THE EMPLOYMENT AND ECONOMIC IMPACTS OF ADVANCED COMMUNICATIONS, AND SOCIAL TRENDS IN THE USE OF COMMUNICATIONS SERVICES

PACE 95

FOREWORD

One important basis for European union policies on growth and employment is the belief that a rapid transition to an "Information Society" through fast deployment of advanced communications infrastructures and services, will generate competitive advantages for business, greater flexibility in employment and more jobs, and new sustainable economic growth.

It is extremely difficult to substantiate this belief in quantitative terms. Much of the change involve in developing an information society is structural, and simple extrapolation of past trends is not a reliable guide to the future.

The transition will also be associated with great volatility : some business sectors will decline, others will grow, and yet move will appear. Many traditional jobs will disappear, but (we hope) even more new jobs will be created.

The four research projects, for which the key results are summarised here, all looked in different ways at the possible impacts of advanced communications deployment :

- the AD-EMPLOY project at the impact on jobs
- the ACCORDE projects at the impact on regional development and European cohesion
- the SOCIAL TRENDS project on changes in lifestyles and on use of electronic media
- the METIER project on growth and trade.

The full texts of the final reports from all projects are available from DGXIII - B. This summary report is distributed as a contribution to the debates about the Information Society. The views expressed are not necessary those of the Commission.

Peter Johnston

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CHAPTER 1

EMPLOYMENT TRENDS RELATED TO THE USE OF ADVANCED COMMUNICATIONS

Executive summary of the final report [1]

The increasing take up of advanced communications services in the European economy is contributing strongly to job creation and to improvements in the quality of work. Development and use of advanced services was responsible for 60 % of new private-sector jobs creation in Denmark between 1976 and 1990.

Organisation in both the private and public sector should therefore be encouraged and enabled to increase their use of advanced communications services as much as possible, and in ways which enhance job creation and improvements in the quality of work.

The growth of advanced communications services represents a new sector of economic activity which should be supported and fostered. Such services not only generate jobs in their own right, but as they tend to be knowledge intensive, they also support the shift towards quality-based production and services in user industries.

In general, this beneficial effect of advanced communications services seems to be both greater and more positive than that resulting from investments only in stand-alone equipment and infrastructure. The more a given infrastructure and inventory of equipment is used by application services over the network, and the more these services are combined with social and economic innovations, the greater the potential beneficial employment effects seem to be.

These conclusions are derived from a study examining the overall employment trends across the whole economy related to the use of advanced communications within the European Union. The study bases its findings upon a comprehensive survey of literature and previous studies, 14 in-dept case studies from Austria, Denmark, France and the UK, an experimental macro-level quantitative analysis of employment change in Denmark, and a delphi-type questionnaire and discussion round with experts from three countries. Although there are unresolved research problems associated with the difficulty of separating the effects of networked advanced communications from stand-alone information technology, as well as technology affects from wider economic and social changes, these different analytical tools do lead to relative agreement on many of the study’s main conclusions.

1. Overall job creation and destruction effects of advanced communications

Within this context of job creation and destruction, the role of three main mechanisms have been investigated. Although these mechanisms clearly take place in concert, they do seem to have their main effects at different levels :

1 *process innovation* (operating mainly at the organisational level) directly increases labour productivity leading to a reduction in labour requirements, but this together with increases in the productivity of other inputs into the production process leads to lower prices and other

[1] The full text of the Final Report is available at the European Commission, DGXIII - B, on CD-ROM and on the WWW at http://www.analysys.co.uk/acts/cec/twork95/

improvements which in turn can result in greater demand, turnover and thereby GDP. Depending on organisational structures and management strategies, more jobs can thus be created.

2 *product innovation* (operating both at the econmic sector and organisational levels) directly creates new markets and increases turnover and thereby GDP. A net creation of jobs can be the results as, depending upon overall economic conditions, the markets and jobs created are greater than those lost.

3 *network benefits* (operating at the network level) are generated by advanced communications and related to the size of, and numbers of subscribers on, the network. Such benefits are not captured directly by the market prices but can, under suitable conditions, lead to increased economic activity and hence GDP and thereby to the net creation of jobs.

Recognising these mechanisms, the study has clearly shown that a net balance of jobs can be created by :

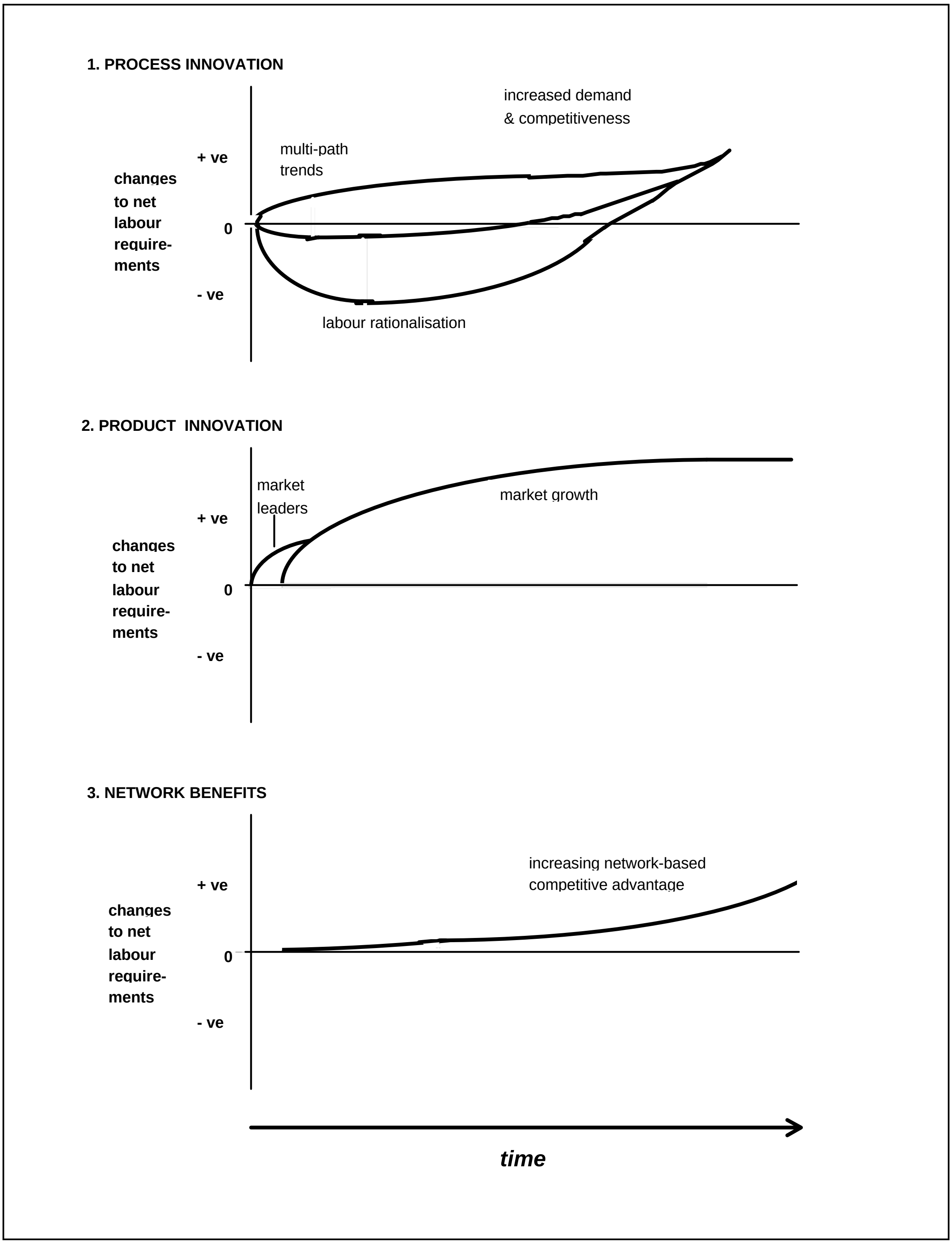
- specifically encouraging the growth and use of advanced communications services as distinct from equipment hardware and software.

  It is important to encourage a change in the use of advanced communications by both the public and private sectors so that the use of services grows faster than the purchase of hardware and infrastructure. It is markets based on, or using, networked services that will create jobs in the wider economy.

- encouraging product innovation using advanced communications.

  The balance between product innovation and GDP growth, on the one hand, and process innovation and labour productivity growth, on the other, is critical for jobs.

Both services and equipment are of course embodied together in economic systems which present characteristics of both process and product innovation. What is important for employment is to encourage the widespread develoment of service applications, driven by appropriate social and economic innovations, which can build upon the platform provided by advanced communications equipment and infrastructure systems. If such services, and especially innovations, are not strongly developed compared with equipment and infrastructures, then potential employment benefits are unlikely to be maximised.


1. PROCESS INNOVATION
increased demand
& competitiveness
multi-path
trends
+ ve
changes
to net
labour
require-
ments
0
- ve
labour rationalisation
2. PRODUCT INNOVATION
market
leaders
market growth
+ ve
changes
to net
labour
require-
ments
0
- ve
3. NETWORK BENEFITS
increasing network-based
competitive advantage
+ ve
changes
to net
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time

In the following tables, sectors are classified on two dimensions: whether the sector has experienced overall increase or decline in employment in the period 1970-90 and whether the use of advanced communications has a positive or negative effect on the sector's employment. The first table looks at the use of services and the second table at the purchase of equipment.

The first table indicates that when a sector's employment is expanding, then the use of services only has positive effects on employment. Most of these sectors are service sectors, though not all. This result would seem to disprove the thesis often put forward that the use of advanced communications services leads to employment decline, even in growing and dynamic sectors. This situation seems to come about through the positive effects on GDP arising from both process and product innovation. Further, three sectors: textiles and clothing, paper and printing and private services, which have experienced employment decline overall, seem to have had their decline reduced by increasing use of advanced communications services. In this type of sector such services can be part of a strategy designed to safeguard employment in an otherwise declining sector.

Finally, in more traditional sectors affected by structural adjustments to the economy which anyway face declining employment overall, including agriculture, it seems that advanced communications services contribute to employment reduction. The mechanism here is almost certainly that AC is used in process innovation to boost labour productivity without contributing to any significant extent to product innovation, nor directly to growth in GDP. Alternatively, labour productivity is growing much faster than GDP.

		overall employment change in sector	
		-	**+**
employment change related to use of services	**+**	textiles & clothing paper & printing private services	gas, el. & water chemicals metallurgy engineering construction tele equipment wholesaling hotels & restaurants transport public sector financial & business services posts & telecoms
	-	agriculture ceramics food & drink wood & furniture retailing	

Table 1 : Danish employment growth/decline by sector related to the use of services

Table 2 shows a similar analysis for the purchase of equipment. A somewhat different pattern emerges which shows a more negative impact on employment. Some sectors which have experienced general employment growth seem to have experienced a negative contribution from this type of expenditure in terms of employment. This is probably associated with the substitution of labour by equipment without making significant contributions to GDP.

Overall, the data in Tables 1 and 2 indicate that in sectors where jobs are being created anyway, the use of advanced communications services seems to boost this trend, whereas in sectors where jobs are being lost, the use of such services can sometimes slow down or even counter such a trend. This is not the case with the purchase of equipment. Here, the picture is much more mixed, but it does seem that in many cases the purchase of equipment, without the use of services, leads to job loss.

Thus, although equipment is necessary to be able to use AC services, it is the use of such services themselves which can turn potential job loss into job gain.

These two observations seem intuitively comprehensible. The purchase of equipment tends to substitute equipment for labour, whereas the use of services tends to increase activity and hence GDP, thereby creating new opportunities and activities for which labour is needed.

Table 3 underlines the importance of advanced communications services to job creation by distinguishing its effects on the private sector from total employment effects. It is important to do this because the mechanisms of process and product innovation are essentially market driven and because employment in the public sector is politically determinded and unlikely to rise significantly in the future. Here we can see that in the context of a net growth in Danish private sector jobs of 6.9% from 1976 to 1990 arising from all causes, the use of advanced communications services made a positive contribution of 4.1%.

		overall employment change in sector	
		-	+
employment change related to purchase of equipment	+	paper & printing private services	chemicals metallurgy construction tele equipment hotels & restaurants public sector
	-	agriculture ceramics food & drink wood and furniture textiles & clothing retailing	gas, el. & water engineering wholesaling transport financial & business services posts & telecoms

Table 2 : Danish employment growth/decline by sector related to the purchase of equipment

Total net employment growth Growth in private sector employment Contribution of advanced communications services	+ 8.8% + 6.9%

to private sector employment	+ 4.1%
Growth in labour productivity	+ 29%
Growth in GDP	+ 41%
Growth in expenditure on advanced communications services	+ 110%
Growth in expenditure on advanced communications equipment	+ 133%

Table 3 : Employment, advanced communications and other indicators in Denmark (1976-90)

There is good reason to believe that a figure approaching the accelerated growth scenario will in fact be experienced in the future. The stable scenario figure is based on the use of services available in the past and does not take account of the profileration of new services entering the market in the 1990s. Further, the liberalisation of the telecommunications sector and the significant decreases in service tariffs already achieved and in the pipeline are dramatically reducing costs. We know from previous experience that spending on advanced communications is very price sensitive.

The net job creation effect of each of these scenarios is summarised in Table 4 under varying conditions. Note this is only the contribution of advanced communications services. The overall change in employment depends on the interplay of all other causes. Table 4 in effect isolates the specific contribution of advanced communications services to employment, everything else being held constant.

scenario: % growth in use of services	(1) assuming that the relationship between growth in use of services and a) growth in productivity, and b) growth in GDP, remain unchanged in the period	(2) assuming that the relationship between growth in use of services and growth in productivity is strengthened. The effect increases by 20%	(3) assuming that the relationship between growth in use of services and growth in productivity is strengthened by 20% and the relationship between growth in use of services and growth in GDP is strengthened by 10%
stable: 110%	+ 4.1%	+ 2.4%	+ 4.0%
accelerated: 220%	+ 8.2%	+ 4.8%	+ 8.0%

Table 4 : Net job creation forecasts for the Danish private sector for 1991 to 2005 related only to the use of advanced communications services

Column 1 in Table 4 shows jobs created under the two scenario conditions assuming that the relatioship between growth in use of services and growth in GDP and labour productivity continue unchanged. Here we can see that the 110% growth rate of use of services contributes 4.1% to private sector jobs in Denmark, whereas an accelerated growth would contribute 8.2%.

2. Overall effects of advanced communications on the organisation and performance of work.

The incorporation of advanced communications use into organisations and working practice can lead to a wide variety of business benefits and accompanying employment change. The most favourable outcomes for employment are typically in situations where the technology is integrated deeply within and between organisations so that transformed processes are able to transcend the formal boundaries of the individual organisation. Costs savings are made by the much reduced external transaction and co-ordination costs and economies of scale and scope derived from the interworking of different organisations'advanced communications systems. It is these savings, coupled with the new business opportunities opened up, that can create new products and markets. Because competitiveness does not need to be achieved by cutting staff costs, and because human capital is indeed required to develop and exploit these new opportunities and markets, the net creation of jobs is possible.

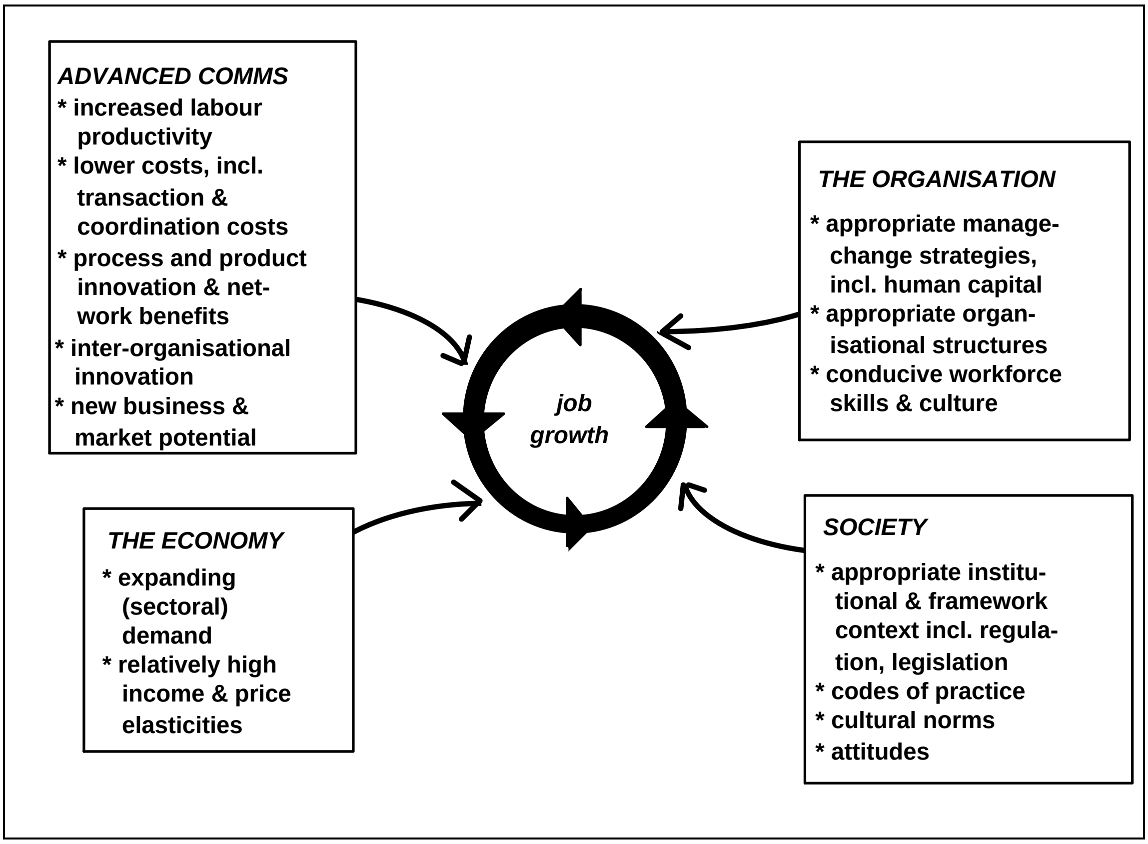
At least four elements are important in determining whether or not organisations which implement advanced communications are also able to increase the quantity and quality of work.

