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Report to the European Council



Job opportunities

in the

Information Society:

Exploiting the potential of the information revolution

(presented by the Commission)

Chapter I: Introduction

The European Union is moving decisively into the information age. The Information Society is fast becoming a reality for Europe's citizens and businesses and has already started to transform the way we live and work.

The November 1997 Luxembourg European Council on Employment asked the Commission to assess the implications of this transformation for employment and training.¹

This report responds to that mandate. It examines the impact that the Information Society is having, and concludes that the prospects are bright:

- ✓ **The Information Society industries have become one of the biggest and fastest growing sectors of the European Union (EU) economy.** They are creating new jobs, new opportunities, new products and new services, driving economic growth and enhancing competitiveness.
- ✓ **The information revolution is only just beginning.** The Information Society industries will continue to grow in importance. And the pace of change – faster than anything we have seen before – will accelerate further.
- ✓ **The EU is well placed to exploit the opportunities.** With the largest single market in the world, the single currency, liberalised telecommunications markets, a strong voice on the world stage, and a diverse, creative and innovative pool of talent, all the ingredients are in place for sustained success.

But despite these positive prospects, there is worrying evidence that the EU is not making the most of the potential of the Information Society. This needs urgent attention. These markets are global by nature, and the EU has to move fast if it is to take and keep its place at the forefront of the information age. Failure to do so will carry a heavy price in terms of European jobs, growth and competitiveness.

Action is needed in three areas:

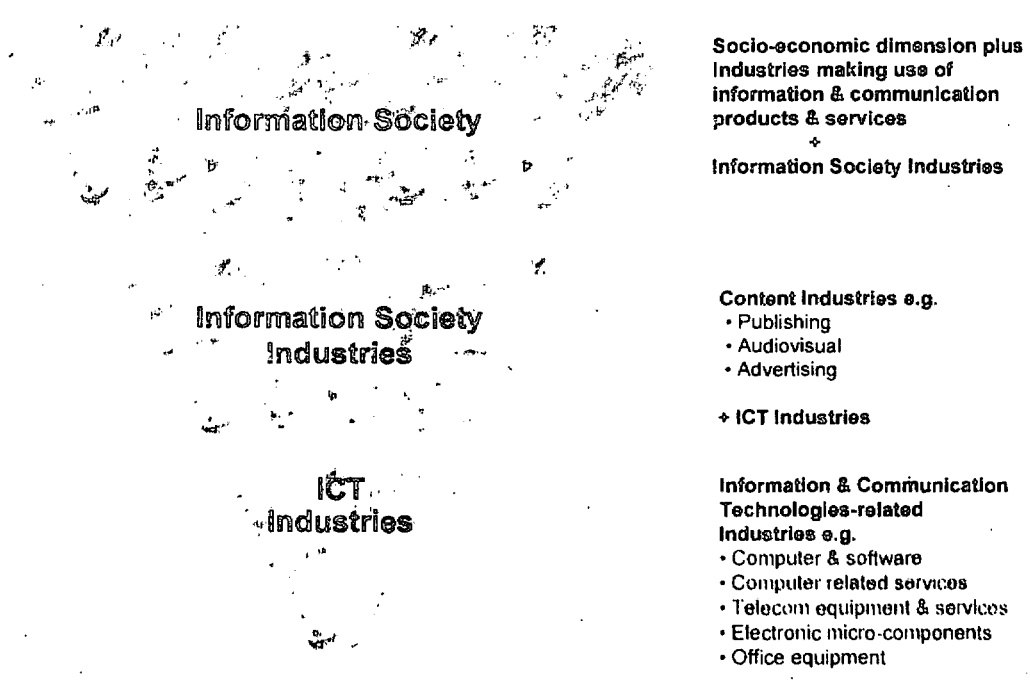
- ✓ **Developing an enterprise culture** to create an environment in which new ideas, new start-ups, new products and new services can flourish.
- ✓ **Promoting organisational change and adaptability** to exploit the full potential of new technology to improve efficiency, develop new products and services and unleash the creativity and innovation of the workforce.
- ✓ **Boosting skills and levels of technical literacy**, and promoting access for all to maximise the employment potential of the Information Society: over 500,000 IT job vacancies in the EU are currently unfilled because of skill shortages, and the problem is getting worse.

This report calls for concerted action at all levels to address this challenge, and proposes a timetable for monitoring and benchmarking of progress made to ensure that the EU derives the full potential of the information age.

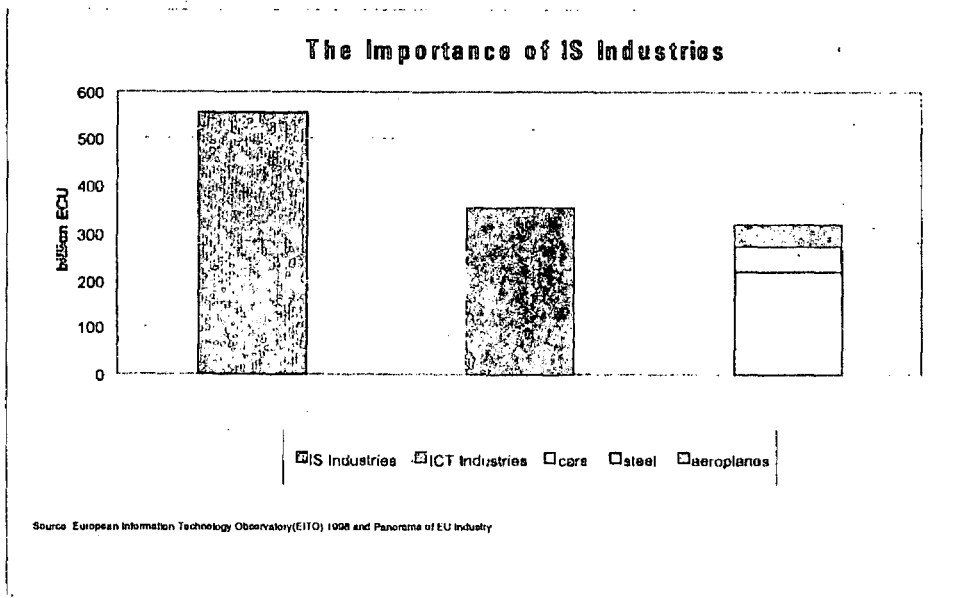
¹ Presidency conclusions, paragraph 35: "Given the potential impact on training and hence employment of the knowledge and information technologies, the European Council requests the Commission to report back to it before the end of 1998 on the results obtained and the prospects for electronic commerce, the development of open networks and the use of multi-media for education and training."

Chapter II: Diagnosis

The Information Society is the most dynamic sector of the EU economy, already accounting for more than 5% of EU GDP.

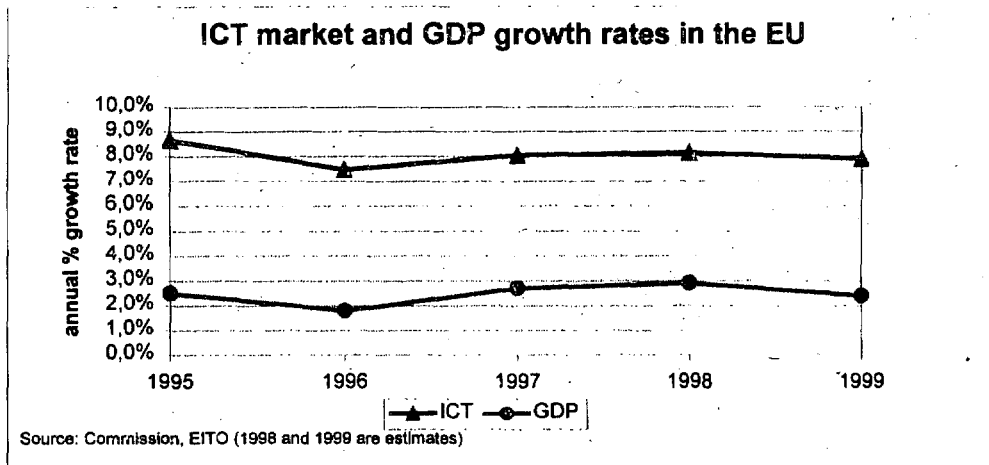


Through products – such as mobile phones, computers, digital TV, fibre optic networks – and services – including mobile communications, computer networking, Internet connections, audiovisual – IS industries already permeate all aspects of business, work and leisure. European consumers and businesses last year spent more on IS products and services than on cars, steel and aeroplanes combined.



