

BUILDING THE INFORMATION HIGHWAYS

TO RE-ENGINEER EUROPE

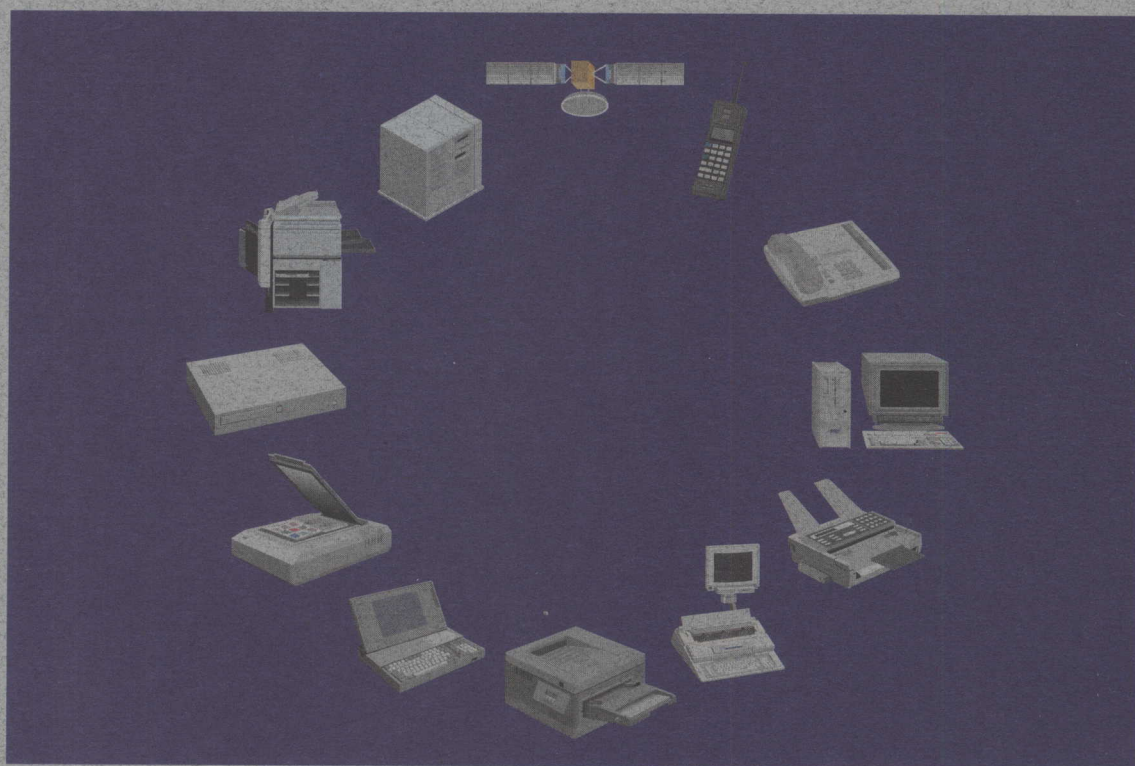
A MESSAGE FROM
INDUSTRIAL USERS

«*INFORMATION HIGHWAYS WILL MAKE
A GREATER IMPACT ON SOCIETY THAN
DID RAILWAYS, ELECTRIC POWER
AND THE TELEPHONE*»

JUNE 1994



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This report was produced by a working group chaired by Carlo de Benedetti and has been approved by the ERT in Plenary Session.

Most of these opinions are widely shared within the business community, but individuals may differ on specific points.

This report does not claim to represent a unanimous view of ERT Members.

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FOREWORD

The world has entered a new phase of development and change.

The «Digital Revolution», driven by remarkable development in information and communication technologies, is changing the way we organise our companies and institutions. It will accelerate the integration of world markets; it will change the way we live and work.

By building these «Information Highways» we will open the door to an information-rich society, where every individual can have access to whatever information he wants, when and where and in the form that he wants it.

The new infrastructures will in some ways make an even more dramatic impact than did the old physical infrastructures of railways, electrical power and telephones which stimulated earlier cycles of economic growth. But there are two major differences.

- The new infrastructures will be financed by private investors, repaid by fees charged to users, and will make little or no demand on the public purse.*
- The new infrastructures will generate more and more employment as people learn to use them more intensively, instead of merely creating short-term jobs during the building phase.*

Companies and countries which use the new information networks are already gaining benefits in terms of lower costs, better services and business competitiveness. But in this process Europe is lagging behind.

The European Round Table of Industrialists, in its 1993 Report «Beating the Crisis», addressed the principal danger facing Europe:

«Europe has become a high-cost, low-growth economy that is not adapting fast enough and is therefore losing competitive advantage to more dynamic parts of the world.»

The present Report sets out a challenging answer to these fundamental problems of economic stagnation, declining competitiveness and structural unemployment.

The Digital Revolution offers a unique opportunity to get Europe moving again at a pace comparable to our US and Asian competitors.

But to do that it is vital to remove obstacles and create competitive conditions in the telecommunications market.

Europe today is a patchwork of incompatible communication networks marked by high costs, low quality services, and very limited interoperability between systems.

European communications costs are up to ten times higher than in the US and present a major obstacle to the introduction of new applications.

National monopolies still persist in most European countries, restricting innovation and competition, whereas deregulation has brought about a dramatic development of the markets in the US and Britain.

The European Union has launched a process of liberalisation, but it is too slow, and in many countries is being applied inadequately or not at all.

This process must be speeded up. The full liberalisation of infrastructures is the vital step, and this must be achieved **no later than the end of 1995**.

If this is done, building the Information Highways will be within our reach. It will not be held back by shortage of technical or financial resources, both of which are readily available. There will be no need for large-scale funding by public money. The market will be the driving force if obstacles are removed. Private business is ready to take up the challenge.

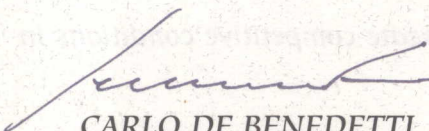
What the European Round Table calls for is urgent action by governments to remove the obstacles and make it happen.

