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Telecom Initiatives and Developments in Europe

There are major changes taking place in the world of telecommunications, and Europe is at the forefront of these changes. The factors driving this change in Europe are: The regulatory environment, particularly the drive towards liberalisation; the changes in the technology available, strongly driven by European RTD programmes. The changing commercial environment as industry structures try to adapt to the possibilities brought about by the first two factors above. The article describes the general European picture and then provides a country-by-country survey of the effect that these pressures are having.

Country profiles provide a quick review of telecoms deregulation and individual market concerns. It is interesting to compare and contrast progress and hurdles-both, a reflection of the many possible approaches and

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interpretations of the EU Directive. Most countries have sought to encourage new entrants, investment in alternative infrastructure, competitive tariffs and innovative services, without detracting from the scope or quality of services which users expect. The challenge lies in achieving lowering barriers to entry and making it easy for users to switch to the carrier(s) of their choice.

European Regulatory Initiatives

Having recognised that telecoms should be one of Europe's most dynamic and thriving sectors, playing a key role in the economic integration of Europe, the first phase of EU (European Union) telecoms policy began in 1984. The objective was to establish common development of the telecom sector. These initiatives have been evolved as deregulation has moved forward. Currently the EU is working with national regulators to ensure that EU policy is observed.

Crucial Phase in Liberalisation

The second, crucial phase of policy began in July 1987, when the EC (European Commission) published its Green Paper on Telecommunications. Highlights covered key points, which would stimulate new services and technology:

- the liberalisation of telecoms services
- the liberalisation of telecoms equipment markets
- technical standardisation across the market
- public procurement by telecoms operators

Service monopolies would only retain exclusive rights to providing switched voice telephony; competition would be permitted in all other sectors. To this end, the framework for Open Network Provision (ONP) was laid out, obliging operators to adopt open, non-discriminatory standards, provide interconnection and ac-

cess to the incumbent operators, and harmonise tariff principles to ensure fair and equal access for users and competitive service providers to network infrastructure.

Beyond Basics to the Realities of Deregulation

In 1992, the EC reviewed the situation which resulted in a timetable for liberalisation drawn up by the Council and the scope of the liberalisation process being extended in July 1993. The main objectives were:

- liberalisation of all public telephony services by January 1st 1998
- acceleration of action to achieve ONP
- development of future EU policy through Green Papers on telecom infrastructure, cable networks, mobile and personal communications to establish common principles regarding universal service provision

Effect of the Maastricht Treaty

The Council reaffirmed that the principles laid out in the Maastricht Treaty of 1993 applied to the telecoms sector. This has been invaluable in helping the Commission enforce EU policy, particularly in abolishing monopolies. The Commission's White Paper on Growth, Competitiveness and Employment (finalised in December 1993) and the Bangemann Group report on Europe and the Global Information Society (1994) both confirmed telecoms as being a key element of EU policies and strategies of the EU.

EC Directive

The European Commission in March 1996 adopted the Full Competition Directive with the aim of having a Single Market for telecoms in place across most of the EU by January 1st 1998. Portugal, Ireland, Luxembourg, Spain and Greece were given more time to develop their markets before opening them to full competition.

Timetable

- July 1st 1996: new operators have the right to provide all services over alternative infrastructure, except voice telephony
- January 1st 1997: national administrations to make available adequate numbers for all services. To be allocated by transparent and objective procedures; licensing procedures to be made public
- July 1st 1997: all incumbent operators to publish interconnection terms and conditions
- January 1st 1998: all monopoly provision for public voice telephony is to end.

Current Initiatives

In the autumn of 1997, the Commission signalled its intention to take strong action regarding the implementation of its various Directives and Recommendations. In October 1997 it set benchmarks for interconnection charges because some dominant operators were demanding high interconnection fees. These benchmarks apply to local, metropolitan and national long distance call terminations and are based on the lowest rates in three EU countries.

At the moment the Recommendation guidelines are not binding and are intended to help regulators to arbitrate between new operators and incumbents.

The Commission is particularly concerned about two areas in which interconnect charges are unacceptably high:

- Price paid by mobile operators to terminate calls on the fixed network
- Calls between EU countries

The interconnection rates suggested by the Commission are anything up to three times lower than some existing rates.

Also in September 1997, the Commission announced its intention to monitor national telecoms regulators to ensure that liberalisation moves ahead satisfactorily across the Union. The regulators' performance is to be measured against a set of criteria. The Commission is to review the monitoring scheme in 1999.

Number Portability

The Council also decided that number portability is crucial for true competition, and decreed that from January 1st 2003 EU telecoms customers must be able to take their telephone number with them if they switch operators. Currently, there is a proposal on the table to bring this date forward to January 1st 2000.

The five countries, which have derogation allowing them to keep their basic telephony markets closed beyond January 1st 1998 (Ireland, Luxembourg, Portugal, Greece and Spain), will have an extra two years to comply.

Basic Monitoring

Almost 18 months after the EU Telecoms Policy came into effect, the EC Telecommunications Council issued a release (April 2nd 1999) stating that even if the European telecoms market was now fully opened, obstacles to true liberalisation remained in certain sectors, notably mobile communications, long-distance communications and local networks. The Council believes that a European regulatory framework will be necessary to remove these obstacles.

The EC has spent considerable time and effort monitoring country activities in order to come to these conclusions. Since May 1997, the EC has submitted four updates on the implementation of EU liberalisation and harmonisation rules at the national levels; a fifth one is expected during the summer of 1999. The 1999 Telecommunications Review is also well under way: its findings, which should have significant implications for competition will be made public later this year and early next with legislation expected in early 2000.

The EC has also used the EC Treaty competition rules to undertake individual action against certain member states, for example with respect to their mobile telecoms markets. In July 1998, the EC decided to conduct nine in-depth investigations on discriminatory or excessive pricing (five other investigations were undertaken by national regulatory authorities). Most recently, in March 1999, the EC decided to send five reasoned opinions to Greece (which has yet to lift all restrictions on mobile telecoms service operations; nor has it yet liberalised satellite services and alternative networks).

Universal Service

The Commission also adopted its first Monitoring Report on Universal Service (February 1998) which concluded that the scope of universal service obligations should not be expanded at this stage. Moreover, January 1st 2000 has been established as the target date by which "access deficit" schemes must be phased out. These schemes had been designed to compensate certain incumbent operators for any financial burden resulting from the tariff rebalancing process.

Numbering

Having established that number portability is critical to true competition, the EC adopted a number of objectives with regard to numbering mechanisms. Two

have already been implemented:
- call-by-call carrier selection has been offered by all fixed local access providers with significant market power in all member states since 1/1/1998
- an ETNS (European Telephone Numbering Schemes) field trial on the basis of country code 388 has been started on January 1st 1999

The next deadline was January 1st 2000; a date by which all fixed local access providers with significant market power in their respective countries must offer carrier pre-selection. Moreover, all fixed local access providers should offer operator number portability by this time. Carrier selection is operating partially in some countries, while number portability has been introduced ahead of schedule in some.

Convergence

On March 10th 1999, the Commission adopted a Communication on the Results of the Public Consultation Regarding Convergence of the Telecoms, Media and Information Technology sectors (launched subsequent to the December 1997 Green Paper on the same subject). The first stage (which ended May 1998) concluded that since technological platforms and network infrastructures were already converging, all infrastructures should be subject to the same regulatory framework – regardless of the types of services carried over them. Nonetheless, the Commission recognised that sector-specific rules would continue to be necessary. This topic is being addressed in the 1999 review.

The second phase of the consultation looked at access to networks and gateway facilities; investment, innovation and content production; and the need for regulation to balance public interest issues and market imperatives.

The consultations highlighted several key messages:
- there is a continuing need to both meet public interest objectives and promote investment
- rules need to be transparent, clear and proportional
- transport regulation has to be separate from content regulation, though the links between them need to be recognised for possible competition problems
- there has to be balanced integration of public broadcasting in the new environment
- competition rules must be applied effectively
- there must be actions to promote premium European content

The Commission is now developing proposals for reforms in regulation, which will be proposed as part of the 1999 Communications Review. Meanwhile, reforms to content services regulation will be covered either by adjustments to existing legislation at an appropriate time, or by the introduction of new measures.

Access

A March 1998 EC Notice included guidelines to applying competition rules to access agreements in the telecoms sector. This Notice:
- sets out access principles stemming from EU competition law
- defines and clarifies the relationship between competition rules and Open Network Provision legislation

Explains how competition rules will be applied in a consistent way across the sectors involved in the provision of new services, and in particular, to access issues and gateways.

Interconnection

Interconnection is a tenet of EC telecoms policy and it remains a major issue. Today, the EC recommends the use of long run, average incremental costs as the most appropriate basis for cost-oriented interconnection charges. The Recommendation proposes that regulators and operators use "best current practices" interconnection charges while they complete the necessary calculations to arrive at such cost. The Recommendation on Interconnection was last updated in January 1999, to provide the latest figures on interconnection charges throughout the EU.

Mobile and wireless Telecoms

Although it took encouragement in some cases, all member states have now issued at least two GSM licences as well as one DCS 1800 licence.

The EC has also released a decision on UMTS (Universal Mobile Telecoms System), which requires that member states grant at least one UMTS license when this next generation of mobile and wireless communications is introduced (by January 1st 2002 at the latest). This should ensure that UMTS users enjoy a level of mobility that is comparable to GSM.