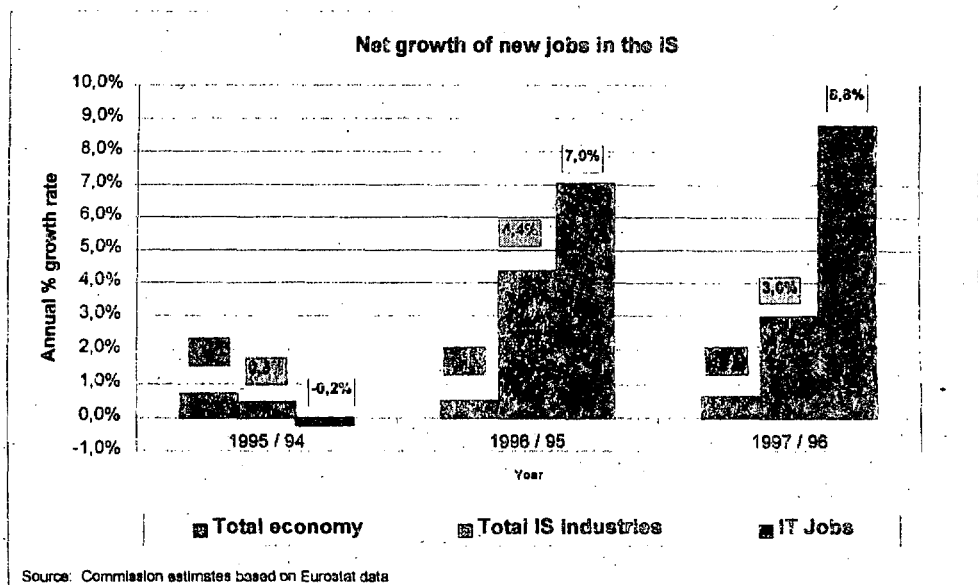
It is growing faster than any other sector...

Information and communications industries are growing more than 5 percentage points faster than other sectors, in real terms, effectively driving total economic growth in the EU by more than 15%.



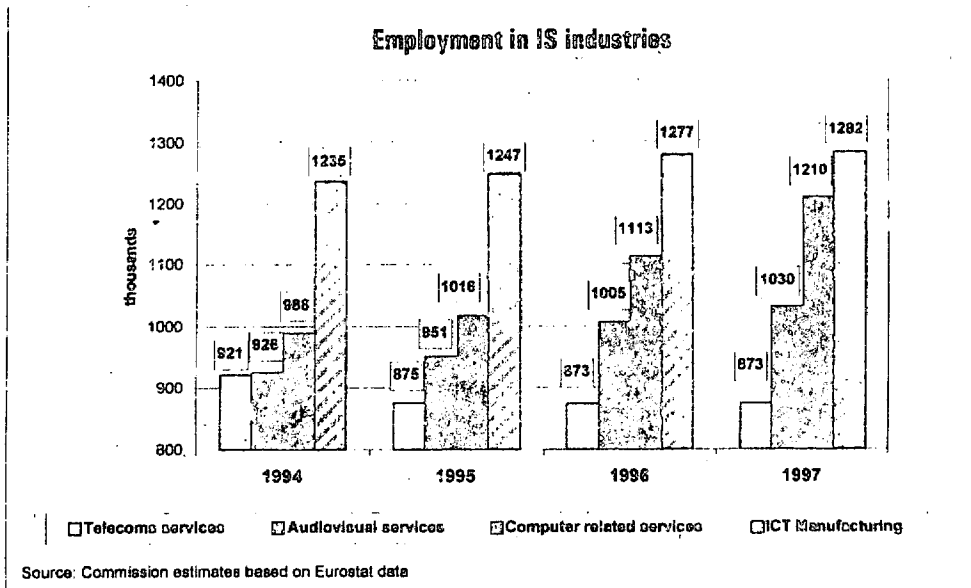
.. and is creating more jobs.

Employment in the Information Society is leading employment growth in the EU. It already employs over 4 million people, with more than 300,000 IS related new jobs created between 1995 and 1997. Thus the IS creates one in every four net new jobs, and demand far outweighs supply (estimates suggest there are currently 500,000 unfilled vacancies for IT professionals alone²).



² Source : IDC

In the European IS services, like in the US, there has been a dramatic increase in employment spurred by computer, software and audiovisual services. The diverse trend in overall employment, including some job losses, shifts to alternative jobs and generation of new jobs, points overall to a net gain and employment growth. Even in the telecom sector where the numbers dipped due to deregulation and restructuring, the trend should now become positive due to new market segments and new operators and service providers.



The potential is enormous because...

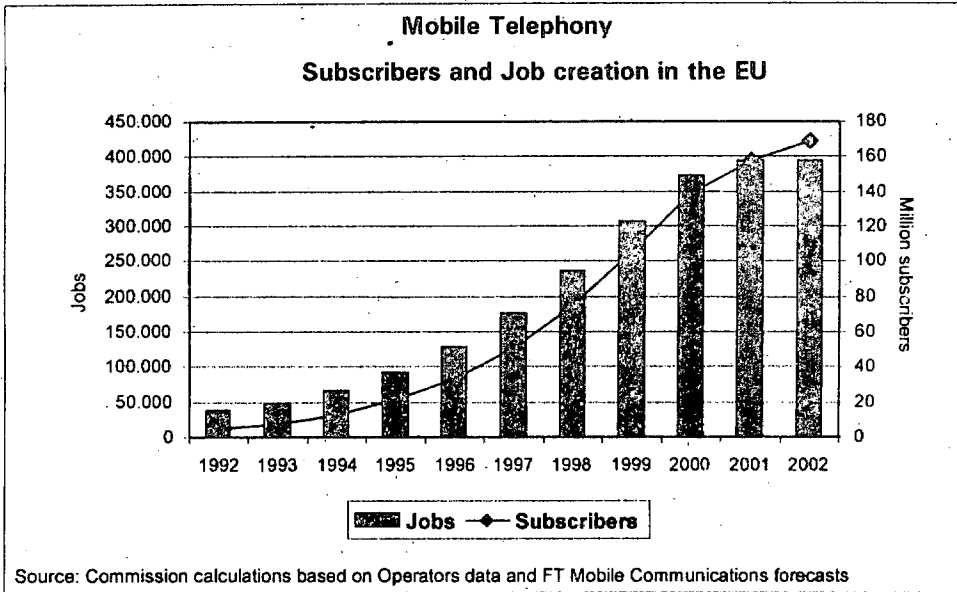
Liberalisation and technological innovation are opening up the supply side and business and consumer demand is increasing.

telecommunications are booming...

There is double digit growth in demand for telecommunications. In the last three years, the EU market has increased by one third, an increase of 38 billion ECU. The main factors behind this are the demand for mobile communications as well as the explosive growth in Internet access and usage. There are now over 300 telecommunication services operators in the EU.

