

ISDN – the telecommunications highway for Europe after 1992?

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This article examines EC policies intended to promote the coordinated introduction of an Integrated Services Digital Network (ISDN) in all member countries by 1993. ISDN was originally supposed to be a new telecommunications network that would eventually replace the old telephone network. It is argued that the EC's ISDN activities are trapped between the attempt to liberalize the so far closed and fragmented European telecommunications markets on the one hand and the aim of building up a strong, independent European telecommunications industry and a Europe-wide telecommunications network on the other. At the moment ISDN deployment is far behind schedule and will not fulfil the Commission's expectations.

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The research on which this article is based is part of a project that compares ISDN implementation strategies in different countries. Funding is provided by the Max-Planck-Institut für Gesellschaftsforschung, Köln. Special thanks are owed to Cynthia Lehmann for brushing up the English of an earlier version of the article.

¹Tjakko M. Schuringa, ed, *EuroComm 88: Proceedings of the International Congress on Business, Public and Home Communications, Amsterdam, 6–9 December 1988*, North Holland, Amsterdam, 1989, p 1.

²*Ibid*, pp 2–3.

Tjakko M. Schuringa, former Director of Telecommunications of the EC Commission, said in his opening remarks to the EuroComm 88 congress: 'Europe has again become number one in telecommunications.'¹ This constituted wishful thinking in 1989 as it would today. But perhaps the remark is understandable in the light of the impressive number of initiatives and bold actions coming from the European Community in the field of telecommunications since 1986. One initiative in the field of network development dealt with ISDN – the Integrated Services Digital Network. Schuringa believed that in the process of European 'revitalization' ISDN would play a key role for two main reasons. First, as Filippo Maria Pandolfi, then Science, Research and Development Vice President, remarked when the first ISDN report was published in 1989: 'ISDN has the potential to develop into an essential component of the new nervous system which the 1992 market so urgently needs' – a telecommunications infrastructure based on a harmonized and integrated network covering the whole of the EC. Second, operating ISDN networks using equipment delivered by European producers would be a good recommendation for sales of European products around the world.²

In spite of the fact that ISDN has been given considerable attention by the Commission and that the EC technology programme RACE is in some ways based upon the development of (narrowband) ISDN, the EC's various activities have not attracted much scholarly attention. In this article I will argue that the EC's ISDN activities are somewhat trapped between the attempt to liberalize and deregulate the hitherto closed and fragmented European telecommunications markets on the one hand and the aim of building up a strong independent European industry and a Europe-wide telecommunications network on the other.

The article begins with some brief comments on the technological basis of ISDN, followed by a survey of EC activities as related to ISDN. Finally it will provide an evaluation of the EC's activities.

ISDN as a new technological system

In 1984 the CCITT (the International Telegraph and Telephone Con-

sultative Committee) defined ISDN as a telecommunications 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'.³ Hidden behind this dry definition are developments that mark a significant break with the theory and practice of network developments in the past.

Historically network developments in Europe were largely independent of 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 introduced that are not compatible with each other on a European basis (such as videotex and mobile communications). This impedes cross-connectivity of networks and services and portability of equipment, for example, and thus is a major stumbling block for a true European common market. Furthermore, telecommunications networks were in the past constructed to transmit information of a specific kind: the telephone network enables individuals to communicate acoustically, the telex network facilitates written information exchange. This has changed: increasingly new telecommunication services are offered in existing – now service-integrating – networks. The analog telephone network is the world's most extensive telecommunications network. The ongoing digitization of the networks is the technological basis allowing the integration of digital data as well as text and even image services into the telephone network. Once the telephone network is completely digital it will provide the broadest, economically most favourable basis for the integration of all voice and non-voice services in a single network. Thus it will become possible to create a uniform 'telecommunications highway': the ISDN.

ISDN as described above 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 would be more favourable for telecommunications users (eg separate networks, packet-switched data links, leased lines, private high-speed networks).⁴ Furthermore, public networks can be supplied under monopoly or competitive conditions. The system structure of networks as well as the implementation strategies may differ significantly. Finally, standardizing network characteristics involves reconciling the interests of competing groups with specific interests and competing conceptions about network architecture, technical requirements, user conditions, etc.

