

**Integrated Services Digital Network - The Telecommunications
Highway for Europe after 1992 - or - Ideas Subscribers Don't
Need ?**

Gerhard Fuchs, Max Planck Institut für Gesellschaftsforschung,
Köln, Germany

The paper examines the policies of the EC aiming towards a coordinated introduction of an Integrated Services Digital Network (ISDN) in all member countries by 1993. ISDN originally was supposed to be a new telecommunications network that eventually would replace the old telephone network. ISDN is "...a network, in general evolving from a telephone IDN (Integrated Digital Network), that provides end-to-end digital connectivity to support a wide range of services, including voice and non-voice services, to which users have access by a limited set of standard multipurpose user-network interfaces" (CCITT). In this paper I will argue that the ISDN activities of the EC are somewhat trapped between the attempt to liberalize the so far closed and fragmented European telecommunications markets on the one hand and the aim to build up a strong independent European telecommunications industry and a European wide telecommunications network on the other hand. ISDN therefore cannot fulfil the expectations of the Commission.

Integrated Services Digital Network - The Telecommunications
Highway for Europe after 1992 - or - Ideas Subscribers Don't
Need ?

Gerhard Fuchs

Max Planck Institut für Gesellschaftsforschung, Köln, Germany

Presented at the Biennial Conference

May 22 - 24, 1991

European Community Studies Association
George Mason University, Arlington, Virginia

Introduction

Tjakko M. Schuringa, Director Telecommunications of the EC Commission, said in his opening remarks to the EuroComm 88 congress: "Europe has again become number one in telecommunications." (Schuringa 1989: 1) Wishful thinking then and now, but may be an understandable point of view on the background of the impressive number of recent initiatives and quite bold action coming from the European Community in the field of telecommunications. Schuringa believed that in the process of European revitalization, the Integrated Services Digital Network (ISDN) plays a key role. For one, as in 1989 Science, Research and Development Vice President Filippo Maria Pandolfi remarked, at the publication of the 1989 ISDN report:

"ISDN has the potential to develop into an essential component of the new nervous system which the 1992 market so urgently needs."

For second: Operating ISDN networks using equipment delivered by European producers could be the best recommendation for sales of European equipment in the world. (Schuringa 1989: 2/3)

In spite of the fact that ISDN has been given lots of attention by the Commission and that the EC technology programme RACE in some ways builds upon the development of ISDN, EC activities in this field have not attracted much scholarly attention. In his recent overview article on EC decisions and directives in information technology and telecommunications, Delcourt for example, does not even mention the ISDN activities (Delcourt 1991). The EC's ISDN plans, however, mirror more closely than other initiatives the overall expectations of the Commission, the Commission's broad policy aims in the field of telecommunications as well as its major shortcomings. In this paper I will argue that the ISDN activities of the EC are somewhat trapped between the attempt to liberalize the so far closed and fragmented European telecommunications markets on the one hand and the aim to build up a strong independent European telecommunications industry and a European wide telecommunications network on the other hand. A full scale liberalization and deregulation, that is not to be expected anyway, would sweep away most of the European producers and would put in limbo the very rationale of the initiatives for a common market in Europe after 1992.¹ On the other hand the EC lacks the power and competence to assure that ISDN development plays a prominent role in the plans of the European network operators. Given the increasing deregulation and liberalization that is also sponsored and supported by the EC, the network operators are less likely to invest in technological developments that are in the interest of euro-political strategies but are economically not very promising - at least in the short run. ISDN therefore cannot fulfil the expectations of the Commission.

I will start out by giving a short survey about activities of the EC as related to ISDN (2.), devoting special attention to the EC programme RACE (3.), and finally I will provide an evaluation of the EC activities (4.). At the beginning there will be some brief comments on the technological basis of ISDN (1.).

1. The Technological Basis of ISDN

Historically network developments in the European countries were largely independent from one another. Each country developed its own infrastructure with its national specifications and services. Even in the last couple of years new services and networks have been developed that are not compatible with each other on a European basis (like videotex or mobile communication). This impedes e.g. cross connectivity of networks and services and thus is a major stumbling block for a true European common market.

Telecommunications networks have been constructed to transmit informations. More specifically they have been constructed to transmit informations in a specific form: e.g. the telephone network to enable the acoustic communication between individuals, the telex network was meant for written information exchange. The telecommunications networks were not planned for a general transmission of information. They thus originally were service-specific networks: each new service got its own new network. This has changed: Increasingly new telecommunications services are offered in existing networks. Telefax, Videotex and certain services of data communication are using the telephone network; teletex and specific services of data communication are offered via the traditional telex-network, that has been transformed into an integrated data network. The telecommunications networks have thus become service-integrated networks.

The telephone network is the world's most extensive telecommunications network. It used to be an analogue network. The digitisation of the analogue networks makes it possible to integrate digital data services. Once the telephone network is digital, it will provide the broadest, most favorable basis for the integration of all voice and non-voice services in a single network.