1 *from advanced communications* : potential business benefits which can deliver growth in labour productivity, greater efficiency, reduction in coordination and transaction costs, flexibility, new types of activity, through process and product innovations and network benefits.

2. *from the organisation* : appropriate management strategies and organisational structures, plus strategies to develop human capital and promote a conducive workforce culture. Companies having a tradition of flexible adjustment to new technology are more likely to be able to exploit the performance-enhancing potential of advanced communications by becoming more competitive.

3. *from the economy* : growing sectoral demand and high income, where demand is generally price sensitive.

4. *from the society* : an institutional and framework context, including appropriate legislations, rules, regulation, cultural norms, attitudes, etc.



The virtuous circle of employment growth

The combination of the first two elements, which are very much under the control of the organisation, with the third and fourth, largely outside the control of the organisation, seems to result in more and better quality jobs. Even in situations where the third and fourth elements are not conducive to employment growth, positive policies in the context of the first two elements can in some instances still lead to an improved employment situation within a competitive context.

The second element focusing on appropriate management strategies and organisational structures is clearly the key driver for a successful organisation which is also able to increase the quantity and quality of work available. An important policy implication resulting from this is that support needs to be given to management in both private and public sectors to understand and embrace the potential of advanced communications.

Particularly in the private sector, the study has shown that in many cases there is a real choice for companies in how they develop their activities and competitiveness using advanced communications. On the one hand, there is a competitiveness based upon *the vicious circle* of a very lean, mean and highly efficient organisational form, whereas on the other hand, there is a competitiveness derived from *the virtuous circle* which builds more explicitly on exploiting the flexibility, creativity and human touch provided by human capital.

Although it is clear that elements of both processes will always co-exist in a given organisation, it is helpful to distinguish these two routes to competitiveness when organisations introduce and exploit advanced communictaions in order to understand the differential employment effects of each:

> ***the vicious circle*** where competitiveness is built upon reducing labour costs, and attempting to speed up existing processes and make them more efficient by using stand-alone information technology. The overriding concern is with cutting the costs of labour, short-termism and downizing.
>
> ***the virtuous circle*** where human capital becomes fully locked into creating competitiveness, so any cuts in labour costs no longer become a sensible option but where cost savings can be achieved by making other inputs into the production process more efficient. For example, by using advanced communications to reduce co-ordination and transaction costs and achieving economies of scope, and by making long-term efforts to develop future business and markets.

	vicious circle	virtuous circle
product	• conceived as hardware and logic	• conceived as knowledge and intelligence
technology	• stand-alone information technology hardware and software • making the machine more efficient • inward looking: islands of automation	• trans-organisational advanced communications services • releasing the potential of the brain • outward looking: complex, networked trading relationships
organisation	• downsizing • de-layering, but otherwise structures and hierarchies often unchanged though slimmer • *machine-like*	• retaining jobs or upsizing • de-layering accompanied by trans-formation and de-centralisation to become flexible and virtual • *brain-like*
work processes	• emphasis on process at expense of product innovation • automation, speeding up, rationalisation of existing processes • processes stop at boundary of organisation	• emphasis on both process and product innovation • developing new processes and thereby new types of activity • processes cross organisational boundaries
workforce	• machine-tending • repetitive tasks single role (specialists) • limited initiative, alienation • once-off training and de-skilling	• as a creative part of the *brain* • flexible, multi-tasks • range of roles (generalists-specialists) • wide initiative, responsibility, teamwork, empowerment • continuous training and up-skilling
competitiveness	• reducing labour costs • speeding up and making existing processes more efficient based upon labour rationalising benefits of information technology hardware and software	• reducing costs of other inputs incl. coordination and transaction costs • flexibility and developing new processes, products and new business opportunities based on creative use of human capital using advanced communications services

From vicious to virtuous circle using advanced communications

In the context of the introduction of information technology and especially advanced communications into organisations, occupations are also undergoing great changes. Most occupations are being affected to a greater or lesser extent, either declining or increasing in numbers, or changing in character:

Occupational losers :

- lower skilled workers : there is a declining demand for such workers which is also driven by competition from low wage countries. It is also more difficult for such workers, compared to managers for example, to obtain a new job if they are made redundant.
- routine, manual and clerical workers
- support workers
- workers unwilling and unable to adopt new work culture and skills: there are dramatic new demands on workers at all levels and in all sectors. More flexibility is required, a greater variety of skills even if these are low level, the ability to perform more tasks, greater customer-orientation, and the use of the new technology.

Occupational winners :

- professionalised information and advice workers
- workers involved in creating, structuring and managing information
- direct customer contact workers
- workers who are able to add human touch to customer contact as a value-added response to the otherwise emerging self-service information economy
- unskilled or semi-skilled workers who are able to offer keyboard skills and low level technical competence coupled with inter-personal and customer service skills.
- workers willing and able to adopt these new work cultures and skills.
- both professional and trades micro businesses which are able to use advanced communications (for example mobile systems) to keep down costs and undertake necessary administrative tasks without losing productive time.

Occupational changers :

- professional roles : becoming integrated with managerial roles
- middle management and administrators : becoming synthesisers, team leaders, animators and case workers, rather than information filters and distributors
- secretaries : becoming facilitators and organisers

These changes are not being driven only by advanced communications, but the technology is being used as an effective tool to implement them.
In similar ways, tasks and people are also being affected by the introduction of advanced communications :

Tasks :

- from single to multi-tasking
- from simple to complex tasks
- from repetitive to flexible, creative tasks
- from support to direct tasks (e.g. customer-contact)
- from physically taxing and boring to intellectually and psychologically demanding

People :

- from specialists to generalists-specialists; in addition to one or more specialisations, workers are expected to undertake a range of tasks at both high and low level, especially in relation to specific customers or cases.
- from low to high job enrichment and satisfaction
- from less to more stress and isolation : strategies are needed to counter this
- from single to multi-skills : computer, personal and business skills
- from once-off to continuous training

Overall, people need to be able to take the initiative themselves within what is becoming, similtaneously, a richer and more varied work environment, as well as more stressful and unstable one. This can, in the right circumstances, produce greater job enrichment and work challenge.

3. Conclusions and recommendations

The ability of advanced communications to increase the quantity and quality of employment is related to its ability both to change how we do existing things as well as to enable us to do new things by opening up new opportunities. The latter is the key to the information society and this needs to be actively encouraged.

Key message 1 :
The overall conclusion of the study is that the increasing take up of advanced communications services in the European economy can, under the right conditions, strongly contribute to job creation and to improvements in the quality of work.

Organisations in both the private and public sector should therefore be encouraged and enabled to increase their use of advanced communications services as much as possible.

Key message 2 :
In general, the potential beneficial effect of advanced communications services seems to be both greater and more positive that that resulting from investments only in stand-alone equipment and infrastructure.

The more given infrastructure and inventory of equipment is used by applications services over the network, and the more these services are combined with social and economic innovations, the greater the potential beneficial employment effects seem to be.

Key message 3 :
Opportunities for growth in employment using advanced communictaions depend on management.

Much of the responsibility for introducing advanced communications into organisations and using it to create new business areas and jobs, as well as in ways which increase rather than decrease the quality of work for employees, rests with the management. The generally conservative and poor response by management to the use of advanced communications within and between organisations seems to constitute the biggest barrier to its full exploitation. The creation of jobs by advanced communications requires new organisational forms and interrelationships. In short, organisational transformations which lock in human capital as part of the competitive process are necessary.

Key message 4 :
Policy and investmment support needs to be given to the information service market and to reduce the barriers to market formation.

Another important barrier is a failure to appreciate that it is the market for networked information services which will create jobs in the wider economy, rather than markets for information technology and advanced communications equipment and infrastructure on their own. Although the latter are necessary, their own wider job creation effect is limited.

But it is not just at the organisational and service market levels that urgent changes are necessary if we are to maximise the job creation potential of advanced communications. At the national and international level decisive action is required to liberalise and re-regulate the telecommunications sector, provide leadership, stimulate new forms of collaboration, particularly for investment purposes and especially between the private and the public sectors, and reduce traffic tariffs drastically. Advanced communications needs to be *available* and *affordable* for all. These issues together constitute another barrier to the development of the information society and the new jobs that go with this.

In terms of the labour, continuing turbulence and the need for worker flexibilty, partly caused by the introduction of information technology and advanced communications, need to be balanced and contained by new forms of strucure and stability. This is necessary in order to enable workers and their employers to invest in, and take risks with, their own education, training and employment futures.

The information society must be launched without delay; organisational and learning effects are much slower than technological adapation. Clear signals and leadership from national and pan-European bodies are needed at all levels. Governments need to show leadership in the adoption of advanced communications. Rather than simply supporting networking in rhetoric, they should directly innovate and invest in these to speed up the rate of diffusion, and to stimulate the growth of new advanced communications-intensive services.

level	Levels of employment issues: advanced communications are supporting the move: from	to
technology	• information technology used for automation of existing processes and activities by making them more efficient and speeding them up	• in addition to use of information technology,advanced communica-tions used to integrate geographically separate activities resulting in an intensification of activity overall as well as the creation of completely new types of work processes, activities and market opportunities
sectoral	• neutral or negative impacts on job numbers when stand-alone information technology systems are taken in use • traditional manufacturing (often traditional unskilled male jobs) • traditional services (often traditional interpersonal skills) • manufactures as highly tradable, highly de-localised commodities due to low storage and transport costs relative to production costs • services as non-tradable, localised commodities which must be consumed when and where produced	• positive impacts on job numbers (even in some sectors where job numbers are otherwise declining) when inter-organisational advanced communications systems are taken in use • high-tech manufacturing and services (often part-time female jobs) • new services (often technical skills, new interpersonal skills) • some manufactures becoming less tradable, more localised commodities due to high storage and transport costs relative to production costs • services as tradable, de-localised commodities which can easily be stored and transported for consumption anywhere at any time
inter-organisational	• vertical economic links and production processes • islands of information technology automation in each organisation as inward-looking technology • simple trading relations between fixed-role suppliers and customers, with competitors excluded	• more horizontal economic networks (incl. outsourcing to small specialised firms, flexible specialisation) • networks of organisations integrated through advanced communications, as outward-looking technology • complex trading relations in which organisations can simultaneously be competitors, suppliers, customers, and distribution channels
organisational	• hierarchical bureaucratic organisa-tions • large stable organisations • internal decision-making to coordinate activity	• delayered networked organisations • down-sized smaller, ever-changing configurations (e.g. virtual enterprises) • external market signals coordinate activity
work	• single and fixed task demarcation • central, hierarchical reporting relationships • static, geographically concentrated work patterns	• multi and flexi tasking (a reversal of the division of labour?) • de-centralised, horizontal and integrative relationships • more mobile, distributed work patterns (e.g. teleworking and direct service getting closer to the customer)
individual	• life-long, full-time, fixed job skills • once-and-for-all education • jobs for life	• changing, flexi-time, multi skill jobs • continuous education • evolving jobs and work portfolios

CHAPTER 2

ADVANCED COMMUNICATIONS FOR COHESION & REGIONAL DEVELOPMENT

Executive summary of the Final Report [2]

The ACCORDE Project posed three questions :

1. What is the relationship between the deployment of advanced communications and cohesion ?
2. Which specific applications have the greatest potential for enhancing regional development and cohesion ?
3. How best can these applications be promoted in a competitive, commercial environment ?

1. How do Advanced Communications Relate to Cohesion?

Can advanced communications, long acknowledged as a central tool of European integration, also play a role in increasing cohesion ? Or might advanced communications lead to greater economic inter-connectedness - but not necessarily to the balanced development of peripheral regions or, thus, to cohesion?
The answer is not obvious. Examples of both effects have been found during our research, even within single applications. Advanced communications have eased the logistics of the take-over of dairy processors in the Azores by distributors from the mainland, on the one hand improving access to mainland markets, but on the other weakening the bargaining position of local farmers. They have brought teleservice jobs to Scotland and Ireland, although with few linkages to the local economy. While no one can claim certainty as to the long-term effects, we distinguish some key trends below.

1.1 An Opening into the 'Networked Economy'

A clear global trend has emerged in certain key sectors, but affecting all sectors, towards 'networked firms' and 'networked regions'. This is much of what the 'information society', is, in practice, about. It creates new possibilities for SMEs to become involved and for mutually beneficial linkages between SMEs and multi-national firms. This in turn opens an avenue for some less developed regions to become involved in higher value-added activities and to gain more control over their economies, endowing them with 'agency' that promises a more secure future. This is perhaps the single most important opportunity offered to regions by advanced communications, to become involved in the emerging networked economies. But it is just an opportunity, one that only some regions, generally the stronger ones, will be in a position to pursue since it demands a number of prerequisites. In essence, it strengthens EU cohesion through enhancing both inter-regional integration and the internal cohesion of regions themselves.

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[2] The full text of the Final Report is available electronically on CompuServe Telework Europa (GO TWEURO) library 8 (RACE General), file name is Accord.zip". It is also available on the WISE WWW server via following address http://www.igd.fhg.de/wise/

1.2. Insertion into New Growth Sectors

More conventionally, there are communication-led growth sectors, such as teleservices, that can create considerable employment in regions with the appropriate prerequisites. Although following the 'branch-plant' economy model, there is evidence that parts of this sector are becoming 'outsourced', with independent firms springing up often in remote regions to service the needs of major corporations.

In this case, advanced communications contribute to cohesion by allowing regional labour resources and skills to be developed and utilised, where previously the barrier of market distance prevented their insertion, other than through labour migration, into the international division of labour.

1.3. Small Firms

Early on, there were high hopes for large numbers of small information-intensive service suppliers setting up in remote regions, supplying the main centres but attracted by the way of life and lower costs. The reality is much more modest. Nevertheless, there are cases, for instance in Northern Scotland, where highly skilled employment has been created in locally owned small firms.

The opportunities outlined above are significant in regional development terms, but advanced communications do not, in themselves, begin to address many problems associated with peripherality and rurality. Advanced communications, ultimately, are utilised most as a tool to reduce the complexity in highly developed regions and sectors to more manageable dimensions. They do not by themselves overcome problems of peripherality and lagging development. Thus, as argued below, advanced communications must be integrated within broader strategies that address problems of uneven regional development and opportunity.

2. Which Services have most Potential to Enhance Cohesion?

There are no simple solutions, no 'golden bullets' or 'trigger applications' that will work for everyone everywhere. But certain broad types of advanced user applications offer more to regional development than do others. In particular, applications that are integrated into the core processes along the value-chain are more useful in practice.

These include:

- Transactional Services: Those affecting the transactional structure of the firm, such as EDI, which lower transaction costs and/or improve the speed of delivery.
- Locational Flexibility: Those that improve the locational flexibility of the multi-site firm, such as data transfer supporting groupware applications running across sites, which enable the organisation to re-configure itself as projects and priorities change.
- Inventory and Logistical Systems: Those that improve the efficiency of communications between stages in the intra-organisational value-chain, such as inventory control and logistics systems, which lead to more effective and rapid integration along the value-chain.

- Integration Support: Those that enhance the ability of the firm to integrate its technical competences.

By contrast, applications addressing generalised needs bring fewer discernible benefits, and are harder to implement. Examples are general databases, teleservice centres lacking a specific set of focused users, and videoconference for general access.

3. How can we Promote Advanced Applications in a Competitive, Commercial Environment?

There are risks in a market oriented approach to the provision of advanced communications services in less developed regions. On the one hand, the more remote areas are unlikely to gain access. On the other, external firms are in the best position to afford, but more important, to make effective use of, such technologies.

A pro-active approach to advanced communication provision will thus be essential if benefits are to realised for all regions. In the lead up to liberalisation, in particular, scope exists for a range of actions that will ensure that more competitive markets overall will not be to the detriment of some regions. Such actions can come under two headings, sectoral and horizontal.

3.1. A 'Sectoral' Strategy

A central plank should be to ensure that carefully targeted sectors, identified as critical to a region's development, can gain access to, and use effectively, advanced communications in a manner that will both increase value-added and strengthen the region's capacity to retain the value generated. This should be implemented at regional and national levels, but supported also by the EU. It demands a number of elements. At a European level, Trans-National Networks may provide a focus for such intervention. Many planned measures to improve the extent, quality and scope of services will strengthen opportunities for regions to become involved in the networked economy, as identified above. However, up to now, the evidence of the STAR and TELEMATIQUE Programmes suggests there is little enthusiasm in less developed regions for trans-national communication among SMEs and administrations.

Yet there undoubtedly exists some considerable as yet untapped potential for cross-regional activities. Given the apparently low level of manifest interest, the key task for Trans-European Networks, for instance in relation to SMEs and public administration, will be how to identify and target meaningful EU cooperation, to uncover genuine opportunities for cooperation that will bring real benefit to the direct participants and to the regions involved.

The following offer some pointers, but apply more forcefully at national and regional levels.

A sectoral policy must:

- Identify sectors that are critical to a region's development, preferably using a 'value-chain' approach, that are likely to benefit from advanced communications;
- Extend support for selected advanced services targeted at these sectors, in the context of a broader sectoral or regional development strategy. Such support can include appropriate incentives to private sector service providers, through to targeted measure to support effective use by users.

For policy makers, best practice in service provision and in specific initiatives must focus on how effectively four functions are performed :

- Technical functionality: the need for the technology application itself to function effectively; Operational functionality: the need for the technology to address intended user application;
- Organisational functionality: the need for the application to be geared to the organisation and the socio-economic structures in which it is embedded;
- Regional development functionality: the need for the application, if successfully developed, to be diffused around the region and, even more important, to contribute to regional development. The case for inclusion of a specific application within a regional development strategic rests ultimately on this.

