

STRATEC

Regulatory Practice of European Telecommunications with special reference to Germany

Abstract.

We look at a key list of recent economic regulatory and convergence issues connected with the dynamics of the telecommunications industry as part of an integrative telecommunications policy for the European Union (EU) with particular reference to Germany as the economically leading country of the EU.

Keywords. Telecommunications Policy, Competition, Industry Convergence,
European Union

Access and Frequency Allocation

Where market players control the access to the customers, for example, through ownership of the local loop, or through control of conditional access technologies, the company concerned may be able to discriminate in favour of its own services. With regard to access issues linked to content, normal commercial principles generally apply, tempered only by applicable competition rules. One exception to this is the treatment of certain "premium" content in Member States, such as national sporting events where the revision to the Television without Frontiers Directive has provided for the mutual recognition across the Community of events reserved by Member States for free-to-air television broadcasting.

Allocation of radio frequency and other resources.

The provision of services (and the development of effective competition) will depend on the availability of sufficient network capacity, which for many services means access to radio spectrum. The parallel expansion of television broadcasting, mobile multimedia and voice applications, and the use of wireless technologies within fixed networks will lead to a significant growth in demand. Where there are marked differences in the amount of spectrum available or the way in which it is allocated, potential barriers are likely to arise, impacting the underlying cost-bases of network operation in the different sectors, potentially encouraging competitive entry into one sector rather than another.

The role of regulation

Regulation is not an end in itself. Instead, it is simply a tool, alongside the use of market forces, for achieving wider social, economic and general policy objectives. This has already been recognised in the Commission's Communication on electronic commerce, which proposed the principle of "*no regulation for regulation's sake*". This principle applies equally to all areas of convergence. The fundamental objectives underpinning regulation in

the Member States are not undermined by convergence. These objectives are varied and tailored to the specific needs of different sectors, but include national goals such as promoting efficiency, economic welfare, and the public and consumer interest. At a Community level, similar aims are reflected in the provisions and objectives of the EC Treaty.

Nevertheless, the nature and characteristics of convergence which are examined below, as well as the perceived need of industry actors for regulatory intervention to be limited and closely targeted, should lead public authorities at both a national and a European level to re-examine the role and weight of regulation in a converging marketplace. Three key issues can be highlighted:

The role of market forces. Some commentators place particular stress on the need to place greater reliance on the ability of market forces to ensure regulatory objectives. They would argue that this philosophy is reflected in the evolving approach in most Member States to universal service in telecommunications, or in the IT and broadcasting worlds by the industry-led development of interoperable standards and software. Others are doubtful about the ability of market forces to provide adequate *ex ante* guarantees for consumers, and recognise an important role for regulation in safeguarding public interest objectives.

The balance between sector-specific regulation and competition rules. A further key issue is the balance between competition rules and sector-specific regulation, with many arguing for a preference to be given to the application of competition rules to individual cases within a converged environment, rather than the further development of extensive regulation.

Finding workable solutions. Where regulation is in place it must apply in a workable and timely manner. The global nature of the Internet or the regional nature of satellite-delivered services point to the potential difficulties of enforcing the rules of one Member State in other countries; whilst the rapid pace of change in terms of services and products, measured in months and weeks, presents a real challenge for anyone seeking a legislative solution to any particular problem. Such solutions at a Community level tend to be measured in months and years.

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Issues of Balancing Market and Regulatory Forces

Market Entry

The grant of special and exclusive rights by Member States is not incompatible with the Treaty rules, where such rights are justified for the fulfilment of a task of general economic interest assigned to the undertaking concerned and proportionate to the achievement of the objective in question, even if those rights result in a restriction of competition or a barrier to the free movement of services.

In this context, some would advocate that where any network can potentially carry any service, public authorities should ensure that regulation does not stop this happening. They would argue that to allow artificial restrictions on the use of networks, or to maintain monopolies where other parts of the converged environment are fully open to competition, may deny users access to innovative services, and create unjustified discrimination. Such an approach would be seen by them as running counter to the technological and market trends.

Barriers could occur in a number of ways: (i) the granting of monopoly or special rights over networks or services to one or a small number of companies, may prevent others from providing the same service; (ii) limiting the services that can be offered over a given

network (for example, preventing a telecoms operator from using its network to offer entertainment services. (iii) requiring certain services (such as free-to-air broadcast channels) to be carried, which reduces the scope for other services to be provided,

Others would argue that the granting of limited rights or limiting the use of networks to particular purposes are important ways of encouraging investment.

Some also argue that these types of restrictions are particularly important where competition is at an early stage or where a particular player enjoys a very strong position (for example, over a competing network or over "premium" content). In such cases, specific safeguards can ensure that potential competitors are not discriminated against or that there are adequate incentives for them to enter the market. According to this argument, appropriate safeguards might take the form of accounting separation or transparency requirements, structural separation or even full line-of-business restrictions.

Licensing Many activities and areas in the computing, and IT areas are not subject to licensing requirements. That is likely to continue to be the case in the future and the Commission sees no reason why there should be any change in this practice, providing IPR issues are effectively addressed.