This Report, which is intended to complement the paper on Europe and the Global Information Society prepared by the Bangemann Task Force, provides:

- a list of actions to create an enabling environment that will stimulate competition, investment, and market growth;
- an analysis of the real needs of European users, based on the experience of ERT member companies;
- an evaluation of the huge market potential.

To bring all these changes into effect as quickly as possible, the ERT urges the creation of a European Authority charged with the task of speeding up liberalisation and creating a competitive and favourable regulatory environment. The private sector will do the rest.

In the new information scenario, competition must be the rule, and monopoly the exception.



CARLO DE BENEDETTI
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I - INFORMATION HIGHWAYS: TO RE-ENGINEER EUROPE

A. A POWERFUL FORCE FOR GROWTH

This paper examines a powerful force which can overcome many of the urgent problems which the ERT identified in its December 1993 report, *Beating the Crisis*.

Beating the Crisis addressed a challenge of fundamental importance:

«Europe has become a high-cost low-growth economy that is not adapting fast enough and is therefore losing its competitive advantage to more dynamic parts of the world. As a result it has too many people out of work.»

Among the 'Conditions for Competitiveness' identified by the report were information infrastructures or «information highways»: **integrated pan-European information networks** for use by industry, the public sector and individual citizens.

Here we argue that **information highways can play a decisive role in the future of European industry**, making a major impact on **Europe's potential for competitiveness, economic growth and employment**.

Due to a remarkable stream of **technology breakthroughs**, it has suddenly become far easier to move and process huge quantities of information - pictures and sound as well as words and data - at high speed and low cost.

We have started a new phase of development and change in human history: the «Digital Revolution» powered by microelectronics, optoelectronics, digital compression, multimedia and the convergence of computer, telecommunications and media.

Information Highways will be a more powerful influence for change than were railways and motorways. They will change the way we organise our companies, the way we live and work, and will accelerate the globalisation of markets.

A single, **worldwide market for information** and communications of every kind is emerging, using technology available today. As a result information's role in society is becoming ever greater, promising to bring far-reaching changes in people's lives. New information infrastructures make it possible to usher in the «Information Society».

So profound are its implications, that the new market should be central in future discussions of rebuilding **employment in Europe** and dealing with the jobs crisis. It is difficult to identify any more fruitful source of new jobs, which will come from two main sources:

Small businesses which will grow by using information highways to achieve wider market access, greater efficiency and better links with large customers.

New businesses created specifically to supply information and new services.

The ERT urges that industry and public policy-makers work together closely to build the Information Society, to maximise the economic benefits it can offer Europe, and so accelerate out of the crisis.

In fact, Europe has no option but to develop information infrastructures rapidly. Its global trading rivals are embracing the new opportunities. If Europe falls behind in information networks and services, **the penalty will be severe**. The handicap of Europe's fragmentation, highlighted in previous ERT reports, will become heavier. Europe's competitive position will worsen. Such economic weaknesses inevitably bring social ills.

B. WHAT IS NEW THIS TIME?

The technology advances which make possible high-power information networks are interacting with other economic and social forces, positive and negative. This combination of forces offers opportunities radically different from the normal flow of technical or social change. The new market has the potential to bring not just new goods and services, but a wide-ranging **reorganisation of the way we live and work**.

Among the driving forces at play are:

- ◆ Worldwide **deregulation** of the telecoms sector and privatisation of public telephone operators.
- ◆ Intensive **deal-making** in the US as the converging communications, computing and media industries seek to position themselves in the new information highway market.
- ◆ Technology **advances** in digitalisation and digital compression (see Section II and Annex 3).
- ◆ Ever-quickenning tempo of **global competition**. Today large companies must seek world economies of scale while also decentralising to gain local flexibility. This combination creates the need for universal and instantaneous communication systems.
- ◆ Severe impact of the recent **recession**, which has aggravated Europe's longstanding unemployment problems.
- ◆ Expected **upturn in world trade**, following successful conclusion of the Uruguay Round.
- ◆ **Smaller businesses** moving to the centre of the economic stage because they have the speed of response and spirit of innovation demanded by the new market.

C. THE US EXAMPLE

Over the last year major US corporations have pledged **tens of billions of dollars** for information highway projects. The US administration has approved an ambitious plan for nationwide advanced information networks.

Some highly publicised deals involving interactive home entertainment have hit regulatory and technical obstacles. Nevertheless **very rapid progress** is taking place more quietly in business networking.

Today the US is racing ahead in the development of universal information networks. That lead could translate into a **formidable competitive advantage** in global markets. What can Europe learn from the American experience?

Favourable environment

Highly favourable market conditions are enabling the US administration and industry to move quickly towards ambitious information highway goals.

- ◆ The US started to deregulate its **telecommunications sector** a decade ago. Intense competition has brought innovation, investment and inexpensive services.
- ◆ Just as important, deregulation has bred a **highly receptive outlook** among users. US companies, small as much as large, are willing to try new technologies and services.
- ◆ US industry has a global lead in **computer technology**.
- ◆ This technology has spread from the **office to the home**. One in three US homes has its own personal computer. Home penetration gives a base for mass market interactive services and builds national computer literacy.

National Information Infrastructure programme

The US administration's information highway initiative has attracted much attention. The NII programme gives the private sector main responsibility for building the new networks. However the White House is taking a crucial leadership role. This is essential to create the regulatory environment that will encourage very large private investments. (See Annex 2 for more details.)

The Internet

Another US networking project is causing excitement in the US business world. This is the Internet, an international network of networks long used by government and academia. Though difficult to use and based on old technology, the Internet is adding over one million users a year because it is cheap and links to thousands of networks within organisations. No-one owns the Internet, which is run by volunteers. But again it has grown from well-judged government decisions. (See Annex 2 for more details.)

Lessons

We note two clear lessons from US information highway activities:

- ◆ Investment by industry in data networks is highly sensitive to public policy-making. Well-judged framework conditions can unleash intense private sector activity.
- ◆ The Internet confirms a huge demand for cheap global networking.