3.2. A Horizontal Strategy

At the same time, a sectoral strategy must work hand in hand with a number of matters at a horizontal level. The following are the main areas for policy development and measures.

- Complementary requisites and strategy integration: Any advanced service has a specific set of prerequisites, the absence of which will prevent introduction and diffusion. The sectoral approach implies close integration with other elements of regional strategy dealing with the relevant sectors.

- A network strategy: A network strategy is especially relevant in the coming years while public authorities remain in a stronger position to influence the direction of network development. There are three parts. The first concerns basic services to support general economic development; the second, enhanced basic services for entry into e.g. teleservices. Third and most relevant, advanced communications need an adequate network platform for those services considered critical to regional development. Support for incentives and investment should come from the appropriate level: regional, national or EU.

- Changing policy role under liberalisation: Liberalisation will, on the one hand, restrict certain policy options after its introduction, and on the other, introduce new ones in the regulatory sphere. Within the overall EU policy context, regulatory responses at regional and national level will cover tariff reform; the speed of introduction of services and infrastructure liberalisation; the elements that comprise universal service; the costs and scope of the universal service obligation; and interoperability and interconnectivity.

- The role of standards: Measure to ensure the effective diffusion of common standards, for instance in EDI, can be crucial in certain sectors.

- Economies of scale in applications: Smaller regions especially will benefit from measures to assist services achieve the necessary critical user mass and economies of scale, through combined service development and use.

- Response to usage and technological evolution: A strategy also needs 'future proofing'. a difficult matter in an area where change is still so rapid. This must be explored and understood not only for new technologies, but for new usages.

Some of these imply an increase in understanding, essential to informed strategy development; others involve specific measures and regulations often relating more broadly to regional and national development contexts. If advanced communications are to maximise their potential for regional development, then these disparate elements must be drawn together and integrated fully into regional development strategies.

CHAPTER 3

SOCIAL TRENDS IN USE OF MEDIA

Executive summary of the Final Report [3]

1. Introduction

This analysis looks at the emergence of new social trends stemming from the increase in the use of communications media in every aspect of every day life both at the workplace and in leisure time. The trends are identified by examining current market conditions and forecasts.[4]

Multimedia originates from four main industries : computers, communication, consumer electronics and programme context production. In the future, to global trends such as digitisation, miniaturisation, higher bandwidth (images and colour), allowing greater use of portability, and the integration of "converging" technologies will lead to a decrease of costs and greater user friendliness. These changes will have major consequences on the structure of each of the industries involved as well as on our use of multimedia services. Their implementation will also multiply the legal and moral issues. The social impact of media is an active process which involves both the people articulating the information flow and the ones that use the end result.

The use of media is <u>context dependant</u> and it takes several forms at an individual level:

- the home equipment, type of housing, and type of neighbourhood.
- the household family structure and social behaviour.
- individual values and cultural habits which inter-relate with the taste in, and acceptability of material.
- the individual purchasing power and the breakdown of the expenditure (in particular the disposable income for leisure activities and for cultural spending).
- the type of professional activity, linked to use of information and communication technologies at work, and to person-to-business use of media.

Moreover, the diffusion of each new communication medium is based on the progressive development of an effective use which may be significantly different from the anticipated one. At a collective level, use of media is inter-twined with social trends. Acceptance of new media will depend on the flexibility of social settings, and organisations, and the nature (in terms of speed, and intensity) of the structural adjustments the community has to undertake because of new technologies.

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[3] The full text of the Final Report is available at the European Commssion, DG XIII - B1 on. CD-ROM and on the WWW at http://www.analysys.co.uk/acts/cec/twork95/

[4] The term media covers three major interlinked aspects representing conduits, infrastructure, languages and techniques, mixing images and sound in an artistic or informative manner. Multimedia presentations combine information and entertainment.

2. Diversity and familiarity

We are all now familiar with a standard set of electronic audio-visual devices such as television and video-cassette recorders, telecommunications devices such as digital phones or visiophones, and computing devices such as PC's or CD-ROM's as well as with traditional media such as the press, cinema, theatre and others.

The following table, gives an indication of communication media spread in Europe, and the United States:

Household penetration of major electronic media (% of households), 1991

Country	**Home PCs**	**Cable TV**	**VCRs**	**Telephone**	**Colour TV**
Europe	20.8	20.5	46.4	83.8	92.6
Germany	28.0	31.0	43.0	74.1	96.0
France	16.0	3.0	47.9	95.0	92.9
UK	24.0	2.0	65.0	89.0	93.0
Italy	20.4	N/A	24.0	88.4	84.0
Spain	11.5	1.0	43.9	75.0	94.1
Austria	9.0	28.0	48.0	87.0	94.6
Belgium/Luxembourg	22.0	92.0	48.0	97.0	95.0
Denmark	7.3	34.0	45.0	96.6	96.0
Finland	24.0	27.0	50.0	93.0	90.0
Greece	5.2	N/A	12.0	84.6	78.0
Ireland	18.0	39.0	54.0	61.0	93.0
Netherlands	20.0	84.1	55.0	98.6	96.0
Norway	17.0	40.0	57.0	93.0	97.0
Portugal	9.0	N/A	41.0	61.0	83.0
Sweden	14.0	43.0	70.0	96.0	93.0
Switzerland	18.6	60.0	45.0	98.0	92.0
US	31.0	59.0	76.0	92.4	98.0

Source: OECD, various according to country

2.1 Television and Audio-visual

Television viewing is by far the most important leisure, in terms of time spent. Average watching time accounts for nearly 3.4 hours per day. Overall, it continues to grow, although saturation and even decline has been observed in some European countries. The increasing time devoted to television corresponds to the general increase of non-working time, taking into account an earlier retirement age, unemployment growth, diminishing working schedules, etc. The increase has resulted from a cannibalisation of the time spent for other cultural activities (i.e. reading, or outside-the-home activities).

The early 1990's have seen a downturn in household spending on equipment due to the reduction in the disposable income[5], despite the fact that consumers have benefited from price competition, saturation in the colour TV sector and maturity of the video cassette recorder market. Increasing multi-ownership (approximately 60% in the US, 40% in France) reduces the sensitivity of the households to traditional purchasing factors such as

5 European Markets : Non-Food Durables - TV and Video Products, Euromonitor, January 1994

innovation and special events. New demand has emerged in such areas as camcorders, satellite dishes, and small and large screens.

In Europe, the biggest current differences are in CaTV penetration. This may lead to significant differences in capacity to deliver interactive services, as the DBS satellite transmission cannot ensure a comparable level of interactivity, and delivery of advanced services to the households will probably have to build on the television base.

Spending for home multimedia is expected to take a growing stake of the total budget for consumer electronics (approximately 15% by the end of the century, representing US$ 26 billion[6]). Within the multimedia slice, the largest source of growth should be interactive cable television, which is expected to reach approximately one third of this total by the year 2000.

In Europe**,** fifteen years after the first trial efforts in Germany, **CaTV** was used by 32.5 million households in 1993, as compared to 26 million subscribers in 1992. Forecasts are bright, despite the ups-and-downs such infrastructure almost inevitably generates[7]. CaTV is expected to be used by 47.5 million households by 2002[8], spending 11.3 billion ECU vs. 4 billion in 1993. The expected increase in spending is expected to be associated with interactive services and Pay TV.

2.2 Telecommunications

Even if telecommunications do not create *sui generis* human patterns, social networks, and socio-cultural environments, new ICT have a major impact on social patterns.

The social use of telephone and the level of importance it has reached in our personal lives within the span of one human generation is a good illustration of the increasing role of media. The evolution of telephone networks took place simultaneously to major social changes such as the growing proportion of urban population, the development of the role of women in the workplace, the increase in single-parent households, and others. Additionally, telephone use contributed to the re-definition of social interactions. New forms of relations with new standards emerged. For example , codes in the presentation and ending of a conversation, behaviour, etc.

The European Union has the largest number of main telephone lines in the world (152 million). In 1992, the EU revenues generated by telephone carriers amounted to approximately ECU 100 billion and grew 10% in comparison to the one of 1991. Telecom revenue represents about 2% of the EU gross domestic product.

6 Ovum Ltd, Interactive Television, 1994

7 See the concern in the UK about the phenomenon of euphoria provided in 1993 by the deployment of telephone services on CATV networks, followed in 1994 by an increase of the churn rate linked to the quality of programs...

8 CIT Research, 1994

The following tables give some indications of evolution of telephone communications:

Number of telephone calls per main line

	1987	1988	1989	1990	1991	1992	%
Germany	1123	1093	1099	1129	1123	1130	0.1
Canada	2876	2880	2867	2867	2864	2866	-0.1
Spain	1649	na	na	na	na	na	ns
United States	3684	3659	3643	3687	3594	3576	-0.6
France	941	971	930	976	1011	1007	1.4
Italy	1038	1060	1118	1160	1223	1271	4.1
Japan	1561	1767	1901	1943	2025	2103	6.1
United Kingdom	1294	1338	1416	1493	1524	1586	4.2

(% : average annual growth) - (na : not available) - (ns : not significant)

Source: Omsyc

Number of telephone calls per capita

	1987	1988	1989	1990	1991	1992	%
Germany	496	495	512	545	555	571	2.9
Canada	1507	1551	1602	1658	1709	1763	3.2
Spain	436	na	na	na	na	na	ns
United States	1779	1816	1843	1867	1878	1901	1.3
France	419	449	446	486	518	534	5.0
Italy	346	371	413	450	489	528	8.8
Japan	630	737	823	871	940	1008	9.9
United Kingdom	498	536	593	651	676	731	8.0

(% : average annual growth) - (na : not available) - (ns : not significant)

Source: Omsyc

Important differences still remain between various countries, with European rates generally below those of the US. Although there is apparent saturation in use of the telephone, the European level of use is only a fraction of that of the USA and Canada, approximately one third. For example, modem and mobile telephone penetration rates in Europe are at best, half those in the US. Faxes have reached saturation within companies but are increasingly used by households or self-employed workers.

The demand for personal mobility for residential and professional purposes is rapidly expanding world-wide responding to the increasing social demand for time productivity. The average growth of penetration rates in most developed countries between the years 1988 and 1993 has been more than 40%. It is expected that 6% of the population will be using a cellular phone in Europe in the year 2000, as opposed to 0.4% in 1990 (vs. 8% a 2% respectively in the US).

2.3 Personal computing (on line/off line media)

There are currently fewer than 16% of the households in Europe equipped with a home PC. This does not reflect the importance of computers in the social environment and the role played by home PCs in the implementation of information highways. PC s have moved into homes and are used not only used for work but also for education or leisure (games). In Europe, the number of households equipped with PC s is smaller than in the United States but is increasing. Portable PCs represent one of the most dynamic segments of the PC market and their linking into mobile networks will open a new chapter in their use.

PC units shipped in the European Community

EC	1992	1993	1994	CAGR '92-'94 %
PCs - professional market	5,618,000	6,026,000	6,453,000	7.2
PCs - home market	2,543,000	2,722,000	2,888,000	6.6

Source : International Data Corporation

The consumer boom is pushing other technologies as well. CD-ROM optical storage, which languished as a business tool for years, has flourished in the home market. Virtually all of the home systems offered in 1995 come with a CD-ROM drive, further compounding the dominance of consumer markets in CD-ROM software sales. On-line services are growing in popularity and driving the demand for ever-faster modems. In turn, the growing richness of what is offered on the services argues for more powerful hardware. More technology will flood the market as vendors try to catch up with consumer demands for performance and new features. Prices will fall, of course, but individual vendors will attempt to differentiate their offerings not on price but on technological prowess.

The effort to match computer product designs with the consumer is not problem free. Not all the features offered will actually strike a chord of mass interest. Will people really want to play audio discs on their CD-ROM drives when most of them own a CD player ? Somehow the idea of watching TV in a tiny window while we are writing a report or running a spreadsheet appears unproductive - but there are many children who claim to be able to watch TV while they do their homework. These reservations aside, the very fact that the personal computer makers are stretching the capabilities of their machines in unaccustomed ways will have an enormous impact that we cannot yet predict.

The most profound implication is that the proliferation of home computers will create “bottom up” consumer demand for interactive multimedia networking services. Service providers should take this into consideration and be prepared to integrate this new challenge in their business strategies.

The video games are industry started in the early 1970’s has already experienced a crash in the 1980’s, followed by a recovery near the end of the decade. The largest penetration of video games has been in the UK, where they represented 40% of the overall toy market in 1993. Video games and gambling are sectors of key importance in the deployment of home services. There are 70 million players in the US, 45 million in

Japan. In some countries, the use of games has become a social phenomenon and has all the appearances of addiction. Some argue that interactivitity reinforces this addiction. Players feeling socially and culturally isolated consider game playing as a social activity.

Virtual reality has the potential for a considerable scope of applications in such areas as performing remote work in complex or hazardous environments, tele-medicine, tele-education of complex topics (i.e. chemistry, mathematics), interactive household applications (i.e. home furnishing and design), and leisure activities (inter-personal communications in "cyberspace"). This market, currently estimated at US$ 110 million[9], is expected to climb to US$ 540 million by 1997.

2.4 Traditional media (cinema, press and books)

Movie theatres are now a century-old activity. Yet instead of being a stable industry, it shows great volatility. Total admissions in the EU have climbed between 1989 and 1993 (+12%) with the frequency of attendance per inhabitant increasing in most European countries but perhaps the 1993 figures might be unusually high. European movie theatres represent a larger share of household spending on film entertainment than their equivalents in the US (i.e. 35% of US$ 9,682 million, vs. 27% of US$ 18,359 million in the US, where home video is accepted widely). Distribution is changing, in favour of multi-screen sites enhancing the spectators' feeling of participating in a shared social event.

Young people tend to spend less time reading with the percentage of readers lowest among those of the "television generation". A survey in the Netherlands has shown that readers born after 1950 accentuate the patterns of use of the general population (i.e. reduction in the time spent reading, and parallel increase of the time spent watching TV). Although age seem to be a decisive factor in the time spent reading, less educated young people spend more time watching television than their educated peers.

3. The growing role of user involvement and active participation

In the last few months, the US business community has endorsed the idea for the full application of digital technology to future TV and other media developments. Furthermore, it is now felt that consumer applications of digital technology should be made a central objective of US Government policy (NII). Many industry leaders from the communication, computer, consumer electronics and media industries have started to commit substantial resources to the effort of connecting large numbers of households to new broadband infrastructures for access to a range of digital interactive multimedia services. It is important that platforms start to be built. Questions concerning the level of acceptance that can be anticipated, as well as the definition of the type of services, remains largely unanswered. In addition, it is not clear what impact all this may have on individuals and society as a whole.

4. Trends in use of media and social change

9 4th Wave Inc. cited in Ecran Total, N°13, December 29th, 1993

Over the past few decades, converging phenomena have tended to renew the social environment on which the use of media acquires its significance. These phenomena may be segmented into four different types, each of them being interrelated with the others:

- the political and ideological environment, having a meaning for human activities, stemming from specific visions of social progress.
- the economic environment.
- the socio-cultural environment, which deals with the relations individuals have and their social and cultural activities.
- the environment of communities and relationships, which groups the patterns of interactions between individuals and their relatives, friends and colleagues.

These environments define a social reality which is continuously transformed through processes that link individual, local, national, and international social levels. Media usage accelerates dissemination of beliefs, values and attitudes.

4.1 Socio-Political Trends

Mass-broadcast systems over-value simple topics and persons, dramatised presentation, separate the issues from their context and perspectives, and "normalise" the presentations due to general weaknesses in information-gathering and processing activities. Moreover, mass-broadcasters tend to be essentially conservative in the representations of the world they transmit because of their dependence on audience rates

On the contrary, narrow-cast and interactive media favour the emergence of new social movements, and therefore stimulate diversity of views. However, it has been observed that local channels often fail to promote a specific vision, and that they tend to imitate the programs of the mass-broadcasters, and their socio-political schedule.

4.2 Socio - Economic Trends

Since 1993-94 the signs of a major evolution can be observed in the diffusion in the home and in small offices of new technological platforms, allowing individuals to communicate and interact with other individuals and/or organisations, and to access information and interactive services with new multimedia features including video and data**.**
A number of issues such as various legal aspects, regulation and deregulation of the markets involved play important roles in the emergence of new socio-economic trends.

4.2.1 New Patterns of Individual to Business Communications

The relative failure of the European economic system to answer the social demand for work and integration tends to weaken all social institutions and collective values. At individual or collective level, it accelerates the re-definition of the traditional boundaries between economic growth, material progress, and spiritual values. Implementation of new technologies will be a major facilitator of redesigning the social role of work in our societies.
An increasing number of people spend part or all of their working life as self-employed or semi-independent workers, working from home or small offices, using information and communication technologies to do what is called telework

or distance working. In 1994, the number of fully equipped home-offices in Western Europe was estimated at 13.2 million, but only 3% of those run business tasks on a PC, and less than 1% have a modem for data transmission. Teleworking still occupies a very small percentage of home-workers but current growth is fast. For example, in Italy, it is estimated that 23% of the households with PCs will use Internet by the year 2000, 60% of those for business goals, (around 1 million households). According to forecasts, 15% of small Italian companies (under 10 employees) will adopt Internet; at least 40% of home-workers would adopt a form of teleworking by the year 2004. This amounts to 8 million people in Europe

According to the quoted forecasts[10], self-employed teleworkers in Europe will be in the medium term still a relatively small percentage of the total work force, but very significant because of their role of pioneers and demonstrators of the innovative potential of new media. The virtual community of teleworkers represents a new emerging social group characterised by flexibility, greater autonomy in controlling working life, ability to connect with others beyond local and national boundaries, awareness of one’s worth in the labour market based on know how and developed skills and cultivated through a life long process of self education, acquisition of knowledge and information. The price to be paid is clearly a lower security and the need to be adaptable to the changing environment. Due to these characteristics, teleworking also represents an innovative way for the young with marketable skills to enter the labour market instead of having to accept lower offers of stable jobs by organisations and for women appreciating flexibility as a way to match the need to work with family obligations.