At the same time, licensing is likely to remain a key regulatory tool through which public authorities can exercise control over their national markets, particularly in relation to the provision of telecommunications and broadcasting networks and services. Any assessment of the justification for, and effectiveness of, licensing procedures must in the first instance be made in the context of the specific sector to which these rules are applied. Nevertheless, the range of potential market entry barriers identified linked to licensing suggests that this issue could need to be examined more closely in the light of technology and market trends. Some commentators argue that a key aim must be to make it easier to get into the market and to move towards lighter obligations applied in a consistent manner across the converging environment. They are therefore encouraged by examples in the computing, Internet and on-line publishing industries, where a degree of self-regulation, for example, in relation to harmful or illegal content on the Internet, has supplemented the application of general laws, such as competition or consumer protection rules applying across whole range of economic activity. Even so, self-regulation is not without risks for the Internal Market given the greater possibility for divergent approaches in developing self-regulation, unless co-ordinated to some degree at a Community level.

At the same time, even where licensing systems are not needed and self-regulatory solutions are proposed, consumers may still require guarantees that their interests are adequately protected and that the respective responsibilities of service providers and operators are identified with regard to the consumer. Consumers should be fully involved with the development and operation of any self-regulatory approaches.

The global dimension of the Internet and other communications and broadcast services will also impact on approaches to the enforcement of licensing, and call into question the relevance of national licensing of activities carried out either within a Member State or delivered by regional platforms, for example, by satellite.

Access to networks, conditional access systems and to content The question arises as to whether rules for open access currently applied to telecommunications and digital television conditional access infrastructures should be applied more widely in the sectors affected by convergence. If market and technology trends develop, convergence is likely to see a shift in the value chain, such that content production, packaging and service provision increase in value (though not necessarily as separate business activities), whilst carrying

services over a fixed or wireless network may, as reflected in some merger activity, become comparatively low value activities. This trend will be accompanied by attempts on the part of today's network operators to extend their activities into higher value business areas.

Access at either end of the transmission network (i.e. the delivery of the service to the user's phone, PC or television and the ability to access the network in the first place to offer services or content) will be of crucial importance. In general the terms on which access is granted to networks, to conditional access systems, or to specific content is a matter for commercial agreement between market actors. Competition rules will continue to play a central role in resolving problems which may arise.

This raises the issue of the role for sector specific rules at a Community level alongside the general Treaty provisions promoting undistorted competition and the free movement of services.

EC legislation is now in place supporting commercial agreements for the interconnection and interoperation of telecommunications networks and services. Similar legislation is in place in relation to digital television, in particular regarding access by third-party broadcasters to conditional access systems.

The emerging market will consist of players of very different sizes, but as indicated above there will also be strong vertically-integrated operators from the telecommunications, audiovisual (principally broadcasting) and IT/software industries building on their traditional strengths and financial resources. Issues which could arise across the different sectors include bundling of content and services, or of network capacity and services, predatory pricing, cross-subsidisation of services or equipment, and discrimination in favour of own activities.

Furthermore, the predominant position of current fixed telecommunications and broadcasting operators in the residential market will mean that for the foreseeable future they will control bottlenecks for accessing customers. Apart from the local subscriber loop, these include conditional access and navigation systems.

Access to networks

As stressed above, as a general rule issues of access to networks or to content, are a matter for commercial agreement, subject to the application of competition rules. Nevertheless, in some areas, regulatory intervention to support the commercial process has been provided for within current frameworks.

In the telecommunications sector, the framework agreed for interconnection ensures that users can contact any other user and that service providers can access those customer on fair, non-discriminatory and proportionate terms. Additionally, powers to intervene and resolve disputes are given to the national regulatory authorities for telecommunications and a number of safeguards are put in place to ensure greater transparency and non-discriminatory behaviour. The fact that an open framework is applied to one set of infrastructure but not to others may create barriers and distort investment, particularly, if convergence of technologies extends over time to the industry and market and service levels. The issue in the context of possible convergence may therefore be whether there is a case for the extension of open access principles such as those applied to telecommunications infrastructure to other networks, or whether there are other principles which might be developed.

Even within the telecommunications sector, the development of the Internet is raising a range of issues connected to the terms on which Internet access providers get access to current fixed and mobile networks. One issue is whether they should enjoy the same interconnection rights as other players and whether they should be able to get access to unbundled service elements, whilst another issue is whether such providers in offering a

range of telecommunications services should share some of the obligations of providing telecoms services.

The issue of access to conditional access systems may become more significant than the issue of control over the pipe up to the point at which it connects to such a system.

Again, in the telecommunications sector, Community policy does not require a full unbundling of the local loop, or a structural separation of the associated infrastructure, from the provision of services carried over it. This does not exclude appropriate safeguards or requirements being introduced under the competition rules. In reality, the issue of unbundling of the local end of transmission networks is complex and must be closely linked to the degree of overall competition in the market concerned, the availability of viable alternative distribution channels and the starting point for competition in the particular market. Some argue that unbundling may act against the consumer interest in the longer term by removing economic incentives for organisations to put their own wired or wireless networks in place.

Access to the Frequency Spectrum

Despite the fact that the digitisation underlying convergence significantly expands the potential capacity of transmission networks, the growth of demand, both in terms of market players and bandwidth, means that resource issues will continue to be a key regulatory issue; principle amongst these is access to radio-spectrum.