History of the EC's activities

What made the EC become interested in ISDN? Starting in the late 1970s and throughout the 1980s the Commission became more active in the field of industrial policy and prepared a number of R&D programmes, the main focus of which was on information technologies (eg Esprit). Information technologies were looked upon as the most volatile sector of what became known as the 'new technologies'. The image of Europe's backwardness in the present compared to its pre-eminence in the past seemed to be most striking in this case. With respect to telecommunications networks, a modernization of the existing inventory had been under way in virtually all member states since the late

³International Telecommunication Union, CCITT, VIIIth Plenary Assembly of the CCITT, Study Group XVIII, Report R 29, Part V, p 2.

⁴This resulted in the reinterpretation of the acronym ISDN as 'Ideas (or Innovations) Subscribers Don't Need'.

1970s. The EC wanted to seize the opportunity to steer the modernization process in a common direction and, at the same time, fulfil the aims of the 'new' Community of the 1990s: creating both a true common market and globally competitive European high-tech corporations. Telecommunications seemed to be especially well suited for EC interventions since it constituted a sector traditionally dominated by public decisions and not by market forces.

In its 'Communication on telecommunications' to the Council⁵ the Commission stated that telecommunications was a stronghold of European industry. However, its strong position was challenged by technological developments mainly in the field of information technology, closed national markets, high R&D investments and an onslaught of US and Japanese competitors. The Commission predicted that Europe's telecommunications industry would only be capable of dealing with this situation if a European policy was developed which set regulatory guidelines, provided policy aims for a European network of the future, R&D cooperation, a truly European market and new political institutions on the European level. It seemed to be quite clear that the overall justification for more action did not spring from a desire for deregulation or more market competition as such. The driving momentum was concern about the future of European industry and its perceived inability to cope with a new and challenging situation.

The EC turns to ISDN

In its September 1983 communication⁶ the Commission again stressed the strategic importance of telecommunications. The communication had already been written on the basis of national memoranda sent to the Commission, which seemed to confirm the Commission's overall analysis of the situation and its main targets. Six action guidelines were developed. In this context ISDN was mentioned for the first time as an area which required urgent coordination and which could be instrumental for the competitiveness of European industry. The Commission claimed that investments in telecommunications networks were the most important public investment decisions for the decade to come, and that within network planning ISDN seemed to be the logical next step.

In November 1983 a group of high officials from the member countries (the Senior Officials Group – Telecommunications: SOG-T) met for the first time to work out a more precise action programme. The Commission's first proposals were ready less than six months later.⁷ They elaborated on the six action guidelines previously mentioned. These six guidelines encompass:

- the definition of medium- and long-range goals for telecommunications policy on the EC level;
- the definition and implementation of R&D actions;
- expansion of the end-user equipment market and the development of community solidarity against the outside;
- common development of the transnational parts of the future telecommunications infrastructure of the Community;
- intensive use of telecommunications technologies for the promotion of disadvantaged regions in the Community and for the development of their infrastructure;
- continuing expansion of market areas for telecommunications

⁵COM(83)329 final, 8 June 1983.

⁶COM(83)547 final.

⁷COM(84)277 final, 23 May 1984.

equipment in which procurement decisions of the network operators dominate.

SOG-T proposed the formation of a group of experts (GAP) which should work on three tasks: narrowband ISDN, business communication systems and mass video communications (broadband networks). Narrowband ISDN was considered the most important task at hand, and the first report on ISDN issues was envisaged for December 1984.

The ISDN report was delivered in June 1985, and in April 1986, on the basis of the GAP report and its approval by SOG-T,⁸ recommended the coordinated introduction of ISDN, and this was finally adopted by the Council in December 1986.⁹ 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 ISDN introduction; objectives regarding market penetration;
- that the European Conference of Posts and Telecommunications Administrations (CEPT) continue to harmonize activities on the basis of a schedule of ISDN specifications still to be completed;
- that the PTTs take all the measures necessary to facilitate the coordinated introduction of ISDN;
- that the financing bodies 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 of 'market penetration': it was agreed that by 1993 each member state should ensure that an equivalent of 5% of the total number of telephone subscribers in 1983 be connected to ISDN.