Thus it becomes possible to create a uniform "telecommunications highway" (Cp. Table 5, Annex). This highway can be viewed as an infrastructure that serves the transmission of a variety of telecommunications services like telephone, telefax, teletex, videotex, data dialogue, batch traffic, picture communication and so on.

Some typical ISDN features are: one subscriber number, automatic terminal access, two connections or the use of two different services at the same time, shorter connection set up time, change between services during a call, portable,

pluggable terminals, change between devices without changing services, semi-permanent connection, closed user groups, call progress signals, block outgoing calls for all services, itemized recording and printout of call duration and charge, status inquiry, continuous activation. ISDN terminals are supposed to be multifunctional and can replace as many as four or five traditional pieces of equipment (like Fax-machines, Teletex-machines, typewriters, computer terminals).

The advantages of ISDN are a higher transmission speed for data (compared to existing telephone networks), a more economical use of the various telecommunications services (drastic reduction of user fees), a more comfortable use of the various services, universality of the access for text, voice, data and image communication (Cp. Table 4, Annex).

ISDN is a mixture of a process innovation - the digitisation of the network - and a product innovation - already existing services will be altered and new services offered. The digitisation does not make it necessary to integrate services. It is, however, to a large extent the precondition for creating new telecommunications services.

The CCITT (Comité Consultatif International Télégraphique et Téléphonique) I-Series Recommendations define the ISDN as "...a network, in general evolving from a telephone IDN (Integrated Digital Network), that provides end-to-end digital connectivity to support a wide range of services, including voice and non-voice services, to which users have access by a limited set of standard multipurpose user-network interfaces".²

The characteristics of ISDN given above are the result of a long discussion process that centered around problems of standardization. I will not analyze the process by which CCITT and other agencies arrived at their respective recommendations. One should keep in mind, however, that these recommendations represent a compromise that resulted in the choice of a set of technological options. ISDN in the described version is far from being a technological or economic necessity. Some critics even hold that the Western European version of ISDN will be a major failure and that other technical solutions besides ISDN are more favorable for telecommunications users. (Therefore: the reinterpretation of the acronym ISDN as Ideas Subscribers Don't Need - More about this later on.) Furthermore public networks supporting leased circuits, telephone, telex, circuit and packet switched data services and ISDN can, from a technical point of view, be supplied under monopoly or competitive conditions. The system structure of networks as well as the implementation strategies may differ significantly.

2. History of EC-Activities

What made the EC become interested in ISDN? Over the eighties the Commission had become active in the field of industrial policy and had prepared a number of R&D programmes. The main focus being on information technologies (e.g. ESPRIT).³ Information technologies seemed to be the most volatile sector of what became known as the 'new technologies'. The image of European backwardness at present compared to European eminence in the past seemed to be most striking in this case. With respect to telecommunications networks in virtually all member states a modernization of the existing inventory was under way since the late seventies. The aforementioned digitisation was the key innovation coupled with major technological breakthroughs in the area of data storage and data processing. The EC seized the possibility to steer the modernization process in a common direction and at the same time fulfilling the aims of the "new" Community of the nineties: the achievement of both a true common market and the creation of European worldwide competitive high tech corporations. The addressees of the EC's initiatives were thus national governments, telecommunications industry and public network operators. These three groups had in most countries developed a kind of symbiotic relationship over the past.

The EC committed itself to a technology push strategy in spite of the fact that the real need for ISDN and even more for broad band ISDN was put into doubt. One among the skeptics being FAST - researchers, the technology assessment brain trust of the EC. Still in 1986 Noam noted the paradox that there seems to be a general understanding about the importance of ISDN but he could not find a single study that would deal with problems like the economic feasibility of ISDN plans or the eventual acceptance of the new network. (Noam 1987)

The Commission of the European Community, however, was early determined about the great importance of ISDN as a basis for efficient telecommunications for the Community as a whole and recommended to the EC Council that ISDN should be introduced in a coordinated way in the EC. In view of the central role of ISDN, and in conformity with the action programme in the field of telecommunications which was confirmed on December 17, 1984 by the Council, the 'Senior Officials Group - Telecommunications (SOG-T) instructed the 'Analysis and Forecast Group (GAP)' to study with first priority the situation in the ISDN field, and to draft appropriate recommendations.⁴ This was "early" because at this time no working ISDN projects did exist. There were only plans from the network operators and attempts were under way to standardize important ISDN at CCITT.

A comparison of the plans of the telecom administrations in Europe at the end 1985 showed that only the general concept of ISDN was common. Common was:

- the ISDN was considered to be a natural evolution of the existing telephone network;
- ISDN was supposed to aim at the residential population, not only professionals, thus envisioning a new universal telecommunications network;
- dates for the introduction of ISDN were mentioned, but they differed significantly for the different member countries⁵. (Arnold 1989: 344)

In 1986 the Council launched a recommendation for a coordinated introduction of ISDN.⁶ The EC Commission recommended to the EC Council:

- that the PTTs apply the jointly developed detailed recommendations on the coordinated introduction of ISDN;
- that the application of the recommendations be concentrated on the following items: - standards and introduction of the S/T interface; - schedule for the ISDN introduction; - objectives regarding the market penetration;
- that the CEPT continues to harmonize activities on the basis of a schedule of ISDN specifications still to be finished;
- that the PTTs take all the measures necessary to facilitate the coordinated introduction of ISDN;
- that the financing instruments of the Community take into account this recommendation;
- that the member state governments urge the PTTs to apply this recommendation;
- that the member state governments inform the Commission annually on the measures taken as well as the problems which have arisen in the application of the recommendation.

