitable co-operative projects (between publishers / higher education institutions, higher education institutions / industry, libraries / computer centres / higher education institutions) should be launched to develop and test new forms of electronic publications, education and the dissemination and retrieval of information. The transfer of the existing stocks of the main classical media into digitalized form is a major task which, when attained, will contribute greatly to the effective utilization of electronic information systems. This task cannot succeed to an adequate extent without public support.

E 36 Worldwide free access to information must be guaranteed, and at the same time, tendencies towards monopolization by the technologically more advanced nations must be countered. This must be ensured by the creation of a market on which there is competition as well as by the conclusion of international agreements. In this way, a division of the world's population into "information-haves" and "information-have nots" (on a personal and national level) is, if possible, to be avoided.

3.4 Politics

The possibility of linking up the population to communication networks presents some ambivalent options to the political culture: on the one hand, representative democracy will be called into question if each citizen can, in principle, participate directly in the political opinion-building process. On the other hand, the quasi "direct-democracy technology" cannot and must not replace the institutionalized forms of democracy in the ever more complex decision-making process and political discourse. That does not, however, preclude direct participation by citizens in decisions on clear-cut matters, especially on a local level (a relevant example is the Public Electronic Network in Santa Monica, California). A point to consider is the well-proven phenomenon on that only certain sections of the population make use of forms of political participation other than general elections. This could endanger the fundamental principle of democratic equality. In any case the involvement of citizens in the communication networks and the accessibility of all political players will entail fundamental changes in the democratic process.

E 37 The developments described should be viewed not as a danger but as an opportunity to involve ordinary citizens more than ever before in political discourse and political responsibility, in the first place at the local level. This could lead to greater acceptance of political decisions and might help to reduce political apathy. However, this type of communication cannot and must not replace the institutionalized discourse of representative democracy even in the future. For this reason policy-makers seek to reconcile the trust-building elements of direct democracy with all their drawbacks in a suitably balanced manner.

3.5 The World of Work

The massive application of information and communication technologies will change the content and structure of work over wide areas. The current structural change in the world of work, which is marked by a decentralization of corporate structures, a concentration on core business with simultaneous outsourcing, the building of networks, and the dissolving of conventional forms of employment, may be accelerated even further by the new technologies. In so-called virtual companies, which have a large number of freelance staff, companies are linked together by data networks and form working partnerships under different corporate names. Cooperation among decentralized units (workplaces, company units, entire companies, branches of industry), even on an international basis, will in many cases speed up the restructuring of work sharing and working relationships between corporations, companies and businesses in terms of space and time, with the result that not only traditional occupations but also working relationships, corporate organization and cooperation, and dependency relationships between businesses and companies will be changed. In terms of the working relationship, the effects are a mixed blessing: while work and individual lifestyle can be better matched, employment relationships with inadequate legal safeguards could evolve in which new modalities of dependency would arise despite a seeming show of independence, and which would burden the employee with unreasonable risks.

Telecommuting will take its place alongside traditional forms of work, to an extent that will depend on the field involved; it has been estimated that potentially 20% of all jobs will take this form after the year 2000. According to the "Bangemann Report", this would affect 800,000 alternating jobs (= 2% of

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the work force). In many cases telecommuting will not exclusively involve work outside the firm, but also means alternating periods at the company.

A investment drive of several hundred million DM annually can be expected for this market, even though current forecasts still differ greatly. One estimate is for a turnover of around 50 billion DM in the year 2000. At the company level, productivity increases of 20% (by saving time and expenses) and improved competitiveness are expected. On an overall economic and ecological scale, 800,000 telecommuters would mean a substantial reduction of road traffic (by saving around 3.2 billion motor vehicle-km per year).

Furthermore, positive employment aspects can be expected (see chapter 1.3). Exact forecasts are, however, difficult to make. The EU assumes that there will be from three to four million new jobs in the next six years. This might open up new employment opportunities for the disabled, who would be able to work at jobs previously closed to them or only accessible with great difficulty. Also, pilot projects should be carried out to test the extent to which homemaking (particularly rearing children) and gainful employment can be better combined through the use of telecommuting. The global component of telecooperation and telecommuting may also lead to a loss of jobs, however.

At the level of the individual firm, there are consequences that will affect not only the structures of work as such (e.g., working hours, remuneration, communication) but also personnel management. Thus management will primarily involve agreement on targets and the discussion of results instead of directions and supervision. Telecommuting is subject to labour law as long as there is no question of self-employment; the Homework Act is not applicable here.

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The individual and collective applicability of labour law is derived from the working relationship. The Works Constitution Act should define the term company in such a way as to solve any problems of collective applicability. It should be understood functionally and not simply in spatial terms. This means that the satellites of the company also belong to it, and these also include its outworkers and telecommuters, with the consequence that the corresponding works council also has authority in this case and may exercise its participation and codetermination rights. There will, however, also be specific legal problems relating to telecommuting:

- in individual labour law, e.g., concerning employee protection (working hours, accidents, health, ergonomics), liability, data protection, equality of treatment, and
- beyond the purview of labour law, other problems that already exist today could also, increasingly, arise in connection with pseudo-self-employment and be intensified as a result of increasing internationalization. If the normal working relationship becomes less and less frequent, this could have massive consequences for social insurance and social security as a whole.