The proposed measures indeed constitute a broadly based policy programme. They contain policy aims, identify the addressees of the measures, name mechanisms for achieving the aims of the programme and define procedures for controlling progress. The aims of the programme as such could also be described as realistic since they were not only agreed upon in a consensual manner but, more importantly, were also based on proposals coming from the national PTTs, which themselves had close contacts with industry. Thus a conflict between Commission and national strategies was not very likely. National strategies and Euro-political strategies seemed to converge easily.

However, the proposals look embarrassingly optimistic today. GAP and the Commission hoped that in certain key areas (specifications, key standards) a consensus could be produced within the course of one year. The GAP recommendations – which are to a great extent identical with the EC recommendation – spoke of the availability of all basic ISDN services in member countries at the end of 1988.

ISDN was not the only telecommunications initiative of the EC at the time. It was one of a growing number of activities that were coordinated and developed by the newly created (1986) General Directorate of

⁸Gruppe Analysen und Prognosen, 'Vorschläge der Gruppe "Analysen und Prognosen" (GAP) für die Koordinierte Einführung des ISDN in der Gemeinschaft', Brussels, 5 June 1985 (approved by SOG-T, 1 July 1985).

⁹86/659/EEC.

Telecommunications, Information Industry and Innovation. In these initiatives the EC committed itself to a technology push strategy in spite of the fact that the real need for ISDN was far from clear. The US telecommunications specialist Noam noted the paradox that while there seemed to be general agreement about the importance of ISDN, he could not find a single study dealing with such problems as the economic feasibility of ISDN plans or the eventual acceptance of the new network by users.¹⁰

Nonetheless the Commission was convinced early on of the great strategic importance of ISDN as a basis for efficient telecommunications for the Community. This was indeed 'early' because at the time no working ISDN projects existed. There were only plans from the network operators, and attempts were under way to standardize ISDN characteristics at CCITT. The chances for the development of a true European network were therefore promising.

The EC recommendation mirrored the shared conceptions and expressed the interests of the people who had participated in the process so far. In SOG-T as well as in GAP people affiliated with the national network operators were primarily represented. The network operators again cooperated closely with their respective national producers. The PTTs were thinking in terms of a new universal network for both private and business users, which would require huge investments but which also promised revenues aplenty in the future. To hardware manufacturers ISDN promised orders for a long period of time and considerable rewards for their huge investments in R&D. It had become obvious that only very few European producers would be able to invest billions in the development of new digital switching and transmission technology. It was tacitly understood that some European producers would simply have to go out of business or merge with competitors. A second consideration concerned financial incentives for the less affluent member state PTTs which would otherwise not introduce ISDN on their own; this concern found its expression in the Star programme.¹¹ In this sense the negotiation process encompassed some distributive issues, but they were minor compared to the overall consensus regarding the definition of the 'crisis', the direction developments should take and the belief that everybody participating would benefit from the outcome.

ISDN and the Green Paper

Parallel to the development of the ISDN plans, the consultation process leading to the Green Paper on the Development of the Common Market for Telecommunications Services and Equipment¹² 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 generation of telecommunications and the necessary levels of investment. Since the EC will not invest much financially in ISDN development, the PTTs are expected to invest billions of dollars in network modernization and guarantee the success of ISDN. Private network operators would hardly be willing to put up the enormous investments necessary.

Nevertheless the overall impact of the Green Paper was on regulatory

¹⁰See Eli M. Noam, 'The political economy of ISDN: European network integration vs American system fragmentation', paper presented at the XIV Annual Telecommunications Policy Research Conference, Airtie, VA, April 1986.

¹¹Council Regulation of 27 October 1986 instituting a Community programme for the development of certain less-favoured regions of the Community by improving access to advanced telecommunications services (the Star programme: 86/3300/EEC).

¹²'Green Paper on the Development of the Common Market for Telecommunications Services and Equipment', COM(87)290 final; 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.