Of special interest is the operationalization of the aim 'market penetration': it was agreed that by 1993 each member state should provide for an equivalent of 5% of the total number of telephone subscribers in 1983 to be connected to ISDN.⁷

ISDN at this moment was - as mentioned before - not the only telecommunications initiative of the EC. It was one among a growing number of activities that were guided by the newly created General Directorate 'Telecommunications, Information Industry and Innovation'.

After the adoption of the recommendation, the PTTs of France, the UK, Italy and West Germany agreed to cooperate intensively and move ahead with the realization of the EC ideas; i.e. to achieve uniform and clear technical specifications, services and supplementary services, terminal equipment as well as introduction dates for ISDN. The activities were concentrated at the following levels:

- group of directors-general
- group of senior technical experts
- expert groups on

- services and supplementary services
- subscriber/network interface, including D-channel protocol
- interworking of the networks; CITT Signalling System No. 7
- ISDN Terminal equipment
- commercial matters, marketing, tariffs, etc. (Rosenbrock 1987: 621)

The consultation process leading to the Green Paper⁸ substantiated the consensus that the current and future integrity of the basic network infrastructure must be maintained or created. This implied, in particular, a continuing strong role for telecommunications infrastructure, and a strong emphasis on Europe-wide standards in this area. It also implied safeguarding the financial viability of the PTTs in order to ensure the build-up of the new generations of telecommunications and the necessary levels of investment. Since the EC is not very much financially engaged in ISDN development, the PTTs are supposed to invest billions of dollars in the network modernization to guarantee the success of ISDN. Private network operators would hardly be willing to put up with the enormous investments necessary.

The first intermediary report on the introduction of ISDN in the EC, published in 1988, was not very encouraging.⁹ The PTTs were well behind schedule, because of "technical and industrial reasons", as the Commission reported. A 1988 SCICON report (Carter 1989) made clear that the Community is heading in some kind of a direction. Considerable progress has been made towards the introduction of ISDN in Europe, in particular in the availability of switched 64kbit/s transmission paths. The report also clearly identified a number of deficiencies in the plans of the Administrations, in particular: the timetables for the introduction of ISDN nationally, as envisaged in the recommendation written in 1986, have slipped significantly and the provision of international ISDN is far behind schedule, and will happen considerably later than the introduction of national services; and there is considerable variation in the standards being adopted in the various member states. Further initiatives from the Commission and near-market activities by the Telecommunications administrations will be needed to ensure the timely and widespread availability of ISDN throughout the Community.

The recommendation that stronger actions should be taken found its imprint in a new Commission proposal to strengthen attempts to introduce ISDN.¹⁰ The proposal was approved in October. Five measures are listed aimed to bring the ISDN activities back on schedule: speeding up of standardization work¹¹, Signing of the 'Memorandum of Understanding' between the PTTs¹², a new Commission directive on Open Network Provision¹³, Data Protection activities¹⁴. In spite of the fact that most of these measures were achieved relatively quickly (by the end of 1990 for the most), the Commission now was late. National ISDN networks and trials had been developed

using different specifications and non-compatible standards, the equipment industry remained passive, the technological and institutional environment was changing quickly, the whole network market had undergone dramatic developments that were not reflected in the Commission's proposals. Discussions moved away from the idea of universal networks and now centered on Local Area Networks, Metropolitan Area Networks, Intelligent Networks and so on.

In 1989 (March 23) the second report on the progress of ISDN was delivered by the Commission. It stated that between 60 - 70% of the work of harmonization of standards has been completed - especially thanks to ETSI and the procedures governing its work. The report also acknowledges the attempts of the four core countries Germany, France, Italy and the United Kingdom to connect their ISDN networks at an early stage. They are praised as forerunners and the hope is still there that by the end of 1992 all EC member countries will offer ISDN services.

The Council, however, also had to admit that new types of action like increased marketing activities, a User Forum (modelled after the NISF), a European ISDN-Atlas are necessary. Furthermore it stresses the importance of the availability of cheap equipment as a necessary precondition for the success of ISDN as well as European-wide compatible equipment. The EC progress report notes that the few ISDN terminals currently under development will not be capable of connecting to all ISDNs, and that many European suppliers are cautious about future network development.

At this time the consensus on ISDN activities was already shaky. Even among the core group the British Telecom became more than nebulous about its support of the ISDN plans. At the same time where the EC was demanding new marketing efforts and the Creation of User Forums, the UK was curtailing its respective activities. This might be interpreted as the familiar trend of substituting national activities for EC sponsored activities. But more at heart of the matter are the pressures coming from liberalization and a tendency to expect quick returns on investment - and this seems unlikely to happen in the case of ISDN.