Frequency spectrum remains a key, but finite resource even in the digital age. Whilst significant gains will ultimately result from a switch from analogue to digital technologies, both for mobile telephony and for broadcasting, any transition will remain a slow one. For Internet access and other on-line services, satellite-based delivery offers the possibility of high speed delivery to a PC or television and the use of the fixed telecommunications network as a return path. In addition, the take up of wireless local loops and the arrival of Universal Mobile Telecommunications Services (UMTS) early in the next century all point to a steady growth in demand for spectrum.

Given the importance of spectrum, variations between sectors with regard to how much spectrum is available and how much that spectrum will cost may have an important impact on the development of existing and new delivery channels. Whilst overall allocations are determined at an international and regional level, current differences across sectors to the pricing of frequency may create potential competitive distortions. One example could be where a broadcaster offering multimedia or on-line services uses spectrum obtained free or at low cost, competes with operators from the telecommunications sector who have paid a price reflecting the commercial value of the resource allocated.

Many commentators argue that, from an economic standpoint, pricing spectrum may encourage its more efficient use and may help to ensure that frequency is allocated to the areas where it is most needed. They would argue that similar commercial principles should influence frequency policies at the stage that allocation is determined within the World Radio-communications Conferences or at a regional level, so that allocation decisions should seek to make spectrum available to high value users in preference to low value users.

Were all spectrum to be subject to a commercial valuation this might have a knock-on effect of encouraging existing public users, such as the military or the police, to use more cost-effective technological solutions, freeing up certain frequency bands for new services.

Frequency auctioning is favoured by many economists as the way to best ensure outcomes which are in the consumer's ultimate interest. Although others express concern about the

impact of such pricing on prices charged to users.

With regard to efficient use of spectrum, one approach could be to move away from current practices of assigning particular blocks of spectrum to particular services, or to the use of particular technologies to deliver such services. In such a situation, certain minimum technical safeguards would still be required, (e.g. against electro-magnetic interference between different systems). This is one of the issues raised in the context of the introduction of UMTS, but could be of wider application. In practice this might mean that instead of assigning a particular band of spectrum exclusively for the provision of mobile communications or broadcasting, the assignee could be allowed to use the spectrum for the services of its choice.

Finally, increasing demand for spectrum, particularly for UMTS and for satellite-based services puts increasing pressure on existing mechanisms for frequency co-ordination at a regional level.

Competition in Telecoms

The Internet

Many of the issues which I have just covered under the pay TV heading also apply to the Internet. Vertical integration, access and provision of content are all becoming increasingly relevant in the Internet sphere as well. At present the Internet is a relatively open and competitive environment, so we have a comparatively conservative task in applying the competition rules to ensure that it stays that way. But given the speed of development of the Internet means that competition issues could be raised very quickly, and therefore vigilance is required when examining the sector in the context of competition law.

Internet regulation and telecoms regulation come from completely opposite directions. Telecoms regulation has been born out of the liberalisation of the monopoly, single provider environment and new entrants have been introduced into the market. Internet regulation before now has been largely self regulation, if any regulation existed at all. Now the Internet is becoming a system over which more and more business is being done, as opposed to the simple exchange and sharing of data which it used to be. This commercialisation is creating a need for a more robust regulatory system to protect users and suppliers. An important element of that protection is the assurance of the application of competition law. The Internet continue to have strong elements of self regulation in the future. That is one of the reasons why it has developed in such a dynamic manner in the past. What cannot be accepted, however, is that self regulation leads to private monopolies having unconstrained power over the Internet outside of competition law. Any system of self regulation must be compatible with European competition law.

Internet mergers and joint ventures

The WorldCom/MCI case essentially revolved around two different views of the Internet. On the one hand there were those who said the Internet was the twentieth century equivalent of the Wild West, where there were no rules, where anyone could enter, and where the small and the big competed against each other on an equal footing.

In contrast to this there were many others who said that only a handful of companies, the equivalent in the voice telephone world of facilities based telephone operators, were truly capable of delivering Internet connectivity. Most of the smaller players relied on the services offered by these bigger players, and competed against them at the retail level, but depended on them for the supply of Internet connectivity, i.e. the ability to get messages anywhere on the Internet.

In this model, each of the large networks is rather similar to the network of telephone subscribers connected to one company. Network effects are important in that if one network should become unduly large by comparison with his competitors, those competitors may no longer be able to compete, because their subscriber base is too small to attract customers away from the dominant network. It is unable to offer the same access to subscribers. And although that may not matter when interconnection is free, any operator who becomes dominant may not be able to resist the temptation to charge others for connection to his network, thus further hampering competitors from offering any effective constraint to the dominant player's pricing.

That was the issue which the Commission, working closely with the Department of Justice, addressed in its decision. The combined weight of the two companies in the Internet was such that there was serious risk of this network becoming dominant. Therefore, the Internet activities of the combined entity had to be reduced. Eventually, the divestment of the MCI Internet business was agreed, and the operation could be permitted under the competition rules.

The importance of maintaining competition in Internet markets is even more important if data networks take over the functions of switched voice telephony, and that the markets become one. The Internet did not start as a telecoms network, although Internet traffic used the cable resources of the telephone companies. It is notable that telecoms companies have acquired the companies which began as the main players in the Internet. The crucial point here is that this convergence hasn't happened yet, and the structure of the Internet might mean that before the point is reached, a relatively small handful of players might be in a position to control access to the key networks.