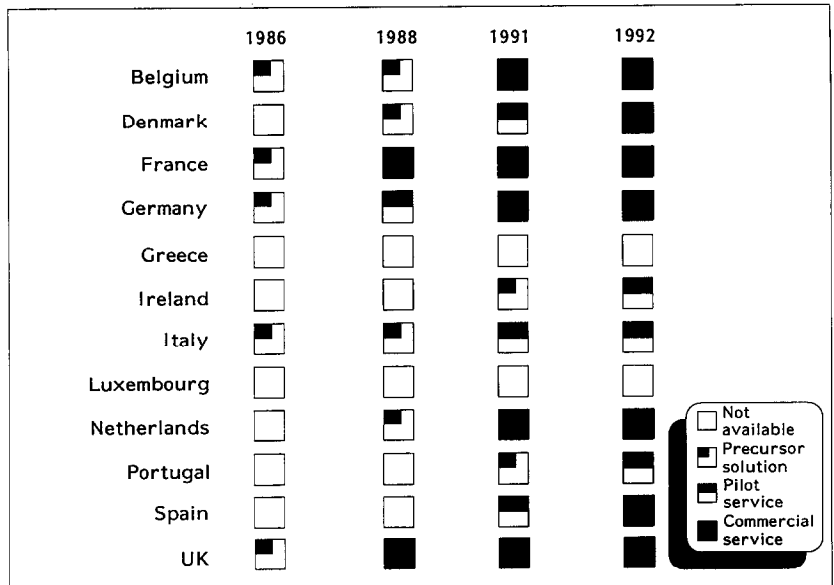


Figure 1. Status of ISDN implementation.

Source: Annual progress reports, European Communities.

issues and not in the field of industrial policy. The final aim was to develop a European market in a direction that would offer the European user telecommunication services of a greater variety and better quality at lower cost. This is a change of emphasis, when compared to the first telecommunications initiatives. No longer was propping up European industry the prime motivating factor, but rather a new regulatory environment was to be achieved, from which European industry might profit later on. At this point the conflict between deregulation on the one hand and an interventionist industrial policy on the other was discussed but was not yet conceived as a major impediment to the realization of the network plans.

First progress report on ISDN

The first intermediate report on the introduction of ISDN in the EC, published in October 1988, was not very encouraging.¹³ The PTTs were well behind schedule for ‘technical and industrial reasons’, the Commission reported (see Figure 1 for a summary of progress). Considerable progress had been made towards the introduction of ISDN in Europe, in particular in the availability of switched 64 kbps transmission paths, but there were also a number of deficiencies in the various administrations’ plans. Not only was the introduction of ISDN at the national level very much behind schedule when compared to the recommendation of 1986, but introduction at the international level was also progressing more slowly than planned, so that it would not take place until long after the national services were available. In addition there was considerable variation in the standards being adopted in the various member states. It became clear that if the EC wanted to guarantee at least partial success for its ISDN initiative, it would have to develop stronger measures and act more decisively than in the past.

A call for stronger action

The commission attempted to strengthen efforts to introduce ISDN in a

¹³COM(88)589 final.

proposal issued at the end of November 1988;¹⁴ the proposal was approved in July 1989. Five measures were listed, aiming to bring ISDN activities back on schedule: speeding up the standardization work, the signing of a Memorandum of Understanding between the PTTs, a new Commission directive on Open Network Provision (ONP), agreement among manufacturers to produce compatible equipment, and data protection activities. In spite of the fact that most of these measures were put into practice relatively quickly (generally by the end of 1990), they came too late. National ISDN networks and trials had been developed using different specifications and incompatible standards, the equipment industry had remained passive, the technological and institutional environment was changing quickly, and 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 (telephone) networks and now centred on improved data communication via local area networks, private networks, etc, and on developments not related directly to ISDN such as intelligent networks and mobile telephones.

Nevertheless the Commission now tried to exert more leadership and provided further means of realizing the ISDN programme. Initially ISDN implementation was not conceived as a process entailing serious difficulties. It was rather thought of as something proceeding on its own, based on agreement among the telecommunications administrations. Over the years the problems increased and even newly devised timetables were found to be out of touch with the real world. There is no doubt that the Commission tried to cope with the main deficiencies, but its efforts were only partially successful.