4.2.2 Teleshopping

Shopping is often cited as an application that will help pay for the massive investments needed to build interactive video networks, upgrade the Internet and expand the bandwidth of wireless communications systems. A successful catalogue of shopping services based on CD-ROM technology would provide one more reason to buy multimedia computers and generate new revenue streams for merchants and advertisers into industry.

Demographically, the seven million users of on-line services (mostly upper income young males) are not representative of the buying public. The transition from catalogue shopping to electronic shopping (with current revenues representing less than 1% of those from catalogue shopping) will have to overcome several barriers. One is simply screen resolution. While NTSC images are good enough for low price, medium quality products, it is not yet a match for the printed catalogue's high-resolution, high-quality photographs that are as close to a true representation of the real item as the seller can expect. Another is that arrangements for convenient customer delivery are not available from non-catalogue suppliers, which support more than 95% of all revenues generated through retail sales. For electronic shopping to be successful, new creative approaches will be required. These may include provision for electronic malls, comparative shopping, electronic auctions, and other forms of value added

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10 ITU, Teknibank

services. The Internet (or even private networks using graphical user interfaces and high speed modems) is be able to make substantially broaden customer choice, but on-line shopping requires new approaches to the interaction between buyer and sellers as well as new back office systems that keep track of transactions and provide billing, marketing and other management functions. The best way to pull these elements together will be the creation of a new industry providing a new breed of “on-line middleman”.

4.3 Socio-Cultural Trends

Home culture is now the dominant model of leisure in Europe**.** A significant share of the European population experiences only home culture, which is characterised by:

- the presence of equipment in more than 90% of the households, the frequent individual use (a daily one for more than 75% of the users) and the time spent accounting for 25-40% of total leisure time.
- the reduction in book reading especially by younger people.
- the percentage of viewers in each socio-economic class is always high and use of television increases progressively with age. Furthermore, it has an international geographical diffusion.

Despite all the warnings about how TV can have serious negative effects on children, many psychologists and educators believe that television can have opposite effect. The list of TV’s potential benefits is surprisingly long but for TV viewing to be constructive, parental discretion and involvement are essential.

TV has the potential to contribute to a child’s healthy emotional environments. In a number of research studies it was found that children learn positive behaviours such as nurturing, sympathy, perseverance, empathy, tolerance and imaginativeness. In addition they can learn cross-cultural and multiethnic interactions.

Public television is still, in most European countries, the dominant service in terms of total market share. This is markedly different from the US media environment, where public television audience in prime-time slot is below 3 million households[11]. But the emergence of commercial television in Europe, implemented in most countries in the 1980's, has considerably changed the operating conditions of public television, and its socio-economic importance. Although these impacts have varied between countries, some common characteristics have been observed [12] :

- a small increase in jobs due to the new competition.
- a shift in the nature of jobs from "permanent" to "non-standard" type of employment.
- an increasing share of production is being achieved by small independent companies, financially under-capitalised, and operating below efficiency-levels thanks to the commitment of their young employees.

4.3.1 Interactive Education

11 PBS Research, cited in Hoynes, William (1994) Public Television for Sale - Media, the Market, and the Public Sphere, Westview Press, Boulder COL., p. 17

12 Thomass, Barbara A. (1994)

The importance of tele-education is today difficult to predict, although there is a general consensus as being one of the key application of AC's.
Several type of impacts are forecasted:

- The possibility to ease access to education for more diversified population including people who are geographically at a distance from schools or universities, people who have professional activities or other equivalent constraints and disabled people.
- The possibility for parents to improve the conditions of education that some environment cannot provide anymore. In the US, tele-education is partly stimulated by the increasing level of violence at schools leading to parents opting for distance learning processes. It is estimated that between 350.000 and 500.000 young people follow a distance learning process in the US compared to 15.000 in the late 1970's.
- The possibility to increase the flexibility of the educational process in itself, by enabling students to learn at their own speed and according to their particular fields of interest. It is argued that multimedia technologies may improve the opportunity to adjust the pedagogy to the learner and widen the scope of the population reaching certain types of formal knowledge.
- Questions are raised about the future role of the written culture in the educational process. As the learning of written culture is the pre-dominant form of the Western cultural history, the development of new technologies such as vocal recognition and multimedia facilitating the recognition of other individual skills might have a very negative effect.

4.4 Environment of Communities and Relationships

A community of interest is an aggregation of individuals/organisations with an issue or values in common, creating an actual or potential need to communication and interact, including exchange of information, knowledge accumulation, and self-control of the established relations. Virtual communities, thanks to the use of new media, allow new patterns of socialisation to materialise among individuals/organisations without face-to-face contacts, as an answer to the growing fragmentation and isolation identified as major trends in today's social environment. The emergence of virtual communities helps to identify the driving needs of new ways to communicate and interact, giving substance and content to the "Universal Information Highways" scenario.

5. Benefits and concerns about future use of media

The next decade will see a dramatic change in the provision and the use of media. There should be a growing role for demand-driven innovations. How this demand emerges is hence essential to clarify. Two types of needs are to be addressed through the new services : performative needs (i.e. which relate to behaviours that have a well-identified rationale) or non-performative needs (i.e. which seldom relate to any rationale). Performative use of media relates to types of use which generate their own incentives to invest such as tele-work, tele-education, tele-medicine, etc. The willingness of individuals to pay for non-performative use of media (e.g. games) is essential. It is only through pilot tests that these two types of needs may be identified, and that implicit demand (i.e. non formalised by individuals) may become an explicit demand for use of media.

CHAPTER 4

MACRO ECONOMIC AND TRADE IMPACTS OF

ADVANCED COMMUNICATIONS

Executive summary of the Final Report[13]

1. Executive Summary

Advanced communication is enabling radical changes in the world economy, and its impact will increase dramatically as it becomes more widely used. These changes are a threat and an opportunity for Europe.

Through its impact on businesses, consumers and the public sector, advanced communications will enable the creation *and* destruction of jobs and prosperity in Europe.

> The job creation processes require Europe to have widespread access to affordable advanced communications services as quickly as possible.
>
> The job destruction processes will tend to proceed irrespective of the accessibility and affordability of advanced communications in short, Europe requires positive action to be taken if it is to benefit from advanced communications, but, irrespective of policy actions, Europe will experience many of the negative impacts.

We maintain that if the right environment is created for advanced communications in Europe then the net impact on employment and prosperity can be positive. However, the prerequisites for such an environment are *not* currently in place.

> **'Creative processes':**
>
> Advanced communications increases the ability of European businesses to project themselves into global markets, particularly in the main centres of new growth such as Asia. Europe has competitive strengths in many service sectors which have been difficult to exploit outside domestic markets until now.
>
> Advanced communications is enabling the exploitation of these advantages through trade and direct investment.
>
> Advanced communications is accelerating the development of the EU Single Market, leading to efficiency gains for the European macro-economy and competitiveness improvements for individual enterprises.
>
> Advanced communications *could* significantly improve the effectiveness of education services, welfare services and healthcare services, which would bring important indirect social and macro-economic benefits. These effects are complex and not yet clearly proven.

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13 The full text of the Final Report is available at the European Commission, DGXIII - B, on CD-ROM and on the WWW at http://www.analysys.co.uk/acts/cec/twork95/

'Destructive processes':

Advanced communications enables business activities to be conducted on a global basis by considerably reducing the risks and costs of widely distributed operations. Firms can exploit cost advantages, market opportunities and financial opportunities on a global basis rather than on a national or regional basis. The true competitiveness of labour forces and individual enterprises is thus exposed, as markets become more contestable. In many sectors, Europe is not competitive in global terms, particularly in many labour-intensive activities. Europe should expect these activities to migrate to other countries more rapidly in an advanced communications environment.

Advanced communications will make Europe more vulnerable to high import penetration by reducing the cost and risk barriers for importers. In an advanced communications environment the true competitiveness of European firms in domestic product markets will be increasingly revealed by import penetration.

The transition from a traditional communications environment to an advanced communications environment will reinforce the already strong historical correlation between macro-economic performance and communications provision. The economies of those countries and regions with widely available and affordable advanced communications services are expected to perform better than those where advanced communications take-up is more restricted.

Although the historical relationships between communications and the economy can be demonstrated statistically, this study does ***not*** attempt to extrapolate these quantified relationships into an advanced communications environment. We believe that the fundamental dynamics of advanced communications, and their economic impacts, will be significantly different to the effects that have been observed to date.

The transition to an advanced communications environment is much more than a technology change - the dramatic fall in the *cost* of communications will open up a wide range of new applications, and allow traditional applications to penetrate commercial, administrative and social processes to a much greater extent than is currently observed.
It is not feasible to expect a statistical approach to predict the macro-economic impacts of a major and rapid change in the cost and functionality of communications. Quantitative approaches that *are* compatible with the available data are completely sensitive to qualitative assumptions that must be made about the new dynamics. This study attempts instead to make a rational, informed, qualitative assessment of the impact of advanced communications on the macro-economy, using quantitative models merely to illustrate the magnitudes of potential effects.

The study examines the potential impacts of advanced communications on a sectoral basis, describing the potential positive and negative effects on European competitiveness, value-added, employment and trade for nine sectors. Two scenarios are described for the transition to advanced communications, and these are used throughout as the basis for investigating the sensitivity of each sectoral effect. Macro-economic conclusions are drawn from a synthesis of these sectoral assessments, and are presented in a quantified picture of the European macro-economy in the next decade.

Europe's external and internal trade (imports and exports) are expected to grow significantly over the next decade, with or without advanced communications. If deployed rapidly and effectively, advanced communications can enable Europe's external trade balances to improve, allowing Europe to share in the economic growth of developing regions such as Asia, Eastern Europe and Latin America. Better trade performance will help to contain European unemployment and sustain current prosperity.

If, however, advanced communications remains expensive and restricted in Europe then this will damage Europe's trade performance, undermine its competitiveness and compound its unemployment problems.

We estimate that the difference in EU employment between a scenario where advanced communications develops rapidly in Europe and a scenario where take-up is slow could be five to six million jobs in the EU (in 2010), corresponding to around ECU 300 billion of EU GDP (in today's terms). The additional employment in the rapid progress scenario will arise from increased activity within Europe as well as improved EU external trade balances, with both of these sources expected to make similar contributions to employment growth. Increased EU activity and increased EU exports are based on higher levels of innovation, productivity and competitiveness within the EU economy, driven by the application of advanced communications.

Whilst the differences in employment between these two scenarios may appear to be modest (3% of the EU workforce at the end of a 15-year period), we believe that the positive impacts of rapid advanced communications take-up are more plausible and more achievable than any of the 'traditional' remedies for Europe's employment problems, and that they merit the close attention of all economic policy makers and politicians, not merely those with a specialist interest in communications.

This view is well aligned with that expressed in the 1993 EU White Paper on Growth, Competitiveness and Employment, which focused on advanced communications as a key factor in addressing Europe's economic problems.

To ensure that advanced communications is a benefit to Europe, policy makers should focus on improving the ***affordability*** of advanced communications, specifically high-capacity intra-European connections. Although a substantial programme of regulatory and structural reform is already underway in Europe, at national and supra-national levels, commercial and political pressures are continuing to keep prices high to preserve existing telecoms revenue streams. Without continuous vigorous intervention from governments, regulators and competition authorities, the erosion of these prices will be too slow to allow Europe to obtain the full economic benefits of advanced communications.

2. The Role of Advanced Communications

Communication, in the broadest sense, has always been an essential enabler of commercial and administrative activity. In the modern age, the effective flow of information within and between organisations is recognised as the key to health and success for corporations, markets and macro-economies. In this century, telecommunications systems have developed to become a key conduit of such information flows. This view is validated by the close correlation that can be observed between macro-economic output and telecoms (see Exhibit below).

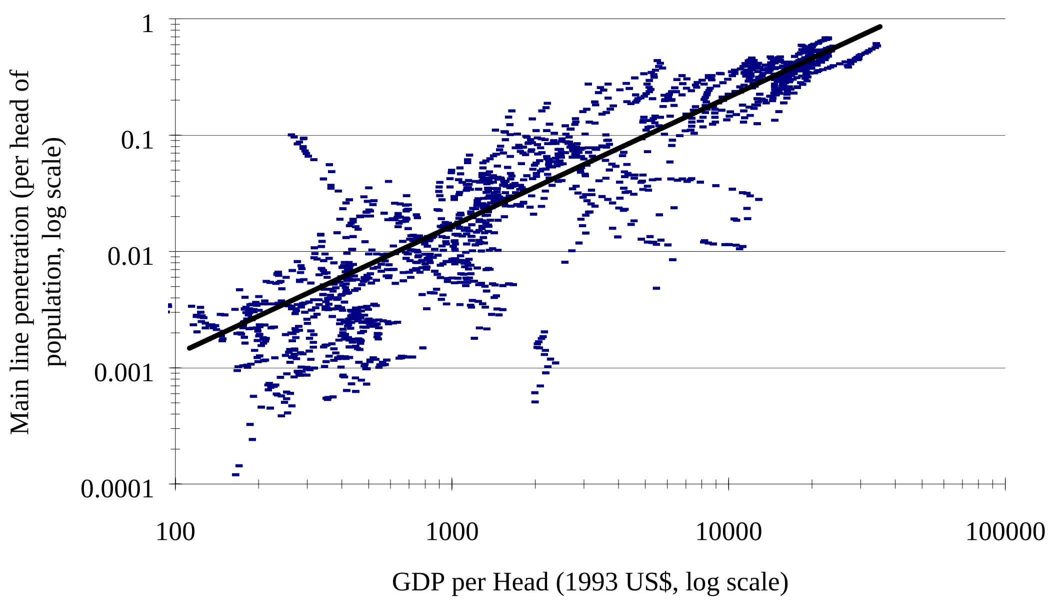


Illustration of the Correlation between Output and Telecoms (OECD, ITU and World Bank data, Analysys processing)

2.1. Advanced Communications and “Best Practice” Organisational Behaviour

Advanced communications is highly relevant to the key issues facing large and small organisations today. These issues centre on the need for flexibility to cope with increasing uncertainty and volatility in their business environment, arising from acceleration of the rates of societal, economic and technological change. Commercial organisations face intensifying competition and pressure on costs at the same time as strategic pressures to embark on risky and complex initiatives to ‘globalise’. All organisations are now finding that they need to improve the flexibility and effectiveness of their processes and review their cost structures on a continuous and intensive basis.

Many of these trends increase the emphasis on communications within and between organisations:

- Organisations are becoming more geographically dispersed. Face-to-face contact between many categories of employee is therefore becoming less frequent, more difficult and more costly.

- Organisations are increasing their level of integration with suppliers, customers and collaborators, and this is increasing the volume and complexity of information flows across organisational boundaries. The resultant ‘extended enterprise’ is usually dispersed on a national, continental or global basis, and cannot rely on face-to-face communications.

- Organisations are breaking down internal functional boundaries in order to organise around key business processes. This tends to increase the volume of information flow within an organisation, and in many cases creates new information flows which cannot easily be supported by face-to-face contact (for example, the information flows between a dispersed and mobile sales force and an order processing department).

- The volume and complexity of information are growing rapidly in almost all areas of activity, including information on an organisation’s own activities and information concerning suppliers, distributors, customers, competitors, technologies, standards, regulations and markets. Advances in IT and a greater understanding of the potential importance of information are both key drivers of this growth.

- The growing scale and complexity of information flows must be handled by ever smaller teams of managers and employees. For many managers their ‘span of control’ has been enlarged, there has been a growth in the volume of project work, and ‘soft’ targets, such as cultural development goals, have been added to their financial and operational targets. These individuals must now fulfil their expanded roles in the light of large volumes of more or less important information. This places heavy demands on the communications media which exist to supply information, to ensure that individuals have easy and timely access to all that is necessary for them to operate effectively.

Large organisations are attempting to emulate the behaviour seen in the best small organisations (which are flexible, entrepreneurial, well-focused, lean, and project-oriented), while smaller organisations are under pressure to act like large organisations (aiming for global presence, global sourcing, strong systems, etc.).
Advanced communications enables both of these objectives to be met, by allowing the information flows within an organisation to be designed and implemented according to its fundamental requirements, and relaxing many of the constraints imposed by geography, mobility, etc. This allows organisations to develop organisational structures and processes that were previously infeasible: control can be maintained even where frequent face-to-face contact is not possible; collaborative work can be carried out by teams at dispersed sites, and access to experts and to senior management can be set up at short notice when necessary.

Advanced communications contributes to these changes in several ways:

- by making global narrowband communications so easily affordable that they can be used by organisations without concern over cost. The costs of transmission and switching are falling faster than the cost of computer power did in the 1980s and, in time, these cost savings will be passed to end users.

- by offering affordable ‘telepresence’ through video and multimedia communications. The technologies which support virtual meetings are not yet able to match all aspects of face-to-face contact, but they do offer at least an acceptable substitute for traditional meetings.

- by making it easier to communicate with people who are mobile, through affordable mobile communications, personal numbering, and store-and-forward systems.

- by offering affordable high-capacity data links that allow wide area networks to operate with the same speed and flexibility as local area networks. When combined with client-server architectures and open systems this overcomes the geographical constraint on information systems.

Advanced communications is not a *driver* of organisational change, but it is an *enabler* of change, whether the change is an incremental improvement or a radical restructuring. Organisations must already have embarked on a process of change before they can take full advantage of advanced communications as an enabler of new organisational forms and new business processes. The drivers of this change can be organisational growth or decline, changes in the marketplace or supply base, changes in ownership, technology change, or changes in management’s vision. The following chapters examine the likely effects of advanced communications in terms of organisational change in different sectors of the economy, and the consequent impacts on output, employment and trade.

2.2 The Effect of Advanced Communications on Products and Services

Advanced communications provides important opportunities for transforming the products and services that are consumed in the economy, and for transforming the ways in which those products and services are delivered. The effects on the shape of the economy are potentially dramatic:

- **Transformation of products and services.** Examples include entertainment (potential substitutes for CDs, video and audio tapes, broadcast television and cinema), information (substitutes for books, journals, newspapers, libraries and advertising), transport (substitutes for travel and postal services).