D. INFORMATION HIGHWAYS IN EUROPE

The single European information market, the network of networks, is a **natural extension of the single market**.

Some networks are international by their nature, such as business and transport. Others, such as teleshopping or tax assessment, are more likely to develop at national level following incompatible standards.

But the cost of making **all networks Euro-compatible** is low, and the benefits of such interoperability are so high that it would be foolish not to plan on a European scale from the start.

If common solutions can be developed for common problems - drawing on Europe's total pool of resources, skills and know-how - several **valuable results** are likely to follow:

- ◆ Development of **integrated services**, such as airlines, banking and communications of all kinds, which Europe's industries badly need.
- ◆ More **integrated economic structure**, with notably better access for the peripheral regions into the mainstream.
- ◆ Better chance for European industry to **sell solutions in world markets** and reverse the serious trade deficit in information products.
- ◆ Opportunity for Europe to **negotiate on equal terms** with other global suppliers for open competition and equal access (as it did during the Uruguay Round).

Even Europe's linguistic and cultural fragmentation - often seen as weakening its competitive position - could spur valuable **innovations for the information highway market**:

- ◆ US interface software and applications use English. Europe has the know-how to develop network access in other languages, selling them to world markets.
- ◆ Production of multimedia material to meet European tastes could grow into a significant industry.
- ◆ Europe is likely to develop strong expertise in desktop videoconferencing. Businesses need face-to-face contacts across borders and high airfares are a significant barrier to intra-European travel.

E. WHAT IS THE 'COST OF NON-INFORMATION' FOR EUROPEAN INDUSTRY?

We stress that Europe does **not have a cost-free** option here. If Europe seeks to avoid or postpone investments in information networks, the results will be:

- ◆ A sharp **loss of competitiveness** to other countries using information networks to achieve higher levels of efficiency.
- ◆ **Worsening balance of payments deficit** with its main trading partners.
- ◆ Domination of global markets by **standards set in other countries**, denying European firms positions of world leadership and the profit benefits that will follow.
- ◆ New industries, skills, patents, knowledge and jobs - the future wealth of nations - **located in the US and the Far East, not in Europe.**

II - WHERE IS THE MARKET?

A. OVERVIEW OF THE TECHNOLOGY POTENTIAL

The new information market has been triggered by **very rapid advances in digitalisation and compression of data**. Today, every kind of information - words, figures, sounds, still and moving pictures - can be transmitted as a stream of digits down a variety of delivery channels organised into networks of every shape and size. This in turn is causing the key industries involved - computing, television and telecommunications - to converge.

Falling costs should allow advanced networking technologies to become universal. The costs of transmitting each bit of information is dropping rapidly. As high volume networks develop, economies of scale will enable the offering of specialist services at affordable prices. (See Annex 3 for an outline of key networking technologies.)

B. INDUSTRY'S KEY NEEDS AND REQUIREMENTS

For business today the most important single dimension is speed. The pressure of global competition often comes in the form of time taken to launch new products or to supply customers.

Example: one leading US firm has publicly set the goal of cutting its production times tenfold every five years.

Many current and future uses of information networks highlighted here make a direct contribution to increasing the speed of commercial operations.

1. Benefits already achieved

Many business enterprises with European scale are already **aggressive users** of information network technologies. They are gaining important practical benefits, despite the weaknesses of today's systems.

Large companies are seeking European economies of scale.

- installing videoconferencing at major sites;
- using electronic mail as a primary form of business communication independent of location, availability, or time-zones;
- expanding external linkages with customers, suppliers and partners;
- relying increasingly on Electronic Data Interchange to obtain specialist supplies exactly when and where needed;
- achieving faster and better communication for project groups;
- saving costs by using telematics (on-line access to information on computer terminals);
- achieving easier support of decentralised information systems.

2. New services to boost competitiveness

Companies want to **do business electronically**. The prime requirement is for Electronic Data Interchange between supplier and customer. This allows the sending of orders and invoices direct from computer to computer, or even direct links from production line to customer's warehouse with delivery when needed.

This demands a public data network that is **reliable, safe, inexpensive, easy to access and universally available**, with vendor and buyer using identical codes, formats and protocols.

So it is essential that equipment and services are **completely interoperable**.

A **common European backbone** is needed, not a set of gateways between countries. And the backbone should give low-price standard connections beyond Europe - to the US, Asia and Latin America.

The network should be easy to use, allowing **cheap transmission of data, voice and images**, with standard connections, no national boundaries and high security level. It should allow everyone to communicate in a standard way, saving on telecom specialists and transmission costs.

It would also make working away from a central office easier, whether in scattered local offices, at home or when travelling. Technical services could be available direct from one country to another 24 hours a day.

3. Impact on design and manufacturing

Simultaneous engineering and the universal use of **Computer Aided Design** are essential to lower costs, increase speed and cut the percentage of goods manufactured in-house (the key to 'lean production').

Engineering generates technical documentation, supported by quality certificates. All this needs to be stored electronically, retrieved when needed, and communicated easily to suppliers, customers and standards authorities in other countries.

Lean manufacturing requires **just-in-time logistics**, with direct information links between production lines and transport services.