The status of end-1990 is on the negative side: delays in the time-table, a crumbling consensus on the importance of ISDN, still not all necessary standards are available, not to speak of cheap and compatible equipment.

On the positive side it has to be granted, that in spite of being behind schedule, the standardization efforts are impressive, that the consensus is crumbling but there is still a commitment by all EC members that will lead to some kind of ISDN implementation in all countries, France and Germany are the closest to keep up with the introduction schedule.

3. RACE (Research and Development in Advanced Communications Technology in Europe)

Parallel to the EC - activities on ISDN, narrow band ISDN this is, the next step in the development of telecommunications networks was prepared by the Commission as well: Broadband-ISDN or the Integrated Broadband Communications Network (IBCN) (Cp. Table 5). Broadband ISDN will deliver moving pictures over the broadband - optical fibre based - telephone lines. The programme on 'Research and Development in Advanced Communications Technology in Europe' (Race) aims at developing a technology base in telecommunications equipment and services for broadband communications. It promotes consensus formation on functional reference models, reference configurations and usage specifications, the development of technical knowledge and verification tools and pilot projects¹⁵. RACE reflects the consensus that the currently evolving narrow band ISDN should gradually be replaced by an Integrated Broadband Communications Network.¹⁶

The evolution of ISDN to an Integrated Broadband Communications Network (IBCN) will involve the development of several new technologies involving synchronous digital multiplexing and cross connection, ATM, optical wavelength division multiplexing and network management - just to name a few. Development in these areas is being stimulated by the RACE programme. RACE also plays an important role by supporting the coordination between PTTs in the evolution of the constituent networks towards this target. The first deadline for ICB activities is 1995. Until then the bulk of work should be finished and implementation should begin.

How did RACE come about?

"The initial ideas on RACE were generated through the interaction of the main actors in the field of telecommunications, the telecoms operators' research establishments and the representatives of the European telecom and IT industry during a planning exercise (May-October 1984)" (Konidaris 1989: 37)

In other words: the EC had invited representatives of these groups to prepare a specific programme for telecommunications R&D. On this basis the Commission worked out a proposal that was accepted by the Council. On July 25 1985 the Council decided positively on a definition phase for RACE. In this phase the more specific aims and tasks of RACE were developed and specific projects designed. The RACE definition phase lasted from July 1985 to December 1986. On November 28, 1986 the Commission sent a proposal for the main phase of RACE I (1987-1992) that clearly aimed at establishing a European wide network and system of Integrated Broadband Communication (IBC). The proposal was eventually accepted in the December of 1987.

Following the adoption of the Council decision on RACE and the approval of the financial plan, the technical work of the selected projects started in January 1988. A second call for tenders was issued in July 1988 focussing on verification and usage of IBC (Application Pilots, etc.). Following the evaluation of this call, close to 40 new projects were starting to work in these areas by January 1989. At the moment the continuation of the RACE programme (1991-1995) is in the pipeline.

The RACE-programme objectives are embedded in the Council decision and can be summarized as follows:

- to promote the Community's telecommunications industry;
- to enable European network operators to compete under the best possible conditions;
- to enable a critical number of Member states of the Community to introduce commercially viable IBC services by 1995;
- to offer opportunities to service providers, to improve cost-performance and introduce new services;
- to make new services available at a cost and on a timetable at least as favorable as in other major western countries;
- to support the formation of a single European market for all IBC equipment and services;
- to contribute to regional development within the Community, by allowing less developed regions to benefit fully from telecommunications developments.¹⁷

These are broad policy aims that can similarly be found in the ISDN initiatives. But the scope of RACE is broader than that of the ISDN initiatives. RACE is something new since it attempts to achieve a west European consensus on a common strategic interpretation of network development und network realization.

This consensus formation process is oriented towards the domestic market: In order to avoid national efforts resulting in incompatible national specifications and standards and thus a further fragmentation of the European market for telecommunications equipment (and a slower diffusion of new equipment as a result of its limited reach), it aims at the development of common standards for a Europe-wide network and related equipment. All major producers and PTT laboratories participate in the programme. The work conducted under the RACE umbrella goes far beyond the activities organized at ETSI.

The consensus formation process is also oriented towards the outside: As an example one can mention the ARG (ATM Requirements Group) established among the major European switch manufacturers in order to seek a common policy and consensus relative to the international standardization activities. (Konidaris 1989, 41)

Race also does not only encompass the few major telecommunications corporations and the old PTTs, it includes a host of universities, research laboratories, small and medium sized firms alongside the established actors. 70% of all RACE participants belong to the first group of small and medium sized enterprises and universities. (Hüber 1991: 19) This represents again significant change relative to the ISDN activities.