As well as WorldCom/MCI, there have been a number of less famous but nonetheless important cases. Several telecoms companies have been combining with existing Internet operators and providers of content over the Internet. These joint ventures are designed to improve the quality of the content on the Internet and enable customers to be charged for accessing that content. There is a great reluctance to pay for Internet content when so much is available for free. But this will come about. It is something that is well known in France, with the Minitel system, where a lot of services are charged for. French consumers may prove to be more willing to pay for content over the Internet as well.

Examples of these co-operations have included Telia, Telenor and Schibsted in Sweden and the joint venture between Cegetel, Canal Plus, AOL and Bertelsmann in France. Each of these joint ventures is positioning the companies to take advantage of the e-commerce possibilities of the Internet in the future. These cases have also shown the advantage of the revised Merger Regulation, which now permits the Commission to examine possible co-ordination effects in the fixed and legally certain timetable of the Merger Regulation. Both dominance and co-ordination analyses take place in one month, or exceptionally five months in Phase 2. This represents a considerable advantage for the companies concerned, who get a decision in a predictable timetable .

MARKET ACCESS

Only market forces will be able to steer the right path between the different avenues into the digital future. This is why we have to keep the gates for combinations between these elements open. This is why we are starting an investigation of cross-ownership between cable and telecoms as a basis for the review foreseen by the Cable Directive for 1st January 1998. This also explains the watchful attitude taken with regard to alliances or extensions of

telecom operators into cable, as shown by the Commission in its handling of the recent Telefonía / Canal+ / Sogecable case.

More generally, we shall look closely at any link ups between content providers, cable, and telecoms, be it the content side extending into cable control, or the cable/telecom side entering content provision.

The acceptability of vertical integration will always depend on the degree of horizontal competition. This is what makes the Countdown to full liberalisation of telecommunications on 1st January 1998 so central. It also explains why the Commission has so strongly insisted, with regard to all Member States, that the commitments taken are actually followed. We now have the bulk of EU legislation for full telecom liberalisation passed at EU level and the national legislation in place in two thirds of the EU market.

Liberalisation and the enactment of the corresponding legislation and regulation is the necessary counterpart to privatisation. But more fundamentally it is an indispensable condition for the flexibility needed to allow the evolution of the multi-component and multi-actor systems of the future.

The other issue is the control of the gates between the components of the future systems.

In the media context, access to content is the major issue, as the recent rush for controlling rights for transmitting sport events has shown again. With the emergence of pay-TV and multi-media, conditional access systems and set top boxes have been also moving to the top of the agenda. Meanwhile, in the telecommunications field, access and interconnection to facilities and services of (single or jointly) dominant network operators are becoming a major issue, as recent disputes in Member States have highlighted.

Access (and the related issue of network interconnection) is becoming perhaps the central issue in the telecommunications / media / information technology market and the way in which competition rules are applied to the players within it.

The central problem is that, given the evolving market structure, the converging sectors depend upon ensuring access to bottleneck facilities. These are essential for entering the market to reach customers and can not be replicated in a reasonable manner by other means.

We must avoid the market foreclosure which would block market development. The Commission has shown that it seeks to achieve the balance between risks and benefits in its application of EU competition rules. In the MSG case it has established the threshold at which point the concentration of market power in the whole value chain - content, distribution, cable becomes unacceptable. But it has also shown in a number of recent telecom and media cases, that it favours restructuring where this corresponds to a sound adjustment to face the future global telecoms and media challenge.

As regards current developments we are watching with particular attention two types of developments and attempts by market players to gain control :

for digital TV based services the focus is on the set top box or decoder ;

for Internet services the focus is on the browser, the server, and the access provider.

We will follow with care any development which links up these critical elements of the future information infrastructure with other dominant market positions. We will, in particular, follow link ups between telecoms, online providers, and content providers as we have made clear with the opening of an investigation into AOL/Bertelsmann/DT Telekom. We will also follow with attention the announced cooperations between France Télécom, DT, and Microsoft in the Internet context, as well as developments in the confrontation which is currently opposing Microsoft and Netscape in the Internet browser market and its potential ramifications in the European market place.

INTERNET COMPETITION

Competition Issues

Although the Internet is in many areas extremely competitive, there are areas which have already proved to be of concern.

The increasing commercial importance of the Internet is encouraging market entry by strong players in closely related telecommunications and media markets. In addition, the rapidly increasing demand for capacity leads to a demand for ever higher capacity backbones, in turn leading inevitably to a greater involvement of established telecommunications operators and the global telecommunications alliances. Developments such as those related to the Domain Name System and, looking to the future, the likely increased importance of key management for encryption will also tend to encourage market entry by established operators.

It is the role of the competition rules to ensure that the success or failure of that market entry is based on the ability of the company to compete on that market, and not on the leveraging of a market position elsewhere. This is particularly important in the telecommunications sector in Europe where liberalisation has only recently taken place. Looking at possible developments such as the proposed changes to the Domain Name System, it is also important to ensure that established operators do not place themselves in the position of acting as regulators in their own market.

The Commission's policy in this area has been clearly stated by Commissioner Van Miert: "Dominant players cannot claim technological progress as a justification for extending their dominance. That would stifle innovation and not encourage it. So we will not allow gatekeepers to block entry into markets. This is true in the case of joint control of cable networks and telecoms infrastructure, of digital set top boxes and of Internet Web browsers."