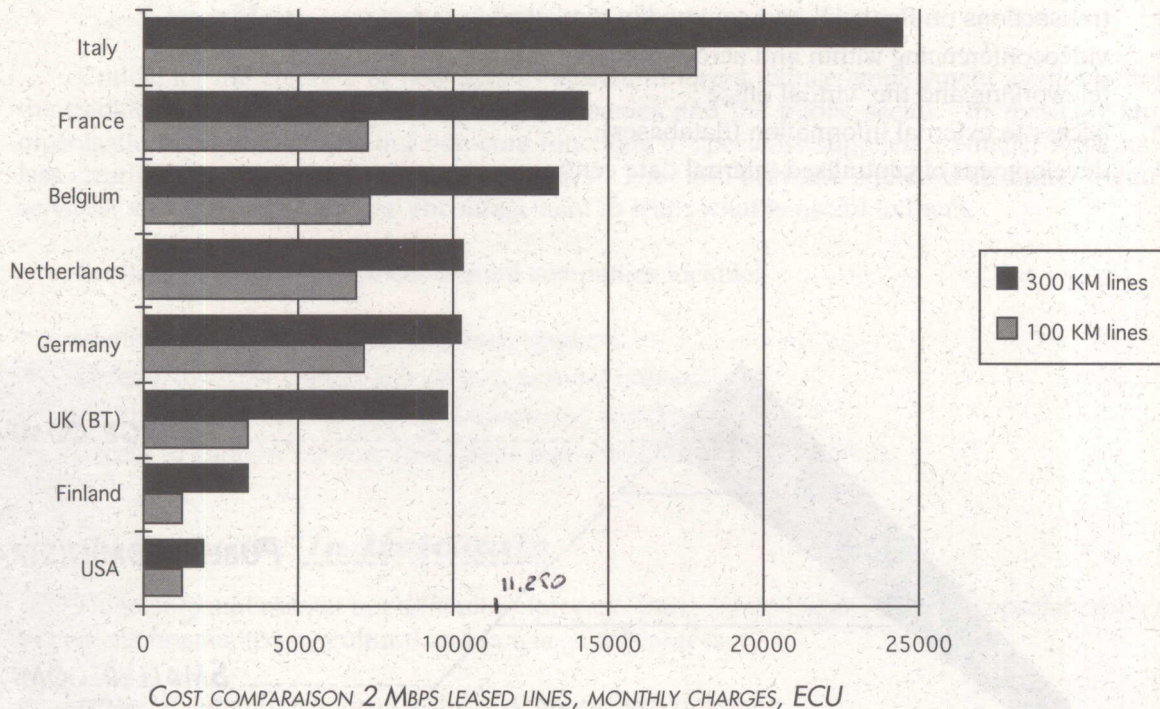
International markets demand that products be adapted to local requirements, technical standards, and manufacturing content. International co-operation in design, manufacturing and procurement of supplies all need to function accurately and at high speed. This is a **critical factor for European competitiveness**.

High quality and complex products require rapid problem-solving, including diagnosis, technical advice and supply of spare parts co-ordinated internationally.

4. Impact on publishers and the media

Information highways could bring a **revolution in the media world**. They promise users far greater freedom to define the content they want and how they want to receive it.

Users will benefit if media suppliers can compete freely for their custom. New creative forces and **new publishing businesses** will spring up to exploit the opportunities offered by change and diversification of the market. Many of these will be small businesses, driven by young people offering new products and services for specialist niches.



In this avalanche of change, **free competition is the key factor**. Newspapers and other media are heavily regulated, for political more than economic reasons. The larger businesses will need freedom to compete and to make strategic alliances with other players in the new market. This will require massive deregulation. For new and small businesses the crucial need will be open access, so that they cannot be frozen out of the market.

C. OVERVIEW OF THE USAGE POTENTIAL

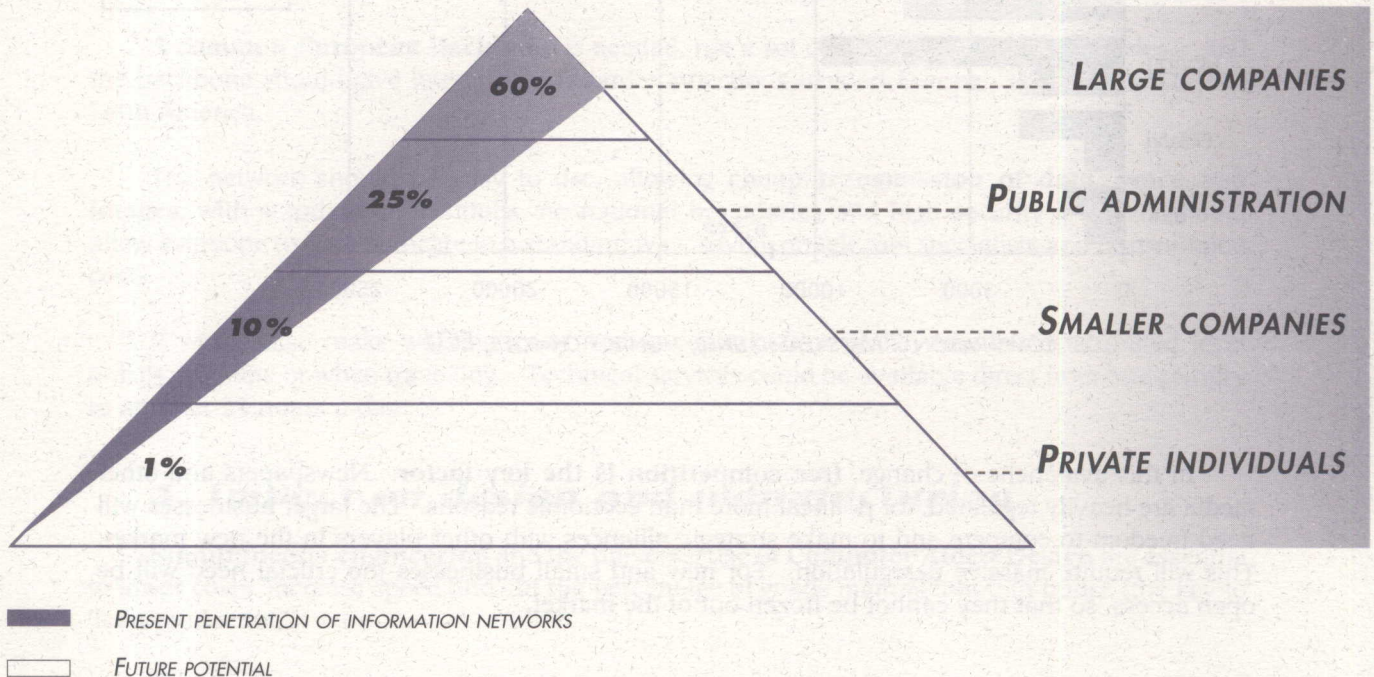
The potential market for information highways can be seen as a pyramid. At the top are the large companies. They are heavy users of advanced communications networks, but relatively few in number. At the bottom of are individual users. They are much less advanced technically, but offer the possibility of a vast mass market.