Finally the market argument is far more pronounced than in the ISDN initiatives. The arguments which underpin the need for RACE hinge on the restricted size of individual member-state markets for telecommunications switching equipment. The amount of R&D needed to fund new generations of switching are beyond the means of individual switching manufacturers, limited to selling to their domestic markets. Manufacturing economies of scale are also limited by fragmentation of the Community into national markets. The RACE initiative in telecommunications is thus underpinned by the perception that individual European national markets are no longer able to support the R&D needed for new generations of switching technology. On the basis of Arthur D. Little calculations, the EC Commission argues that there is a need for rationalization within the European industry. Arguable, some 8% of the world switching market is now needed to pay back the R&D investment in a new generation of switches. World-wide, few suppliers' market share approaches this level, and no European company's does so.¹⁸ As a result, European producers tend to be internationally uncompetitive. By implication, RACE will foster not merely co-operation but, eventually, mergers and market withdrawals.

The intermediate goals of RACE, as communicated by the Commission to the Council in April 1985¹⁹ in this way represent a strong combination of actions to increase the strength of the EC in formulating standards, establishing infrastructure which will permit the growth of new applications markets, strengthening the Community telecommunications industry, and mobilizing regional development lobbies and funding to underpin some of these efforts. RACE thus contains an extraordinarily broadly based strategy, that perhaps some remind more of Japanese industrial planning than previous European efforts.

4. What is in the making: a European White Elephant or a European MITI-strategy?

Before we answer the question how we can evaluate the activities of the community and ask ourselves whether a European white elephant or a Miti-type strategy is being developed here, we surely have to admit: the whole thing involves a further significant annexation of territory within the industrial policy domain by the Commission.

A close look at Commission proposals in the last years suggest that now the Commission, or rather the EC as a whole, is well

positioned for making the modernization of Europe's industry a focal point of its activities both present and future.

While government intervention in support of national industry and industrial development was once a basic feature, these national interventions are now limited and openly constrained by European institutions.

The commission is exerting leadership in divers areas reaching from domestic regulation to technology development where once Brussels initiatives were severely limited.

The manufacturing companies in this process have recognized that cooperation may secure their future business. A network of collaborative projects has come into existence that may well survive the end of the specific EC programmes. And furthermore a wave of mergers and concentration in the industry is under way, thus fulfilling the hopes of the Commission. In the public switching market it seems more than likely that the market will be dominated by two consortia, one led by French Alcatel, the other led by German Siemens.

One should neither overlook the shortcomings, however. Just a reminder about the status of ISDN-plans: the aims with respect to standardization and availability of "cheap" equipment have not been fulfilled. It can be easily admitted that over the last year the importance national standard setting has been reduced. Nevertheless standard setting is a national endeavour and the different ISDN national standards have to be switched to European standards after 1992. In Germany German standards and European standards will be used alongside. This makes the whole process a more messy and costly endeavour and does its part to mystify users about what really is going on out there.

Furthermore: Whereas the EC objective was to penetrate 5% of the network by 1993, recent market studies forecast an actual penetration of less than 1%. The 5% target was chosen to represent the minimum amount below which investment will be needed to achieve the timely introduction of ISDN and above which market forces will stimulate natural growth and migration to ISDN. The level of 5% represents offering ISDN not just to large business users, but also requires ISDN to penetrate the small business and residential markets. At present it is not clear that effective marketing policies have been produced by the Telecommunications Administrations to address these areas. In particular the lack of a European multi-line ISDN interface standard, unclear service benefits for small users and the lack of a harmonized standard for use behind a PABX ensure that ISDN remains as a technical capability, rather than a major new service initiative.²⁰ At the moment it seems unlikely that ISDN will function as a new universal telecommunications network.

Finally if we look at international competitiveness of the European telecommunications industry, the figures so far are not very impressive. Even if we look at the international

level at the introduction of ISDN, we do have to admit that when compared with the US and Japan the EC as a whole is lagging behind. (Cp. table 3,6) It is granted that especially the US has a different ISDN concept than the EC. Nevertheless the Commission's self proclaimed role as a leader in ISDN development has to be put in question.

How come? What have been the reasons, not for the total failure, but for the serious miscalculations and changes? In the beginning I mentioned the main thesis of this paper being that partial failure resulted from the irreconcilable conflict between the aim to deregulate and liberalize telecommunications markets and the aim to build up a strong European telecommunications sector. This misfit has been built into the programme from the beginning.

The introduction of the ISDN is not only a technological innovation process, it is at the same time a policy process. Contrary to the early phases of electrical power, railroad or telephone system development, ISDN has been planned as a nationwide and European wide system from the very beginning. The basis of the planning process in the European countries constituted the existing telephone monopoly that offered the central government a focal role in the planning and construction of the network. ISDN plans have been worked out by a tightly knit policy community without much public discussion. Economic considerations were secondary since PTT plans dominated all consideration of development policies. Concepts like universal access, common architecture and standards mirror the old preconceptions of the PTTs. Besides ISDN seemed to be a very elegant solution on technical grounds as well. The planners among the manufacturers were also pleased because long term plans by the PTTs could secure profitable and worry free market shares in the future.²¹ The EC was pleased because not only of the obvious consensus, but also because of the existence of partners with whom one could conduct a seemingly longtime and reliable policy: public network operators and big business. Thus the Commission was also prepared to guarantee the further existence of somewhat reduce telecommunications monopolies.