The speeding up of the standardization work was supposed to be done by the newly created European Telecommunications Standards Institute (ETSI). The European Community still had only limited influence on details of national telecommunications policies. For the national network operators CEPT was a far more important institution than the EC. At CEPT network operators were also trying to coordinate their ISDN plans, especially in the area of standardization, but not very successfully. The EC was therefore looking for a new way through the 'standards bottleneck' that would vindicate Community claims in this policy field. Based on an agreement between the Commission and CEPT, the latter began forming ETSI in 1988. One of the key issues facing ETSI from the beginning has been ISDN standardization. For this purpose a specific sub-organization, the ISDN Standards Management Group (ISM), was set up.

The lifetime of ISM, which was originally intended to last only one year, had to be prolonged several times due to its inability to meet deadlines. It soon became clear that, despite the new organization and institutional innovations, standardization work would take much longer than expected. One specific problem was the intention of ISM, based on the original GAP recommendations, to develop common service descriptions for public and private ISDN. This required close cooperation with standards organizations which had an interest in private ISDN, especially the European Computer Manufacturers' Association (ECMA) and the Information Technology Ad Hoc Experts Group – Telecommunications (ITAEGT), which were not necessarily eager to join forces with ETSI.

The signing of a Memorandum of Understanding, again under the

¹⁴COM(88)695 final.

CEPT umbrella, complemented the EC proposals on ISDN. The MoU was initially signed by 22 network operators from 18 European countries, including all EC member states. The document is more precise with respect to procedural aspects than is the EC programme, and enjoys the advantage of being considered far more binding. It stresses close cooperation with ETSI and the fact that the signatories 'recognize' the EC recommendation. In this respect the CEPT document is very telling, because it acknowledges that the EC is moving head on into territory previously occupied by CEPT.

Second progress report

On 23 March 1990 the second report on the progress of ISDN was delivered. It stated that 60–70% of the work of harmonization of standards had been completed – thanks especially to ETSI and the procedures governing its work. The report also acknowledged attempts by the four core countries – Germany, France, Italy and the UK – to connect their ISDN networks at an early stage. They were praised as forerunners, and there was still hope that by the end of 1992 all EC member countries would offer ISDN services.

The Council, however, also had to admit again that new measures such as increased marketing activities, a user forum (modelled after the North American ISDN User Forum, NISF) and a European ISDN atlas were necessary. Furthermore it stressed the importance of the availability of cheap equipment as a necessary precondition for the success of ISDN as well as equipment that is compatible throughout Europe. The EC progress report noted that the few ISDN terminals currently under development would not be capable of connecting to all ISDNs, and that many European suppliers were cautious about future network development.

At this time pressures coming from liberalization and a tendency to expect quick returns on investment – which seems unlikely to happen in the case of ISDN – made the network operators more and more reluctant to commit themselves. Users were also worried about the growing array of services offered by the network operators. Initially ISDN was conceived as being a new universal network. Meanwhile a variety of competing networks had emerged, as had services that did not use or need ISDN. What ISDN really stands for, its advantages and disadvantages compared to other services and networks, was unclear. In the private sector ISDN developments were rather the exception than the rule.

Present status and third progress report

Towards the end of 1991 the third EC progress report was published. The mixed evaluation presented in the previous reports is implicitly affirmed. At the date of publication five countries offered commercial ISDN services, another five offered pilot services and two had no ISDN at all.

According to the report, the network operators will not be able to meet all their commitments. The status of international interconnection between the member states is behind even the reduced expectations. A variety of differing protocols is being used in international gateways, and only five operators use the protocol suggested by the Council

Table 1. ISDN installed base in Europe, 1 January 1991.

	Basic access	Primary access
Belgium	800	25
Denmark	700	na
France	5000	500
Germany	7615	640
Greece	na	na
Ireland	na	na
Italy	na	na
Luxembourg	na	na
Netherlands	100	na
Portugal	na	na
Spain	40	na
UK	500	1700

Source: Fischer and Lorenz, Ovum, 1991.

recommendation. Little information is available on the range of services provided via international interconnections. Existing implementations of the user network interface show considerable differences with regard to signalling protocols, addressing mechanisms for terminals and support for supplementary services. Four different plugs are used; only one had been recommended. Frequently stated reasons for this delay are that not all the necessary standards are yet available, and that cheap and compatible equipment is not on the market.¹⁵ Underlying all these problems, however, seems to be the crumbling consensus on what ISDN will actually mean in the future and what role it will play generally in network developments.