- **Transformation of the delivery of products and services.** Examples include home shopping, home banking, delivery of business services such as accountancy, legal advice, consultancy, and delivery of welfare services and education services.

Whilst the potential for change in this area is enormous, the obstacles to change are also significant. Chapters 4 and 5 of this report examine the drivers and obstacles in specific areas to assess where the potential of advanced communications may be realised and where the transformations may be slower.

2.3. Economic Impacts and Constraining Factors

If the hypotheses summarised above are correct, and advanced communications can enable the transformation of organisations, products, services, and product and service delivery, then we might expect to see dramatic and rapid impacts in the economy, including:

- significant increases in competitiveness for those organisations and countries which make the best use of advanced communications
- accelerated rates of re-structuring in those organisations and sectors which make widespread use of advanced communications
- changes in the patterns and composition of trade to reflect changes in competitiveness
- increased turnover of employment in sectors and countries where advanced communications enables re-structuring and underpins the success of new competitors at the expense of traditional market-leading firms (many jobs created and many jobs destroyed)
- increased productive capacity in sectors and countries where advanced communications is most widespread.

In practice, however, the realisation of these impacts is constrained by the level of penetration of advanced communications. At present the use of advanced communications is concentrated in the core networks of traditional telecoms operators, yielding cost benefits to customers through the falling costs of traditional telecoms services. Very few businesses or homes have direct access to advanced communications services, because for almost all businesses and households most advanced communications services are not yet affordable (or available). Even by 2010 many advanced communications services are likely to remain beyond the reach of many potential customers.

This key constraint (penetration) will govern the rate at which the impacts of advanced communications are realised. When assessing the likely impacts of advanced communications, therefore, it is essential to understand this constraint, and set out clearly the assumptions that are made concerning the rate at which advanced communications will become affordable. The following chapter describes the assumptions made in this area by the METIER project.

3. Scenario for Advanced Communications in Europe

This chapter describes the assumptions used in this study concerning the availability and affordability of advanced communications in Europe until 2010. Two scenarios are described 'rapid progress' and 'slow progress'. In both scenarios there is significant investment in advanced communications infrastructure and services, and the price of communications services falls substantially over the period. Both scenarios are intended to represent plausible development paths for advanced communications in Europe.
These scenarios for advanced communications are used in Chapter 6 as the basis for two macro-economic scenarios, illustrating how different rates of progress on advanced communications could translate into different trajectories for the EU macroeconomy.

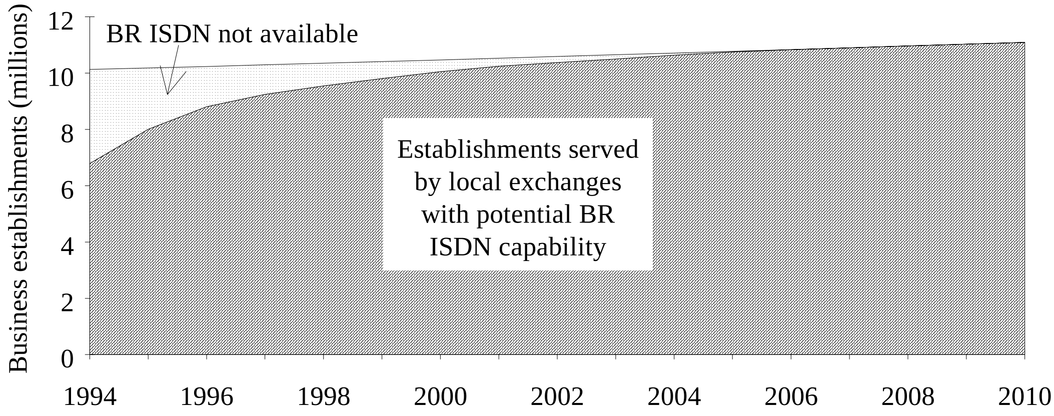
3.1 The 'Rapid Progress' Scenario

In the rapid progress scenario, the availability and affordability of advanced communications services improve significantly over the period to 2010, as investments are made in new and existing networks and unit costs for delivering advanced communications services continue to fall.

This assessment is based on the following assumptions:

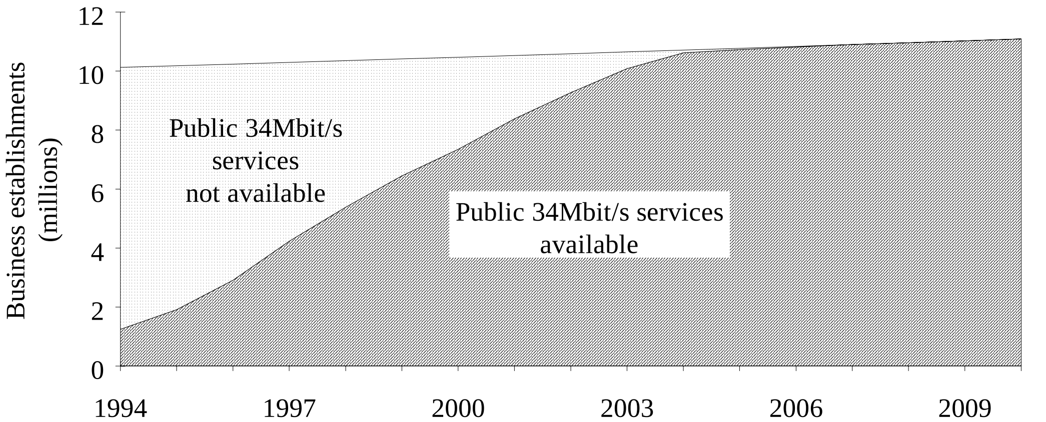
1. **Increasing benefits from liberalisation and privatisation**.
   The availability and affordability of advanced communications services will improve as the EU telecoms sector becomes increasingly commercially driven. We assume that all EU countries except Ireland and Greece will end their voice service monopolies by 1998. We also assume that, by 1998, the majority of EU countries will end their telecoms infrastructure monopolies (i.e. licences will be issued for new entrants to build networks) and that national regulators will be established with the power and inclination to prevent abuses. We also assume that by 1998 the majority of telecoms operators in the EU will have been either fully or partially privatised.

   In this scenario the national regulators encourage new entrants in both business telecoms services and infrastructure, and residential services and infrastructure. Re-balancing of tariffs is allowed to proceed quickly. Price regulation is implemented vigorously but without unduly deterring new entrants or dominant operators from making investments.



Basic Rate ISDN allows users to transmit digital voice, video or data at speeds up to 128kbit/s. It is already in widespread use in Europe for applications such as electronic data interchange, low-speed local area network interconnection and basic videotelephony. As the graph illustrates, Basic Rate ISDN will be available to over 90% of business establishments in the EU by 1997.

EXHIBIT : EU Establishments Served by Local Exchanges with Basic Rate ISDN Capability, Rapid Progress Scenario



Public E3 services allow users to transmit several channels of high-quality video, high-speed data and voice traffic at up to 34Mbit/s. Currently such services are only available to around one in seven business sites in Europe, and are too expensive for ordinary business use (charges typically amount to several hundred thousand ECU per year). Most E3 connections are private point-to-point links for TV broadcasters, research establishments and other specialists. The graph illustrates the expectation that public E3 services will be available to over 90% of EU businesses by 2003.

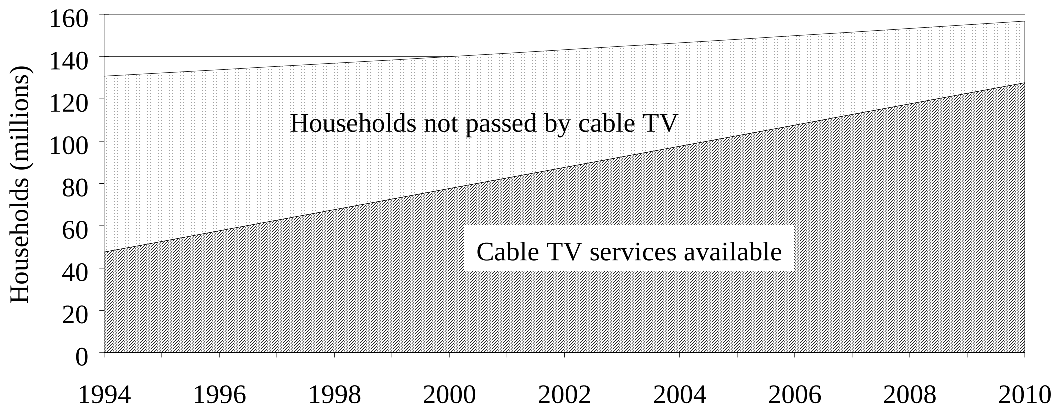
EXHIBIT : Availability of Public 34Mbit/s Services in EU, Rapid Progress Scenario

2. High advanced communications service availability for businesses.

Many advanced communications services are already ‘available’ to businesses across much of the EU, although most high-capacity services are too expensive for the great majority of businesses. Those exhibits show our assumptions on the availability of two advanced communications services in the rapid progress scenario, one ‘entry level’ service (Basic Rate ISDN) and one true broadband service (Public E3). These two examples have been chosen to illustrate the range of advanced communications services, from entry-level services which are already widely available to high-speed services which will be widely available within a few years. The availability of these business advanced communications services will *not* be a major constraint on their take-up – affordability will continue to be a much more significant constraint.

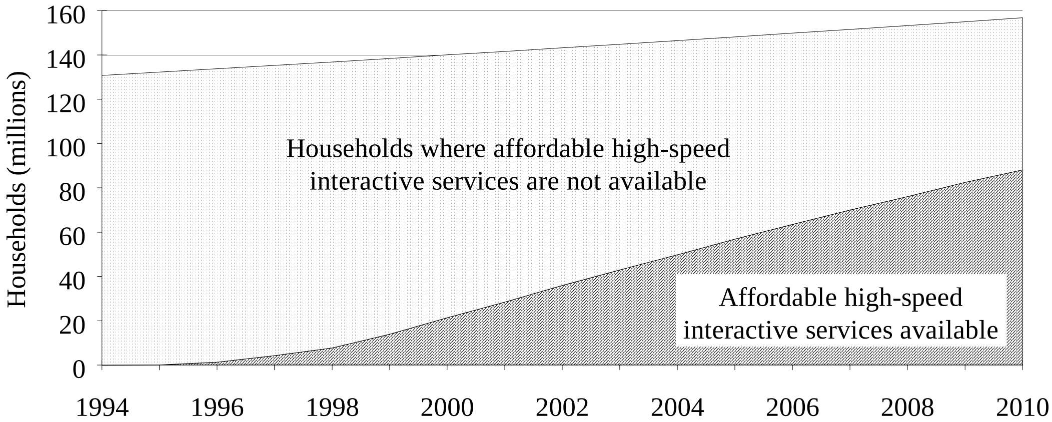
3. Improving advanced communications service availability for residential customers.

'Availability' is more of a constraint for residential customers, who in general cannot afford to access business advanced communications services, and must have services configured to meet their needs. This is illustrated in the exhibits below, which show the expected availability of cable TV services to households in Europe and the expected availability of high-speed interactive residential services.



Cable TV networks are an important platform for a range of advanced communications services, as they can be adapted and enhanced at relatively low cost to deliver interactive services such as basic telephony, Internet access and asymmetric services (where traffic from the customer is narrowband and traffic to the customer is broadband) such as video-on-demand, home shopping etc. The above graph shows that the percentage of homes with access to cable TV networks is expected to rise from less than 40% in 1994 to more than 80% by 2010. The potential growth rate for cable TV coverage is constrained by the processes of raising finance and network construction, making it unlikely that the rate shown in the graph could be exceeded. National cable TV coverage levels currently vary from almost 100% (Belgium) to almost zero (Italy).

EXHIBIT : *Availability of Residential Cable TV Services in the EU, Rapid Progress Scenario*



Basic cable TV infrastructure can be upgraded, by incremental investment, to support services which are more sophisticated than broadcast TV. For example, high-speed interactive services such as full-motion videotelephony and LAN-speed switched data communications can be supported on an upgraded cable TV (or telephony) network. The above graph illustrates our assumption in the rapid progress scenario that affordable high-speed interactive services will be available to over 50% of EU households by 2010.

EXHIBIT : Availability of High-Speed Interactive Services in the EU, Rapid Progress Scenario

Even though the rapid progress scenario assumes steady growth in availability for these two example services, it is clear that the impact of residential advanced communications will be significantly limited by its non-availability for a large proportion of EU households over the period to 2010. This contrasts with the relatively high availability of advanced communications services for businesses.

4. Substantial improvements in advanced communications affordability for business and residential customers.

We expect significant falls in the cost of advanced communications services and equipment in the coming years. The exhibit below illustrates these expectations, as well as indicating actual cost reductions since 1989. Clearly not all advanced communications service and equipment costs will fall at the same rate, and there will continue to be national differences in prices across the EU, so the use of a single index for business or residential advanced communications is a substantial simplification. However, the key point is that we expect the advanced communications environment to be characterised by rapid improvements in affordability.

In the rapid progress scenario, business advanced communications costs fall to 10% of their 1995 levels by 2010 (in real terms), which means that even small, low-margin businesses will be able to afford access to high-speed services and applications. Under the rapid progress scenario, residential advanced communications costs fall to 30% of their 1995 levels, enabling the majority of households with access to advanced communications networks to take a wide variety of communications, information, entertainment and retail services and yet spend less than they do today on their current equivalents.

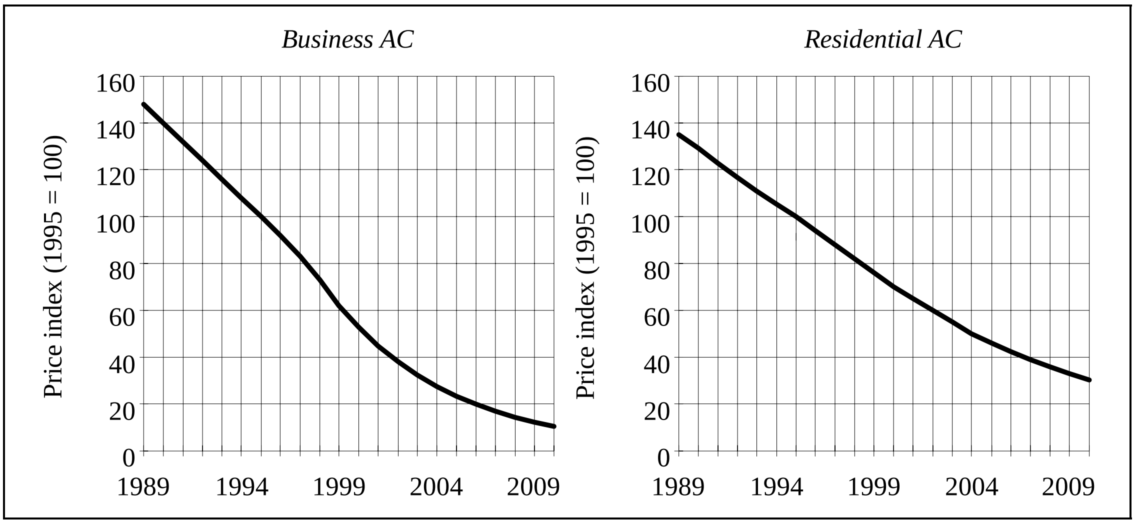


EXHIBIT : Affordability of Advanced Communications in the EU in Real Terms, 1989-2010, Rapid Progress Scenario

These dramatic improvements in affordability are driven by the fundamental economics of networks and mass market electronics. Both exhibit extremely strong scale effects and learning curve effects. Networks also exhibit strong economies of scope (which will strengthen as more multi-service networks are deployed). Electronic equipment has demonstrated strong ‘expectation effects’, where increasing functionality increases user expectations and accelerates the obsolescence of existing equipment. This effect is likely to become increasingly apparent in the network equipment and service markets. All of these effects combine to create strong virtuous circle effects, which act to drive down costs, as shown in the following exhibit. Regulatory action (the introduction of effective competition and/or the direct regulation of prices) will ensure that lower costs are translated into lower prices for end users.

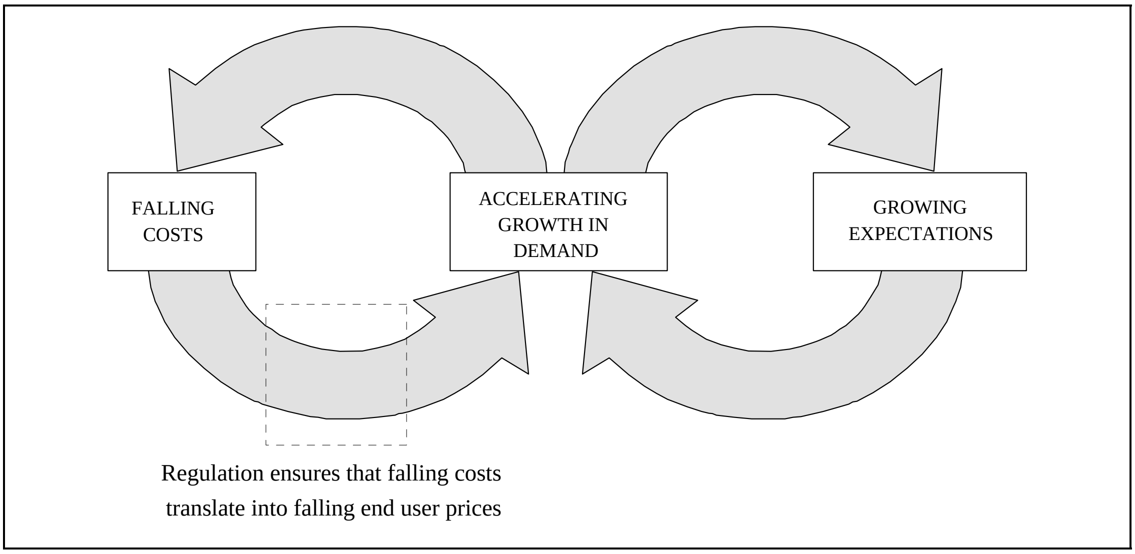


EXHIBIT : Falling Costs, Growing Expectations and Growth in Demand for Advanced Communications Services.