Internet and Electronic Commerce

A liberalised telecoms market has paved the way to a host of new Internet services and has led to a boom in e-commerce and e-business. Not surprisingly, the EC has paid significant attention to these developments.

Initially, the EC adopted a notice that stated that Internet telephony was not subject to regulation applying to voice telephony, at least until certain conditions are met. At about the same time (February 1998), the EC highlighted the need for European representation on the non-governmental Internet Addressing and Naming Authority (IANA) proposed by the US.

Today, the EU and the US seem on more common ground on the subject, but the EC maintains that some questions still need to be resolved, particularly with regards to membership in and functioning of the now-named ICANN (Internet Corporation for Assigned Names and Numbers).

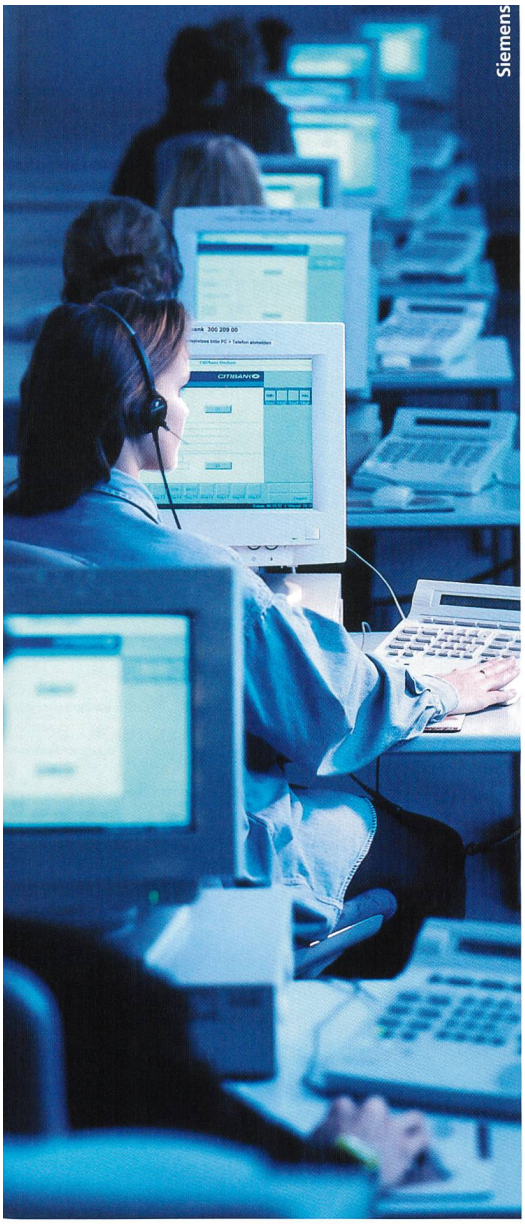
Recent Internet-related initiatives include a multi-annual action plan to combat illegal and harmful content on the Internet (January 25th 1999). The action plan will run 1/1/1999 to 12/31/2002.

On electronic commerce and new services several directives entered into force in 1998, covering areas such as the legal protection of databases and personal data. For its part, the directive on a transparency mechanism for information society services was adopted and will enter force around mid-1999. Other proposed directives in the works mostly cover the legal aspects of e-commerce.

Finally, the Commission adopted a Communication on globalisation and the information society, which launched an international debate on how to improve coordination of worldwide policies affecting the global online economy. This could lead to the adoption of a non-binding International Charter by the end of 1999.

Other Initiatives underway

The EC adopted a Green Paper on public sector information in January 1999, intended to initiate a broad consultation on new ways of exploiting the vast potential of the information held by public services across Europe. The EC is also in the process of gathering the reactions it received to the public consultation regarding the Green Paper on Radio Spectrum Policy.



European RTD Initiatives in Telecom

The Strategic importance for Europe of Advanced Communications

Advances in communications are now one of the major driving forces of change. Communications is itself important as a European industry sector, but its significance is far greater. It is an essential infrastructure for the competitiveness of other economic sectors, and is the basis for trade, provision of services, production, transport, education and entertainment. Communications also has the necessary potential to meet the challenges of sustainable economic growth and new job creation, particularly outside major cities.

The use of advanced communications technology will make traditional services cheaper and make many new services economically viable: services like video telephony, multimedia mail, libraries and home shopping. There will be new hobbies and leisure interests available from home and new forms of entertainment – with a wide choice of high quality and interactive entertainment channels. There will be access to digital video libraries. Technology will make distance less important, thus allowing more people to work at home or in local offices. This will reduce the pressure to commute into the centre of large cities. It will allow rural and remote areas to share fully in the prosperity of Europe. It will support new ways of working such as the virtual corporation where employees have no fixed workplace. Advanced communications will create many new job opportunities both in the telecommunications industry itself and also in other areas of the economy.

Such advances have already enabled a steady improvement in quality, cost/performance and user friendliness of communications services, customer equipment and apparatus. However, these are far from having reached their full capabilities. Within the coming decades distance and capacity constraints in communications will be largely overcome. This will give people increased freedom to organise their own lives in the ways they prefer, and in the places they prefer, by providing greater opportunities to control their own leisure and working environment.

Advanced communications technologies and services are crucial for consolidation of the internal market, for Europe's industrial competitiveness and for balanced economic development. They also offer new opportunities for social cohesion and cultural development. All of these considerations have been important concerns of European policy for many years.

The Role of European Research and Technological Development (RTD)

Within the European communications sector, EU research programmes amount to perhaps 5% of the total RTD effort being realised by its supporting industries. Though historically the industries have undertaken comparatively high levels of long-term research, competitive pressures and the pace of technological change have led to a steady shortening of product life cycles, and the need for industries to concentrate their resources on the shorter-term needs of product development. Though small in percentage terms, European research can have a significant impact when its orientation is pre-commercial and pre-competitive and having a medium to longer-term horizon. By jointly addressing fundamental issues on which industries need to agree for common foundations for technologies, for frameworks and practices, within which they will later develop their own products in a competitive manner.

There are other reasons why European research makes a significant contribution to the communications sector, relating to the truly international nature of this industry. Firstly, an increasing proportion of communications traffic crosses national borders. This is particularly the case for the Internet and the more advanced services, for the communications of larger multinational companies, and for those individuals who exercise their right to live and work in other Member States. The equipment supply industry, and the network operators themselves are also extending a significant proportion of their business to markets outside their home country.

Secondly, research is so costly that in many countries even the major companies no longer make the necessary resources available to bring major new systems to market on their own. Strategic alliances are being formed on a global scale as organisations seek to share the burden and the risks of heavy long-term investment, and in return to share in the benefits of a much enlarged scale and scope of their combined markets.

Finally, these factors imply that individual corporate or national actions on standardisation and regulation are on their own, to ensure that broadly supported international solutions emerge and that fragmentation of markets is avoided.

Since 1985, international action and co-operation at the level of pre-competitive research has been steadily built-up and extended beyond the Member States. In this way subsequent developments of international standards, regulations and markets can follow at a much faster pace than has been achieved in the past. This trans-national role has been supported, from a European perspective, by the research and technological development undertaken within initially in RACE, and currently in ACTS – both research & technology development (RTD) programmes of the EU and, from a global perspective, by other international cooperation initiatives such as the pilot projects on the Information Society launched by the G7 countries.

However, the Commission's actions are always governed by the principle of subsidiarity. In simple terms, this means that Commission intervention is made only in those cases where a pan-European action is appropriate and necessary, and not otherwise. Areas where a national action would be most appropriate are left to that national action. In the implementation of ACTS, this principle of subsidiarity led to the "National Host Testbed" concept which is now supporting most of the practical experimentation and related dissemination initiatives in the ACTS Programme.

RACE, ACTS and IST

RACE and ACTS

Advanced Communications Technology and Services, known simply as ACTS, is one of the specific programmes of the "Fourth Framework Programme of European Community activities in the field of research and technological development (RTD) and demonstration (1994 to 1998)". In fact, it is the focus of the EU's research effort to accelerate deployment of advanced communications infrastructures and services, and is complemented by extensive European research in the related fields of information technology and telematics. ACTS research strongly complements a broad range of Community policy initiatives, examples of which include:

- improving the competitiveness of European enterprises in global markets
- achieving sustainable economic growth
- creating more employment opportunities and new ways of working
- strengthening the single market through the development of Trans-European networks

ACTS builds on the work of the earlier RACE programmes (Research into Advanced Communications for Europe, 1985–1995), which were established to contribute to the "Introduction of IBC (Integrated Broadband Communication) taking into account the evolving ISDN and national introduction strategies, progressing to Community-wide services by 1995." Independent assessments have confirmed that RACE broadly achieved this objective, and that by 1995 such technologies were beginning to be deployed in European countries either in specialised scientific networks or, in a few cases, as limited public services. ACTS is instrumental in achieving a further step towards the longer-term goal of moving into a global Information Society. This not only serves the economic interests of the Member States but also provides a framework for European businesses to play leading roles within their sectors of operation. Participation and cooperation within ACTS has already become truly international in nature, through a progressive inclusion of participants from countries outside the EU and through an extension of scope from the core spheres of interest of the communications industries of Member States to major international usage interests. European industries expect major benefits for their own competitiveness and employment strategies from being at the forefront of world developments in communications. Within Europe, all the major telecommunications network operators, the leading broadcasters, cable TV operators and all the key European equipment manufacturers, together with European Small and Medium size Enterprises (SMEs) participate in the ACTS programme. Their enthusiasm, and sense of partnership with the major consumers of communications coupled with their willingness to conduct pre-competitive research in collaboration with their international rivals is leading to a shared vision of the future. Together these lead to the so-called level playing field on which global competition may rapidly develop.