1. Large companies

Well-defined needs for IT to improve efficiency and quality on an international scale, especially to take advantage of the much higher speed of communication now available:

- communicating with suppliers and customers (including design, engineering, quality procedures, logistics and delivery schedules, finance and payments);
- multinational research and development;
- faster access to scientific knowledge;
- shortening the product development cycle;
- decentralised production, transport and distribution;
- decentralise administration, reducing travel costs, environmental load and eventually housing densities (applies also to large public organisations);

- transactions on financial and commodity markets;
- videoconferencing within and across borders;
- teleworking and the 'virtual office';
- access to external information (databases);
- development of centralised internal data centres.



2. Public administration

Today a small and conservative market, likely to develop slowly and on national lines unless a co-operative and trans-European approach can be established:

- lower costs;
- decentralised personal services (welfare, local government);
- wider use of electronic mail;
- information retrieval from database systems ('electronic filing cabinets');
- data exchange between countries (medical, tax, customs, police);
- education and training (language teaching, distance learning);
- public procurement (standardised procedures and electronic commerce);
- infrastructure projects (air traffic control, road traffic, road pricing)
- crime (terrorism, drugs, immigration, recovery of stolen vehicles);

3. *Smaller companies*

Critical for the creation of new jobs as structural forces reduce employment available from the traditional large-scale employers - big companies and the public sector. Increasingly large organisations are contracting out non-core functions to specialist suppliers. Smaller firms have less clearly defined needs than large enterprises. They will only use standard customer-friendly services, and will need help and encouragement to learn what is useful to them.

Services of special relevance to small companies include:

- identification of new customers and suppliers;
- speedy, low-cost completion of international transactions;
- databases for international regulations and standards;
- access to support services (transport, marketing, technical advice...).

4. *Private individuals*

Huge potential market but difficult to forecast. Here, Europe again meets its special problem of markets fragmented by cultural and language differences:

- personal communications (mobile telephone, videophone);
- entertainment (video on demand);
- interactive systems (bulletin boards, games, exchange of information);
- information (databases, real-time news);
- services (shopping, travel, self-education);
- finance (banking, transfers and payments, smart cards);
- health (transmission of laboratory data, health insurance when travelling).

III - PROBLEMS AND OBSTACLES IN EUROPE

If the potential is so high, **why is Europe not doing more?** Why is the private sector not investing now? Why do more people not use the services that are already available?

In reality, Europe today is a **patchwork of national monopolies and incompatible networks**, with high communication costs and low-quality services. This situation creates **major obstacles** to the building of the Information Society and is also restricting:

- > the competitiveness of industry;
- > the diffusion of knowledge;
- > efficient public administration;
- > quality of life.

A. NATIONAL MONOPOLIES IN TELECOMMUNICATIONS

National monopolies still persist in the majority of European countries. They are limiting innovation and the reduction of tariffs. Telecom deregulation has been the driving force of industrial competitiveness and technological advantage in the US.

The deregulation process introduced by the European Union through the 1993 Council Regulation is **too slow** and is not followed in practice by many countries.

This process must be accelerated with special regard to deregulation of infrastructures - the most critical area - which is decisive for creating an competitive environment. To get anything done, it is essential that infrastructures for all telecom services should be liberalised by the end of 1995 (except perhaps for voice telephony which might take longer).

In the new scenario, competition is the rule and monopoly is the exception.

B. HIGH COSTS

When national monopolies in telecommunications are maintained, high tariffs are the result. Reducing their cost is the fundamental enabler of information highways.

European tariffs are on average ten times higher than in the US, especially for professional and business applications.

Example: the high cost of leased lines.

C. FRAGMENTATION OF THE MARKET

- ◆ Passing data from one network to another involves **gateways, protocol conversion, time lag, unreliability**. None of these networks is universally available.
- ◆ Incompatibilities and **lack of sufficient interconnectivity** between systems restrict the exchange of information between countries.

D. OVER-REGULATION

Many new services are possible today but blocked by unnecessary regulation.

Examples:

TV regulation in Belgium. Cable TV reaches almost every household, yet operators are forbidden to transmit 'new services', while government decides which conventional programmes may be distributed.

Controls on newspaper mergers and acquisitions. Publishers are restricted from linking with other communications companies to secure new outlets.

Wireless data transmission. GSM telephones have the capability for data transmission, and could offer an advanced platform for pan-European communications. Depending on national rules, regulatory obstacles prevent pure data services, or connecting company exchanges directly to a mobile switch, or international link-ups between mobile switches.

E. PROBLEMS WITH STANDARDISATION

Creating effective international standards is **difficult**. When governments try to control a new market through standards, innovations tend to jump the standards barrier. Such innovations often come from the US and are impossible to block.

On the other hand, leaving standards-making to market forces can cause consumers to waste money on failed systems and often hands control of markets to the biggest suppliers.

Europe has had much experience, good and bad, of the technology standards dilemma over the last decade.

Examples:

GSM telephones. A successful example: good standard for digital mobile phones agreed and imposed, with much potential for further development. Possible extension to the US, which still lacks universal standards. Regulatory enforcement helped industry and consumers.

High definition TV. Failed to agree a standard in time to catch the market.

Digital television. Manufacturers, operators and regulators are working together successfully to establish a common standard for satellite, cable and terrestrial broadcasting.

Electronic mail. US Internet has succeeded despite existing European and international standards, and its own performance weaknesses. Internet's attractive additional services, including database access, are taking customers from European service providers.

ISDN. Network operators failed to ensure cross-border compatibility and put high price tags on new ISDN services to protect their traditional business. Europe has therefore not developed an extensive ISDN infrastructure.