On the positive side it must be acknowledged that, in spite of being behind schedule, the standardization efforts are impressive. Also in the two years to 1991 the number of ISDN installed accesses grew from 1500 to over 20 500 in Western Europe, a growth rate of over 1200%. The consensus may be crumbling, but there is still a commitment by all EC members that will lead to some kind of ISDN implementation; France and Germany are the closest to keeping up with the introduction schedule.

White elephant or European MITI strategy?

The RACE programme and the ISDN recommendations have elicited a variety of responses. At the extremes they range from the fear or hope that the EC is developing MITI-type strategies to the expectation that the EC plans will be a huge failure, that a European white elephant is being constructed. Before addressing this problem, one surely has to admit that the whole development involves a further significant annexation of policy territory by the Commission. Wollcock has enumerated the various information technology initiatives that failed during the 1970s.¹⁶ Similar initiatives were successful in the 1980s.

The shortcomings of the EC's initiatives should not be overlooked either. It should be remembered that, as concerns ISDN, the goals set for standardization and the availability of 'cheap' equipment have not been fulfilled, and strategic aims and timetables are out of touch with emergent reality. Furthermore, whereas the EC objective was to penetrate 5% of the network by 1993 (based on 1983 figures), recent market studies forecast an actual penetration of less than 1%. The 5% target was chosen to represent the minimum amount below which investment would be needed to achieve the timely introduction of ISDN and above which market forces would stimulate natural growth and migration to ISDN. In addition the level of 5% also means that ISDN must penetrate not only big business users but small business and residential markets as well. In particular the lack of a European multiline ISDN interface standard, unclear service benefits for small users and the lack of a harmonized standard for use behind a PABX consign ISDN to remaining a technical capability, rather than a major new service initiative, let alone a new universal telecommunications network.

Finally, if we look at the competitiveness of the European Telecommunications industry, the figures so far are not very impressive either. The dominant theme of the last year was the call for more protection and again for a more active industrial policy by the EC. Even if we look at the international level at the introduction of ISDN, we have to admit that when compared with the USA and Japan the EC as a whole is

¹⁵See Kurt König, 'ISDN – a strategy for Europe', paper delivered at the 3rd EIUF meeting in Brussels, November 1991.

¹⁶Stephen Wollcock, 'Information technology: the challenge to Europe', *Journal of Common Market Studies*, Vol 22, No 4, 1984, pp 315–333.

lagging behind. The Commission's self-proclaimed role as a leader in ISDN development must be questioned (see Table 1).

What have been the reasons, not for total failure, but for the serious miscalculations and changes? In the beginning I stated that the main thesis of this article is 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 telecommunication sector. This mismatch has been built into the programme from the beginning.

ISDN, like other telecommunications innovations, has been planned as a nationwide and Europe-wide system from the very beginning.¹⁷ The basis of the planning process in the European countries was the existing telephone monopoly that offered both the central government and its telecommunications administration a focal role in the planning and construction of the network. ISDN plans have been worked out by a tightly knit policy community, a well-established network, without much public discussion. Economic considerations were secondary since PTT plans dominated all discussion of development policies.

Concepts such as 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. The planners among the manufacturers were pleased because the long-term plans of the PTTs could secure profitable and worry-free market shares in the future. The EC was pleased not only because of the obvious consensus, but also because of the existence of partners with whom it could conduct a seemingly long-term and reliable policy: public network operators and big business. Thus the Commission was also prepared to guarantee the further existence of somewhat reduced telecommunications monopolies.

Concepts based on the old telecommunications monopoly and on the idea of universal access, however, prevented the Commission from looking at technological alternatives that were developing at the same time but less under the influence of the PTTs. Nevertheless in the mid-1980s the climate for active policy making was very favourable. A network of competent actors that agreed on a common programme had been established. The participating actors seemed to command the necessary resources for strategic action, too.