Other EU Programmes

Within the Fourth Framework for EU research, there are several programmes relating to Information and Communications Technologies (ICT), and it is important to coordinate the work done. In the past, RACE projects built on the results of generic technology projects from the ESPRIT Programme (in areas such as microelectronics components and software tools). Similarly the telecommunications requirements of the telematics applications have drawn heavily on the technologies developed and evaluated in RACE. ESPRIT and TELEMATICS are both current Programmes under the Fourth Framework, with ESPRIT addressing fundamental technologies and TELEMATICS looking at sector-specific applications of ICT (such as in education, public administration, health). Cooperative links are continually being strengthened, and a number of joint projects and initiatives are now in place covering subjects of common interest.

Strong relationships also exist with a number of COST (European Cooperation in the field of Scientific and Technical Research) actions and EUREKA (A Europe-wide Network for Industrial R&D) projects centred on communications subjects. Though they are not EU research actions, these are widely supported by organisations from many European countries, and are producing many significant results that are actively taken into account within ACTS.

Apart from considerations of technology, industry, and employment, the increased use of information and communications technologies (ICT) raises many issues of a social or societal nature. Studies of these wider aspects of the information society are being coordinated by an Information Society Activity Centre (ISAC), which supports the developing policies of the Commission itself.

ACTS participants have also been encouraged to seek the support of the EU's International Cooperation Programme (INCO) and specific assistance programmes for Central and Eastern European countries such as PHARE and TACIS. Nearly thirty of the ACTS projects have, together, a total of about sixty participants from C&E Europe that are supported by INCO. This total remains high in comparison to that achieved in other RTD programmes.

In addition to the direct participation of organisations from C&E Europe in ACTS,

a close working relationship was developed with the twenty-four autonomous projects in advanced communications that were established under the EU's COPERNICUS scheme. This was designed to improve cooperation in science and technology between the EU and the countries of C&E Europe and to promote the transfer of knowledge and technology. Notable examples of East-West cooperation in leading edge research have emerged as a result: eg. in the fields of integrating satellite and terrestrial mobile communications, and multimedia services.

IST

For the European Union, the fifth Framework Programme for Research, Technological Development and Demonstration Activities is an opportunity to pursue a new approach to policy with regard to research conducted at Community level, which is designed to address contemporary issues and meet the aspirations of Europe's citizens.
The fifth Framework Programme aims to enhance economic competitiveness and social needs. It also strives to strengthen the involvement of keyplayers in research, and to simplify procedures.
Within the fifth Framework Programme, DG XIII (The European Commission Directorate General office for Telecommunications, Information Market and Exploitation of Research) manages the Information Society Technologies Programme, which provides a single and integrated programme that reflects the convergence of information processing, communications and media technologies.
The Information Society Technologies (IST) Programme is a single and integrated programme, which reflects the convergence of information and communications technologies and media and of industries and markets, together with the increasing significance of content, and responds to the need to integrate research and development and take-up actions. It brings together certain selected and important elements initiated under ACTS, ESPRIT and Telematcis, but introduces a new focus of strategic importance for the policies of the EU. To this effect, this programme consists of a set of four key actions:

- services for the citizen
- electronic trade and new methods of work
- multimedia content
- essential technologies and infrastructures
- a specific activity on longer-term or higher-risk future and emerging technologies.

These activities complement each other and are derived by grouping the technologies, systems, applications and services and the research and development and take-up actions with the greatest affinity or interdependence. Each activity has its specific focus and priorities. However, the key issues of usability, interoperability, dependability and affordability will be addressed throughout the programme. The Information Society Technologies Programme, has a budget of 3.6 billion Euro (1999–2002).

Regulatory Initiatives and Developments across Europe

Austria

Austria's liberalisation programme was slow to start, but seems to be making good progress. It was quick to respond to comments made in October 1997 by the European Commissioner for Competition, Karel Van Miert. Austria's telecoms sector was opened to full competition from January 1st 1998 after a new Telecommunications Act was passed on August 1st 1997. Among other things, the Act paved the way for a regulator, Telecom Control, to be in operation by Autumn 1997. The new Act built on the foundations laid down in 1996, which converted the incumbent carrier Post & Telekom Austria AG, known as PTA, to a joint stock company.

Privatisation Issues

The 1997 Telecommunications Act stipulates that a substantial stake in PTA will be sold off by the end of 1999. The government made it clear at the time the Act was passed that it did not intend to remain a majority shareholder. However, the government is under increasing pressure from the right to keep Austrian assets in Austrian hands and it looks like the legislation pertaining to the partial sell-off of PTA will now include a clause stipulating that no foreign company can hold a majority stake in PTA.
This led to be a backlash response to the government selling 25% of PTA's mobile division, Mobilkom Austria, to Italy's Stet in October 1996. In March 1997 PTA finally chose Concert as its international strategic partner after much soul-searching. In the light of subsequent events, this decision gave rise to anxiety among some politicians.

Interconnect Charges Satisfy EC

Telekom Austria had failed to reach agreement over interconnect charges with several competitors. As a result, Austria's Telekom-Control-Kommission stipulated in early October 1998 a flat rate per minute fee of 28 Groschen (2 cents) for local and 55 Groschen (4 cents) for national calls. These rates are binding for future negotiations and also differentiate between competitors with their own networks and those smaller rivals without a network who were seen to benefit unfairly.
These lower rates also satisfy the EC investigation into the high interconnection charges of seven countries including Austria and whether the PTOs were abusing their dominant position.
Preselection will not be introduced until 2000. Currently Austria's regulator has assigned twenty prefixes to competitive operators.

Mobile

Austria now has three mobile operators: Mobilkom Austria (a unit of PTA), Max-mobil Telecommunications GmbH and newest on the market Connect Austria GmbH (a consortium of Austrian and foreign investors). Connect Austria be-

gan operations in late October 1998 with an aggressive marketing plan to wrest customers from its two rivals. The company is also the largest private investor in Austria since 1945.

Belgium

Belgium's progress towards liberalisation has been slow and fraught with difficulties. The old Régie de Télégraphes et Téléphones (RTT) became Belgacom in 1992. The government sold 49,9% of Belgacom in 1995 to help prepare the company for open competition.

Privatisation – complex Investments and Crossholdings

In December 1995 the ADSB Telecommunications consortium was informed that it had won the tender for basic services and became involved in operations from March 1996. The consortium comprises the US' Ameritech (owning 35%), Tele Danmark of Denmark (33%), Singapore Telecom (27%), with three Belgian banks holding the remaining 5% stake. Since 40% of Tele Danmark is in Ameritech's hands, the US carrier effectively controls 51% of the ADSB consortium, and thus 25% of Belgacom.

Competition already on the Scene

Belgacom is in a strong position at home, but 1998 saw Telenet enter the market. Telenet is mostly owned by GIMV, an investment company belonging to the Flemish government; US West became a minority shareholder (25%) in autumn 1996. Telenet is to upgrade cable TV networks so that they can offer telephony too, starting in the north. This should be a highly effective strategy as Belgium has one of the highest levels of cable penetration in the world at over 90%. Telenet is also to build a national fibre optic network linking the different regions, as well as gateways to the domestic and international PSTN.
WorldCom, in a joint venture with cable TV operator Coditel, was granted a licence to operate in Spring 1997 and became the first facilities-based alternative to Belgacom when it began offering on-net services in July 1997.

Denmark

The Liberalised Telecom Market in Denmark

The telecom market in Denmark used to be a heavily regulated market but has been steadily liberalised since the beginning of the 1990s. The original monopoly, Tele Danmark, still dominates the market, although it is now meeting growing competition – especially in such areas as international and cellular services and Internet.
It was the Social Democrat-led government that took the first step in 1994 towards a liberalised market, inspired in part by developments in the EU, including the Bangemann plan. There is broad political backing for the telecommunications policy.

Best and Cheapest in the Year 2000

The legislation is based on a government initiative from 1994, "Best and cheapest by the year 2000" introduced by the Social Democratic Minister for Research and Information Technology at that time, Frank Jensen. The initiative resulted in broad political agreement on complete liberalisation of the telecommunications sector in 1995. This agreement has since been adjusted several times.
Initially, the way was paved for other operators to establish themselves in Denmark, for example by the prefix scheme on the fixed network. This scheme ended on January 1st 1999 and has been replaced by carrier pre-selection. From July 1st 1999, number portability will be introduced, thereby removing the last serious obstacle to open competition.
The rules and practice for interconnect traffic and access to the raw copper local loop are complicated. That is also reflected in the number of complaints being dealt with by the National Telecom Agency (NTA) and the Telecommunications Complaint Board (a board of appeal for the NTA's decisions).