The analysis below looks at three specific areas which the Commission expects to be important over the coming months: the domain name system, access issues - including backbone access, local access and user interface issues, and some particular points in relation to competing service provision.

Backbone access

The Internet is a network of interconnected networks. In order to provide a full Internet service any operator will need access to all, or at least the vast majority, of the networks connected to the Internet. This can be achieved either by the operator entering into a number of peering agreements, or by the operator entering into transit agreements with one or more larger operators.

Market definition in this area is difficult: the distinction between competitors to whom an operator will provide reciprocal access to its customers, and customers to whom an operator will provide access to all other Internet users appears more fluid than is the case in traditional telecommunications, such as voice telephony.

In addition, determination of market share is also complicated: should market share be measured in terms of capacity, traffic carried, traffic exchanged, revenue, numbers of connected Internet Service Providers (ISPs) or hosts, importance of particular connected ISPs or hosts, or a combination of the above? It may be the case that no-one figure will provide a complete picture of the market position of the various operators.

Finally, in a rapidly growing Internet market, is there a possibility of market power, and if so, how should this be assessed?

Notwithstanding these difficulties of market definition and quantification, similar concerns in relation to the power of particular networks appear to arise as with traditional telephony and interconnection. These concerns include the risks that a dominant network operator: charges supra-competitive fees for network access; seeks to reinforce its position, for example, by concluding lengthy exclusive arrangements with its customers; or favours its own operations at the expense of third parties. This latter point is discussed further below. Given the increasing consolidation in the industry, the area of backbone access is one which the Commission has kept under close review.

Local access

In order for an operator to provide its residential and, probably, small-business customers with access to the Internet, it will often be reliant on the local loop to provide a connection between its customers and its equipment.

At present there are two main local loop access mechanisms - the traditional copper telecommunications network usually owned by a dominant telecommunications operator and, where an appropriate network exists, (TV) cable. Alternative mechanisms such as wireless or digital mobile are at present either insufficiently widespread or too expensive to be a viable alternative to the above mechanisms.

Looking to the future there is likely to be increased demand for broadband services, including broadband Internet access, delivered to the home. Given the available technology capable of delivering broadband interactive services, it is likely that the position of copper and cable will be reinforced in the local loop as the only affordable broadband alternatives in the medium term.

Given the commercial and technological constraints on providing competing local access mechanisms, it will be fundamentally important to ensure, first, that competition in the local loop develops and, secondly, that network operators of local loops are not at the same time the only service providers over those networks.

Cable Review

In addition to being the most important potential local infrastructure competitor for the provision of voice telephony services, cable networks are technically capable of providing substantially faster Internet access to domestic users. The Commission has therefore published a draft Article 90 Directive dealing with the situation where a telecommunications operator also owns the cable network in a particular area, and proposing as a first step structural separation of the cable and copper operations. The Commission will consider taking further action on the basis of individual cases.

Unbundled Local Loops

In addition, the Commission is keeping under review the possibility of taking action against dominant telecommunications operators who refuse to provide unbundled access to their copper local loop. Unbundling entails the separate provision of access to the switch and to the copper wire: this allows alternative operators to use only the copper wire of the incumbent, to invest in their own switching equipment and thus bypass the switching infrastructure of the incumbent.

Bundling can in itself constitute an abuse under Article 86 EC: in addition, however, refusing to unbundle where such unbundling would allow competitors to invest in infrastructure which would upgrade the narrowband copper telecommunications network to broadband capability could, depending on the circumstances, constitute a separate abuse under Article 86(b) - that of limiting production, markets or technical development.

Ensuring that telecoms operators do not use their control over the telecommunications network to stifle development of broadband infrastructure and services will be extremely important over the coming months and years.

Convergence Regulation

Telecoms

With this new framework, competition policy is increasingly being applied to deal with antitrust and merger cases. Already some major telecom competition cases came up in recent years (e.g. *BT-MCI*, *Unisource and AT&T-Unisource*, *Global One*; and more recently *WorldCom-MCI*). On the basis of Article 85 of the EC Treaty (anti-competitive agreements), Article 86 of the EC Treaty (abuse of dominant positions, including issues of unfair pricing and refusing access and interconnection), and the Merger Regulation, the Commission examined the planned mergers or alliances. Some of the cases were only acceptable from a competition point of view with sufficient remedies (e.g. *MCI WorldCom had to divest substantial Internet assets to obtain Commission clearance*).

Increasingly competition cases involve telecom companies and companies from neighbouring sectors, indicating the emergence of convergence. Two crucial cases concerned planned mergers in Germany in the digital TV market (e.g. *1994 decision to block Media Service Group (MSG), a digital TV venture of Bertelsmann, Kirch and Deutsche Telekom*; *mid-1998 decision to block plans by Kirch and CLT-UEFA to take joint control over the German pay-TV channel Premiere to turn it into a common platform for digital TV with the support of Deutsche Telekom for the distribution platform*).

Internet Drive

The Internet as a driver for convergence:

The Internet is the most significant and the most unanticipated market development in the telecom services sector of the last ten years. Yet, none of the major studies commissioned as part of the "1992 Telecom Review" identified the Internet as a significant market phenomenon. Its strong and continuing growth presents a number of challenges to Regulatory Authorities as market players move rapidly into this new business:

The Internet has become an important driver of demand for faster access. New entrants now require much easier access, i.e. unbundling, to the local loop. Their objective is to introduce xDSL technologies which multiply by 100 the capacity of a twisted copper pair traditionally used in the local loop. At present, only 5 Member States allow local loop unbundling, under specific conditions.