Falling Costs

The costs of high-speed networked services are falling due to a combination of scale effects and technological developments:

- *As certain key technologies, standards and protocols have matured, equipment manufacturers have been able to justify the risks of investing in the development of products by planning for long production runs and growing markets. Investments in high-functionality chipsets can be justified, and manufacturing facilities can be set up for low unit cost production. 'Learning curve' effects in high volume manufacturing act to reduce costs further. The impacts of these scale effects on the costs of producing both network and terminal equipment have been dramatic, and are by no means exhausted. A competitive global equipment market is ensuring that these savings are passed on to purchasers.*
- *Technological developments are continuing to make key network components more powerful and thus potentially cheaper in terms of unit cost.*

These effects of scale, standards and product development are most pronounced in the terminal equipment markets: for example, desktop videoconferencing equipment prices will continue to fall steadily as the market expands and as major suppliers invest in developing 'mass market' products.

The networks which carry video traffic are driven by similar economics. Already there are networks which can carry substantial volumes of video traffic at relatively low marginal cost to the network owner, notably national ISDN networks and MANs in many cities. The cost to the user for accessing these networks will continue to fall as network operators compete to develop these new revenue streams and pass on the lower capital and operating costs of networks to their customers.

Rising User Expectations

The second virtuous circle concerns user expectations and requirements. Behavioural effects which were first visible in personal computing and mobile telephony are now becoming important in the networking area: managers and staff who are exposed to advances in computing (such as quicker response times, better graphics, easier interfaces) or telecoms (mobility, voice mail, paging) soon come to expect the same levels of performance to be available universally.

In the networking area, this 'expectation effect' is currently most noticeable as a driver of growth in Wide Area Networking. When individuals are used to moving files at LAN speeds, they are likely to become frustrated with wide-area communications that may run a thousand times more slowly. It is much easier for an IT manager to justify the installation of 64kbit/s or 2Mbit/s links to replace slower inter-LAN connections when there is a group of frustrated end users, including senior managers, whose expectations are not being met.

User expectations will continue to grow ahead of current provision. Where video applications are added to corporate LANs and WANs, users will come to expect 'off-net' video connectivity, driving demand for public network videocomms (such as ISDN and broadcast quality links). Beyond that, the cycle will be sustained as new and faster LANs are installed to cope with full client/server implementations and multimedia file sizes, revealing again the relatively slow wide-area connections.

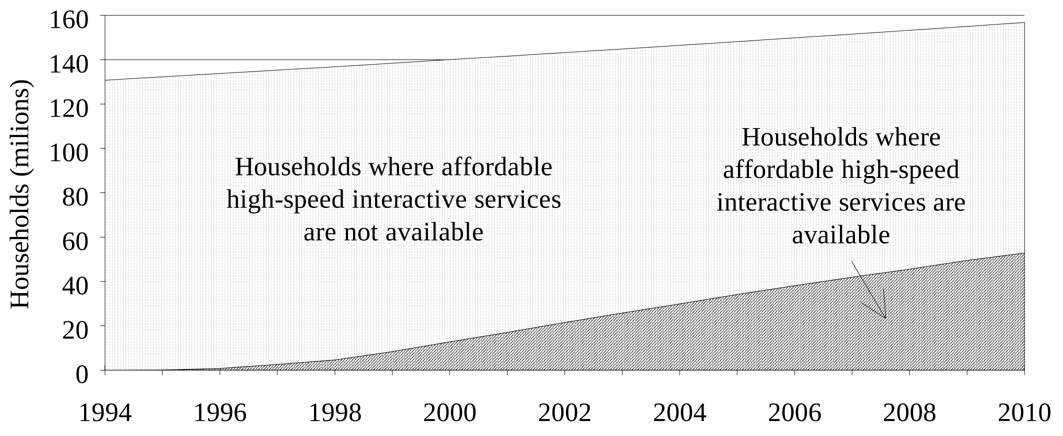
The transformation from ‘minority’ to ‘mainstream’ has not yet occurred for any of the services which depend upon high-bandwidth telecoms, but there are strong indications that certain services, such as LAN-LAN interconnection and videoconferencing, are entering a period of transition in a number of key world markets, driven by the virtuous circles described above.
In summary, the rapid progress scenario is characterised by high levels of advanced communications availability for EU businesses, steadily rising availability for EU households, and dramatic improvements in advanced communications affordability for both business and residential customers.

3.2 The ‘Slow Progress’ Scenario

In the slow progress scenario the virtuous circles of demand growth and improvements in affordability do not take off to the same extent as in the rapid progress scenario.
This is because the EU environment does not result in rapid price reductions:

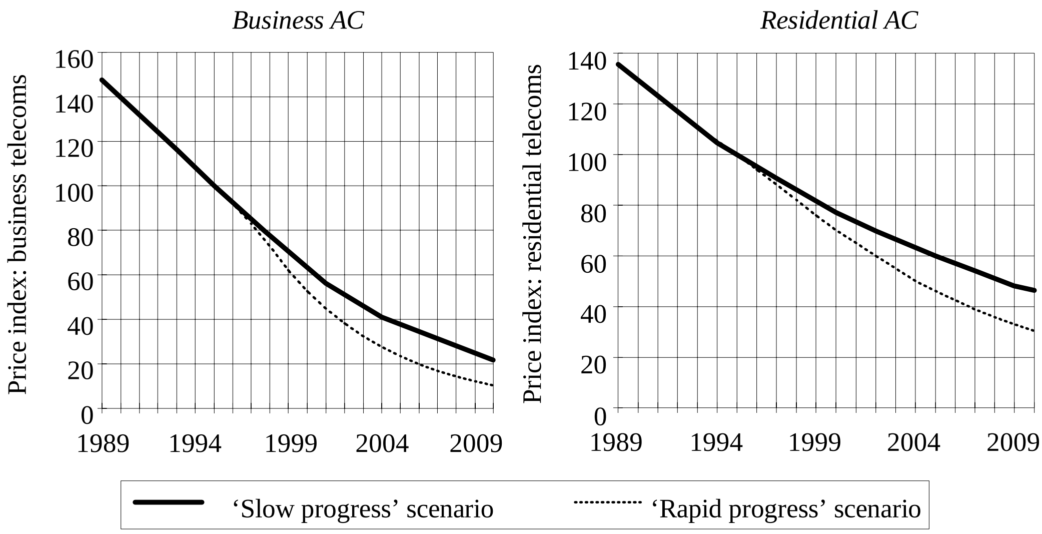
- In this scenario the regulatory and competitive environment is not as strong in its actions to force the dominant players to reduce prices in line with falling costs, but enables telecoms operators to preserve their margins at the expense of growth, innovation and change within the sector.
- In such an environment the deployment of residential broadband networks is retarded because the dominant players pursue a more cautious strategy and new entrants are impeded or prevented from pursuing rapid infrastructure investment programmes by the regulatory environment and the reduced attractiveness of the EU marketplace.
- The feedback between demand and cost is therefore reduced, and the virtuous circle effects which dominate in the rapid progress scenario are much weaker in this case.

In many respects, advanced communications availability does not differ *significantly* between the two scenarios. For example, business advanced communications availability is high in both cases. However, as illustrated in the following exhibit the availability of high-speed interactive services for residential customers is significantly lower in the slow progress scenario.



High-speed interactive services will be available to 34% of households in 2010 (compared with 56% in the rapid progress scenario). Potential investors in these services will be much less enthusiastic and build more cautiously in an environment of low affordability and limited demand growth.

EXHIBIT : Availability of High-Speed Interactive Services in the EU, Slow Progress Scenario



The above graph shows that advanced communications affordability continues to improve steadily for business and residential customers in the slow progress scenario. In real terms, business advanced communications costs fall to 22% of their 1995 levels by 2010, and residential advanced communications costs fall to 46% of their 1995 levels.

EXHIBIT: Affordability of Advanced Communications in the EU, 1989-2010

3.3 Summary

Affordability is the dominant constraint on advanced communications diffusion and hence on its impact in Europe. Advanced communications affordability will improve significantly over the period to 2010, so the impact of advanced communications will grow strongly as this constraint is reduced. The availability of many residential advanced communications services will also constrain the impact of advanced communications in the period to 2010, but the availability of business advanced communications services will be a less significant impediment.

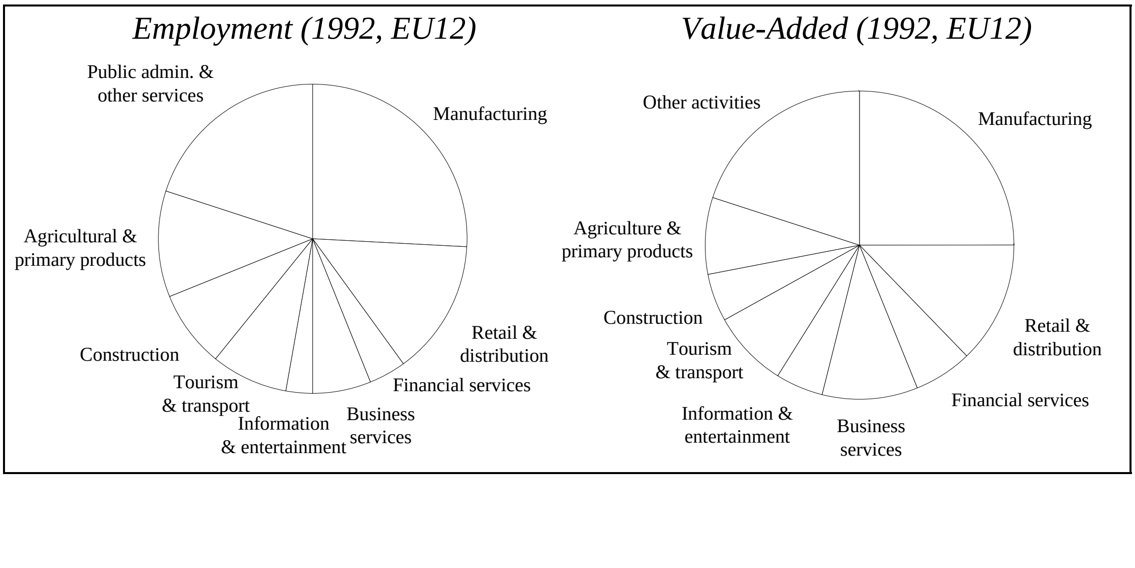
We have used two scenarios to represent the difference between an environment where advanced communications prices fall in line with falling advanced communications unit costs (stimulating demand and further unit cost reduction) and an environment where price falls are less rapid (and demand, investment, innovation and cost reductions are all retarded)

4. The Social Impacts of Advanced Communications

This chapter considers the impact of advanced communications on nine sub-sectors of the EU macro-economy:

	Employment, millions	*Value-added, ECU bn*
4.1 Manufacturing	36.1	1355
4.2 Retailing and distribution services	19.5	705
4.3 Financial services	5.6	325
4.4 Business services	8.3	542
4.5 Information and entertainment services	4.1	271
4.6 Health, welfare, education & public admin.	27.8	n/a
4.7 Transport and tourism	11.1	434
4.8 Construction	11.0	271
4.9 Agriculture and primary products	15.3	434

For each sector, we summarise its key characteristics and assess the impact of advanced communications in terms of the effect on competitiveness, employment trade, growth and EU integration. Section 4.10 summarises the employment and competitiveness impacts of advanced communications in each sector. The following pie charts summarise the employment and value-added in each sector addressed in this chapter. It should be noted that sector-by-sector data for value-added is only approximate, as Eurostat and OECD sources cannot always be reconciled. Value-added data for non-commercial activities is particularly problematic.



5. Advanced Communications and the Growth of International Trade

This chapter examines the importance of trade in the global economy, the trading position of the EU, and the likely effects of advanced communications on the development of EU trade.

5.1. Trade is Growing more Rapidly than Output

International trade represents a growing share of global output, and growth in trade is expected to outstrip overall growth in output for the foreseeable future On the basis of current trends, international trade may grow to the equivalent of 30% of world output by 2010 (from its current level of around 15%).

The rising significance of trade is a consequence of the increasing integration of the global economy. Practical, legal and cultural obstacles to trade are diminishing at the same time as the motivation to trade is increasing. Integration is occurring both at the regional level, through initiatives such as NAFTA and the EU Single Market, and at the global level, supported by the continuing evolution of the GATT and GATS.

These developments have very significant implications for individual national economies. Increased openness to trade exposes the true competitiveness of all sectors of the national economy, with inevitable casualties in some areas, caused by import penetration. The focus of industrial policy is required to shift from the protection of uncompetitive activities to the stimulation of areas of the economy that *can* compete effectively, resulting in increased specialisation within national economies. In this environment, there is more rapid growth in both imports *and* exports. The performance of national economies is ever more closely linked to the fundamental parameters that underpin competitiveness, such as the quality and cost of labour, political and economic stability, efficient capital markets, and the level of physical infrastructure.

5.2. Trade in Services is Increasingly Significant

Many services are difficult or impossible to trade internationally, and this is reflected in the low level of trade in services relative to the importance of services in the overall economy. Trade in commercial services accounted for only 21% of world trade in 1992, whereas services output constituted more than 50% of world output.

In recent years, however, the share of trade represented by services has grown significantly, from 17% of world trade in 1985 to 21% in 1992. This is partially explained by the increasing tradability of many services, and another factor is improvements in the measurement of trade flows for services (although this still remains very difficult).
This upward trend is likely to be maintained as the obstacles to trade in services continue to diminish and the share of output represented by services continues to rise. The fastest growing service sectors – business services, financial services, information and entertainment services are also the most tradable service categories.

5.3. The EU's Trade Position

The EU has an important presence in the world trade arena, with EU external exports constituting around 16% of world trade, and trade among the EU15 making up a further 28% of world trade. More than half of all world trade involves an EU state as an importer or exporter.

In recent years the EU has run a trade deficit, as illustrated in the Exhibit below. Although the transition from surplus to deficit is a cause for concern, the magnitude of the deficit is not yet harmful. The cause of the deficit has been an increase in import penetration rather than a decline in exports.

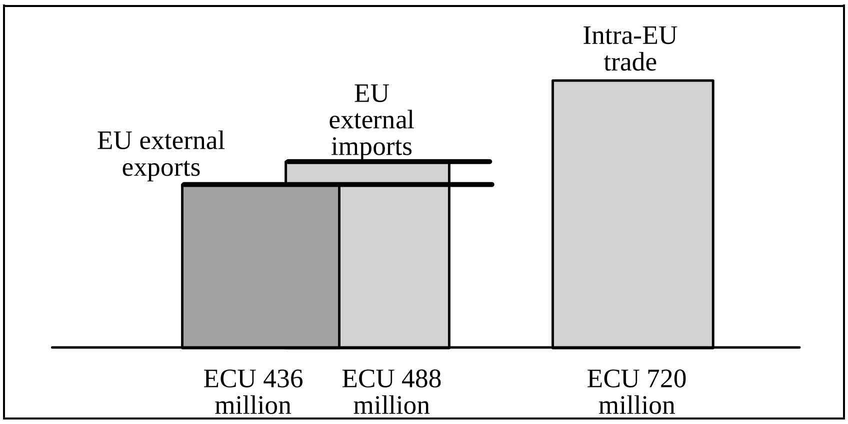


EXHIBIT : EU12 Internal and External Trade in 1992 (Source: Eurostat)

Both internal and external trade have grown more rapidly than EU output over the past decades. Since 1950, international trade has grown, on average, 1.5% per annum faster than output for the EU Member States, as illustrated in the Exhibit above. It is clear from the chart that the establishment of the EU Single Market in 1990 had not made any striking impact on the official trade statistics by 1992, demonstrating the lags that are inherent in the response of the economy to regulatory and legal change.

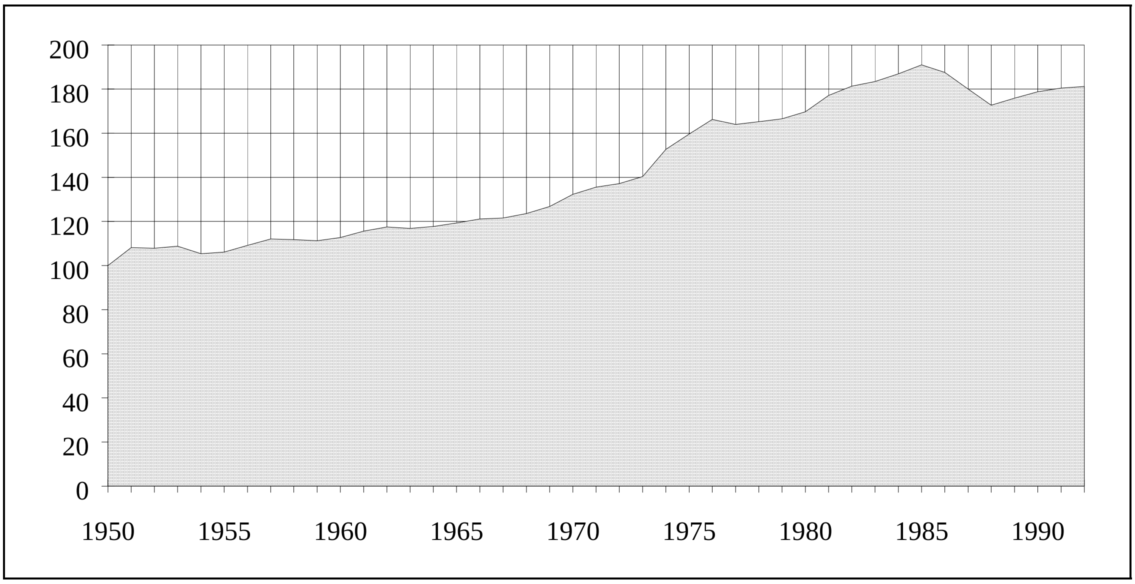


EXHIBIT : The 'Openness' of EU Economies (Index, 1950=100), 1950-92 (Source Penn World Tables)

As the EU Single Market develops it will become increasingly difficult to measure and interpret the flow of goods and services between Member States (as it is between the US states), and it will be the external trade of the EU that becomes the main focus of concern. The EU's major trading partners are the USA and Japan, which account for about one quarter of EU external trade. Europe has run a trade deficit with Japan for many years, and with the USA since 1988. The diagrams below show the nature of the trade deficits in 1992, and the flows of foreign direct investments in the same year.