Prices have to be reduced

The present situation is that NTA did not accept Tele Danmark's interconnect fees and ruled in September 1998 that the fees had to be reduced by 10–30%. The Telecommunications Complaint Board upheld that decision. NTA also rather strictly interprets the rules to the effect that a market-dominant operator must give smaller telecom companies access to its telecommunications network. NTA has also given other companies access to set up equipment at Tele Danmark's exchanges to enable the companies to link their own transmission networks with Tele Danmark's access network.
Today, Mobilix, France Telecom's Danish operator, in cooperation with the Danish Railway Agency (the state owner of the Danish railway infrastructure) and Powercom (the telecommunications arm of the electricity company) have their own large transmission networks in Denmark. And more transmission networks will be established in Denmark in the years ahead.
The driving force behind the liberalisation of the telecom market has been – and still is – the Minister for Research and Information Technology's right to intervene and establish actual legislation in cases in which the industry itself fails to reach agreement on the many details. The Minister's latest move came in February 1999, when he announced in Denmark's largest business newspaper that he was going to amend the legislation, primarily with a view to getting interconnect fees reduced.

Finland

Finland is one of the world's most deregulated, innovative and outward looking countries in terms of its telecoms, but like its neighbours Norway and Sweden, it has so far avoided complete privatisation. Despite the turmoil in the global stock market the Finnish government has said it is still on track to sell off up to 20 per cent of Sonera (the renamed Telecom Finland).
Competition is alive and prospering in Finland. Finnet, the organisation comprising 46 local loop companies that between them used to serve the more densely populated parts of the country (the sparsely populated areas were served by Sonera which had a monopoly of long distance and international traffic) has now gained 50% of domestic long distance traffic and is making serious inroads into the international market since deregulation in 1994.
Sonera has been rather less successful in making an impression in the local loop, although it is now making good progress using a variety of technologies such as wireless local loop using Nortel equipment. It will also be helped by legislation passed in 1997, the Telecommunications Market Act, which was designed to speed up the opening of the local loop. The Ministry of Transport and Communications has also said that it will intervene if competition in the local loop does not improve.

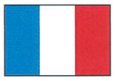
Quick to recognise IP

Sonera was one of the first operators to see the potential of Internet Protocol (IP)

networks, and has pioneered IP as a core carrier technology for all types of traffic. It has also legitimised Internet telephony and offers some of the most advanced Intelligent Network-based services and Virtual Private Networks (VPN) in the world. A third carrier IVO was allowed into the long distance and international market in 1994 and so far has under 10% of either sector.

First to operate dual mobile
In April 1998, Sonera said it would be the first European carrier to launch a dual-frequency GSM network operating at both 900 MHz and 1800 MHz, giving it a head start for future multiband mobile standards.

Investing abroad
In keeping with many PTO's, Sonera is investing abroad as domestic competition increases following liberalisation. Sonera has joined Swedish state-owned Telia in the purchase of 60% of Lithuanian Phone Company AB Lietuvos Telekomas, the transaction receiving the sanction of the EC in August 1998.



France

The French telecom sector is unusual. The incumbent, France Telecom, is well poised to face the onslaught of competition in this market, which is US-$ worth 25 billion a year. France Telecom boasts one of the most modern networks anywhere in the world, along with one of the highest levels of income per employee within the carrier community. France Telecom has also rebalanced tariffs and worked hard to ensure they are akin to costs.
France's regulator, the Autorité de Régulation des Télécommunications (ART) only came into existence on January 1th 1997, but is proving effective.

Maintaining the Pace
This should set the stage for a highly liberal and competitive industry that will greatly benefit the French economy. Ironically, the long established practice of government interference in industrial matters is threatening to nullify these great advantages, as well as bring the unwanted attentions of the Commission. For example, the government obliged France Telecom to build out cable television networks to be run by others. Already this has led to rows between France Telecom and ART over the cable networks being used for high speed Internet access. No doubt the temperature will rise far higher when cable operators try to offer full telephony services across their networks.
It is likely that the Commission will become involved, believing as it does that cable companies should not be owned by the state nor incumbent operators and that they should be used to provide alternative local loops.

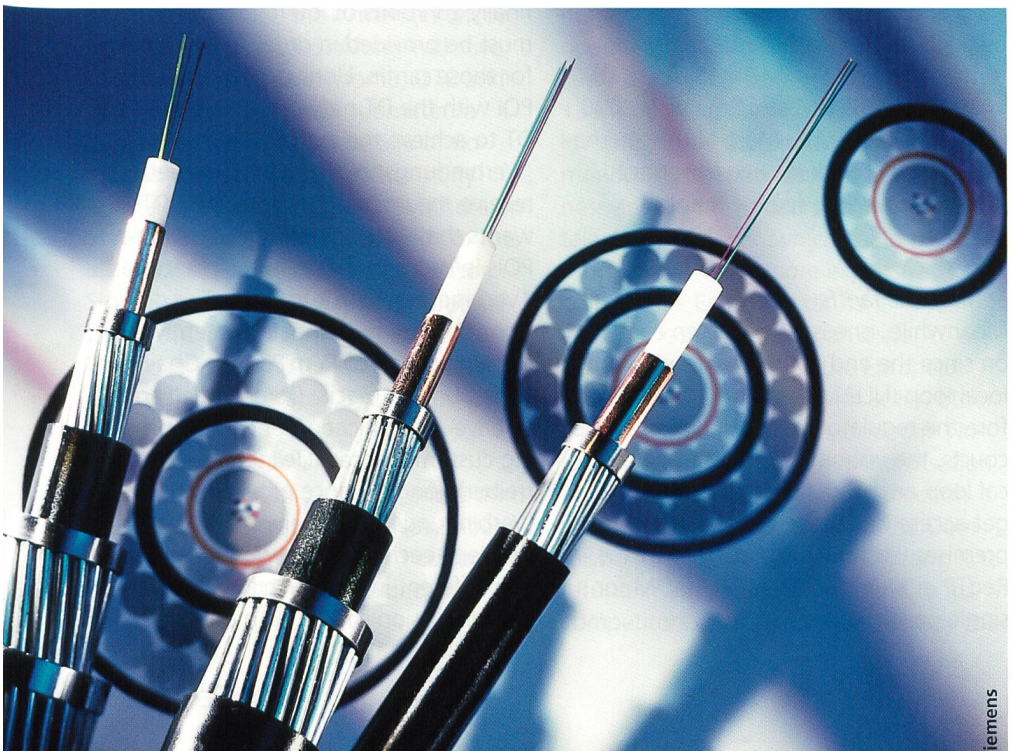
Privatisation – first Step
Despite the change of government in summer 1997 and the launch of yet another consultative process, the IPO of France Telecom finally went ahead in October 1997 (about five months later than originally planned). The government raised almost 42 billion US-$ for selling off just less than a quarter of France Telecom.
France Telecom's efficiency has not deterred competitors; there are seven companies now competing in the residential market, each of which has been allocated a so-called E number, awarded by lottery or negotiation.
The E digit is necessary because preselection for individual users will not go into effect before the year 2000, the deadline set by the European Commission. Instead, until then, callers must choose their preferred operator on a call-by-call basis. However, businesses will be able to use a preselected indirect access code (four digits) which will be transparent to the user.
France Telecom (8) is facing competition from six operators with direct access E numbers (shown in brackets): Cegetel (7), a CGE/British Telecom joint venture; Bouygues' 9 Telecom (9); Siris (2), a Unisource subsidiary; Esprit (6); and Omnicom (5) and Tele2 (4) both start-ups. This significance of the E digit means callers must use one of operator access codes to complete the call. Thus, France Telecom cannot automatically benefit from those who fail to select a carrier for their calls.