"...part of the reason for this extra degree of protection is derived from the CEC's determination to encourage member states to install ISDN. Such networks represent very substantial investment expenditures which may not be recouped (or investment not undertaken) if an alternative technology threatens to undermine the revenue base of ISDN. Satellite based services could present a threat to certain segments of non-reserved services and undermine the viability of an ISDN grid. Clearly, though the green paper takes a pro-competitive stance, it maintains some interest in technological and industrial objectives which have wide ramifications."
(Locksley 1990: 38)

Concepts based on the old telecommunications monopoly and on the concept of universal access, prevented the Commission to

look at technological alternatives that were developing at the same time but with more limited influence of the PTTs. This line of reasoning is still very prominent among the Commission (Cp. König 1989) as well as among some of the equipment manufacturers (Cp. Zeidler 1989).

The plans were of course not all encompassing. Treaty constraints and national interests still make it difficult to define a consistent long-term strategy. RACE and other community programmes are by far not as consistent and homogenous as the French or German network plans. The EC wants to provide insular solutions and deal with specific identifiable problems. A long-term network strategy like the one of the DBP is hardly visible. Besides the EC has to take into account that the different European PTTs and/or its liberalized successors have differing network philosophies. The EC has to provide recommendations that take these differences into account. The West German plans are thus compatible with the EC plans, but they are not the only possible option even within the EC framework. But still: an intelligent network like the one proposed for Europe would not be possible under the divestiture agreement, posing a potential problem of interconnecting the US with the rest of the world.

Since the Commission cannot force the PTTs and industry to act in a specific manner, e.g. to establish international ISDN connections or to build and sell Euro-ISDN-compatible equipment at reasonable prices, the EC works not only in this field more as an organizer off dispute, collaboration and consensus formation, as a catalyst for developments already under way. The EC Commission against general belief is not a new super bureaucracy. This demonstrates insight in given restrictions and the willingness to learn from failures of the past that were committed most strikingly in the sector of agriculture. This can also be illustrated when we look at the budget of RACE that runs for the years 1987-1992 up to a meager 500 mio ECUs - meager if compared to the R&D investments made by the key corporations as well as meager if compared to the investment costs to be covered by the network operators. The full cost of installing an ICB network across the whole of the EC is likely to be in the region of 350 billion ecus spread over 10 years - if we believe in conservative estimates. The Commission strongly favors the widespread installation of ISDN in member states, but it has no powers to force this through. It can sponsor technological research but it is the creation of conditions conducive to investments in these networks that is the main instrument of policy.

This also demonstrates the shaky nature of the whole process. Telecommunications policy on the European level is not a "Selbstläufer". If interests start to diverge significantly, or consensus is failing or shifting, the Commission in this field has few possibilities to enforce policy guidelines. The EC cannot prescribe private or deregulated network operators

to install ISDN if it is not profitable. Success depends on the willingness of the partners to cooperate and formulate consensus, they have to show a "problem-solving attitude". This is not trivial as the history of the EC gives ample evidence.²²

"What is necessary for the "problem-solving" style to emerge is an orientation towards common interests, values or norms which are separate from the individual self-interest of participants and which, therefore, may facilitate voluntary agreement even when sacrifices in terms of individual self-interests are necessary." (Scharpf 1987: 26)

This seemed to be roughly the case in the early years of ISDN development. At the beginning the interests of PTTs as well as of the protected telecommunications industry did converge. The PTTs perceived ISDN or better the European version of ISDN as a viable instrument to secure monopoly status and the telecommunications industry hoped to secure its profitable and protected status. Both business and PTTs were accepting sacrifices to ensure long term viability of their respective interests.

However, the deregulation and liberalization, the coming into existence of competing networks mainly implemented by Computer companies like DEC, IBM etc. changed the status quo.

The PTT's now have to look more for profitability, as less profitability increases the likelihood for further deregulation and also had to accept the demands of the EC as well as the demands of reform coalitions in the member countries. Following the United Kingdom all of the core countries in the EC have meanwhile enacted institutional reforms (with Italy being most hesitant but already working within a kind of fragmented status).²³ The telecommunications industry again partly under pressure from the EC was forced to internationalize and was forced to accept competitive pressures coming from non-EC companies. On the world market ISDN is not a prime interest of users, but more powerful specialized data communication networks or broadband capabilities.

"..customers who do not invest in ISDN may find the service that the existing PSTN provides meets their requirements and is cost effective." (Fitzgerald 1991: 24)

Furthermore: given that the ordinary domestic consumers seem unlikely to want the full range of services potentially on offer in a ICBN for the price that is significantly higher than what the average person has to pay now for regular telecommunications services, there is considerable dispute as to how extensive the network should be. Both France and German have retracted from most ambitious plans and are following - nevertheless hesitatingly - the lead of British Telecom which is concentrating its activities on the extension of business networks.