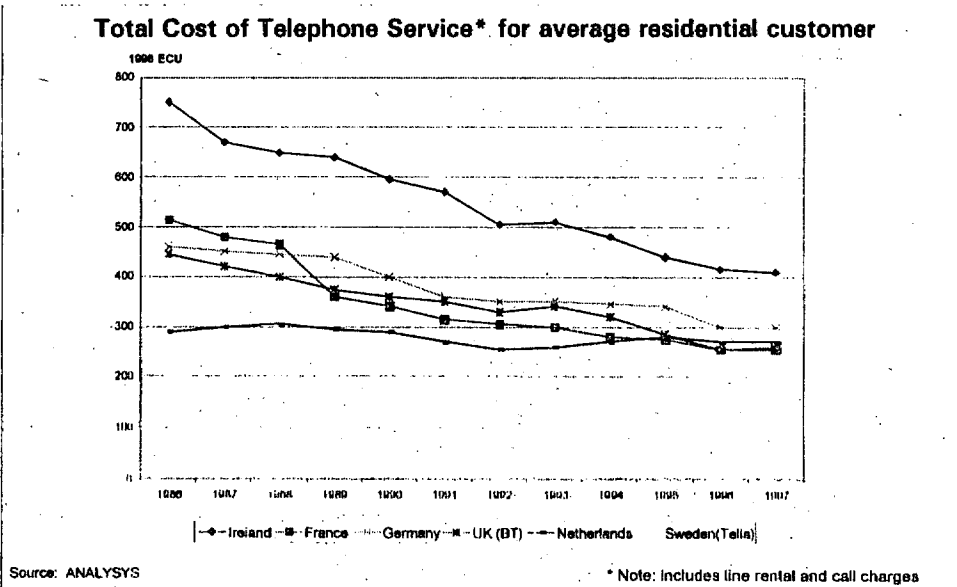
Mobile telephony is a major success story for the EU. Europe's standard, GSM, has become *de facto* the world standard and is foreseen to be followed by its successor, Universal Mobile Telecommunications System (UMTS). World-wide, the number of mobile phone subscribers grew by 52% in 1997 and this is set to continue. In Europe, growth is even faster with rates of 57% in the West and 126% in Eastern Europe.

The scope for further growth and therefore jobs is clear. This graph shows how the GSM market could more than double to above 170 million customers, if the rest of the EU caught up with Finland's current mobile phone density of 50%. This would mean at least 150,000 new jobs.



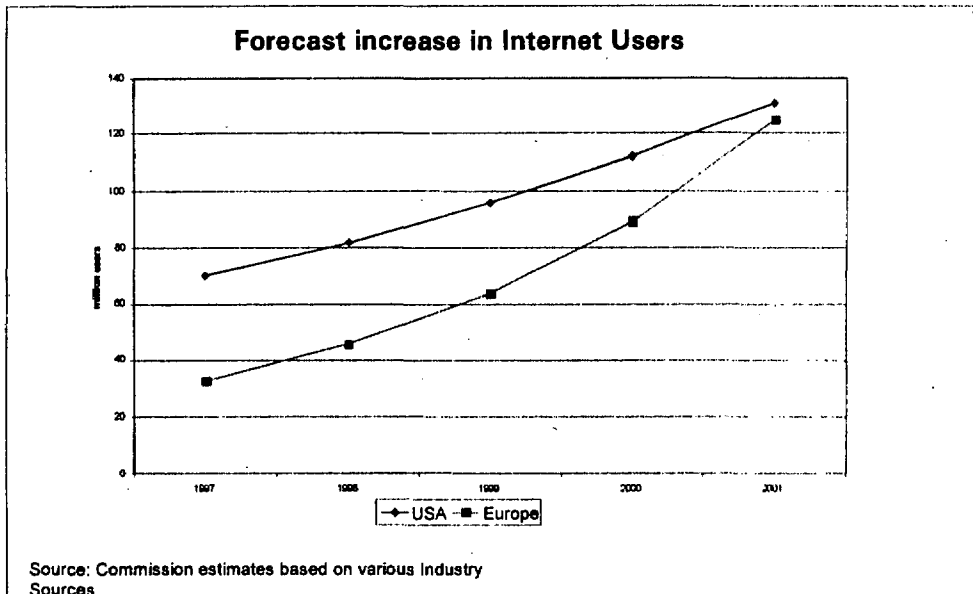
costs are beginning to come down...

At the same time, liberalisation of the telecommunications sector has increased competition between firms, between networks and between technologies, and lowered prices whilst enhancing both the choice and quality of services. But there are still large differences between Member States.



Internet use is exploding in the EU...

Rates of connection to the Internet are exponential. Although overall levels of penetration in the EU remain below the US, the gap is narrowing quickly: some Member States (Sweden, Finland) lead even the United States, and household connections to the Internet have shot up across the EU.

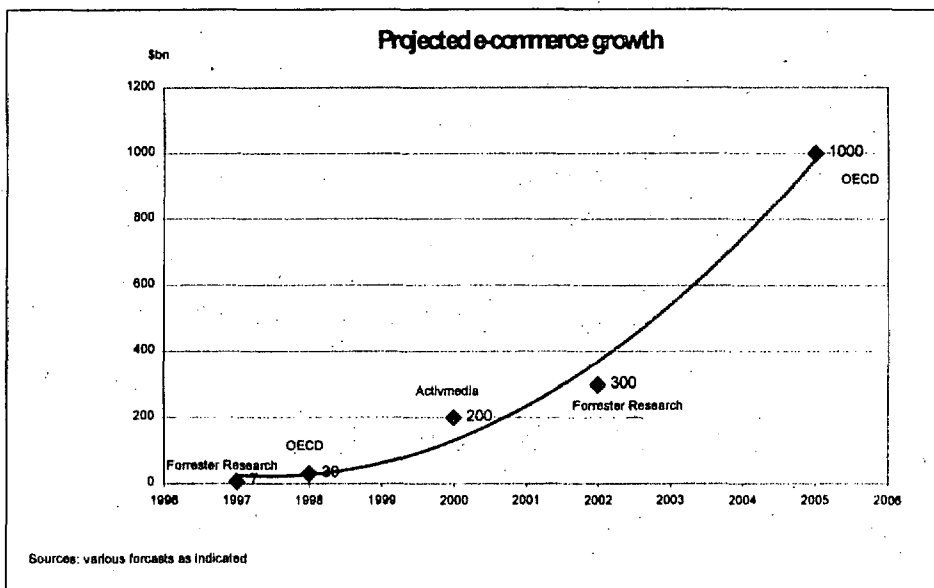


electronic commerce is taking off ...

Electronic commerce (e-commerce) is just starting and has already achieved revenues of 6.5 billion ECU in the EU. Estimates for the future vary widely, but all project significant growth and estimates are adjusted upwards frequently. For example, the OECD has estimated the world market will reach 1 trillion dollars by 2005, mainly in business to business trading – the EU needs to ensure its share.

The single market already opens up a large home market. Electronic commerce is an opportunity for all businesses, especially SMEs, to exploit the potential of the single market and to access global markets at low cost. It can also be a powerful force for cohesion, reducing the barriers of distance. Maximising this potential requires good distribution networks and, in particular, an efficient and modern postal services sector.

Electronic commerce will impact on all aspects of business, increasing the flexibility of doing business. A factor that will support the spread of e-commerce will be the launch of the Euro, which will be born on 1 January 1999 as an electronic currency. Moreover, once the millennium bug and the introduction of the Euro have been dealt with, ICT resources will be released and this should further enhance e-commerce growth

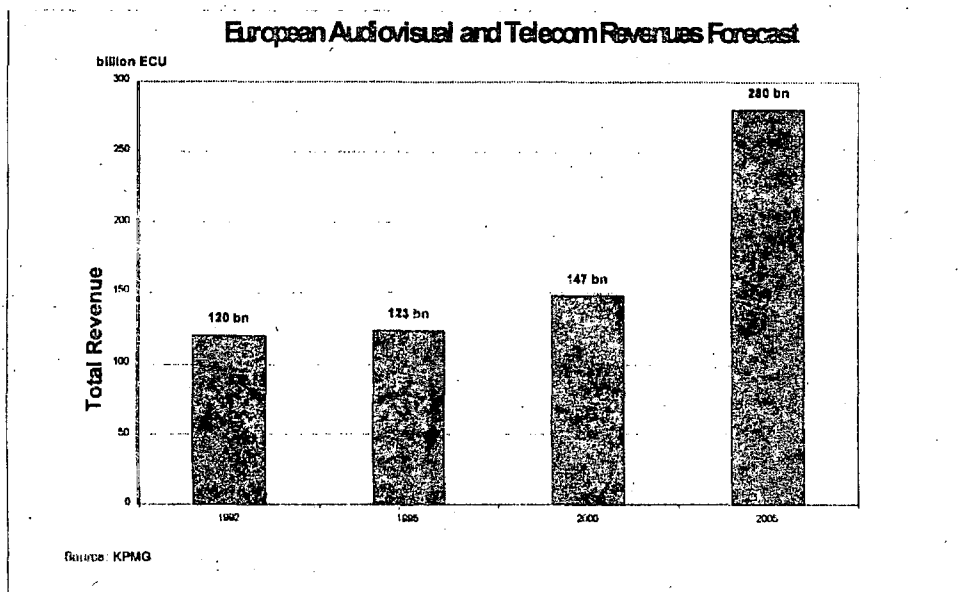


and the multi-media sector is expanding...