E 38 *The changes that are expected to take place raise numerous questions which will have to be dealt with by education, institutions and by research to the extent that this has not already been done, to provide orientation for policymakers, industry and the trade unions. Multimedia pilot projects provide an opportunity here.*

E 39 *No special laws are required to improve legal protection for telecommuters. There is, however, a need for regulation in certain*

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areas which can be met by company agreements or collective bargaining agreements or, in individual cases, by adapting existing laws (e.g., physical access to teleworkplaces, accident cover, liability). Legislation on access rights must balance the requirements of employee protection with the constitutional right of the inviolability of the domicile.

E 40 A point to be observed is whether the restructuring of companies will eventually require new forms of representation for employees. It is recommended to commission an expert opinion - involving also those affected - to examine matters of collective labour law as well as the problems concerning pseudo-self-employment.

E 41 Restraint should be exercised in terms of legislation concerning telecommuting to prevent such work, which is particularly easy to move elsewhere quickly, from migrating to countries with far lower levels of regulation. Instead, efforts must be made at the level of the EU, and beyond (within the framework of the ILO), to guarantee a minimum level of protection in terms of employee and social rights. At the European level, the EU-Directive on a European Works Council, to which national law will have to be adapted, is to be welcomed. This directive is apt to overcome potential problems with telecommuting across national boundaries.

Appendix

Members of the Working Groups of the Council for Research, Technology and Innovation

All the working groups have held three sessions. The members have either taken part fully or partially in the work of the working groups.

Working Group A „Research, Technology, Applications“

Led by: Prof. Dr. Eberhard Witte

Roland Bickmann	Bickmann & Kollegen Unternehmensberatung, Hamburg
Dr. Horst Blume	DLR, Köln
Dr. Alexander Broich	Bertelsmann AG, Gütersloh
Dr. Rudi Dinger	ASULAB S.A., Marin, Switzerland
Dr Ernst Josef Durwen	Mannesmann Eurokom GmbH, Düsseldorf
Dr.-Ing. Andreas Engelke	Deutsche Forschungsgemeinschaft (DFG), Bonn
Prof. Dr.-Ing. Georg Färber	Technische Universität München
Jürgen Galler	Universität Saarbrücken
Dipl.-Inform. Rainer Glatz	VDMA, Frankfurt
Manfred Harnischfeger	Bertelsmann AG, Gütersloh
Prof. Dr. Friedel Hoßfeld	KFA Jülich
Prof. Dr. Egon Hörbst	Siemens AG, München
Dr. Hubertus Hoffmann	Burda Medien, München
Jürgen Kanzow	DeTeBerkom GmbH, Berlin

Ulrich Klotz	IG Metall, Frankfurt/Main
Dr. Guido Korff	Grundig GmbH, Fürth
Arnold Pott	Consultant for Net Cologne, Essen
Prof. Dr. August-Wilhelm Scheer	Universität Saarbrücken
Gerd Tenzer	Deutsche Telekom AG, Bonn
Alfred Töpfer	Stiftung Warentest, Berlin
Gabor Toth	KirchGruppe, München
Dr. Joachim Türk	BMW AG, München
Dr. Hans-Dieter Wiedig	Siemens AG, München
Norbert Willisch	Bayerisches Staatsministerium für Unterricht, Kultus, Wissenschaft und Kunst, München
Prof. Dr. Eberhard Witte	Universität München
Gottfried Zmeck	KirchGruppe, München

For information:

BMBF:	Dr. Andreas Goerdeler, Prof. Dr. Jürgen Richter
BMPT:	Dr. Manfred Witte
BMV:	Dr. Josef Kunz
BMW:	Dr. Wolfram Berger, Dr. Reiner Clement

Working Group B „Legal Framework“

Led by: Prof. Dr. Wernhard Möschel

Wolfram Backert	Bayerisches Staatsministerium für Bundes- und Europaangelegenheiten, Bonn
Dr. Manfred Huber	Siemens AG, München
Bernhard Jüttner	Deutsche Telekom AG, Bonn

Appendix

Dr. Paul Katzenberger	Max Planck-Institut für Patentrecht, München
Prof. Dr. Wernhard Möschel	Universität Tübingen
Dr. Detlev Müller-Using	Deutsche Telekom AG, Bonn
Hermann Oertel	SNI, Paderborn
Prof. Dr. Reinhart Ricker	Universität Frankfurt
Heinz Sarbinowski	GMD, Darmstadt
Volker Schmits	Working with Prof. Ricker, Frankfurt
Prof. Dr. Gerhard Schricker	Max Planck Institut für Patentrecht, München
Prof. Dr. Spiros Simitis	Universität Frankfurt
Bruno Struif	GMD, Institut für Telekooperations- technik, Darmstadt

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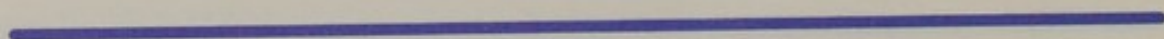
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