F. COMPETITION POLICY

- ◆ There is concern that Competition Policy may **obstruct** the establishment of uniform standards and necessary co-operation between suppliers. A correct balance is needed.

G. LACK OF EUROPEAN INITIATIVES

- ◆ **National thinking** predominates where European thinking is needed.
- ◆ Too **little co-operation** between companies.
- ◆ European Union has not initiated projects with the **critical mass** to overcome these restraints.
- ◆ Lack of advanced **public databases**.

IV - ACTION TO BUILD A COMPETITIVE ENVIRONMENT

Market forces and competition will drive Europe towards an Information Society. Obstacles in the way of market forces should be removed.

Our objective should be to create a **single European market for information**, open to everybody.

The essence of such a market is **competition**, both between services and between delivery systems.

Pragmatic development is required, not a top-down master plan. The private sector will undertake the main tasks of building pan-European information highways and developing services.

But this development will not happen naturally - **current market conditions are difficult**. Relying on spontaneous market forces will only produce fragmentation. Private enterprise needs a degree of regulation which will encourage and even force competition.

Careful **balance between regulation and deregulation** is central to this strategy. Deregulation must be flanked by new rules designed to maximise the positive effects of a competitive environment, especially confidence to risk investments in the volatile new market.

The issue of **universal access** requires a similar balanced approach. Imposed from the start, this could bring premature standards setting and cross-subsidies between services - an environment hostile to competition. Europe must begin by encouraging competition, investment and innovation. We should evolve towards completely universal access as winning solutions emerge.

On the following pages we set out the detailed recommendations for action, followed by a seven-point strategy to achieve these goals.

A. PUBLIC AUTHORITIES AS LEGISLATOR AND REGULATOR

B. PUBLIC SECTOR AS USER AND PURCHASER

C. PUBLIC SECTOR AS EDUCATOR

D. PUBLIC/PRIVATE: TELECOMMUNICATIONS OPERATORS AS THE CATALYST

E. PRIVATE SECTOR AS SUPPLIER OF INFORMATION NETWORKS AND SERVICES

F. PRIVATE SECTOR AS USER OF INFORMATION NETWORKS AND SERVICES

A. PUBLIC AUTHORITIES AS LEGISLATOR AND REGULATOR:

- ☆ Accelerate the process of **deregulating** information infrastructures and services by the end of 1995 (except for voice services, whose deregulation may take longer).
- ☆ Establish machinery for **constant consultation** with the private sector, including network operators, service suppliers, hardware manufacturers and users.

Example: Two permanent consultative bodies:

A standing EU governmental body to approve legislative action. Ministers from different Councils to be involved as issues demand.

A standing private sector body to co-ordinate the views of users, suppliers and broadcasters, liaising with the permanent EU body.

- ☆ Develop a **single European regulatory framework** for information networks, with a clear statement of rights and responsibilities, and safeguards to encourage investment in new services.
- ☆ Set an environment that **forces competition** between networks, other delivery systems and specific services.
- ☆ Develop a **framework** to ensure transparency, interoperability and open access at European level.
- ☆ Support the development of **effective standardisation**, in close consultation with industry. Ensure Competition Policy rules do not block standards-making.
- ☆ **Privatise all state-owned networks and services**, and ensure that operators act on private-sector lines until privatisation is completed.
- ☆ Ensure **protection of privacy and Intellectual Property Rights**.
- ☆ Create measures to **support high-risk investments** in pilot projects.

Examples: tax credits, risk insurance.

- ☆ Maximise the potential for **job creation**. Align **other policy areas** to the opportunities provided by the new market. Raise the flexibility of labour. Change the system of employment regulation and the 'wedge' of social security charges to encourage the rapid growth of employment in this sector.
- ☆ Pay special attention to the needs of **small businesses**, which will be the **key to innovation, growth** and the creation of new jobs.

B. PUBLIC SECTOR AS USER AND PURCHASER:

- ☆ Introduce Electronic Tendering procedures in public procurement to reduce costs and harmonise technical standards.
- ☆ Focus on **Electronic Data Interchange** systems for public procurement at all levels (European, national, local).

Examples: EDI could save costs, raise efficiencies and open the market to cross-frontier procurement. Public sector use of EDI would also create a broad pool of electronic commerce available to smaller companies throughout Europe.

- ☆ Develop Electronic Data Interchange for **full implementation of the Single Market**.
- ☆ Develop innovative and cost-effective trans-European **public services** that use information highways.

Examples: health, education, training, administration.

- ☆ Add a European dimension to **infrastructure investment projects**, pooling resources to seek common solutions that will sell on world markets,

Examples: air traffic control, road pricing and traffic management, integration of multi-modal transport - especially road-rail services, location of stolen cars...

- ☆ Use information highways to improve **public services to industry**.

Examples: checking and registration of patents, administrative certification of products on international markets.

- ☆ Identify **flagship projects** from the above list which can be rapidly carried out. Use them to gain practical experience and explore the potential benefits of advanced information networks.
- ☆ Use the very limited amount of available **public sector money as a catalyst**, to support and stimulate activity by the private sector.

Examples: in partnership with the private sector, contribution to...
...investment in basic infrastructure and services,
...launching support for basic services,
...targeted support for R&D.

C. PUBLIC SECTOR AS EDUCATOR:

USE INFORMATION NETWORKS:

- ☆ as a **tool to improve education and training** for all young people.

Example: through the regular use of interactive video.

- ☆ as a **tool for lifelong learning** - the constant retraining of people already at work.

- ☆ to give an **international dimension to education**.

Examples: language teaching, cultural awareness.

- ☆ as a **key subject** for education and training, to ensure:

- universal IT literacy for the emerging information society;
- future availability of competent IT designers, suppliers, operators and users;

- ☆ to **support Europe-wide employment services** so that qualified people can locate job opportunities.