The demand for fast access is also a major driver of backbone investments, potentially stimulating the wide-scale deployment of ATM switching. Over time, the percentage of data traffic on networks is likely to substantially overtake the volume of voice traffic. In the medium term (3-5 years), this points to a shift away from circuit-switched services towards packet-switched networks which may increase competition in infrastructure services.

The Internet has the potential to become the competitive platform for many traditional services, be they public voice telephony or broadcasting. The main reason is that the use of the Internet protocol (IP) allows the integration of different services on the same network, which is much cheaper than running in parallel several networks (for example, voice telephony and cable-TV networks) and brings clear marketing advantages (i.e. package of services, one-stop-shopping etc.). In response to new entrants strategies (e.g.

the US IP long distance operator Qwest which took over the pan-European Internet access provider Eunet in March 1998) many European telecom operators are now offering Internet-based voice telephony services, in competition with their own voice telephony business: *Telecom Finland, Deutsche Telekom, Telecom Italia* already provide examples of such strategic changes. Similarly, an increasing number of telecom operators are also investing in digital TV platforms (ex. *Telefonica, France Télécom, Telecom Italia, BT*). *Beyond traditional services, the Internet is also becoming an important platform for electronic commerce.* According to the OECD on-line business done at world-wide level is estimated worth close to 22 billion ECU in 1997. Speculative forecasts from management consultancy and market research firms estimate that this figure could increase up to 270 billion ECU by 2001-2002 and 800 billion ECU by 2003-2005. The Expansion of the Internet in the EU, although growing at a current annual rate of 53%, against 17% for the USA, is very much correlated to the internet charges - levied at the local rate, which are still on average more than twice as high in the EU than in the US.

Regulatory consequences of convergence

The convergence issue has been the subject of a wide public consultation exercise based on the publication, last year, of the **Green Paper on the convergence of the telecom, media and information technology sectors, and the implications for regulation.** In July 1998, the Commission adopted a Working Document summarising the results of the five-month consultation. In short:

Broad agreement on technological convergence, but different views as to the speed and scope of its impact on markets and services.

General recognition of the continuing need for certain sector specific rules - for example to secure public interest objectives with regard to the audio-visual sector.

Broad agreement that self-regulation will play an increasing role in the on-line world. Most respondents therefore wish to retain a sector-specific approach to audio-visual content.

Substantial support for separating transport functions and content rules, thus moving towards a common set of rules for networks.

Reflecting these orientations, a clear majority of respondents are in favour of building upon current regulatory structures rather than to introduce an integrated regulatory framework for all services. Some, however, suggested that the latter be applied to networks and transmission.

Without trying to predict the final results of the consultation and the policy conclusions that will be published by the Commission early next year, common rules for networks would raise the question as to access to cable tv networks and to technical platforms notably conditional access systems, electronic programme guide, and application programme interface of set-top boxes. It might also concern the availability and re-allocation of frequencies currently consumed by analogue terrestrial TV broadcasting once fully digitised. In fact, several Member States have already decided (or are in the process of deciding) a complete analogue switch-off for terrestrial broadcasting at a certain date within the next 10 years. Such a process might call for a harmonised European policy both as regards the switch-off date and the re-allocation of former analogue frequencies.

Evolution of the specific telecommunications framework

The objective of the 1998 framework is to create a competitive telecoms market throughout the European Union. It can be assumed that the more this objective is being

achieved, i.e. the more the telecoms market is becoming mature, the less detailed sector specific rules will be needed.

There can be little doubt that competition policy will have an increasing role in telecoms markets and in markets with converging services. Sometimes the conclusion is therefore drawn that sector specific regulation must be gradually replaced by the application of competition law. Indeed, the application of competition rules can correct anti-competitive developments or interpret initially unforeseen challenges according to the spirit of the framework (e.g. Internet Telephony Notice). However, competition policy will not entirely replace regulation for at least three reasons:

(*) Many issues relevant to market actors, such as licence procedures, frequency allocation, numbering, are not related to the abuse of dominant market positions or mergers. It would therefore be an illusion to assume that all undesirable developments could be ironed out by competition decision.

(**)

Policy makers are not only concerned with the introduction of efficiency and competition in the market place but also with public interest issues such as universal service, data protection, public safety, or consumer protection. Nevertheless, it should be stressed that some of these "public interest issues" can be also solved through competition, but even then, politicians demand the provision of appropriate safeguards.

(***) Market forces alone or the application of competition rules on a case by case basis cannot always remove bottlenecks, particularly for local access, which are not likely to disappear within the next 5-10 years. Ex-ante asymmetric regulation, i.e. regulation that puts strict obligation on the incumbent operator, offers more predictability to new entrants than the prospect of ex-post competition decisions.

As a consequence, the issue is not one of specific sector regulation versus competition rules, but rather which evolution of the existing regulatory framework should be envisaged. This evolution will be accompanied by competition cases and nurtured by the experience they bring with them.