Why, then, was there 'failure'? While the EC was talking to network operators which were at the same time for the most part identical with the regulators in the beginning of the planning process, today it talks primarily with the regulators alone as the representatives of the member states. The regulators have increasingly diverging interests from the network operators, who themselves are coping with a new environment and changed relationships with industry. They have also developed a different outlook on network planning. Where, for example, the old German PTT and its ministry were congratulating themselves for supporting the wide-ranging concept of a universal ISDN network, the 'new' ministry in its self-interpretation as a regulatory committee does not today even demand that the PTT consider ISDN as an obligatory service.¹⁸ Furthermore, the spread of private data networks and the increasing number of network operators as a result of deregulation not only pose a threat to the old network operators but also signify a change in who is important in telecommunications. Faced with a more competitive situation, the old network operators now have to concentrate

¹⁷Renate Mayntz and Volker Schneider, 'The dynamics of systems development in a comparative perspective: interactive videotex in Germany, France and Britain', in Renate Mayntz and Thomas P. Hughes, eds, *The Development of Large Technical Systems*, Campus, Frankfurt, 1988, pp 263–298.

¹⁸See Bundesminister für Post und Telekommunikation, Überlegungen zur Festlegung von Pflichtleistungen für die Unternehmen der Deutschen Bundespost, 'Analyse und Bewertung', *Informationsserie zu Regulierungsfragen*, Vol 5, Bonn, December 1991.

harder on profitability. Within this process the network plans of the operators have also changed. The idea of universal networks (the original justification for promoting ISDN) is gradually losing importance, while custom-made, client-oriented networks and services are gaining in significance.

The EC has become more and more interested in deregulation, especially as it has moved towards 1992. Following the UK, most of the countries in the EC have enacted institutional reforms. The telecommunications industry, partly under pressure from the EC, was forced to internationalize and to accept competitive pressures coming from non-EC companies. On the world market, however, ISDN is of less interest to users than more powerful specialized data communication networks or broadband capabilities.

Thus a MITI-type strategy is not visible on the EC level, not only because the EC is hardly talking to some of the most relevant actors, but also because of its inability to press for the realization of an achieved consensus. Since the Commission cannot force the network operators, telecommunications administrations and industry to act in a specific manner, eg to establish international ISDN connections or to build and sell Euro-ISDN-compatible equipment at reasonable prices, it has to work – and not only in this field – as an arbiter of disputes and promote collaboration and consensus, as a catalyst for developments already under way. Despite the general opinion, the EC Commission is not a new super-bureaucracy that shells out large amounts of money, at least not in telecommunications. It has demonstrated insight into existing restrictions and a willingness to learn from past mistakes that were committed most strikingly in the agricultural sector. The Commission strongly favours the widespread installation of ISDN in member states, but it has no power to enforce it. It is the creation of conditions conducive to investments in and the use of these networks that is the main instrument of policy. Therefore the most important tasks at hand for the Commission, if it wants to secure Europe-wide ISDN availability, are to organize and promote user demand for ISDN (as it is doing in the European ISDN User Forum) and to adapt its ISDN plans to the changing policies of the operators. This means that ISDN has to be reconceptualized in a way that makes it fit into a deregulated telecommunications market. Efforts in this respect can be seen in the ONP discussion and the most recent discussions on standardization.

Appendix

The main EC documents relating to ISDN

COM(83)329: Communication on Telecommunications
COM(84)277: Telecommunications Progress Report and Proposals for an Action Programme
COM(85)310: White Paper on the Completion of the Community-Wide Market for Goods and Services by 1992
86/659/EEC: Recommendation on

the Coordinated Introduction of the ISDN in the EC
COM(87)290: Green Paper on the Development of the Common Market for Telecommunications Services and Equipment
COM(88)48: 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)589: First Annual Progress Report on the Coordinated Introduction of ISDN
89/C196/04: Council Resolution on the Strengthening of the Coordination for the Introduction of the ISDN in the European Community up to 1992
COM(90)123: Progress Report 1989 Concerning the Coordinated Introduction of ISDN
SEC(91)2183: Third Annual Progress Report Concerning the Coordinated Introduction of ISDN