The EU's trade deficit with the major industrialised economies of Japan and the USA is a source of considerable concern in terms of the competitiveness of EU players in key world markets. The same goods and services that are responsible for EU deficits with Japan and the USA are required in the newly industrialising economies of Asia – and EU exports must be competitive in these areas if Europe is to benefit from the growth that is occurring.

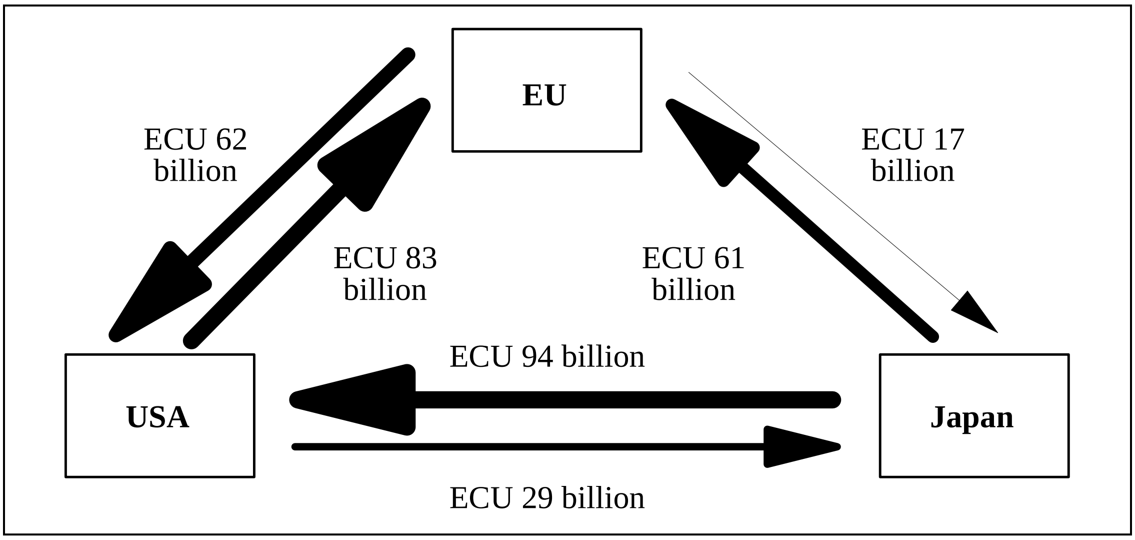


EXHIBIT : Trade Flows between the EU, the USA and Japan, 1992 (Source: Panorama 1994)

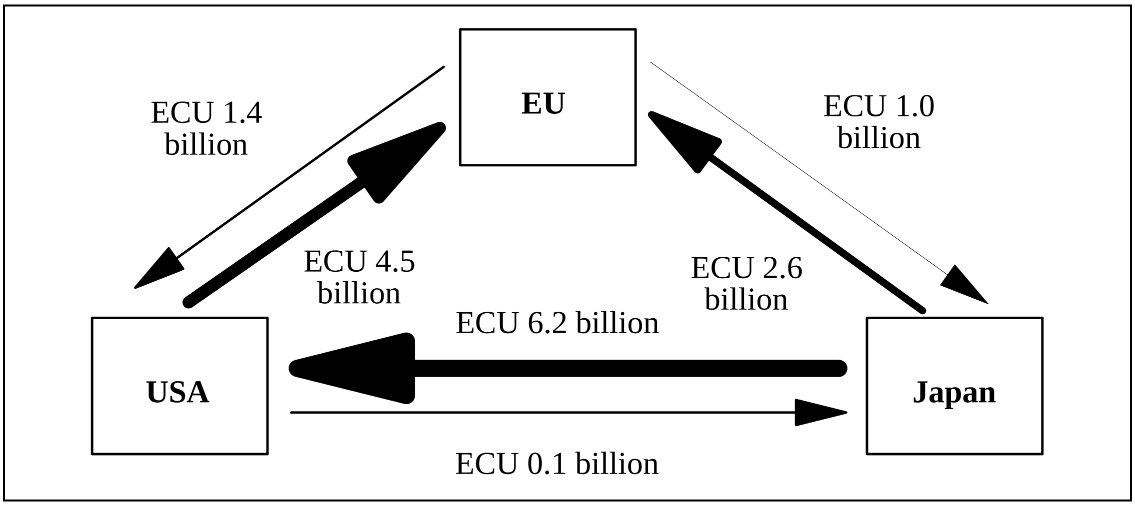


EXHIBIT : Flows of Foreign Direct Investment between the EU, USA and Japan, 1992 (Source: Panorama 1994)

5.4. The Impact of Advanced Communications on Trade

Trade has always depended on the flow of information, and the creation of our current global trading system has depended on the development of an effective global communications infrastructure. The transition to an advanced communications environment will enable global trade to continue to develop, but as well as increasing volumes advanced communications will also alter the patterns and mix of trade. The impact of advanced communications on EU trade is discussed below under four headings: the increased tradability of goods and services, the removal of geographical constraints on production, the revealed competitiveness of activity, and the effect on trade in communications equipment.

The Increased Tradability of Goods and Services

Improvements in communications reduce the costs and risks of trade, and the transition to an environment of better, cheaper communications will stimulate further growth in international trade. In an advanced communications environment it becomes possible to trade in information-intensive products and services that were previously effectively untradable. Services which entail complex interactive information flows (including many financial and business services) and products that are heavily customised (including many capital goods categories) *can* be traded effectively if the quality, speed and cost of communications between buyer and seller are adequate. The mix of global trade is already shifting from goods to services, and advanced communications will accelerate this process.

The impact of increased tradability in services and customised goods is positive for the EU macro-economy, even though, in the face of competition from US and Japanese players, EU firms operating in these areas may not always be able to capture large shares of global markets. Both imports and exports will increase, but EU exports of financial services, business services and customised goods to the high growth markets of Asia, and to other regions such as Latin America and Eastern Europe, should enable export growth to outstrip import penetration.

Increased tradability will accelerate the important process of integrating the EU economy in which most markets are still divided on a national basis.

The Removal of Geographical Constraints on Production

The geographical separation of stages in a production process is constrained by the need to transport intermediate products, and the need to maintain cost-effective operational and managerial control over remote operations. This latter constraint has prevented many firms from relocating production to countries with lower factor costs. The problems of integrating widely distributed operations have led to a common assumption that ‘lean production’ (i.e. optimised, flexible and responsive) is not compatible with ‘low cost’ production (i.e. the use of low cost labour in developing countries). However, through better and cheaper voice, data and video communications, advanced communications is making it easier to integrate and control remote operations without incurring prohibitive costs, and enabling ‘lean operations’ to be established in low cost locations such as Latin America and South East Asia.

The impact of advanced communications is therefore to enable firms to migrate activities to low factor cost countries. The intermediate or finished goods which are produced then appear as increases in imports, and there is a transfer of employment to the low cost country.

So far, the main areas of ‘job migration’ – the replacement of jobs in Europe with jobs in other regions – have been among manual workers in industries such as textiles, footwear, component manufacturing, data entry and assembly work, where the processes are relatively straightforward (even if the work is skilled) and the integration with other operations is simple to manage. Advanced communications will extend the impact of ‘job migration’ to areas such as software production, clerical work, customer service, and professional activities (law, accountancy, architecture, engineering and management).

The impact of reducing geographical constraints will be to reduce EU employment, increase EU imports and increase EU foreign direct investments, and advanced communications will contribute to these effects. However, EU firms which succeed in reducing their costs through this strategy will become more competitive.

The Revealed Competitiveness of Activity

The competitiveness of many activities is concealed because of low levels of competitive intensity. Examples include many service sectors (including some public services, financial services, professional services and many services in rural or disadvantaged areas). Competitive intensity is low in many such activities because the costs of entry outweigh the benefits for potential new entrants. Low competitive intensity is often, but not always, a warning of low competitiveness and economic inefficiency.

Advanced communications will help to reveal the competitiveness of many such areas by lowering the cost of entry for new entrants, particularly within the EU Single Market, where much of the protective regulation has been eliminated. The costs are lower in an advanced communications environment because direct access to the business customer or the consumer can be obtained through on-line services, and the costs of a local presence (branch networks, agents, etc.) are avoided. There are many examples of areas where advanced communications will lower the cost of entry and increase competitive intensity – including insurance services, banking services, food and consumer goods retailing, the supply of goods or services in response to invitations to tender, legal services, consultancy services, automotive retailing, property retailing, travel services, and many intermediate and wholesale markets.

The impacts of increased competitive intensity will be increased international trade, particularly within the EU, and increased economic efficiency. The net impact on employment should be neutral or slightly negative in the short term, but positive in the medium term.

Effect on Trade in Communications Equipment

The growth of advanced communications will be directly linked to increased trade in communications equipment. Global investment in networks, terminal equipment, communications satellites and submarine cables is running at over ECU 100 billion per annum, and the liberalisation of trade is allowing internationally traded telecoms equipment to account for an increasing share of this investment (although currently trade in telecoms equipment accounts for only about 10% of total investments, and represents about 1% of world trade). The EU is a net exporter of telecoms equipment, the world’s largest telecoms equipment manufacturers (Alcatel and Siemens) are based in Europe, and EU equipment exporters are successful in world markets for switching, transmission and wireless systems. EU exports of advanced communications equipment are expected to continue to grow in line with world markets for the foreseeable future, helping to offset the declining EU employment in this sector.

However, two effects may combine to bring a substantial increase in EU imports of telecoms equipment in the short to medium term :

- Telecoms liberalisation tends to bring a dramatic increase in the import penetration of telecoms equipment, as demonstrated by US and UK experience in the 1980s. EU liberalisation is likely to trigger a sharp rise in equipment imports, although some of this will be intra-EU trade.
- Some areas of major growth correspond to known EU weaknesses. For example, US and Japanese players are strong in many potentially high growth categories of customer premises equipment (CPE) such as ‘set-top boxes’ for advanced TV-based services, PC networking equipment, routers, voice processing equipment and applications products. In some cases increases in imports will be limited because non-EU players will choose to set up EU facilities to assemble or manufacture equipment for EU markets.

The net impact of rising exports and imports on the EU balance of trade in telecoms equipment is likely to be close to neutral, but the growth in trade volume will be beneficial. The employment impact should be positive, as export growth will protect employment and import penetration in customer equipment is a ‘missed opportunity’ for Europe, rather than a threat to existing jobs.

Summary

The following table summarises these four effects:

	EU external exports	*EU external imports*	*Intra-EU trade*
Increased tradability	◕	◔	◕
Migration of low value-added activities	○	◑	◔
Revealed competitiveness	◑	◑	◕
Trade in communications services and equipment	◔	◔	◔
Total impact	strong increase	strong increase	very strong increase

Note: *A solid black circle indicates rapid growth, an empty circle indicates no change.*

Overall, advanced communications will stimulate export and import growth, with a particularly strong effect on intra-EU trade. The impact on the EU balance of payments is difficult to predict, (since small changes to the high growth rates of imports or exports translate into relatively large changes in the size of the trade balance), but there is no reason to expect that the proper deployment of advanced communications should have a negative impact on the EU trade balance. Quantified estimates for the impact of advanced communications on trade are discussed in Chapter 6 below.

It should be noted that the main impacts of advanced communications will be on categories of international trade that are very difficult to measure, and where current econometric data is acknowledged to be very weak. Trade in services, trade in intermediate goods within multinationals, and hybrid FDI/trade/capital projects will all be stimulated by advanced communications, and are all problematic for econometricians.

However, the macro-economic impacts of these developments will occur irrespective of measurement problems – only the diagnosis of such effects will be made more difficult.

5.5. The Effects of Delayed Advanced Communications Take-Up on EU Trade

If advanced communications availability and affordability in Europe are poor and the take-up of advanced communications services is retarded, this will have a negative effect on EU external exports and intra-EU trade, but will not have the same effect on EU imports.

In other words, a slow take-up will harm the balance of EU trade. This is because:

- An increase in EU external exports depends on the increased tradability of sectors where the EU has competitive strength. In many of these sectors SMEs are the drivers of activity and innovation. Take-up of advanced communications among SMEs is particularly sensitive to the affordability of advanced communications services, and if these are expensive the export-increasing processes will be constrained.

- The migration of employment to regions with low labour cost (and the associated increase in EU imports) is *not* particularly sensitive to advanced communications affordability. Many of these location decisions will be taken by large corporations which will spend what is necessary to achieve the desired benefits, and in the current/future environment the costs of connecting remote sites into corporate voice and data networks are unlikely to change the economics of these decisions.

The increase in intra-EU trade will be significantly impaired by slow advanced communications take-up – a key driver of cross-border activity will be the establishment of new direct contact with potential customers through on-line connections. If the penetration of advanced communications in the mass market and the SME market is slow, the opportunity to start these new activities will be less attractive, and Europe will forego the welfare and efficiency benefits that would come from accelerated integration.

In summary, advanced communications will be a strong stimulant for the growth of international trade. The net benefit to the EU, in terms of the impact on the balance of external trade, will increase as advanced communications affordability increases for SMEs and residential customers – delays in the take-up of advanced communications among these groups will impair export growth more than they will slow the rate at which imports increase.

6. The Macro-Economic Impact of Advanced Communications

The purpose of the chapter is to explore the nature and magnitude of the creative and destructive advanced communications impacts on the EU economy, rather than to make quantified forecasts of the economic outcome for Europe.

6.1 Review of two scenarios for Advanced Communications

This section re-introduces the two scenarios for advanced communications in Europe (Chapter 3) and distinguishes between these scenarios, in terms of the different impacts of advanced communications on key economic variables in each case.

The two scenarios illustrate different rates of improvement for the availability and affordability of advanced communications in Europe:

- A 'rapid progress' scenario, where a virtuous circle of advanced communications usage is established in Europe, leading to falling unit costs, falling prices and high levels of service and applications innovation.
- A 'slow progress' scenario, where advanced communications prices fall more slowly, and take-up is retarded among price-sensitive customers such as small and medium-sized enterprises and residential users. The restricted penetration of many advanced communications services reduces the rate of service and applications innovation, and makes advanced communications take-up a less compelling proposition.

It is important to note that advanced communications plays an important role in the developing EU economy in *both* scenarios. Even in the slow progress scenario advanced communications underpins many important trends in the economic, social and political development of the EU – there is *no* plausible scenario in which the impact of advanced communications is not significant.

The Exhibit below illustrates the relative magnitude of changes in important areas of the EU economy in these two scenarios. These assessments are based on a qualitative analysis of rate of uptake of a wide range of advanced communications applications in the different availability/affordability environments defined in the two scenarios, and the mapping of applications onto the parameters listed below:

	'Rapid Progress' Scenario	*'Slow Progress' Scenario*
Rate of restructuring for 'mature' EU industries	◕	◑
Improvements in EU competitiveness	◑	◔
Growth in EU external exports	◕	◑
Growth in EU external imports	◕	◕
Growth in EU internal trade	●	◑
Growth in SME share of EU output	◑	◔
Job creation in the EU	◕	◑
Job destruction in the EU	◑	◑
Growth in EU unemployment	○	◔

EXHIBIT : Summary of Advanced Communications Impacts on Key Areas of the EU Economy
Note: A solid black circle indicates rapid growth, an empty circle indicates no change.

The following paragraphs describe the expected impacts of advanced communications on the competitiveness and structure of EU manufacturing and service industries:

- **Restructuring.** The EU has already seen substantial restructuring of mature manufacturing industries (such as steel, textiles and shipbuilding), which is expected to continue and spread to service industries (financial services, retailing and distribution, telecommunications, etc.). In the rapid progress scenario restructuring will be accelerated by increased competitive intensity in many sectors, and by advanced communications enabling business processes to change more radically and more rapidly. **Job destruction** through restructuring will be more pronounced in the rapid progress scenario, but the medium- and long-term job creation effects of improved competitiveness will also be significant.

- **SMEs.** In the rapid progress scenario small and medium-sized enterprises will be drawn into advanced communications usage by its affordability and the high-level potential impact on their business. Advanced communications will become a vital competitive weapon for a growing number of SMEs, and the health of the smaller enterprises sector in general will benefit significantly from the early emergence of an 'information society'. SMEs will be more effective in their role as the engine of innovation and job creation in Europe. In the slow progress scenario SMEs will still be the main focus of improvement in the performance of the EU economy, but their impact will be less marked. The impact of advanced communications on SMEs is predominantly positive and **creative**.

- **Competitiveness.** The competitiveness of EU firms will be enhanced by the transition to an advanced communications environment, and this will happen more quickly in the rapid progress scenario. Even though advanced communications will reveal uncompetitive areas of the EU economy (by exposing them to new forms of competition) it will also enable competitive EU firms to project themselves more effectively into wider EU and global markets. The increased health of EU SMEs will contribute to the overall growth in EU competitiveness in the rapid progress scenario. The competitiveness effects of advanced communications will be both **creative** and **destructive** for Europe.