Revision of the regulatory framework will take into account the results of the Convergence Green Paper and the Telecom Review, complemented by related policy measures such as in frequencies or electronic commerce. Relaxation of current rules will depend on the speed of convergence and the emergence of new services, on the speed with which incumbents will lose their dominant positions, i.e. the degree of effective infrastructure and service competition. Independently of the precise structure, the evolving framework will most likely develop along the following lines:

- i. Undertaking a comprehensive adaptation exercise that should simplify provisions and lower the level of technical details;
- ii. Establishing principles and guidelines that gradually replace detailed regulation but should be immediately applicable;
- iii. Introducing more elements of flexibility where more detailed regulation is still required, e.g. through self-regulation;
- iv. Building more on market mechanism to safeguard public interest than to introducing corrective measures or reserving monopoly areas;
- v. Taking into account global developments both through international negotiations on the basis of a regulatory framework and intensified co-operation in preparing and implementing legislation.

Technological Developments

Technological developments are one of the main forces shaping the telecommunications sector. Over recent years, developments in integrated circuits and digital technology have led to the modernisation of fixed telecommunications networks in order to achieve cost savings and performance improvements. This has also led to the rapid emergence of mobile telephone networks.

Over the coming years, the sector will be influenced by technology developments in four main areas:

- broadband transmission and switching
- multimedia applications
- wireless technologies
- intelligent networks.

The implications are explored more fully below.

Broadband technologies and network infrastructure

The widespread deployment of optical fibres supporting Synchronous Digital Hierarchy (SDH) transmission and Asynchronous Transfer Mode (ATM) switching technologies, ultimately in both local access and core networks, will change the fundamental nature of infrastructure. It will evolve from one that is today limited in the capacity it can provide to customers, to one of virtually unlimited capacity. The task of operators and service providers will be to ensure that such capacity is made available to users as efficiently as possible by deploying appropriate technologies in the local access network.

SDH represents an evolution of current transmission hierarchies, not only allowing optical fibre capacities to be more suitably exploited, but adding flexibility of access and superior reliability through topological and network management features. ATM, based on fast packet switching concepts, will complement SDH by providing high bitrate switched services to end users. It is this technique which is generally regarded as the basis for the future Broadband ISDN.

Although capacity may be huge, using the available bandwidth and sharing it among users is still a problem. In the shorter term, novel methods of enhancing the information-carrying capacity of existing copper-based cables are emerging, spurred on by current regulatory constraints and market conditions in the US. HDSL provides high-speed digital capacity to the customer premises over copper-pair cable. A similar copper-based technology, ADSL, is being employed by some operators for video-on-demand services, as a means of addressing the entertainment market. Such approaches can be seen as both complementary and competitive to optical fibre solutions, depending on the configuration chosen. They are complementary in that they provide high-speed terminations in partial-fibre networks. They are competitive insofar as advances in data compression technology are able to compensate for lack of available bandwidth, thereby enabling the copper pair to deliver a sufficient number of video channels to the home.

Developments in broadband technology, complemented by parallel developments in

techniques for data compression, mean that future telecommunications networks will be able to handle realtime television in a way that was previously the preserve of the cable TV and broadcasting networks. This technological convergence of two previously separate fields paves the way for innovation and increased investment in the fixed network infrastructure.

Convergence will encourage multimedia applications

The fields of computers and telecommunications began to converge over a decade ago, resulting in the birth of a new family of innovative services which became known as *valueadded* telecommunications services (such as voice mail or videoconferencing). A similar convergence between telecommunications and audiovisual worlds now promises to bring with it even more radical changes through the introduction of multimedia services. The real significance of this convergence is that, unlike the previous case of information technologies (IT), the services resulting from this new combination of telecommunications and audiovisual sectors will not be limited to business users, but will have mass market appeal. The consequences in terms of both service and manufacturing industry impact are potentially enormous.

The convergence arises primarily from technological synergies which enable both media and telecommunications vehicles to be combined into a single delivery platform. This platform has been popularly labelled the *information superhighway*; in essence it refers to tomorrow's telecommunications infrastructure.

Multimedia services will require convergence at the user terminal level, in the form of a multifunction processing and display device combining the attributes of an advanced PC and a digital television receiver. Until digital television becomes a reality, PCs are leading the way with local multimedia applications being produced on CDROMs, identical in makeup to Compact Discs. The evolution of new terminal products into a mass market consumer electronics item will take a number of years, but the challenge for the telecommunications industry will be to encourage users to migrate from local CDROMbased applications to those supplied over remote connections via a cheap and efficient broadband network infrastructure.

Wireless solutions in the access network

The 1994 Green Paper on Mobile and Personal Communications reviewed the main technology and market trends in the mobile area. The Paper recognised that the advent of personal communications promises to revolutionise the sector and expand the market. However, this requires a convergence of fixed and mobile networks, not only at the level of a single, global service offering to users, but also through a substitution by wireless technologies of network elements hitherto made up of wired cable systems.

Early examples of such substitution include the use of analogue mobile technology for fixed rural communications by operators in Spain and eastern Germany, and the application of DECTbased systems to the local subscriber loop by Ionica, recipient of a new operating licence in the UK. Although both solutions represent new ways to tackle old

problems, it is perhaps significant that the truly innovative approach is that proposed by the new market players. It is also noteworthy that speed of service rollout appears to be as important as cost in assessing the viability of radiobased solutions, an indication of the changing competitive market.