Due to digitalisation and globalisation, the multi-media sector is growing dramatically. This will be a major value-added sector in the 21st century reinforcing economic growth as well as the EU's cultural diversity.

Further, the growth of digital television, with the increase in the number of channels available in parallel with the rapid uptake of the Internet at work and in the home, will create more demand on the content and production side.

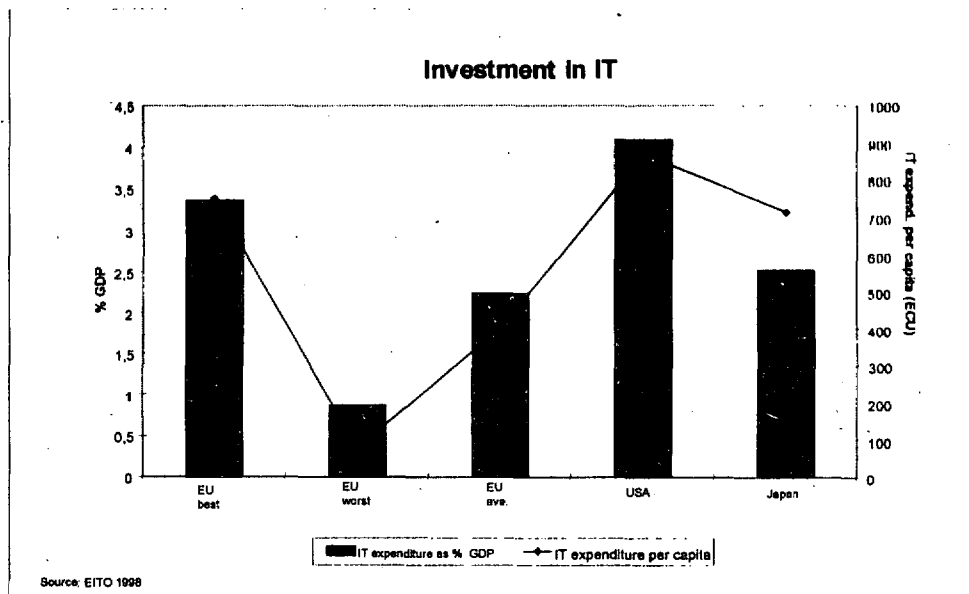
There were 950,000 people employed in the audiovisual sector in 1995, and this sector is expected to grow by 70% between 1995 and 2005. This growth could translate into 300,000 new jobs.



Chapter III: The conditions for success

It is clear that the Information Society presents the potential for enormous growth and job creation, both in the IS industries and in the economy as a whole. The EU is well placed to exploit this potential. Knowledge, creativity and diversity, the key factors for success in the information age, are core European strengths.

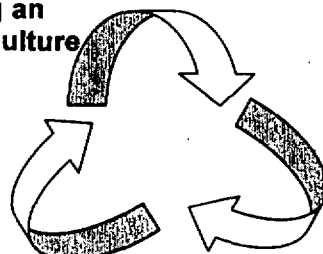
But in spite of the bright prospects, there are worrying signs that the EU is not yet geared up to reap the full benefits of the Information Society. Levels of penetration and usage of information and communication technologies (ICTs) in the EU remain well below the US, and within the EU there are big differences between Member States.



Urgent, concerted action is needed in three key areas if the EU is to remove the barriers to success and maximise the full economic and social benefits of the Information Society:

**Developing an
Enterprise Culture**

**Promoting
Organisational Change**



Boosting Skills

III.1: Developing an enterprise culture

The speed of innovation and the novelty of the opportunities mean that a new, flexible, simple business environment is needed – to encourage the development of new ideas, products and services and which allows for the rapid take-up by business and consumers.

- **Entrepreneurship**

To attract entrepreneurs and deliver the multiplier effects that generate jobs, the EU needs to bring together prospective entrepreneurs, venture capitalists and creators of knowledge.

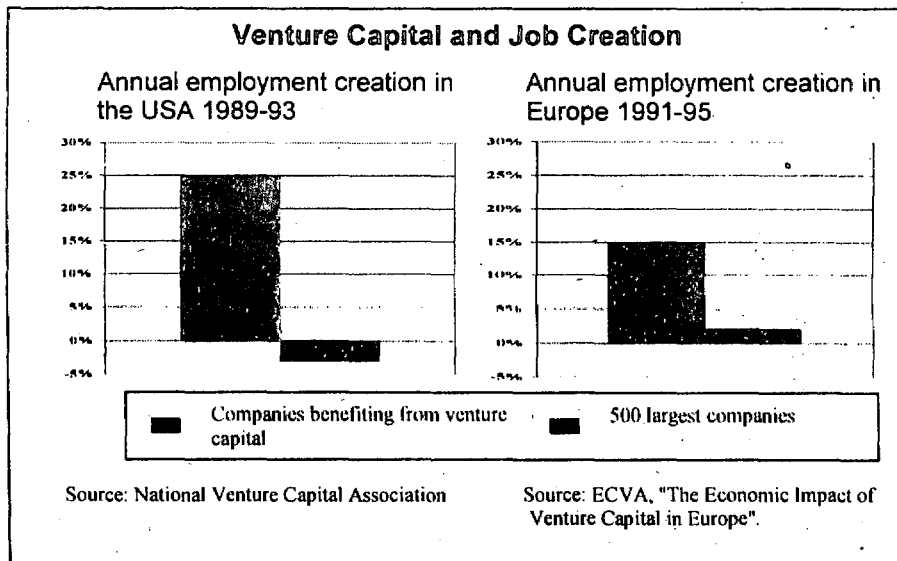
The Information Society depends on new ideas, new start-ups, new products, new services, new working methods, new attitudes to work.

In the EU, there are too few entrepreneurs and too few start-ups. A strong European entrepreneurial culture is lacking. This is compounded by a lack of market incentives with many taxation systems discouraging initiative. Legal and administrative barriers to the creation of companies and the introduction of new products and services frustrate the new entrepreneur.

Business needs simple and rapid administrative solutions, such as 'one-stop shops' with formalities and procedures standardised across agencies and Member States. The European Employment Strategy has identified this as a key area and called on Member States to specifically report on improvements by June 1999.

- **Improving access to venture capital**

The EU must endeavour to get the 'risk reward ratio' right if the venture capital market is to play its role in generating new jobs.

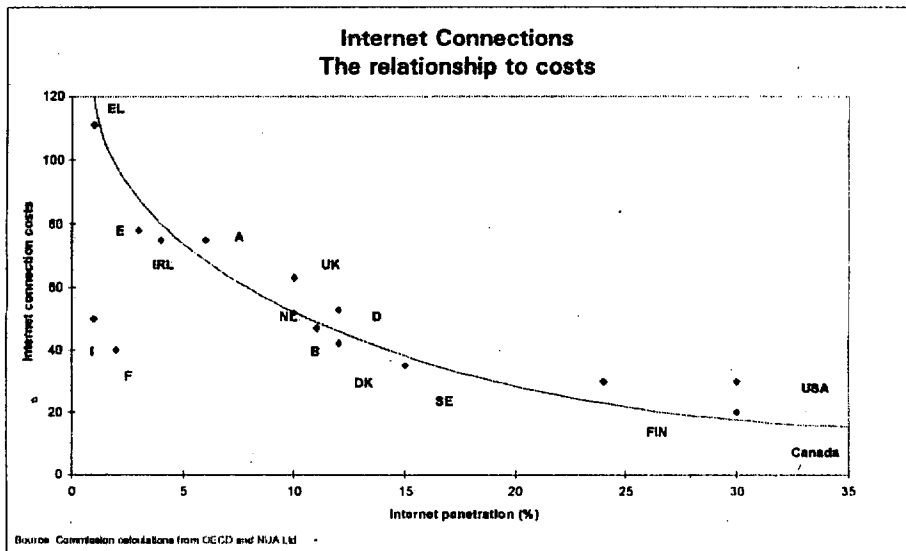


Venture capital plays a vital role in fostering innovation and the development of new markets and jobs. But the EU is not up to speed: in 1997, European ICT industries received only 17% of venture capital investments as against 55% in the US. This is hindering IT start-ups and job creation: evidence shows that companies benefiting from venture capital create significantly more jobs. Companies quoted on the NASDAQ in the US employ no less than 9 million staff.