Conclusion:

For me the conclusion is that neither a MITI type strategy is in the works nor a white elephant - the latter at least not on the EC level, since the EC is financially hardly engaged in the matter.

Hills (1986) put the ISDN development in the context of a conflict between the rapidly advancing computer industry and the endangered PTTs holding hands with the 'old' telecommunications manufacturers:

" For the providers of information services and the data processing equipment which goes with such domestic and global flows, the timing is crucial. It is necessary to break the PTT monopolies before they are able to institute their plans for ISDN, expected to come onstream in the 1990s. Domestic ISDN under public control would not only make redundant the provision of private informations networks, but would also introduce higher costs to multinational business. Whereas currently these businesses lease lines from the PTTs and do not pay for the amount of information passed along them, ISDN would instigate a costing of transmission by the 'bits' of information passed. Costs would therefore escalate for the major users of the system - multinational and large businesses ... Additionally, ISDN transfers power from these private companies back to governments and PTTs. Where the interface between public and private equipment is located in the network will decide how much of current customers premises equipment is redundant... Liberalization can be used to delay the accrual of software capabilities within the PTT." (Hills 1986, 3)

The EC seemed to be caught up in this definition of the situation as well. Liberalization and deregulation are acknowledged as necessary aims of the EC but on the same level they impede the realization of other aims.

" Again this issue revolves around the extent and intensity of competition in telecommunications. If the PTOs face too much competition in too many segments of the market their discounted view of future revenues may augur against a risky gamble in ISDN except in limited locations. If there is too little competition the PTOs could sit back and enjoy their quasi-monopoly positions extending the new grids to the detriment of a very wide European constituency." (Locksley 1990: 43)

This points to a striking dilemma that the EC faces in other areas as well. A dilemma that will not be resolved by more liberalization and deregulation alone. The consensus that brought forward the EC's proposals were linked to the expectation that European industry will not only survive but also prosper. To what extent this will be achieved in the area of telecommunications remains anybody's guess. But a breaking

up of the reform coalition will inevitably come about if the EC fails to deliver.

On the long run my guess is that the EC telecommunications network will resemble somewhat the American - a little more complex even but with a matching amount of fragmentation. The EC in this system could authorize in a more distant future something like an European FCC. This also implies that the ideas feeding both RACE and ISDN, the creation of a common, totally compatible infrastructure seems more and more unlikely with the number of network operators increasing and the processes of liberalization and deregulation still going on.

NOTES:

1. In this paper I consider the European Community as well as the European Commission to be 'actors'. I do not even distinguish generally between the aims and interests of these two compound actors. This simplification seemed to be necessary in order to avoid an over complex argument. With respect to the question whether it is feasible to call the EC a corporate actor, cp. Schneider/Werle 1990.
2. International Telecommunications Union, CCITT, Data Communication Networks Services and Facilities, Recommendations X.1-X.15, CCITT Red Book, Vol. VIII, Facsimile VIII.2, pp. 45, 50, 52.
3. Information technologies are the prime recipient of subsidies within the EC Framework Programme of Community Activities in the Field of Research and Technological Development.
4. Vorschläge der Gruppe 'Analysen und Prognosen' (GAP) für die koordinierte Einführung des ISDN in der Gemeinschaft, 5.6.1985.
5. The present status of national ISDN-plans is illustrated in Table 1.
6. Cp. Table 2a, 2b.
7. Com (86) 205 final.
8. Green Paper on the Development of the Common Market for Telecommunications Services and Equipment (Com 87 (290) final, June 30, 1987) and Towards a Competitive Community-Wide Telecommunications Market in 1992: Implementing the Green paper on the Development of the Common Market for Telecommunications Services and Equipment (Com 88 (48) final, February 9, 1988).
9. Com (88) 589 final.
10. Com (88) 695 final.
11. largely to be achieved by the newly created ETSI in Southern France. Cp. Resolution: Establishment of a European Telecommunications Standards Institute, CEPT January 1988.
12. The ISDN services to be standardized were fixed in a Memorandum: Memorandum of Understanding on the Implementation of an European ISDN Service by 1993. Among those services are 7 kHz-telephone calling, Telefax group 4, ISDN-Telefax, services for 'PC-Communication'. The memorandum was submitted to CEPT and was signed in April 1988 by 23 network operators from 17 countries.

13. June 28, 1990 (ABl. No. L 192)

14. 1990 proposal for a council directive concerning the protection of personal data and privacy in the context of public digital telecommunications networks in particular the integrated services digital network (ISDN) and public digital mobile networks. (COM (90)314 final)

15. Cp. Sharp 1989.

16. 'Introduction of Integrated Broadband Communications (IBC) taking into account the evolving ISDN and national introduction strategies, progressing the Community-wide services by 1995.'