By granting mobile telephone licences to at least two operators in all Member States, governments have already taken an important step towards the introduction of parallel alternative radiobased infrastructures.

Network Intelligence

The requirement of mobile communications networks to track the whereabouts of thousands of users, and the meshing of fixed and mobile networks to implement future concepts of terminal and personal mobility will raise new demands for enhanced intelligence in the fixed telecommunications network. This requirement will be compounded by an increasing need to provide for customer control of bandwidth demand and network management services in the context of broadband infrastructures.

The market for valueadded telephony services, expected to receive a new impetus when voice telephony services are liberalised in 1998, has already resulted in a shift of the architecture of switched telephone networks towards the so-called Intelligent Network concept.

Closely linked to the development of the intelligent network is that of network management. Sophisticated telecommunications network management systems will allow diverse telecommunications infrastructures to be managed as a whole. Network intelligence and network management systems are the cement holding together the various elements which make up an end-to-end service, allowing multiple organisations to compete and cooperate in order to supply services to the customer.

Network architectures: and convergence between telecommunications and audiovisual sectors

There are four possible configurations of network infrastructure based on the technological trends described above. These are based on studies carried out on behalf of the Commission and represent current perceptions of network architectures most likely to be implemented over the next decade. They reflect the widely held views that:

- the fiber to the home concept requires a convergence of telecommunications and audiovisual services to become financially viable;
- the large investment already made in existing copperbased networks will lead operators to apply technologies aimed at enhancing its capacity;
- a combination of optical fibres and coaxial cable will constitute the standard cable television network architecture for some time to come;
- new possibilities are opened up by the use of wireless technologies in the local access network.

Whilst at present separate services tend to use separate infrastructures, in the future it will be possible for at least two of the network infrastructures to handle both telecommunications and broadcasting services, as well as the many new services associated with multimedia. The table comments on each configuration without making any

predictions as to which is most likely to be taken up. It is probable that all four architectures will be deployed in the light of specific circumstances and needs.

The technological developments associated with the evolution of network infrastructure, and the inevitable convergence between telecommunications and audiovisual sectors that this makes possible, emphasise the need for a review of the current regulatory environment concerning telecommunications infrastructure to ensure that unnecessary barriers to these developments are removed.

Regulatory Agenda

The combination of the market developments and technological innovation outlined above have been the driving force behind the shifting regulatory agenda for telecommunications in Europe. This pattern, mirrored in other jurisdictions, such as in the United States and Japan, has led to political recognition that regulatory reform of the telecommunications sector is a key element in maintaining economic competitiveness, sustaining growth and employment, and in opening to every citizen the opportunities provided by new, advanced networks and services.

These trends were a key element in the acceptance of the inevitability of the liberalisation of voice telephony services for the general public during the 1992 Telecoms Review. They were also a factor in the Council Resolution agreed at the Council Meeting of 17 November 1994 which endorsed the liberalisation of infrastructure in parallel with the liberalisation of voice telephony services i.e. by 1 January 1998, subject to certain transitional arrangements.

That regulatory agenda at a national and European level, both inside and outside of the Union, is itself a major driver of further change in the sector. The successful opening up of telecommunications services and equipment to competition has inevitably created pressures for the extension of this approach to communications infrastructure, whilst at the same time technology has increasingly provided ways to stretch the boundaries of current arbitrary delimitation between the monopoly and liberalised areas. With the advent of the Information Society and the linked challenges flowing from the convergence of the telecommunications, broadcasting and information technology sectors, new momentum for the removal of unnecessary restrictions on the development of new markets and services has been created.

As a chronological sequence of events on the regulatory milestones involving Germany would read :

- (1) Importance of new technological development such as digital transmission of signals, mobile phones, Cable TV, satellites and so on
- (2) First Directive 90/388/EEC on liberalisation of telecom services from 1990
- (3) 'Full Competition' Directive 96/19/EEC from 1996 on full liberalisation of telecom services and infrastructures
- (4) Implementation into national law in Germany: 'Telekommunikations Gesetz' (TKG), from Aug. 1, 1996
- (5) Establishment of regulatory agency (TP) in Jan. 1998 involving (i) technical regulation, especially non-discriminatory access and portability of telephone numbers, (ii) regulation of universal services, (iii) regulation of market power, i.e. access to networks, Dec.

2000 EU Regulation on 'local loop unbundling', regulation of access charges (price capping).

The main regulatory developments since October 1, 1999 have been the award of the third generation licences on Aug. 19, 2000 to a relatively high number of competitors (6) and the decision of Reg TP of 8 September 2000 setting the conditions for the element-based charging system for interconnection as from 1 June 2001. Reg TP is determined to enforce a cost accounting system which reflects costs in all areas, i.e. voice telephony, leased lines, interconnection, and local loop access.

A substantial number of operators have entered the local access market and as a result, a quarter of the population can connect directly to an alternative access network operator and can choose between DT and one, or in some towns more than one, or in some towns more than one (Reg. TP).

The German Monopoly Commission, in its report of June 2000, concluded that there was not yet self-sustaining competition in any market (local, national, and international) and that the current degree of competition can only be sustained can only be sustained by retaining the present regulatory framework in its entirety (i.e. ex ante regulation of prices charged to operators and to end-users).

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