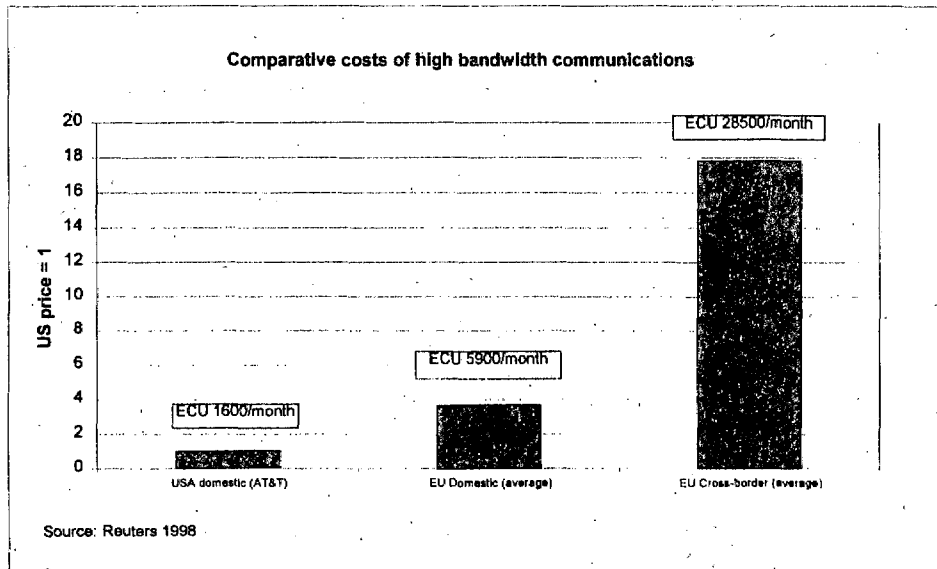
- **Using advanced technologies and services to gain competitive advantage**

The EU needs to develop and maintain a flexible, but robust, policy framework with effective regulation which allows rapid market introduction, protection of the public interest and development of new, advanced technologies and services in the converging areas of telecommunications, media and information technology.

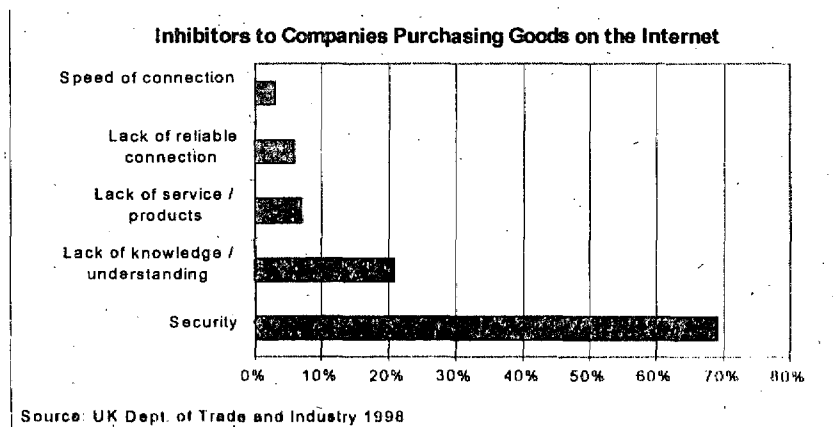
The liberalisation of telecommunications markets in the EU since 1.1.1998 has already resulted in sharp cuts in prices, especially for business users and long distance calls. However, internet charges - levied at the local rate - are still on average more than twice as high in the EU than in the US. This hampers consumer access to new products and services. And there are significant differences between Member States.



Similarly, costs to access advanced telecommunication services (e.g. leasing high-speed broad band lines) remain significantly higher in the EU than in the US. This hampers the business use of advanced services.



The use of electronic networks, for commercial and non-commercial purposes, is hindered by high cost as well as the lack of a clear and predictable legal framework particularly between the Member States (intellectual property rights and privacy protection, commercial communications, contractual form requirements, redress, liability, electronic signature, taxation, etc....) and security of transmission. Electronic commerce does not acknowledge geographic boundaries and can move easily, so the EU must continue to lead the process in establishing a global framework for these issues.



- **Public Sector as a driver**

The public sector should lead by example by both investing in new applications and integrating the use of ICT in internal and external operations.

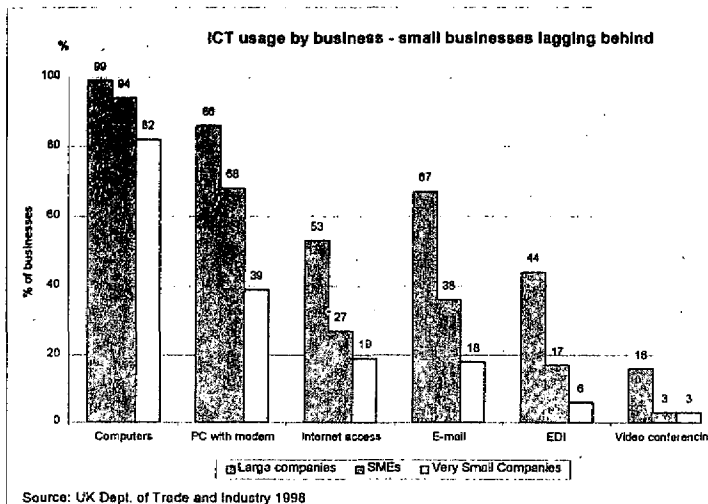
This involves a determined effort by all public authorities to accelerate the use of ICTs in their everyday relations with citizens and business, thus increasing the efficiency and quality of their services. Priority should be given to access to public information, on-line transactions with administrations, digital procurement procedures, and social and cultural services. This may also involve, where appropriate, a reallocation of resources to support investment in ICTs.

III.2: Promoting organisational change

ICTs provide opportunities to improve the efficiency of existing activities; facilitate changes in business processes and structures, and create entirely new opportunities for products and services. The introduction of new technology is accelerating a range of structural changes in markets and companies and in the workplace, stimulating changes in the way work is organised. But European businesses are not yet fully exploiting this potential.

- **Investment in technology – too low, too slow**

European companies, particularly SMEs, are under-investing in new information and communications technology. The problem is especially acute for very small companies. Under-investment means under-performance – and less jobs.