D. PUBLIC / PRIVATE:

TELECOMMUNICATIONS OPERATORS AS THE CATALYST

Operators of telecoms services have a central role to play in rapidly building Europe's information highway market. This sector is undergoing revolutionary change, resulting from both 10 years of deregulation in Europe and global change. Many of Europe's public telephone operators have started down the road to privatisation. Private operators are now active in all European markets.

- ☆ All public operators to prepare for eventual privatisation.

- ☆ Public operators to be regarded as private commercial entities by European and national authorities while awaiting privatisation.

Example: investments by private operators not classified as adding to public deficits.

- ☆ Public operators to behave as private bodies in this field.

Examples: search for new market opportunities, invest to develop new service products, develop new technologies, cut costs, use price cuts to win customers.

- ☆ All telecom operators should have equivalent conditions for operation.

E. PRIVATE SECTOR AS SUPPLIER OF INFORMATION NETWORKS AND SERVICES

- ☆ Raise funds for financing new ventures and making new investments in Europe's information infrastructures.
- ☆ Speed up development of a competitive environment, favouring multiple competing operators, and leading to a lowering of European telecoms tariffs.
- ☆ Create framework conditions for that encourage early investment by users in new high-powered networking technologies.
- ☆ Establish a cross-industry forum to ensure maximum compatibility between networks. Monitor the activities of standards bodies developing open interfaces that will enable different networks to work together. Here, the Intellectual Property problems involving Europe's ETSI standards body need resolving.
- ☆ Promote widespread agreement on new standards, avoiding standards wars that hurt user interests.
- ☆ Participate in demonstration projects. Take advantage of favourable framework conditions to make high-risk investments in demonstration projects.
- ☆ Launch co-operative pilot projects to test demands. Stimulate investment in such projects.
- ☆ Promote the development of pan-European basic services for industry.

Examples: E-mail, file transfer, desktop videoconferencing.

- ☆ Develop new services (beyond the basic service set) and markets for these services.
- ☆ Initiate private/public consortia to create networks in education, healthcare and public administration.
- ☆ Promote interconnection with networks and services worldwide.
- ☆ Besides developing networks for industry, major European companies are also exploring interactive multimedia services for the home. Their work could be a driver for diffusion of a low-cost high-bandwidth network infrastructure.

F. PRIVATE SECTOR AS USER OF INFORMATION NETWORKS AND SERVICES

- ☆ Make use of advanced pan-European services to raise productivity and global competitiveness.
- ☆ Speed up the use of advanced pan-European networks and their services in large and small companies.
- ☆ Take part in the definition and promotion of new standards through the cross-industry forum.
- ☆ Increase compatibility between networks, both public and in-company.
- ☆ Promote the use of pan-European basic services (E-mail, file transfer, desktop videoconferencing.)
- ☆ Encourage smaller businesses to use the new networks and services.

Example: by opening large corporate networks to small companies.

- ☆ Educate users and create a favourable culture in Europe.
- ☆ Develop new forms of work organisation.

Examples: teleworking, flatter corporate structures involving much greater cross-border contact between workgroups.

A 7-POINT STRATEGY

1. A **political commitment** by governments to accelerate the construction of information highways in Europe on the basis of private, not public finance.
2. Rapid **deregulation** of telecommunications infrastructures and services and a drastic reduction in tariffs.
3. Agreed **standards** and full **interoperability** of both networks and services, to be ensured by public and private sectors alike.
4. A new **regulatory framework** to provide clear rules at European level for intellectual property rights, privacy protection and security.
5. **Private business** to take the main responsibility for building the information highways and providing the services and applications, with a clear focus on economic growth and job creation.
6. A **European Authority** at Ministerial level to drive the process of liberalisation and develop the open regulatory framework.
7. A permanent **advisory body** from the private sector to work closely with the Authority.

ANNEX ONE

DOCUMENTATION EXCERPTS

MAASTRICHT TREATY ON EUROPEAN UNION:

The Community shall contribute to the establishment and development of trans-European networks in the areas of transport, telecommunications and energy infrastructures.

Within the framework of a system of open and competitive markets, action by the Community shall aim at promoting the interconnection and interoperability of national networks as well as access to such networks.

The Community shall establish a series of guidelines covering the objectives, priorities and broad lines of measures....shall implement any measures that may prove necessary to ensure the interoperability of the networks, in particular in the field of technical standardisation.

DELORS WHITE PAPER ON GROWTH, COMPETITIVENESS, EMPLOYMENT:

The information society: the dawning of a multimedia world represents a radical change comparable with the first industrial revolution. At the heart of the development model for the 21st century, this issue is a crucial aspect in the survival or decline of Europe.

The European dimension would give the information society the best possible chances of taking off. The Commission is therefore proposing, in the context of a partnership between the public sector and private sector, to accelerate the establishment of «information highways» and develop the corresponding services and applications.

CONCLUSIONS OF THE BRUSSELS EUROPEAN COUNCIL, 10-11 DECEMBER 1993:

The new information and communications technologies have brought about fundamental changes in the structures and methods of production. Europe must adapt itself quickly to these developments and must control their consequences. Those economies which are the first to complete this transformation will have a significant competitive edge.

The European Council requests that a report be prepared for its next meeting by a group of prominent persons on the specific measures to be taken into consideration by the Community and the Member States. The report should cover the following aspects:

- development and interoperability of networks for facilitating the dissemination of information;
- trans-European basic services (databanks, electronic mail, interactive video, etc.);
- new applications.

On the basis of this report, the Council will adopt an operational programme defining the precise procedures for action and the necessary means.

ANNEX TWO

THE US EXPERIENCE

NATIONAL INFORMATION INFRASTRUCTURE PROGRAMME.

The US administration's information highway initiative comprises five actions:

- \$1 billion High Performance Computing research project.
- Networks to link universities, schools and technical centres.
- Strategic role of government as user (electronic commerce for suppliers, direct access to government information for all citizens).
- Information policy for privacy, copyright, etc.
- Telecom deregulation with guarantee of competition, universal service, open access, interconnection.