17. Cp. COM(85) 113 final/2.

18. Cp. Caty/Ungerer 1984

19. (1) creation of a Community terminals and telecommunications equipment market;
(2) implementation of joint infrastructure projects;
(3) execution of a development programme covering the technologies required for the establishment, in the long term, of broadband networks;
(4) improvement of access for the Community's less-favored regions to the advantages arising from the development of services and advanced networks;
(5) co-ordination of negotiating positions within the international organizations concerned with telecommunications. (COM(85) 113 final/2)

20. Cp. the market penetration data as shown in Table 3.

21. This situation in Germany is analyzed in more detail by Fuchs 1988.

22. Cp. Scharpf 1987.

23. Cp. Grande/Schneider 1991.

Bibliography:

- Arnold, Franz, 1989, The Introduction of ISDN in the European Community, in: Schuringa 1989, 343-366
- Carter, S G, 1989, European Telecommunications: Liberalization by Regulation, in: Electronics 1989, 418-420
- Caty, Gilbert-Francois/ Ungerer, Herbert, 1984, Les télécommunications, nouvelle frontière de l'Europe', Futuribles, December
- Cowhey, Peter F., 1990, The International Telecommunications Regime: The Political Roots of Regimes for High Technology, in: International Organization, Vol. 44, 2, 169-199
- Delcourt, Bernard, 1991, EC Decisions and Directives on Information Technology and Telecommunications, in: Telecommunications Policy, Vol. 15, No.1, 15-21
- Dyson, Kenneth/Humphreys, Peter (eds.), 1990, The Political Economy of Communications. International and European Dimensions, London: Routledge
- Electronics and Computing and Control Divisions of the Institution of Electrical Engineers (ed.), 1989, Second IEE National Conference on Telecommunications. 2 - 5 April 1989. London: Institute of Electrical Engineers
- Fitzgerald, Margaret, 1991, Limited Growth for ISDN Worldwide, in: Communications International, Vol. 18, March, 21-24
- Fuchs, Gerhard, 1989, The Implementation of ISDN in West Germany, Paper presented at the Annual Meeting of the American Political Science Association, September 1989, Atlanta
- Hills, Jill, 1986, Deregulating Telecoms: Competition and Control in the United States, Japan and Britain, London: Frances Pinter
- Hüber, Roland, 1991, Integrierte Breitbandkommunikation und fortgeschrittene Telematikdienste. Chance und Herausforderung für den Binnenmarkt, in: Effelsberg, Wolfgang/Meuer, Hans W./Müller, Günter (eds.), Kommunikation in verteilten Systemen. Grundlagen, Anwendungen, Betrieb. GI/ITG-Fachtagung, Mannheim, 20.-22. Februar 1991. Proceedings, Berlin: Springer, 16-28
- König, Kurt, 1989, ISDN - Eine Strategie für Europa, in: ISDNreport No.11, 37-42 and No.12, 28-34
- Konidaris, Spyros, 1989, The RACE Programme: The IBC European Perspective, in: Schuringa 1989, 37-44

- Locksley, Gareth (ed.), 1990, *The Single European Market and the Informations and Communication Technologies*, London: Belhaven Press
- Locksley, Gareth, 1990, *The Communications Complex*, in: Locksley 1990, 29-43
- Lodge, Juliet (ed.), 1989, *The European Community and the Challenge of the Future*, London: Pinter Publishers
- Noam, Eli M., 1986, *The Political Economy of ISDN: European Network Integration vs. American System Fragmentation*, Paper presented at the XIV Annual Telecommunications Policy Research Conference. Airlie Virginia, April 1986
- Rosenbrock, Karl Heinz, 1987, *The Development of the Integrated Services Digital Network (ISDN) in Europe*, in: *Int. J. Technology Management*, Vol. 2, Nos. 5/6, 605-623
- Scharpf, Fritz W., 1987, *The Joint-Decision Trap. Lessons from German Federalism and European Integration*, in: *Law and State. A Biannual Collection of Recent German Contributions to these Fields*, Vol. 36, 7-45
- Schneider, Volker/Werle, Raymund, 1990, *International Regime or Corporate Actor? The European Community in Telecommunications Policy*, in: *Dyson/Humphreys, 1990*, 77-106
- Schuringa, Tjakko .M. (ed.), 1989, *EuroComm 88. Proceedings of the International Congress on Business, Public and Home Communications*. Amsterdam, 6 - 9 December 1988, Amsterdam: North Holland
- Sharp, Margaret, 1989, *The Community and New Technologies*, in: *Lodge 1989*, 202-222
- Zeidler, Gerhard, 1989, *Neuorientierung der Telekommunikation in Europa*, in: *ntz*, Vol. 42, 208-209

ANNEX:

- Table 1: Introduction of ISDN in various countries
(status 10.90)
- Table 2a + b: Introduction of ISDN services in the EC: phase
one and two
- Table 3: ISDN accesses (worldwide), as of December 90
- Table 4: ISDN benefits
- Table 5: Development of telecommunication networks and
services
- Table 6: ISDN regions in the introduction phase
- Table 7: ISDN coverage in various countries, as of May
1990

Statistical material and images by courtesy of
Deutsche Bundespost Telekom; Siemens AG.