6.2 Growth, Trade and Employment expectations in the two scenarios

This section describes the expected evolution of EU trade, growth and employment in the two advanced communications scenarios, illustrating the expected trends with quantified results for key economic variables.
We emphasise that the quantified scenario projections in the following exhibits are for illustrative purposes. They are abstracted from quantified models of the EU economy developed during the study, but the purpose of these models is to ensure that trade, output and employment figures are mutually consistent and plausible - the models do *not* have a predictive capacity for quantifying the impact of advanced communications. These quantifications have been developed on the basis of the *qualitative* assessments developed within the study team. The following table shows the expected impacts on the development of EU trade in both scenarios

	1992	*'Rapid Progress' scenario, 2010*	*'Slow Progress' scenario, 2010*
EU external exports	436	1,197	954
CAGR		*5.8%*	*4.5%*
EU external imports	488	1,209	1,103
CAGR		*5.2%*	*4.6%*
EU balance of trade	(52)	(12)	(149)
CAGR	(deficit)	*-7.8%*	*6.0%*
Intra-EU trade	730	2,143	1,794
CAGR		*6.2%*	*5.1%*
Total EU exports	1,166	2,998	2,748
CAGR		*6.0%*	*4.9%*
Total world trade	2,668	9,163	8,571
CAGR		*7.0%*	*6.7%*
EU exports/world trade	44%	36%	32%

EXHIBIT : Scenarios for EU Trade (all figures in 1992 ECU billion. 1992 - figures from Eurostat (1994b)).
Note: Figures and Compound Annual Growth Rates (CAGR) are expressed in real terms.

- **External exports and imports.** In the rapid progress scenario EU external exports and imports both grow at a rate of more than 5% per annum, but export growth is marginally higher, enough to reduce the balance of trade deficit to ECU 12 billion (in 1992 terms) by 2010. In the slow progress scenario both exports and imports grow less rapidly, but the poor take-up of advanced communications amongst SMEs in this scenario depresses export growth so that the EU balance of trade deficit widens in real terms to ECU 149 billion. The difference between the two trade balances will translate into an impact on EU employment (see below).
- **Intra-EU trade.** In both scenarios intra-EU trade grows strongly, but the increase is more dramatic in the rapid progress scenario – rising from 13% of EU GDP (ECU 730 billion) in 1992 to 25% by 2010 (ECU 2,143 billion). The difference in intra-EU trade between the two scenarios is ECU 350 billion per year by 2010 (in 1992 terms), and some of this difference can be translated into real growth in EU output (in the rapid progress scenario), with a consequent impact on EU employment (see below).

  The compound annual growth rate for external and internal trade is relatively high in both scenarios. This is based on an assumption of rising year-on-year growth rates as the integration of the global economy translates into new trade flows. Note also that these figures refer to real trade rather than measured trade – current measurement processes will not capture a significant and increasing proportion of the expected growth of trade in services, which is an important component of the above projections.

These internal and external trade effects contribute to the development of output and employment in the two scenarios, as summarised in the following Exhibit.

	1992	*'Rapid Progress' scenario, 2010*	*'Slow Progress' scenario, 2010*
EU output (GDP, ECU billions) *CAGR*	5,421	8,612 *2.6%*	8,314 *2.4%*
EU working population (millions) *CAGR*	154	180 *0.9%*	180 *0.9%*
EU employment (millions) *CAGR*	139	166 *1.0%*	160 *0.8%*
EU unemployment (millions) *CAGR*	15.0	14.4 *-0.2%*	20.1 *1.6%*

EXHIBIT : Scenarios for Output and Employment
Note: *Figures and growth rates are expressed in real terms.*

- **Output.** The underlying GDP growth trend is assumed to be 2.5% compound annual growth over the period to 2010. The combined impact of the internal and external trade differences between the two scenarios, the relative levels of stimulation of the SME sector, and the many other effects discussed above, results in a difference in EU output of about ECU 300 billion. Of the various contributing effects, the most significant is the difference in the 2010 EU trade balance of the two scenarios – approximately ECU 150 billion. It should be noted that, in the model, the divergence in GDP between the two scenarios increases over time, as the impact of advanced communications grows. The annualised growth rates are based on a small advanced communications impact in the early years, rising to a proportionately higher impact at the end of the period. In the slow progress scenario EU GDP/head is ECU 25,000 in 2010 (in 1992 terms), and ECU 25,850 per head in the rapid progress scenario.

- **Employment.** Assuming that output per employee rises by 1.5% per annum in real terms over the period (which is an approximate extrapolation of historical OECD trends), the difference in output between the two scenarios translates into 5 or 6 million jobs in 2010. (Note, however, that this is based on today's definitions of employment; it is likely that patterns of employment, and the definition of the working population, will have changed radically by 2010. The impact on unemployment is therefore included in Exhibit 6.3 for illustrative purposes only.) However, regardless of how employment is measured in 2010, the conclusion is that the 'slow progress scenario' will have a *negative* net impact on EU employment by 2010.

  A more detailed examination of employment trends can be found in the report 'Employment Trends Related to the Use of Advanced Communications', prepared by the AD-Employ Consortium (1995).

6.3. Conclusions

The objective of constructing the two macro-economic impact scenarios was to establish a framework for balancing the impacts of creative and destructive processes associated with rapid or slow take-up of advanced communications in Europe.

The outputs from this process reinforce our hypotheses that:

- If advanced communications take-up in Europe is rapid, the creative effects will outweigh the destructive effects, and the net impact of advanced communications on employment and prosperity will be positive.

- Slower advanced communications take-up will hold back the creative processes more than it delays the destructive processes

- By 2010 one could expect the impact of this asymmetry to be visible in the macro-economy. The quantified assessments (above) indicate that accelerated progress with advanced communications could reduce the EU unemployment figure by 6 million in 2010, and that EU GDP per head could be ECU 850 higher in 2010 (3.5%)

Clearly, given the uncertainties present in this area, it is not feasible to turn subjective hypotheses into firm conclusions, but we conclude, on the balance of evidence available, that the rapid take-up of advanced communications in the EU will permit advanced communications to make a valuable contribution to European growth, trade and employment in the medium to long term, and that EU policy makers should endeavour to accelerate the take-up of advanced communications in order to realise these benefits.

7. Policy Implications

The policy options for rectifying Europe's structural weaknesses are limited in the current economic environment. Industrial policy interventions are constrained by the availability of funds, by competition and trade law, and by concerns over the effectiveness of past actions. Fiscal and monetary policy is constrained by the discipline of the global markets. As the 1993 Delors White Paper emphasised, the traditional remedies are now discredited, and policy makers must search for new directions.

Advanced communications is a two-edged sword. On the one hand it presents Europe with an opportunity to stimulate innovation and trade, improve efficiency and increase economic integration; but on the other it can destroy jobs through an acceleration of import penetration and re-engineering in larger corporations. The net result of these creative and destructive processes will be determined by the way in which Europe adopts advanced communications, and this, in turn, can be significantly influenced by national and supra-national policy decisions.

To ensure that advanced communications is a benefit to Europe, policy makers should focus on improving the *affordability* of advanced communications. If the price of advanced communications is kept in line with its falling costs then virtuous circles of usage, innovation and further cost reduction will be initiated, and advanced communications will diffuse rapidly through small and medium-sized businesses and residential customers. In such circumstances, the creative processes outweigh the destructive processes.

Policy makers need to recognise that rapid improvement in the affordability of advanced communications is not in the commercial interest of the players who currently dominate the European communications landscape, the telecoms operators. Their commercial interest is optimised by protecting their traditional revenue streams and profit sources (such as international telephony) and managing new services to avoid the cannibalisation of existing revenues. We should not expect the telecoms operators to take actions that are not in their commercial interest, even though the macro-economic consequences of slower take-up of advanced communications are negative.

Policy should focus on removing the major obstacles to rapid advanced communications price falls:

OBSTACLE 1: High advanced communications prices set by dominant operators concerned about the cannibalisation of existing revenues

Policy Actions:

- *Early infrastructure liberalisation.* Competition in advanced communications services depends on infrastructure liberalisation – new entrants need to be able to construct their own infrastructure in order to support high-speed services and develop innovative applications.
- *Assertive national price regulation.* Even in a competitive environment such as the UK, the main downwards pressure on price comes from the regulator. Enforced price cuts on traditional services encourage dominant operators to develop new services and also lower the price ceilings for advanced services.
- *Forcing telecoms operators to offer high-capacity circuits.* The Open Network Provision Directive on Leased Linesshould be extended to include 34Mbit/s and 155Mbit/s circuits. Under the terms of the Directive, the price of such circuits would have to be justified, and they would have to be offered on a non-discriminatory basis. The wider availability of high-speed links would increase the competitive intensity in the EU telecoms sector and feed through into lower advanced communications prices for end users.

OBSTACLE 2: High cross-border advanced communications prices in Europe

Policy Actions:

- *Early licensing of trans-European network operators*, such as Hermes, the European railway consortium which is building a high-capacity pan-European network.
- *Replacement of the existing 'accounting rate' régime for international telecoms settlements* with a régime based on interconnect pricing. The unjustifiably high prices of international telephony underpin the high prices that are charged for more advanced international services. Reform of the accounting rate régime will take many years. The liberalisation of services in 1998 will provide an opportunity to bypass the accounting rate system within the EU, but the licences issued to operators in this new environment will need to be drafted carefully to ensure that the move away from the accounting settlement régime occurs on 1 January 1998.

OBSTACLE 3: Unbalanced tariffs

The history of cross-subsidy in telecommunications has resulted in a mismatch between the costs and prices of different services. In general, line rentals and local calls are too cheap, and long-distance calls, international services and advanced services are too expensive. The mismatch has been used by incumbent operators to argue successfully for restrictions on competition, and this has slowed the rate of price falls for traditional and advanced services.

Policy Actions:

- *Accelerate rebalancing.* Rebalancing is a political issue, because increases in line rentals and local call charges have a disproportionate impact on residential customers, particularly low-income customers. Policy makers need to consider the longer-term effects of delaying rebalancing as well as the immediate impacts, and where possible should implement solutions which do not delay rebalancing.
- *Re-assess the ways of compensating incumbent operators for the obligations that are placed upon them.* Currently there is an effective quid pro quo arrangement in all EU countries, whereby incumbent operators fulfil their pricing and service obligations in return for greater or lesser restrictions on their competitors (ranging from prohibition to the levying of various charges on competitors). This is not sufficiently transparent to ensure that maximum competitive intensity is achieved in the European telecoms sector.

In summary, if Europe is to maximise the economic benefits of advanced communications, there are a range of specific policy actions which are required to create an appropriate environment. The focus of all the actions recommended here is to improve the affordability of advanced communications, which we see as the limiting constraint on the rate of diffusion of advanced communications usage among those groups where it will have the most positive impact.

ANNEX 1

EMPLOYMENT TRENDS RELATED TO THE USE OF ADVANCED COMMUNICATIONS

AD-EMPLOY Employment Trends Related to the Use of Advanced Communications T 1010

Duration of project: 12 months

The overall objectives of the study are to assess the overall employment trends in Europe related to the use of advanced communications (AC) **and** to contribute to policy formulation and make recommendations concerning how AC can best be used to stimulate new job creation.

The quantified objectives of the study are
to compile and review existing knowledge about the level of diffusion and application of AC in relation to changes in employment;
to analyse the employment creation, destruction and modification effects of AC;
to provide an overall conceptual framework for understanding the employment effects of AC;
to propose policies (at CEC and national levels) for mapping and measuring employment trends with the aim of identifying best practice in the implementation of AC;
to identify requirements for generic types of technology development and usage innovation, and make recommendations for promoting best practice.

A conceptual framework has been created to develop a series of heuristic models, including the different mechanisms by which AC effects employment.
Within this loose context a three-pronged series of investigations is taking place:
micro-level case studies analysing the actual situation in 15 organisations (or networks of organisations), both public and private, within a range of economic sectors, a range of sizes, and using different types of advanced communications in different ways.
macro-level analyses of quantitative changes in employment (by occupation and economic sector) in order to examine the context of the micro-level case studies and some possibility of their generalisability to the whole economy.
a delphi-type expert investigation aimed at providing validation or alternative views of the macro level changes taking place as well as deeper insight into the mechanisms driving the changes, the factors involved (both trends and policies), the identification of key technology applications, and policy scenarios which could optimism both quantitative and qualitative employment changes in the future.
All of the above investigations were completed in 1994 and resulted in three deliverables.

Co-ordinator:

Tele Danmark Consult A/S* DK

Subcontractors:

Institute of Technology Assessment (Vienna) A
Programme of Research on Engineering Science and Technology (Manchester) UK

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ANNEX 2

ADVANCED COMMUNICATIONS FOR COHESION & REGIONAL DEVELOPMENT

ACCORDE **Advanced Communications for Cohesion & Regional DevelopmentCommunications** **T 1015**

Duration of project: 12 months

The main objectives of this projects are the identification of regional economic development strategies relevant to Advanced Communications and the elements that comprise them; the categorisation of cohesion regions according to the different combinations of development strategies they may pursue; the identification of the user applications of Advanced Communications that will enhance these strategies; the proposal of policy and programme measures to promote these user applications.

The approach pursued by ACCORDE underlines the importance of focusing on real user needs for Advanced Communications use, in the context of sectoral ‘value-chains’ that are decisive for regional development. Rolling out generic advanced services, and expecting take-up to follow, is a waste of time and resources, and experience has shown this.

Methodological instruments included a literature review (to learn from experience); the Case Studies (to find out what is happening on the ground in different regions); and an EU wide questionnaire survey (to get a general picture).

The key achievements of this projects are:

- Developed the Framework of Analysis and the Methodology.

Completed and delivered the Literature Review (Deliverable 1B), and secured its Publication in a refereed Journal :

- Completed the Report on EC Cohesion Context (Deliverable 3B).
- Completed a survey and report regarding AC use of over 300 EU firms.
- Completed twelve in-depth Case Studies (Deliverable 2B)
- Successfully co-organised run a dissemination and feedback conference in the Azores
- Completed the final draft report

Coordinator :

NEXUS Europe*	IRL

Subcontractors :

CURDS - Centre for Urban & Regional Development Studies	UK
ISI - Fraunhofer Gesellschaft: Information and Communications Technology	D
Recherce e Projetti (Cristiano Antonelli)	I
IDATE - Institut de l'Audiovisuel et des Télécommunications en Europe	F
CCS - Culture & Communication Studies (Lars Qvortrup)	DK
University of Azores (Tomaz Dentinho)	P
PRISMA (Nicos Varelidas)	GR
TRG -Telecommunications Research Group (Knud Erik Skouby)	DK

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ANNEX 3

SOCIAL TRENDS IN USE OF MEDIA

SOCIAL TRENDS **Social Trends in Use of Media** **T 1026**

Duration of project: 9 months

The primary objective of the project is to present a global picture of social trends related to the use of communication media, given that provision of advanced communications services will have important consequences for day-to-day living and working conditions.

This overall picture is structured as follows:

- the use of each individual media (including telecommunication and audio-visual) is analysed globally
- evolutionary aspects of media usage are modelled to build a general background, highlighting the social and economic significance of the new technologies.

The project is based on a three methodology developed by the three partners.
The first phase is an review of the trends based on an overview of existing research. This overview provides a broad perspective of the evolution of media use over the last decade, and up-to-date input on the development of new services such as video-on-demand.
The second phase consists of developing a business perspective mainly through interviews and case studies. The focus is on the benefits and concerns raised by decision makers or those directly involved in the development if advanced communications services.

The third phase involves the organisation of a workshop on tele-shopping services, one of the important aspects linked to the use of new technologies. This workshop presents the standpoint of the consumer and highlights the possible role of tele-shopping services in the restructuring of distribution channels in a wide range of sectors.

The project started in the second half of 1994. The different members of the consortium focused their trend reviews on complementary topics, such as, the person-to-business use of media (including telework related aspects), the residential use of media, and an overview of the situation in the US and in Japan.

Contacts have been made with the Metier project (T1023) concerning person-to-business issues, and with sociologists to validate the trends review.
The workshop on telework was carried out in January 1995.

This project will provide European Parliamentarians with an overview of social trends in connection with media use. This document will be distributed in the context of the white paper on *Unemployment, Growth and Competitively*. The possible social impacts of advanced communications services will be stressed and put into perspective.
As part of the management consulting activities of GEMINI, it is planned to disseminate results to companies and professional group wishing to implement advanced communications services.

Coordinator:

Groupe Mac Gemini Consulting F

Subcontractor:

Technibank I
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Technology Investment Partners USA

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ANNEX 4

MACRO ECONOMIC AND TRADE IMPACTS OF ADVANCED COMMUNICATIONS

METIER Macro Economic and Trade Impacts of Advanced Communications T 1023

Duration of project: 12 months

The project objective is to present, to a non-specialist audience, the linkage between advanced communications and European economic growth and trade performance.

The METIER approach has been to investigate the likely impacts of Advanced Communications (AC), on individual sectors and then to synthesise key macroeconomic messages.

The investigations are complete and the final report is under preparation. Some of the issues are clearly identified.
To maintain its prosperity, Europe must address a number of structural weaknesses (as identified in the 1993 White Paper on Growth Competitiveness and Employment) and, at the same time, needs to share in the projected strong growth of economies in the Asia/Pacific region (through trade and direct investment).

AC, if effectively and rapidly deployed, can have a significant positive impact in both of these key areas, enabling restructuring and integration in Europe, and linking the economies of the Asia/Pacific region more closely with European manufacturing and service industries.

AC will bring dramatic changes to individual industrial and service sectors over the next decade, at least comparable with the impact of information technology in the past decade. The traditional cost-base will change in many businesses, and in some cases (such as banking and insurance) the whole shape of the value chain may be transformed. Many businesses will be able to achieve competitive advantage through their use of AC. Improved communications increases the tradability of many goods and services, and can reduce many of the risks associated with making foreign direct investments.

The impact of these effects will be particularly strong in service sectors, benefiting the EU through increased external trade in services and the integration of service industries (such as retailing and business services) within the EU.

Coordinator:

Analysys Ltd*	UK

Subcontractor:

Institute Cerda	E
Epsilon International	GR
The German Institute for Economic Research (DIW)	D
The Telecommunications Research Group at the Technical University of Denmark	DK

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