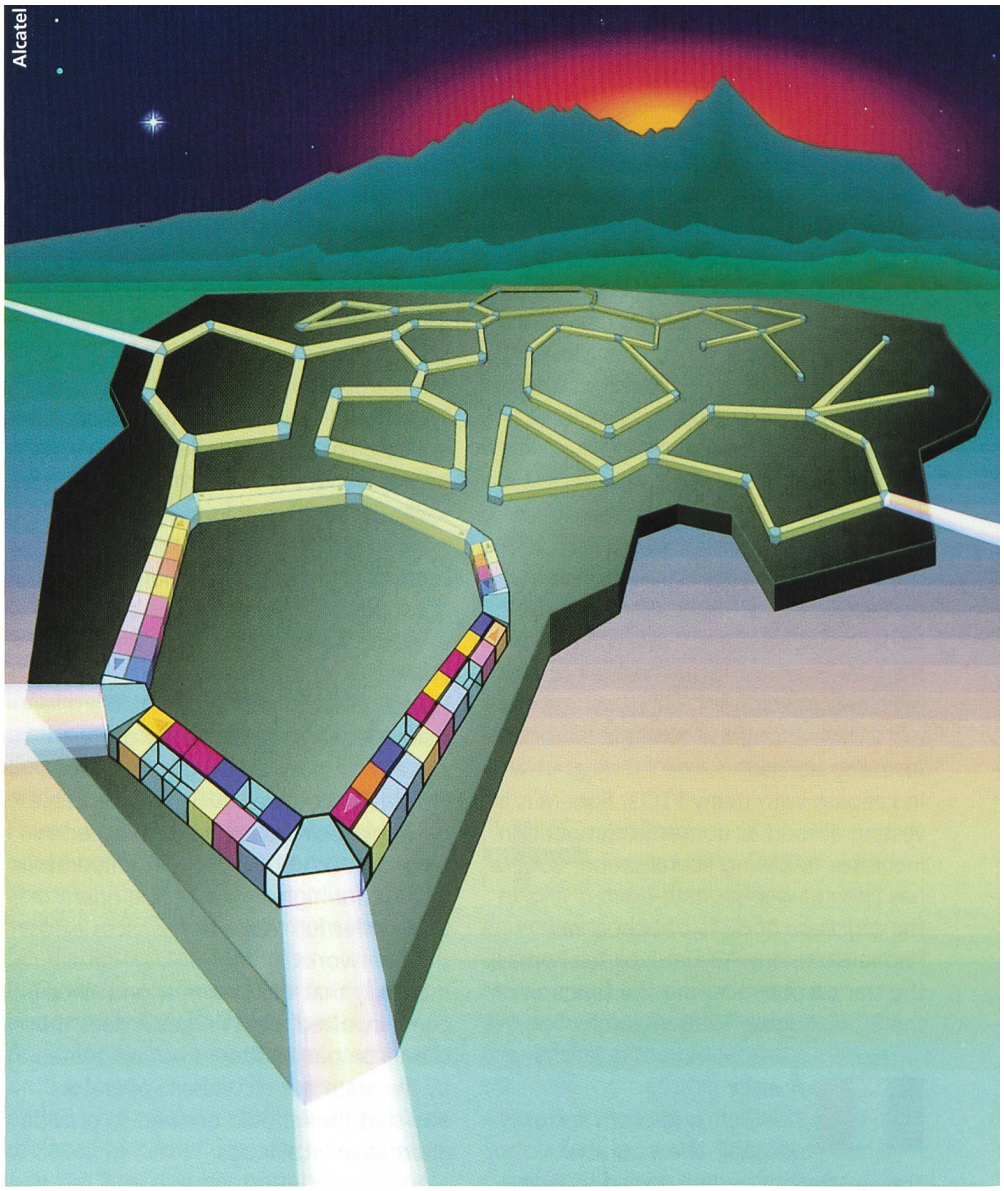
Interconnect
France can justly be proud that its interconnect rates are currently amongst the lowest in Europe. However, ART's announcement in October that France Telecom's rivals will have to pay it 16 million US-$ to help cover the cost of universal service is unlikely to be popular.

Cellular – slow to Take Off
Cellular began slowly out of the starting blocks. So far mobile telephony has not been widely embraced by the French, but recent growth has been robust – as of June 30th 1998 the penetration rate had risen to over 13% – no doubt due to the arrival of a third competitor, Bouygues in June 1996.

Germany

The German telecom market represents roughly 25% of the whole European telecom market and, therefore is one of the world's key telecom markets. The overall European market size for the year 2000 has been projected to 70 billion US-$ and for the year 2005 up to 97 billion US-$. With a





market of such significant proportions, liberalisation and industry watchers look to future developments in Germany.

Steps toward full Competition

Germany has been coaxed along the telecoms liberalisation path by the European Commission resulting in the German Telecommunications Act of 1996 (Telekommunikationsgesetz, TKG). Key provisions of the TKG include German users being able to choose between easy and equal access. With the Call by Call Access Service (easy access), customers can choose their operator by dialling a specific carrier identification code (CIC). With the Preselection Service (equal access), customers are automatically routed to their preferred carrier, thus eliminating the need to dial a carrier code.

As of January 1st 1998, the German regulatory body, the Regulierungsbehörde für Telekommunikation und Post (RegTP), started its work to monitor deregulation, a task which after the Telecommunication Act had become effective in 1996 had previously and for the interim been taken care of by the authority's predecessor, the federal Bundesministerium für Post und Telekommunikation (BMPT).

One of the first issues to be resolved in the regulatory arena between the incumbent, Deutsche Telekom AG (DT) – the government is still the majority shareholder – and the regulatory bodies were the interconnection rates. These rates were determined by the BMPT on September 12th 1997 to be at an average of 2.7 Pfennig following a complaint which had been filed by Mannesmann Arcor AG&Co. and o.tel.o. Communications GmbH&Co. (mainly claiming that the DT prices were not cost based). The BMPT had arrived at this average price by an international benchmarking taking into account eleven countries.

Germany is one of the first and few countries in Europe where customers can keep their telephone number when they change service provider (number portability). This is a very convenient advantage for German users.

Hot Debate

At the beginning of 1998, heated debates had erupted over DT's intention to charge either competitors or customers a 95 DM fee if they change service provider. DT claimed such a fee was necessary to cover the 170 million DM it is investing over two years in computer systems and software to facilitate competition. These demands were subsequently reduced to 42 DM, but were still considered too high, even though DT insisted it will not cover the costs involved. Competitors and experts pointed out that the equivalent fee in the US is between 2 US-$ and 5 US-$. In June the regulator decided that DT can charge their customers a fee of 27 DM (in 1998, 20 DM) in 1999 and 10 DM as of the year 2000 (all inclusive of VAT). Most of the alternative service providers have announced they will cover the fee for their customers.

Setting fair Tariffs

Meanwhile, one issue has been carrying on since the end of 1996 – unbundled local loop (ULL). After proceedings before the regulator and the administrative courts, the interim fee for unbundled local loop enabling alternative carriers to get access via DT lines to customer premises was preliminarily fixed by the RegTP in March 1998 at 20.65 DM for a single pair of copper cable.

Another decision taken by the RegTP at the end of November 1998 concerns the eligibility to benefit from the interconnection tariffs, which had been fixed by the regulator in September 1997. The issue had been brought before the RegTP by DT, which claimed that initially, 8 and finally 23 Points of Interconnection (POI) must be provided in order to be eligible for those tariffs. Until recently only one POI with the DT network was required by DT to achieve the status of a "Verbindungsnetzbetreiber", or better to receive the interconnection rates. DT wants these providers to have multiple POIs in order to maintain their status as "Verbindungsnetzbetreiber". The discussions became more heated recently by the suggestion of RegTP's Vice Chairman Arne Börnsen (Social Democratic Party) to have a classification of carriers providing customer access (Teilnehmernetzbetreiber), long distance providers (Verbindungsnetzbetreiber) and simple resellers, each of which would have to pay different interconnection rates to DT. This discussion should be monitored

carefully due to its considerable impact for the German telecoms market.

Greece

Although Greece has a high teledensity of 50%, the state-controlled telephone monopoly is under pressure from the government, the European Commission and investors to expand and improve its network. The Hellenic Telecommunications Organisation SA, known as OTE, is to hold onto its monopoly of basic telephony and a number of other services until January 1st 2001. This is the longest preparation time given to any EU member state incumbent before competition is introduced. OTE's request for a derogation until 2003 was turned down by the Commission and alternative network infrastructures were opened to competitors from October 1st 1997.
OTE put a business plan in place that was to run from 1996–2000 and had allocated 44.9 billion US-$ to the network improvement programme which was to include the full digitalisation of the trunk network. However the investment plans were delayed until December 1997;
OTE's board awarded five year contracts, mainly for digital phone-line hardware from Intracom SA and Siemens AG's Greek unit, that were worth up to 1.45 billion US-$.

Investment Partners

OTE is also investing abroad as part of its bid to become a regional hub. In June 1997 OTE and Telecom Italia jointly acquired a 49% stake in Serbija Telekom of Yugoslavia. In December it agreed to buy 90% of ArmenTel, the Armenian telco, for 142,5 million US-$. Along with five other companies or consortia, OTE and SBC Telecoms of the US submitted a joint bid in May 1998 for 35% of Romanian state-owned telecoms utility Romtelecom SA. The bid was withdrawn in August with "fears for security of the investment" being cited as the reason. Since February, there has been speculation that OTE is planning a joint bid with Deutsche Telekom AG to acquire Bulgaria's phone operator, BTC.

Privatisation Continuing

OTE first went public in 1996 and a third offer of shares was made in November 1998. The Greek Government currently owns 75% of OTE and is expected to sell a further 10%.

Active Mobile Scene

In the mobile sector, both competitors are already active – Stet Hellas Telecoms SA (unit of Telecom Italia) and Panafon SA (unit of Vodafone Group, UK).

Ireland

Ireland is known as the Celtic Tiger because its economy is booming. Yet even now Ireland only has around 37 telephones per hundred people – far below the EU average, despite being a major base for multinationals and call centres. This is rapidly changing, however, with the call centre business alone expected to double in the next fifteen months.

New Moves on Liberalisation

Ireland's incumbent operator, Telecom Eireann (TE), originally did not have to surrender its monopoly of basic telephony until January 1st 2000, instead of 1998 like most other member states. The derogation was granted on the grounds that TE needed extra time to modernise and expand its network before full competition is introduced. However, in May 1998 an important decision was made by the Irish Government in which they promised to deliver full liberalisation by December 1st 1998 – bringing Ireland in line with the rest of Europe. This decision was made for a number of reasons including the Irish government's belief that to fall behind the rest of Europe in liberalising its telecommunications infrastructure would adversely impact its strong economic growth.
Prior to this decision, Ireland, along with most European countries, had inherited a monopoly telecommunications service operated by TE. TE was reluctant to lease lines to other carriers and, until July 1997, other carriers were not legally allowed to build their infrastructure. This monopoly situation resulted in Irish business and domestic users having to pay telephone charges, which could be as much as ten times more expensive than comparable European tariffs.
Interconnection remains an issue. TE attracted the attention of the European Commission and along with seven other incumbent operators was chided in November 1997 for hindering liberalisation in their markets. High interconnection fees came under scrutiny and the Commission has written to TE instructing it to refund interconnect overcharges to its competitors. The amount decided by the Irish regulator, the Office of the Director of Telecommunications Regulation (ODTR), was established in the summer of 1997.
In July 1997, the first step in relaxing the restrictions arrived as other carriers were allowed to build their own networks. However, these developments really only impacted business customers in designated areas such as the financial district in Dublin or the National Technology Park in Limerick. The next step is for Telecom Eireann to put in place a tiered business offering retail, wholesale and full interconnect rates to other carriers. This will reduce carrier costs and as result will further reduce consumer costs.