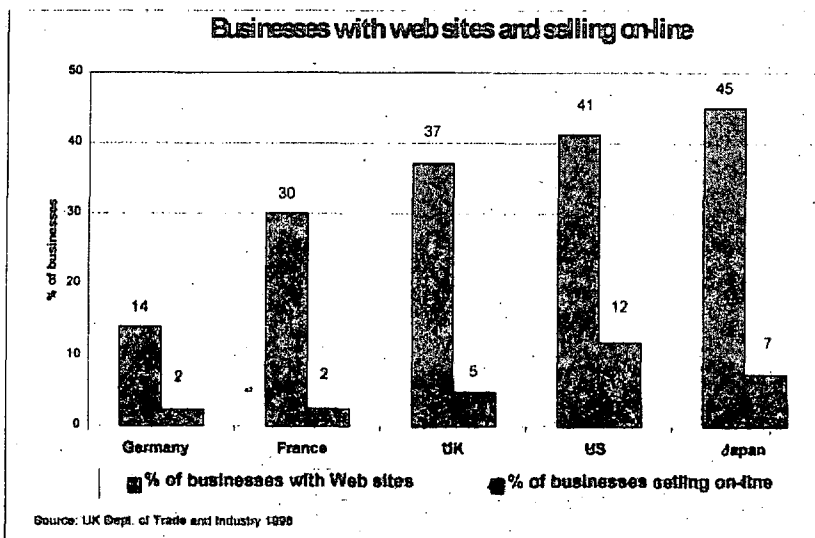
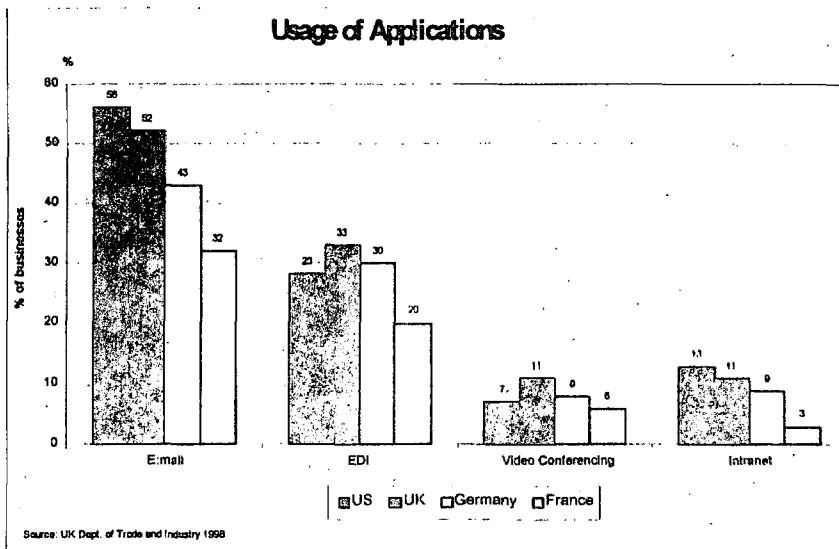
Where companies have invested in ICTs, it has improved productivity, thereby strengthening their global competitive position.

- **Business re-configuration**

Competitive gains have not been fully achieved because of a reluctance to sufficiently re-think the consequences of ICT to business organisation: its internal functioning; its interaction with suppliers and clients; and its integration into the rest of the economy.

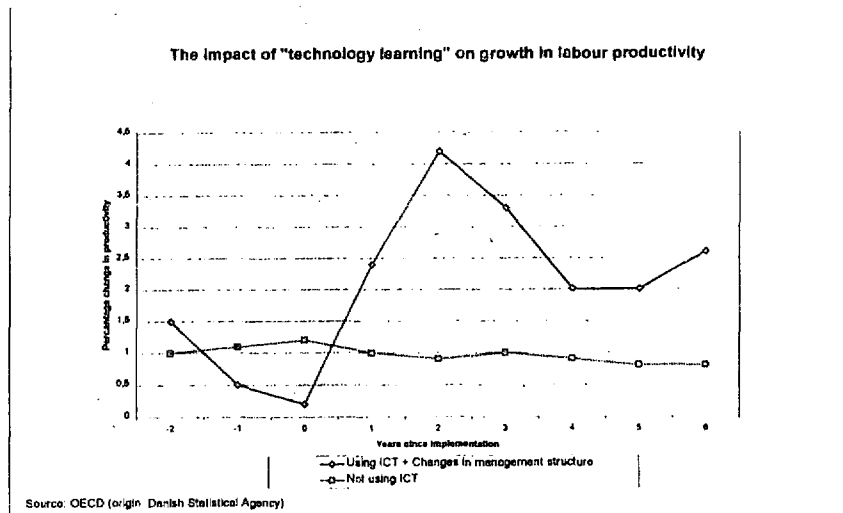
Success in the information age involves both understanding the benefits ICTs can bring to business and the ability to use them effectively. Some European companies have become world class performers by successfully combining ICT investment with organisational change.

However, many businesses are using only a fraction of the power of the technology because they have not reorganised their business processes to exploit the full potential of ICT. Company usage of ICT has focused on automation of existing processes and internal management, often without altering them, to the detriment of external usage and systems of decision making.



- o matched by a new organisation of work and adaptability

Introducing technology alone is not sufficient. More than ever before, people are the most important resource in the new knowledge-based economy. The benefits of new technology can only be fully realised if it is introduced together with new forms of work organisation and continuous training.



In the global, networked economy, the barriers of time, distance and location are being broken down. Companies need to be increasingly agile to seize the opportunities in the fast-moving information age. This requires new, more flexible, adaptable ways of working, with flatter hierarchies, more team-working, multi-skilling, and greater individual autonomy.

However, the rate of diffusion of new forms of organisation is slow in the EU, and there is often a lack of partnership in introducing change. This prevents business from exploiting the full potential of the technology, and it prevents employees from playing a full part in the change process.

The key to success is to adapt both management structures and work organisation in a way that balances flexibility for enterprises with security for the individual worker. This requires a new partnership, built on information, dialogue and participation, in which change brings mutual benefits. Employees gain security, for example through a greater choice of working arrangements, more job satisfaction, the possibility of developing skills and long-term employability, and employee financial participation. And business becomes more flexible, with a more skilled, motivated and versatile workforce, better able to take the initiative and cope with change.

III.3: Boosting skills

The full potential of the Information Society in the EU is also not being maximised because of low technological literacy, poor public access and a shortage of skilled people. This lack of technical literacy is costing jobs, reducing both the supply of skilled people and the demand for new products and services.

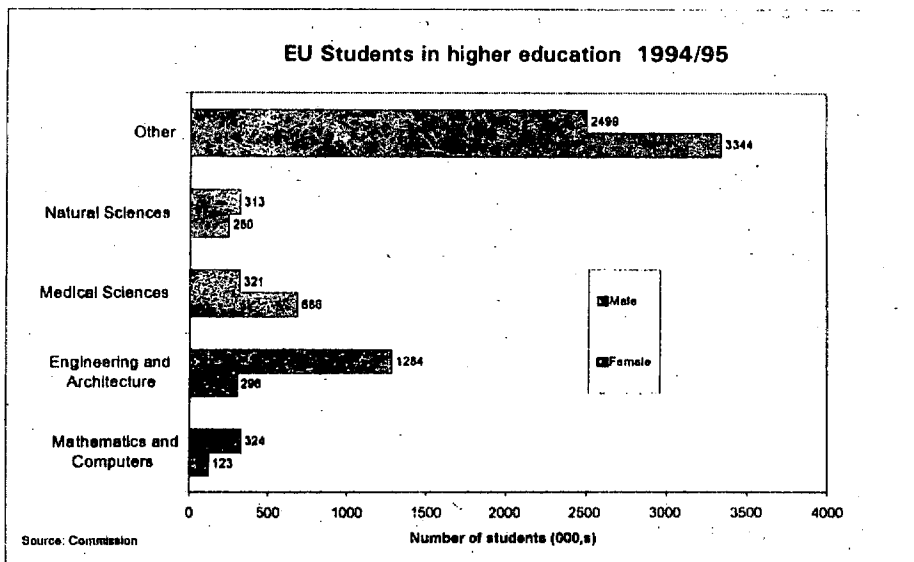
- **Overcoming the shortage of IT professionals**

The shortage of IT expertise is a serious constraint to the growth of both the IS industries and the user economy. At the end of 1998, the gap is estimated to be 500,000 unfilled vacancies in the EU, and the gap is expected to widen to 1.2 million by 2002.

The concern is not limited to ICT suppliers - 60% of IT jobs are located in sectors other than the Information Society industries, many of which are in SMEs. Nor is this just a European problem. The risk of the "brain drain" is real: the United States recently increased its immigration quota for IT specialists by 135,000 over three years.

This is a serious structural problem. The millennium 'bug' and the passage to the Euro are adding short-term pressure, but longer term demand is the major source of new skill requirements. There is a shortage of third level places in computing in European training and educational systems, a problem further accentuated by a strong gender bias.