Five principles of administration action:

- Encourage private investment.
- Protect competition.
- Provide open access to the network.
- No discrimination between haves and have-nots.
- Flexible and responsive government action.

Most of the US work is to be done by the private sector. Key elements are competition within the telecom industry, the many entrepreneurial communications services reaching the market, and the aggressive initiatives of computer technology companies.

But the White House is driving the programme. Its leadership has proved essential to cut through regulatory barriers and produce a unified administration view. The federal government's role is to trigger private investment in infrastructure through deregulation, standardisation, support for pilot projects and promotion of social applications. It will not provide public finance.

INTERNET.

The White House NII project promises an advanced national network able to carry large volumes of interactive video. However the US has a more primitive international network operating today - the Internet. It is growing at tremendous speed.

Key Internet features:

- A network of 25,000 computer networks worldwide.
- 20 million users worldwide, mainly in academia and US government.
- 150,000 new customers joining per month, mainly from business world.
- Main uses are E-mail, accessing databases, taking part in electronic discussion forums.
- Not owned by anyone. Ad hoc system, run by volunteers. (Internet enthusiasts are proud of this self-organisation. However, the system grew from a 1969 government initiative. Its lack of central organisation was a deliberate choice to avoid destruction by a single nuclear strike.)
- Uses old networking technology, main links are over basic public telephone network.
- System is cheap but hard to use and offers no privacy protection.

ANNEX THREE

KEY NETWORKING TECHNOLOGIES

EXISTING NETWORKS

Basic telephone system. Conventional copper telephone wires were thought to be very narrow pipes that could carry only small volumes of data. New compression techniques will enable them to carry good quality moving video. (Uncompressed video creates huge data volumes.) Main use of this capability will be video on demand to homes.

Mobile telephones. Europe's GSM digital cellphones have achieved great success after only two years of launch, with 1.3 million users, thirty network operators, 18 billion ECU of investment. The GSM technology is spreading worldwide. Discussion of networks often assumes a system of fixed cables. Wireless networks are equally possible, offering advantages of mobility and speed of set-up.

TV networks (land, cable, satellite). Digital technology will allow existing TV broadcast stations to fit many more channels into their available transmission space. Cable TV networks are especially important because they can most easily upgrade to carry interactive video, as well as voice and data telephony services. Cable TV-based information highways are receiving much attention in the US. Europe faces important decisions about regulations for its very fragmented cable infrastructure.

NEW NETWORKS

These technologies are priorities for investment.

ISDN. This technology enables copper phone lines to carry images and high-speed data. Despite great promise, it has been slow to take off. There has been a lack of attractive, low-cost applications. In Europe, different national systems have been incompatible. All that is changing. Desktop videoconferencing offers an ideal ISDN application. Europe's phone companies have recently launched Euro-ISDN, which at last ensures pan-European compatibility.

Broadband (optical fibres). Even ISDN pipes are relatively narrow. Fibre optic cables offer very wide pipes that can carry vast quantities of compressed video. Such broadband networks will be the basis for global information highways. An important supporting technology for broadband is ATM, a system for switching multimedia information streams, comprising voice, data and video. European operators and IT suppliers have major ATM projects.



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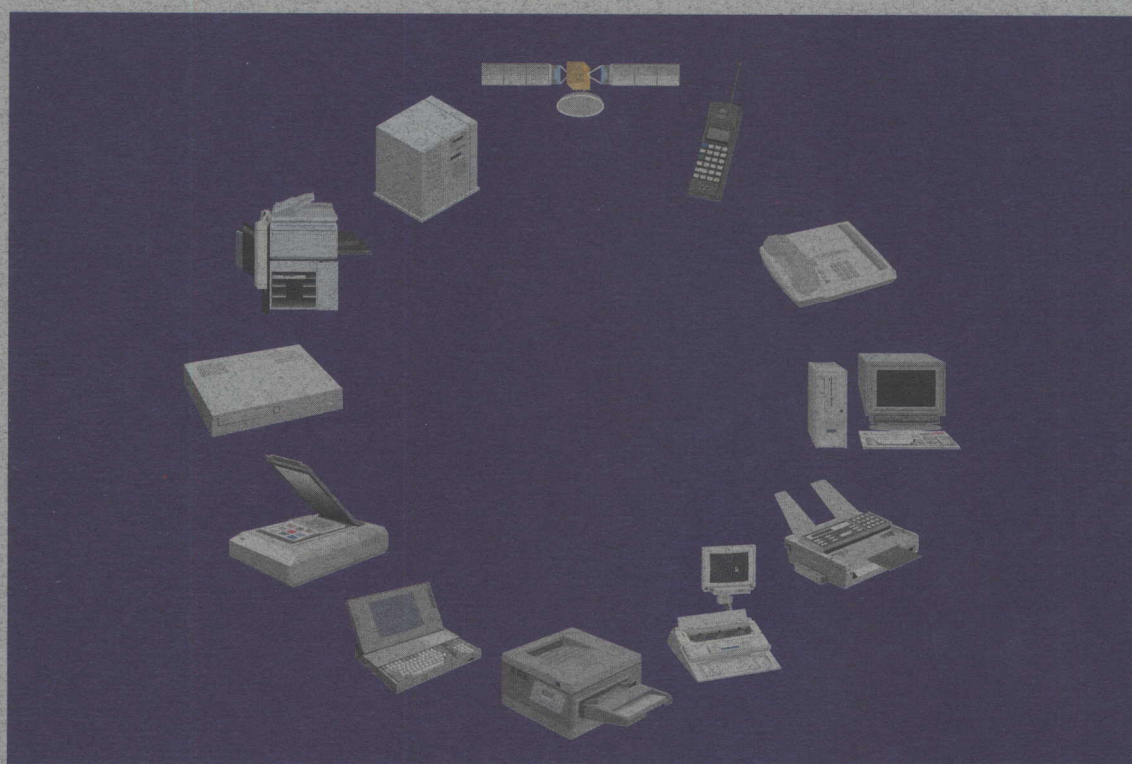
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