Italy

Italy's road to telecoms liberalisation has been characterised by protracted political debate. However, on a brighter note, in July 1997 the unification of incumbent operator Telecom Italia (formed in 1994) and STET, its state-owned holding company, took place. This enabled the sale of 45% of the Italian government's holding in the new entity, Telecom Italia, in October 1997. The sale raised 11.14 billion US-$.

Privatisation of Telecom Italia

The privatisation could not have gone ahead if political agreement to establish a regulator had not finally been reached in April 1997. In December 1997 the Italian government appointed high court judge Enzo Cheli to head a new telecommunications regulator (which will also oversee broadcasting) to be based in the southern city of Naples. The Italian authority has been operational since the beginning of June 1998.

Progress on Interconnect

On the interconnection front, Telecom Italia was relieved of having to pay 900 billion lire (507 million US-$) in to the Italian government every year, a legacy of its former status as a monopoly. Telecom Italia welcomed the news saying it would make it possible to lower its interconnect rates which at the moment are contributing to the charge. It is unlikely the charge will be abolished before 2000, but in the meantime it could be substantially reduced.
On June 10th 1998 the Official Gazette published a decree entitled "provisions concerning interconnection in the telecommunications sector".

The decree sets out the contents to be compulsorily included in the standard interconnect offer, which the incumbent operator (Telecom Italia) is obliged to publish within 45 days of the decree coming in to force.
The decree also introduces the principles of unbundling and establishes that interconnect tariffs must be set using principles of transparency, must not be discriminatory and must be based on costs. To this end it lays down criteria for the separation of accounts so that the costs incurred can be verified.
Trouble is also looming regarding the Universal Service Obligation; the north is far better served than the poorer, less densely populated south.

The booming Cellular Phone Sector
The cellular sector has grown rapidly over the last two years after a sluggish start, with more than 14 per cent of Italians having a mobile phone. Telecom Italia Mobile (TIM) and Omnitel-Pronto Italia, the two existing cellular operators, were joined in June 1998 by Wind, a joint venture between Enel (the Italian state electricity company), Deutsche Telekom and France Telecom, which won the contest for the third cellular phone licence with its DCS-1800 technology. Wind started offering its services for a test period towards December 1998 with a view to joining the market early in 1999.
TIM, the most dominant mobile operator, caused a sensation in October 1997 by announcing its commitment to W-CDMA (Code Division Multiple Access technology.) for its next generation of mobile services.

Luxembourg

Luxembourg's national operator has a number of significant advantages. There is a very high number of lucrative multinational companies with a substantial presence in Luxembourg. It is geographically at the heart of Western Europe, has a teledensity of 60%, according to the ITU, while its network has been fully digital since August 1995. But the road to liberalisation has been characterised by indecision and these advantages could be eroded.

Hard to keep Track
After applying for a derogation to have its liberalisation deadline extended to 2000, on the grounds that the incumbent operator, P&T Luxembourg, needed the time for organisational restructuring, the country fully opened its telecoms sector to competition in mid 1998. The post and telecoms services have not yet been separated and, to date, there have been no announcements about how or when P&T might be privatised.
The Institut Luxembourgeois des Télécommunications (ILT) was established on April 1st 1997 as an autonomous regulatory body.
P&T is a small concern with an annual revenue of under 300 million US-$ which, coupled with the advantages outlined above, make it extremely attractive to larger concerns.
Along with half the EU member states, Luxembourg had attracted criticism from Commissioners Martin Bangemann and Karel Van Miert, who were respectively responsible for telecoms and competition. However, the government is now speeding up the movement towards full liberalisation. Interconnection tariffs were published at the end of September 1998 and Carrier Selection Codes (CSC) which came into play at the beginning of December 1998 were announced in early October 1998.

Mobile Sector
In October 1997 MILLICOM SA became the second mobile operator alongside LuxGSM (mobile unit of P&T). MILLICOM commenced operations mid 1998 and is investing in the development of the GSM-DCS 1800 network named TANGO.

Netherlands

The Netherlands has adopted a mixed approach in the run-up to EU liberalisation. While the government blew its whistle for an early start of play on July 1st 1997, six months ahead of the January 1st 1998 EU deadline, users had to wait a little longer before they could feel the benefits of full competition.
The Netherlands passed an interim law to ready the environment for full competition within the EU timetable. Infrastructure and the "non-reserved" services market were liberalised. In addition, two national operators were licensed:
- Telfort (BT and Dutch railway Telecom Spoorwegen joint venture)
- Enertel (comprising regional electricity and cable TV companies; recently taken-over by WorldPort)

The government has a stake in both these operators, in addition to its remaining stake in the incumbent, PTT (KPN) Telecom. A new Act came into force in autumn 1998. In 1997 the Netherlands established an independent

regulatory body, OPTA (Office of Posts and Telecommunications Authority), which reports to the government's ministry of economic affairs.

Regulator takes Action
In January 1999 OPTA got down to business, publishing a discussion paper which signalled its intention to push the incumbent swiftly in the direction of cost-based interconnection pricing. OPTA is clearly pushing for the incumbent to begin rebalancing its pricing by upping line rental and lowering local call charges – thus leading the way to lower interconnection costs for competitors.

Sky is limit
With the introduction of the new Telecom Basic Law, in autumn 1998, there is no limit on the number of operators in the Netherlands and licensing is scrapped. New operators need only register their intentions with the government to gain equal interconnection rights; and there will be no distinctions drawn between facilities-based operators and non-facilities based operators.

Portugal

Portugal was granted derogation by the EU on the grounds that it was still a developing telecoms market. Voice, telex and telegraphy services were to remain within Portugal Telecom's monopoly until January 1st 2000. However, in March 1998 the Economy Ministry announced that competition in the provision of basic voice telecoms would begin in 1999, although an exact date has yet to be determined.
Portugal's government was accused in November 1997 of failing to make Portugal Telecom (PT) put transparent, cost-based interconnection systems in place by EU Commissioners Martin Bangemann and Karel Van Miert. The Commissioners were in charge of telecoms and competition respectively.
If Portugal and the six other member states cited by the two Commissioners did not respond quickly to the EC's complaints, the Commission would issue a "reasoned opinion" (final warning) before proceeding to the European Court of Justice.

Progress Continues
PT appears unruffled by the Commission's concerns and continues to make good progress. Portugal's teledensity is now up to 38,5% and 80% of TP's network is digital. TP has been largely privatised in three successful tranches, with the government now holding only 25%. All in all, new entrants will probably have a tough time in the Portuguese market. ETG, owned by a consortium of Portuguese utilities holds the second fixed-line operator's licence.
In December 1997, Telefónica de España and PT agreed to provide preferential services and prices to each other's major customers, as part of a wider alliance the two companies formed in April 1997. The aim was to lower the cost of phone calls between Spain and Portugal, with the ultimate aim of making the Iberian peninsula into a single telecoms market.

Falling Tariffs
The early liberalisation of voice telephony is good news for new entrants Electricidade de Portugal and Inparsa-Industria e Participacoes. The latter is also the main shareholder of Optimus, Portugal's third mobile telecoms provider, the other two being Telecel-Comunicacoes Pessosais and TMN, a unit of PT.
Portugal's mobile phone market is one of the fastest growing in Europe and is likely to benefit from falling interconnection fees to fixed networks as competition in that sector increases. In August 1998 Optimus announced that for certain customers it would undercut the local rate for fixed-line phones. TMN reacted by saying it would charge even less.

Spain

Although originally aiming to opt out of early European liberalisation, Spain has accelerated the introduction of competition: establishing a regulator, selling off its stake in Telefónica and licensing competitors. Users can look forward to increasing competition in Spain itself, but turmoil in the global alliance scene in 1998 has left large corporate users in limbo.

Ahead of 2003 Deadline
In fact Spain originally secured EU agreement to keep its market closed until 2003, along with Greece, Portugal and Ireland, on the grounds that its telecom industry would still be ill prepared for the cruel pressure of full-scale competition. In the event, that undeveloped industry is turning out to be a pivotal piece in the global jigsaw. Spain is liberalised as of December 1998. An independent regulator commenced activities in 1997.
Spain's current competitive environment roughly follows EU policy directives, although details of interconnection are still uncertain.

Privatisation
1997 saw the government sell its remaining stake in Telefónica. It also licensed a second operator from Spain's state-owned television distribution network, Retevision, sold off this year to a consortium of Spanish banks and utilities along with Italian carrier, STET. Retevisión already has an extensive, broadband backbone network and is expected to build out its own access networks, perhaps in alliance with cable TV companies.