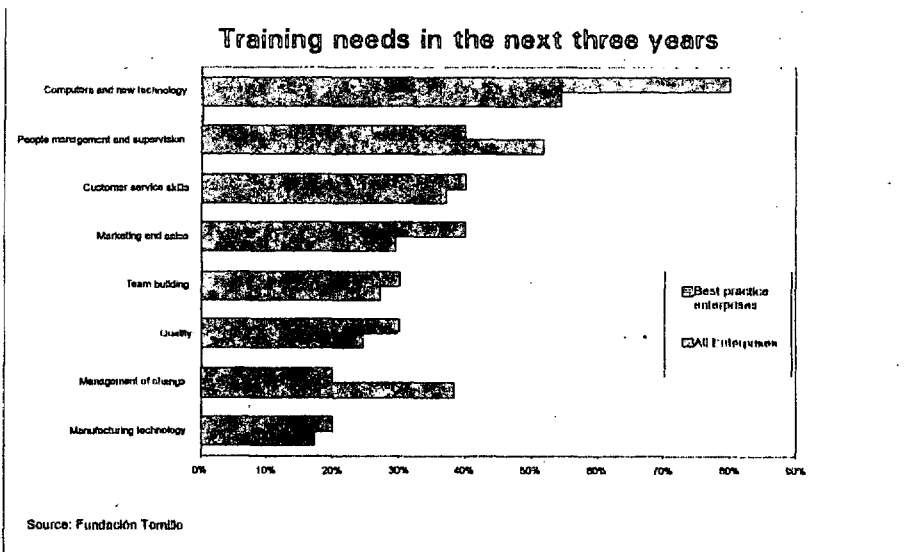
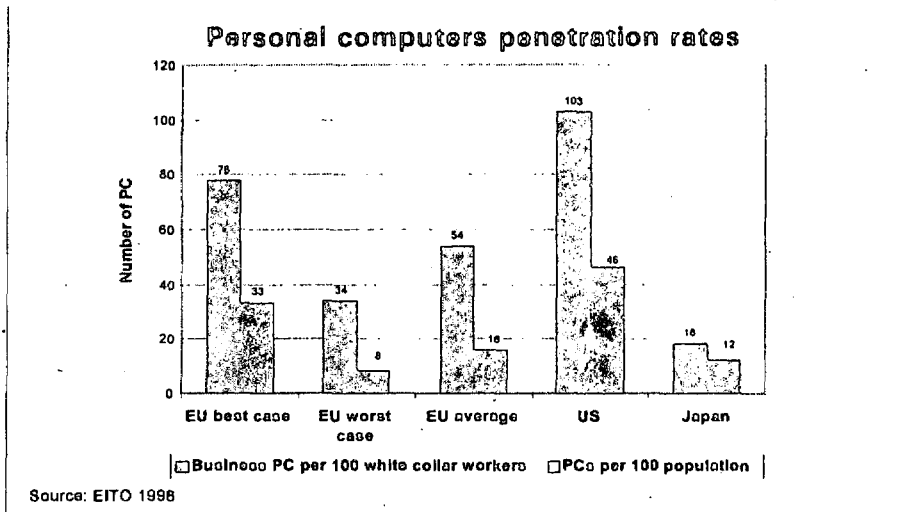
Urgent preventive action needs to be taken, including a reallocation of resources into computer courses, an increased emphasis on retraining older workers (and the unemployed) through conversion courses, continuing training and the development of public-private partnerships to transparently set curricula content in line with technology development and better anticipate skill needs.



o Improving workforce ICT literacy

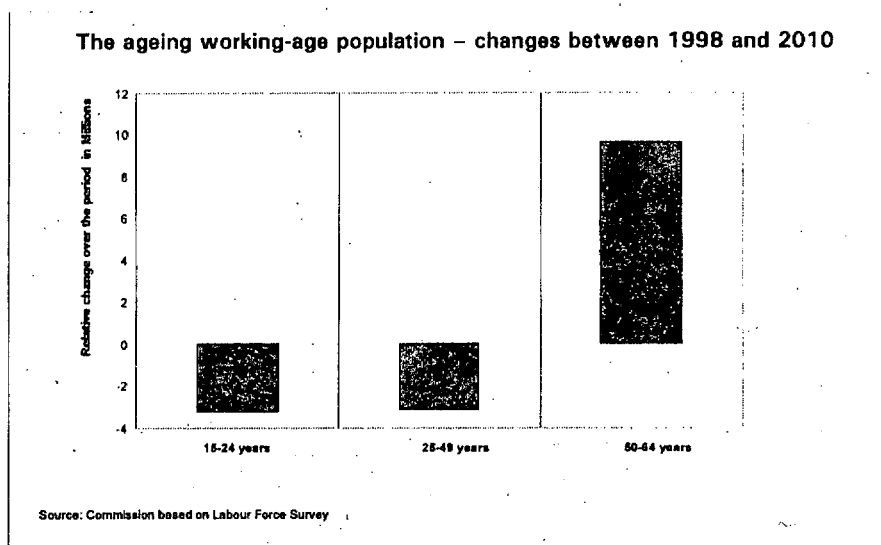
ICT literacy is fast becoming integral to business. ICTs are now everywhere in the workplace, and everybody needs to be ICT literate to maintain their employability.

The job opportunities are enormous, and many of them will arise in areas where the EU has traditionally been strong (design, creative industries, content production...). However, a recent survey of European companies highlighted a shortage of ICT literacy in the workforce which poses a major challenge for the competitiveness, long-term growth and employment prospects of the European Union.



Far greater efforts need to be made to retrain and upskill people (both those in work and the unemployed), to improve their employability in the Information Society. This needs to be done on a continuous basis because the technology is developing so fast, through a combination of life long learning, particularly self training of workers and the promotion of systems of validation of work experience.

Re-skilling and training of the existing labour force is an essential and urgent task. There is no option but to invest in the existing workforce, which is an ageing workforce. In the next twelve years, there will be 3 million fewer new entrants to the workforce and those aged over 50 will increase in number by 9.6 million.



- **Rethinking education:**

More than just learning technology, what is important is learning to learn with technology and learning to use information and communicate.

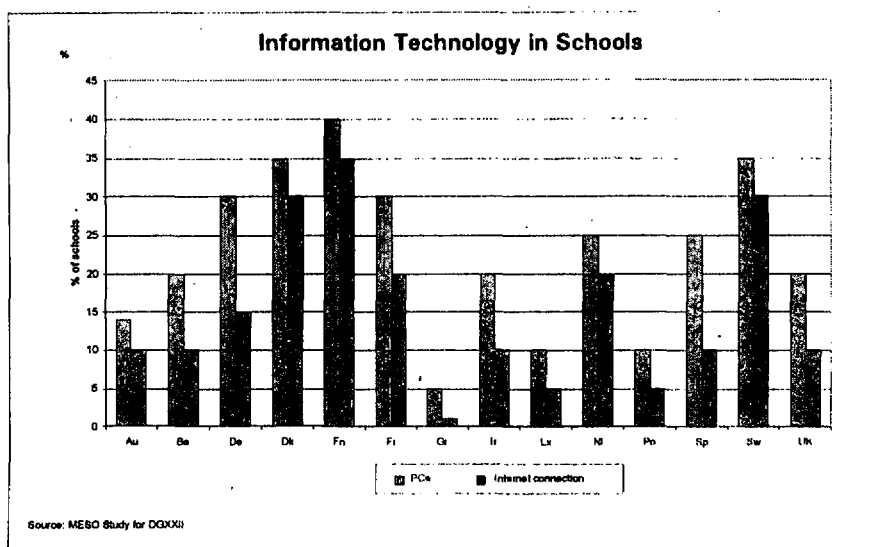
The speed and pervasive nature of the changes brought about by the Information Society require a fundamental rethinking of education and training policies. Boosting levels of ICT literacy across the board is essential to success in the knowledge-based economy.

"Technical literacy is quickly becoming as important as the ability to read. Yet our educational systems do not treat it as such. Too often, IT training is seen as ancillary, not central, to the educational process. The pace of technological change is far outstripping the investment we are making in our future – in our children and their education". (Joint statement from the Summit on employment and training in the Information Society, 22 September 1998.)