International Partner Search
In April 1997 Telefónica announced a dramatic defection from Unisource, an alliance of European national carriers comprising Sweden's Telia, Holland's PTT Telecom and Swiss Telecom, to join the BT/MCI alliance, Concert. With Telefónica came Portugal Telecom and valuable access to the potentially huge South American market.
But with the MCI WorldCom merger announcement in the latter part of 1997, Telefónica's position altered again and it signed a sweeping agreement with MCI WorldCom, ending its three year search for an international partner.
As a result of this turmoil, many corporate users in Spain – especially those with global telecommunications requirements – were left in limbo, awaiting a settled competitive landscape before making strategic supplier decisions. Since the MCI WorldCom merger completion in mid September 1998 the situation is now stabilising.

Third Licence Tender
Telefónica came to an agreement with Retevisión before the latter's privatisation, although the controversy ensued over an envisaged increase in the 0.03 US-$ per minute rate to shadow the "rebalancing" between local and long distance charges Telefónica expected to implement. A third licence was awarded in April 1998 to Lince, a consortium headed by France Telecom (69%) with the condition that it must invest 653 million US-$ over the first five years.

Observers say that most of the investment "action" so far in Spain has been focused on strategic interests, rather than Spain's own under served population. Having already invested around 5 billion US-$ in Latin America, Telefónica is spending more than 6 billion US-$ to buy telecommunications assets in Brazil reinforcing its position as Latin America's largest phone company.

Competition Increases

The effects of increasing competition are beginning to be felt. At the beginning of September 1998 Retevisión cut its long distance rates by an average of 16% and international rates by 8% and announced it was cutting provincial rates from the middle of the month. A week later Telefónica announced it would cut its provincial rates by up to 15%. Telefónica had gained government approval to increase local rates and cut long-distance and national rates less than a month previously. At the end of September ONO, part of the Lince consortium and one of Spain's largest cable TV operators, announced local tariffs 10% to 60% lower than those of Telefónica. Telefónica no longer holds a monopoly on local phone services.

Mobile gaining Ground

Having won a fixed licence in 1997, Retevision was awarded Spain's third mobile licence in June 1998 putting it into competition with Telefonica and Airtel which is controlled by AirTouch Communications Inc. and BT plc. Spain has one of the fastest growing mobile phone markets in Europe, although its expected 16% growth in 1998 is still below the EU average.

Sweden

Sweden, like Finland, has been an enthusiastic supporter and early adopter of telecoms liberalisation, without seeing privatisation as its necessary companion. Despite trends in the rest of Europe, the privatisation of the already "corporatised" national carrier, Telia, remains off the legislative programme. For users the fear is that Telia's power will inhibit the development of competition in Sweden.

Tilted playing Field?

As the rest of Europe catches up on telecom reform, Sweden is in danger of slipping down the liberalisation league due to the power Telia, the state-owned dominant carrier, continues to wield within the Swedish market. As hitherto loose telecom operator alliances begin to tighten through equity swaps, the position of Telia within the Unisource alliance will look increasingly anomalous: not only may Telia be unable to cement closer ties with its Dutch, Swiss and Italian partners, plus AT&T, due to the 100% government holding, but its state ownership position may place a regulatory block against the expansion of the entire alliance.

Rivals can and will point out to the European Commission that Telia's dominance in its home market acts as a structural tilt in the pan-European "level playing field". Sweden's national carrier was detached from direct state control in 1993, when it became a state-owned corporation and faced competition in international, national long distance and leased line services from Sweden's second operator Tele2, backed by UK operator Cable & Wireless. Despite five years of full-on competition, however, Telia still dominates with 94% of the national call market and 68% of the international.

In some ways, Telia has been allowed to increase its grip in the domestic market. With mobile cellular usage booming in Sweden, at over 30% penetration, Telia has reabsorbed its mobile subsidiary, Mobitel, in preparation for the emergence of mobile/fixed telecom services. With over half the cellular market in Sweden, Telia is well placed to deploy innovative "one number" services.

Future far from Certain

In forming Unisource, however, Telia threw down the gauntlet to the other dominant Scandinavian operators, since one aim was to use the alliance to win a slice of the lucrative business of providing telecom services to organisations across the region. This challenge was duly picked up by Telenordia, a partnership between the UK's BT, Norway's incumbent Telenor and Denmark's Tele Danmark, now controlled by US telco, Ameritech. Telenordia operates a broadband network linking the four Scandinavian states, tailored to provide advanced business services.

With over ten operators in Sweden, market segmentation has already taken form. Despite the need to differentiate, many operators compete on price alone, causing churn and varying qualities of service level agreements. The winners will be the

Sources of Information used in preparing Article

European regulatory initiatives: Worldcom, Directorate General XIII of the European Commission

European RTD initiatives, INFOWIN & ACTSLINE projects, RACE, ACTS & IST, INFOWIN & ACTSLINE projects, PROSOMA, CORDIS: Community Research and Development Information Service

Regulatory Initiatives and developments across Europe:

Austria	Austrian Telecoms Authority
Belgium	Belgacom
Denmark	Danish National Telecom Agency
Finland	Sonera
France	French Regulatory Authority
Germany	German Ministry of Post & Telecommunications
Greece	Hellenic Telecommunications Organisation SA
Ireland	Department of Public Enterprise, Liberalisation Section
Italy	Italian Competition Authority
Luxembourg	Luxembourg Regulatory Authority
Netherlands	OPTA (Office of Posts and Telecommunications Authority)
Portugal	Portugal Telecom
Spain	Telefónica
Sweden	Swedish Regulatory Authority
Switzerland	BAKOM (Swiss Federal Office for Communications)
United Kingdom	UK Regulatory Authority

operators who achieve a unique position among their target market.

Switzerland

Liberalisation is making good progress in Switzerland, in line with the EU timetable, even though it is not a member state. Swisscom is in a strong position to face competition. It provides 4,5 million lines for a population of seven million; a high teledensity of 64%. Its network is modern and a wide range of services is available to both individuals and businesses.
A new telecoms law was passed in April 1997 to open up the market fully to competition and it came into play on January 1st 1998. On the same date, telecoms and the national postal service became legally separate entities.
An initial public offering of Swisscom shares was made at the beginning of October 1998 putting the incumbent PTO on the road to privatisation.

Competitive Scenario

In November 1997 the incumbent PTO Swisscom (its name changed from Swiss Telecom in autumn 1997) agreed an undisclosed interconnect rate with its rival Sunrise. Under the new law, all interconnect agreements are to be reached through negotiation. Swisscom's other main rivals include Diax, a consortium comprising the Swiss electricity companies plus the US' SBC Communications and Sunrise which consists of three Swiss companies, including the national rail network operator (Swiss federal Railways), plus BT of the UK and Tele Danmark of Denmark.
Despite having stated it only wanted to cover costs on interconnect, Swisscom charges are considerably higher than the average in other European countries.
The first tranche of Carrier Selection Codes (CSC) which allow users to choose their operator was allocated in November 1997. Another tranche had to be issued in August 1998 to satisfy the demands of an increasing number of alternative operators.

Regulator in Place

The Swiss regulator, the Federal Office of Communication (Ofcom) is well established and the Communications Commission (ComCom) has been set up to oversee frequency allocation, numbering and interconnect. ComCom, for its part, awards the basic provision licence and licences for the provision of mobile telephone and other radio services where the licence is awarded on the basis of an invitation to tender. It also rules on interconnection disputes. ComCom additionally approves frequency and numbering plans.

United Kingdom

The UK is always held up as a paragon of liberalisation in the EU because of its early lead in competitive policies. Yet despite the award of more than 150 local, regional, national, international and value added (such as personal numbering) operating licences by the Department of Trade & Industry (DTI), the incumbent, British Telecom still has the lion's share of the UK market.
BT's monopoly ceased as long as 1982 when Mercury Communications, a subsidiary of Cable & Wireless, was licensed as a "duopoly" competitor to BT. The 1980s therefore saw relatively low-level competition, giving a privatised BT time to adapt and maintain its hold on the market.

Duopoly Ends in 1992

Although the duopoly of Mercury and BT ended in 1992 for domestic services, it was allowed to continue in one critical area – international traffic – until December 1996 when the DTI awarded 44 International Facilities Licences.
Local loop is one of the areas in which the UK truly blazed a trail. After the "Duopoly Review" of 1991, UK cable television operators were the first in the world to be allowed to provide telephony as well as entertainment services. By the end of 1997, the cable companies had around 2.5 million telephone lines installed. About 60 000 customers are moving to cable operators for telephony each month. Atlantic Telecom, however, are using wireless technology to roll out alternative local loops.

Fierce Mobile Competition

On the mobile side, the UK has four operators – Vodafone, Cellnet, one2one and Orange. The first two entered the market in 1985 with analogue services. They both also offer GSM services now and will phase out the analogue networks in the first years of the next millennium. One2one and Orange are PCS operators who started operations in 1993 and are beginning to take market share from the other two. About one in four people in the UK have a mobile phone.
Meeting the deadline of January 2000 for Equal Access is causing some concern and the EC and Oftel, the UK's regulator, are currently looking at this area of liberalisation. [4]

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Zusammenfassung

Die Welt der Telekommunikation verändert sich schneller als je zuvor. Dieses Tempo scheint noch zuzunehmen, und Europa hat eine führende Rolle in diesen Veränderungen. Die EU ist verantwortlich dafür, Richtlinien für die Telekommunikation aufzustellen und für deren Einhaltung zu sorgen. Die EU ist auch verantwortlich dafür, die technischen Entwicklungen, die es für die Einhaltung dieser Richtlinien braucht, zu ermöglichen und teilweise zu finanzieren. Dieser Beitrag zeigt auf, was in ganz Europa diesbezüglich geschieht und gibt einen Überblick über die wichtigsten Veränderungen in den einzelnen europäischen Ländern.

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AMD will sein gesamtes Mikroprozessorprogramm überarbeiten

Im kommenden Jahr soll das gesamte MPU-Portfolio von AMD auf den neuen 0,18-µm-Produktionsprozess umgestellt werden. Das gilt sowohl für die K6-Reihe als auch für den «Athlon». Die K6-Prozessoren sollen dabei für mobile Geräte «umgestrickt» werden, während man die Leistungsklasse des «Athlon» nach oben ausbauen möchte. Dazu hat man bereits einen luftgekühlten «Athlon» als Prototyp gezeigt, der mit fast 1 GHz getaktet war.

Offene Ausschreibungen im Mobilfunk

Nach einem Bericht der «Nihon Keizai Shimbun» will das japanische Postministerium zu einer offenen Ausschreibung für künftige Mobilfunkbetreiber übergehen. Bislang wurde mit potenziellen Bewerbern solange unter der Hand verhandelt, bis man eine Einigung erzielt hat. Das hat aber ausländische Interessenten davon abgehalten, sich um Lizenzen zu bewerben. Jetzt beabsichtigt man eine Gesetzesänderung, die eine offene Zuordnung von Frequenzen nach überprüfbaren Kriterien bisher verhindert haben. Die erforderlichen Neuregelungen sollen bereits in den nächsten Monaten auf den Weg gebracht werden. Ganz ohne Druck von aussen dürfte diese Entscheidung nicht gekommen sein: Amerikanische Interessenten haben sich seit langem beschwert, dass sie wegen der «versteckten» Lizenzen keine Chancen auf dem japanischen Markt hatten.

300-mm-Wafer vor dem Durchbruch?

Nachdem der Vorstandsvorsitzende von Infineon Technologies, Dr. Ulrich Schumacher, eine Entscheidung für die erste Serienproduktion von 300-mm-Siliziumscheiben in den nächsten Wochen angekündigt hat, scheint man sich auch woanders auf diese neue Produktionstechnik wieder zu besinnen. Das 300-mm-Joint Venture zwischen Infineon und Motorola in Dresden hat in den vergangenen Monaten gezeigt, dass man ausserordentlich produzieren kann. Jetzt hat Hitachi angekündigt, seine früheren 300-mm-Pläne zu reaktivieren und eine eigene Fertigungslinie aufzubauen. Dies soll in einem Joint Venture (60:40) mit der UMC aus Taiwan geschehen, und zwar ab April 2000. Insgesamt werden knapp 700 Mio. US-$ investiert. Die Produktionslinie soll bis Mitte 2001 auf 7000 WSPW (Waferstarts per Week) hochgefahren werden, die Hälfte davon nimmt UMC für seine Foundry-Kunden ab.

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Ein Speichermodul für 512 MByte

Nicht für jedermann ist das neue DIMM- (Dual Inline Memory Modul), das Hitachi seit Anfang des Jahres anbietet. Es ist das erste Industriemodul der Welt, das synchrone 256-Mbit-DDR-Chips (Double Data Rate) zu einem halben Megabyte zusammenfasst. Das DIMM ist zu 64 M-Worten mal 72 bit organisiert. Es ermöglicht nach draussen einen Datentransfer von 1,6 GByte/s bei 100 MHz Takt. So viel Leistung hat seinen Preis: Das 184-pin-Modul soll fast 4500 US-$ kosten.

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In Japan entsteht durch Fusion der zweitgrösste Telekomkonzern

Jetzt scheint es sicher: Im Herbst 2000 wollen die drei japanischen Telefonunternehmen DDI, KDD und IDO fusionieren. Das Gerücht hielt sich hartnäckig schon seit Monaten. Ein Basisabkommen scheint nunmehr erreicht zu sein. Das neue Unternehmen wird einen Umsatz von rund 20 Mia. US-$ repräsentieren. Aus internen Quellen war zu hören, dass bis zuletzt um den Namen des neuen Unternehmens gerungen wurde. Toyota Motors, Hauptaktionär bei KDD und IDO, wollte unbedingt den Namen von KDD erhalten. Letztlich aber setzte sich Kyocera als Hauptaktionär von DDI durch, das vereinigte Unternehmen wird weiter unter «DDI» firmieren.

ATM 2000 Developments

The ATM European Congress

ATM/IP : Quality of Services

VPN, IP, Video

Novamédia — Rennes District, Vivre en intelligence — Rennes Atalante — Conseil Général d'Ille et Vilaine — Région Bretagne

March 28, 29 and 30, 2000, Rennes, France

International Conference / Exhibition

Sponsors : Newbridge, Ericsson, Matra Nortel Communications, Devoteam, France Telecom, eci Telecom, Nokia, Lucent Technologies, Fujitsu

Tuesday, March 28, 2000 : 4 tutorials and the European Commission workshops

ATM *by Jacques DUPRAZ, Professor, Supélec*

Routing over ATM and IP *by Daniel KOFMAN, ENST Paris*

Voice over ATM and IP *by Hossam AFIFI, ENST Bretagne*

Quality of services ATM, MPLS, DiffServ...
by Jacques DUPRAZ and Salim HAMZAOUI, ALCATEL

Parallel workshops organised by IST projects by the European Commission

The theme of the workshop covers the state-of-art-technologies in the area of Next Generation Networks such as future of ATM, evolution of IP networks, QoS related to IP Networks, Home networks supporting multimedia services, IP over WDM guaranteeing high bandwidth services, convergence between fixed and mobile networks, nomadic services, etc.

These are the major research issues in the Information Society Technologies (IST) research programme of the 5th EU framework.

The invited speakers from IST, IETF, ETSI, EURESCOM and ATM Forum will provide the expert views in the round panel discussion.

Wednesday March 29 and Thursday March 30, 2000 : conferences

March 29, 2000

Building service level agreements

Session chairman : ***André RENAULT, SEMA GROUP***

- The business model for the 21st century ?
  Sylvie RITZENTHALER, NEWBRIDGE
- Service Level Agreement for ATM services
  Jean-Pierre SAVI, FRANCE TELECOM
- How to build an SLA in an ATM network - tools and indicators
  Christian GROSU, MATRA NORTEL COMMUNICATIONS
- Advanced testing techniques for ATM service level agreement (SLA)
  Yvon ROUAULT, AGILENT TECHNOLOGIES

Terry MATTHEWS, NEWBRIDGE Chairman, will present his vision of the future of networking (Canada)

ATM/IP technologies for voice transport

Sessions chairman : ***Jean-Pascal JULIEN, FRANCE TELECOM***

- Developments in new network telephony
  Michael MCLOUGHLIN, GENERAL DATACOMM (UK)
- ATM and IP for the telephone network of the future
  Michel JOUBERT, CEGETEL
- Towards programmable switches for the next generation networks ?
  Philippe DECOTTIGNIES, N.E.T.

Core telephone network migration

- Technical considerations for deploying ATM in the core of third generation mobile networks
  Mark PURDOM, LUCENT TECHNOLOGIES (UK)
- Voice, data convergence over a multiservice platform
  Gabriel BOUZERDAN, TELECOM DEVELOPPEMENT
- Practical applications of PSTN applications on a packet based network : real requirements, real solutions
  Marc SHANNON, NEWBRIDGE (Canada)

ROUND TABLE "Which technology for the new telephony ? "

Moderator : ***Fred S. KNIGHT, Chief editor of BUSINESS COMMUNICATION REVIEW***

March 30, 2000

New challenges in the local loop

Session chairman : ***Jean-Pierre SER, FRANCE TELECOM***

- ATM broadcasting in an ADSL local loop
  Souad DAMIEN, CS TELECOM
- The alliance of TV and fast internet
  Christian LEVESQUE, NBTEL MONDIALE (Canada)
- ATM benefits for xDSL accesses
  Jean-Marc ODET, MATRA NORTEL COMMUNICATIONS

Recent developments in QoS

Session Chairman : ***André DANTHINE, Emeritus Professor, Liege University***

- CLE-based VPN Model
  Ariel CANER, RAD DATA COMMUNICATIONS (Israël)
- MPLS, QoS, Differentiated Services and ATM
  Speaker to be confirmed, ERICSSON
- VPN et quality of service
  Bob BRACE, NOKIA NETWORKS (UK)
- Inside an ATM Label Switch Router
  Geoff BENNETT, FORE SYSTEMS

ATM in live services

Session Chairman : ***Gérard W. RYAN, Technical Manager, Bell Labs, Lucent Technologies***

- Video tele-teaching using ATM
  Gilbert SOL, UNIVERSITÉ PARIS VII
- MPEG-2 over ATM broadcasting. Example of the use of this technology in the domain of teleteaching.
  Olivier DANTHINE, TOLMA
- A real-life application : motorway videosurveillance
  Hervé HOFF, T2M and Jean-Philippe HAMARD, SOCIÉTÉ DES AUTOROUTES PARIS RHIN RHÔNE
- Strasbourg tramway
  Alain JOVELET, SPIE TRINDEL STRASBOURG and Philippe LECLERE, COMPAGNIE DES TRANSPORTS DE STRASBOURG

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