However, evidence shows that education and training systems are not yet geared up for this challenge.

ICT as a proficiency skill and the use of multi-media techniques need to be incorporated into the curriculum at all levels and more resources should be devoted to teach and train high-tech skills. Educational establishments must be provided with the tools for the job: both the hardware (sufficient PCs and internet connections) and the software (including suitable multimedia content). Teachers need to be better trained to use ICTs and to teach tomorrow's skills.

This requires a broad public/private partnership between schools, colleges, universities, libraries, specialist service providers and industry in order to provide everybody with the skills to benefit from the Information Society. In this context, networks of schools, higher education institutes and training centres are a priority.



- **The Information Society: Access for all**

Public access to the tools of the Information Society, and the skills to use them, needs to be prioritised. Everyone should have easy and affordable access to a basic set of information society applications and services.

The information society has the potential to be a powerful force for inclusion and cohesion in Europe, breaking down the barriers of distance for remote and rural areas provided that strategies are integrated within the productive fabric of the region and designed to respond to the local economic milieu. The Information Society can also favour inclusion by opening new opportunities for disadvantaged groups – for example, people with disabilities and older people – and localities.

And the potential is not yet being realised. Access to the information society remains closely linked to wealth, education and employment. Price is a significant barrier to entry, and household computer ownership in the EU remains low: for most people the main route of access is still the workplace. There is a lack of awareness of the potential of the technology, compounded by problems of "user-friendliness", especially among the groups with the most to gain. Regional disparities are marked. It is essential to ensure that the information age will not actually lead to new divisions in society but rather promote inclusion and cohesion.

Investment in awareness raising and public access – by both government and industry – is therefore needed. New services and products will not gain acceptance if people cannot access them. In the same way that public telephones are an integral part of the universal service (despite the very high household penetration of phones), so public access points – for example in libraries, schools and community-based knowledge resource centres – will be central to building an inclusive information society.

Chapter IV: Conclusions

The information age holds great promise for the European Union. Harnessing its potential will be one of the determinant factors of our future economic success.

The EU is well placed to be a driving force in the transition to a global knowledge-based economy, particularly if it can exploit the strong, positive synergies between:

- ✓ the knowledge, creativity and diversity of the EU workforce.
- ✓ the completion of the European single market, particularly the opening of the European telecommunications market
- ✓ the introduction of the Euro from 1st January 1999 offers an important opportunity to use electronic money
- ✓ the development of European entrepreneurship, supported by open financial and risk capital markets in the EU
- ✓ improvements in the adaptability of enterprises and the organisation of work
- ✓ the foreseen growth of electronic commerce
- ✓ the major ongoing investment in RTD and innovation in the EU

Taken together, these factors provide a unique opportunity for stimulating sustainable economic growth, improving competitiveness, promoting inclusion and cohesion, and creating significant, good quality employment in the EU. However, although jobs are already being created, **the full employment potential of the information society will only be maximised if these synergies are exploited across the board.**

This is a matter of common concern. At present, a lack of overall coherence and direction in policies is preventing the EU from harnessing the full potential of the information society.

Policies designed to unleash its potential to improve the quality of people's lives at work and in leisure need to be put in place. In this way, the EU can show the positive effects that can be obtained from co-ordinated policies in an area of prime importance to its citizens: **employment.**

Much is already being done to respond to this challenge. The EU is driving the process of telecommunications liberalisation, and is playing a lead role in international efforts to create an environment in which electronic commerce can flourish. European initiatives have been launched to simplify the business environment, promote entrepreneurship, develop the necessary advanced technology base, stimulate risk capital, and promote a partnership for a new organisation of work.

Based on the co-ordination and monitoring of national employment policies, the four pillars of the European employment strategy – entrepreneurship, adaptability, employability and equal opportunities – are all vital for the successful development of the information society.

The unprecedented pace of technological change and globalisation, the pervasive nature of the new technology, and the global nature of the information society means that **decisive political action is needed now** if the EU is to take and keep its place at the forefront of the information age.

Priority areas for action

- ✓ **revitalise the enterprise environment in the EU**, in particular the promotion of an entrepreneurial culture, access to venture capital and the conditions for the growth of electronic commerce.
- ✓ **develop and maintain a flexible, but robust, policy framework** - including full implementation of the current telecommunications and audiovisual regulatory frameworks - to allow market introduction and development of new, advanced technologies and services in the converging areas of telecommunications, media and information technology.
- ✓ **drive the Information Society by public sector example** - introducing the use of advanced information society technologies and re-engineering public administrations to improve their quality and efficiency in the everyday dealings with businesses and citizens.
- ✓ **maximise the potential of information society technologies** by investing in technology, including research and development, adapting business processes and promoting organisational change and innovation, especially in SMEs, so as to ensure EU competitiveness in the global economy.
- ✓ **ensure access to the tools for the job** - the infrastructure, equipment, software - in all our schools and universities, businesses and small companies, and local communities.
- ✓ **invest in the employability and adaptability of the people to make it happen**: a revitalised and advanced education and training system, more university places for IT professionals, investment in life-long learning, workplace re-skilling and self training, new forms of access to skills, and conversion courses for older workers.

The prime responsibility for achieving these actions rests with the **Member States**. A piecemeal, sporadic approach will not remove the obstacles that have been identified. The Commission considers that decisive, concerted action is now needed, and that a clear timetable, with indicators, should be set for monitoring and benchmarking progress made.

The **Information Society Industries** also have an important role to play, building closer partnerships with educational establishments and public administrations, maintaining technology leadership, supporting European entrepreneurship, developing global leadership in mastering organisational change and skills renewal, and taking co-ordinated positions on policy issues arising from the introduction and use of new technologies and services.

The Social Partners can lead the way by developing a framework for modernisation, in particular strategies for the introduction of the new technologies in companies and simultaneous adaptive organisational changes. These strategies build on continuing training of all workers, and the adaptation of management structures and work organisation in a way that balances flexibility for enterprises with a new concept of security for the individual worker.

The EU can co-ordinate this process. It can help create the conditions for growth by setting in place a flexible, but robust, EU policy framework; removing market distortions; and consolidating the largest Single Market in the world. It can encourage excellence by identifying best practice and benchmarking performance; promoting partnership for a new organisation of work, investing in RTD and innovation, and making sure that top class European ideas are marketed and developed in Europe. And it can champion investment in people through the European employment strategy, the education and training programmes and the structural funds, in particular the European Social Fund. In this way, the European Union can continue to play a leading role in the development of global policies on the information society.

The Commission recommends that:

1. Member States should prepare comprehensive national Information Society strategies to give new impetus and urgency to these issues.

- ☞ Each Member State should appoint a high-level representative to co-ordinate the national strategy and contribute to the co-ordination of the EU strategy.
- ☞ Member States should submit their comprehensive national strategies by June 1999, taking particular account of the priority areas for action identified above. This exercise should be closely co-ordinated with the proposed 1999 Employment Guidelines, which place a particular emphasis on tapping the employment potential of the information society. This new priority should be reflected in the updated National Action Plans for employment to be submitted by mid-June 1999, and Member States are invited to present their comprehensive information society strategies at the same time as they report on their NAFs.
- ☞ Top priority should be given to ensuring the swift implementation of EU initiatives directly related to the Information Society. In particular, in the areas of telecommunications, audiovisual, electronic commerce, venture capital, research and development, employment, education and training, cohesion, and international affairs.

2. The Information Society industries must show leadership.

- ☞ They are invited to present both their priorities for the EU's successful transition to the information age and their suggestions for strengthening the EU's leadership in the information society, in particular in relation to exploiting the employment potential.
- ☞ The Information Society industries should submit their priorities and suggestions by June 1999

3. The Social Partners are invited to make their contribution,

- ☞ by developing a framework for modernisation designed to promote the introduction of new technology and new work organisation in the knowledge-based economy.
- ☞ The Social Partners should report on progress by June 1999

The Commission will place all of these contributions on a web-site for public consultation. The Commission will subsequently present a report on progress made, with recommendations for future action in all policy areas of importance, in preparation for the Helsinki European Council in December 1999.

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