Building the European Information Society for Us All

Final Policy Report

of the High Level Group of Experts

April, 1997

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*****Mrs. Carlson passed away on February 17th 1997, two days after the final meeting of the Group.

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Apart from these individual comments and reactions, we would like also to acknowledge the formal written comments received from the following organisations. Their comments have been particularly useful to our discussions and deliberations.

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DG X.D.3 - Audiovisual Policy
DG X.B.4 - Libraries
DG XXII - New technologies for Education and Training

Others

Participants at a meeting on 'The Information Society and Gender' convened by the Equal Opportunities Unit (DG V.A.3) of the European Commission
Members of The European Commission's Information Society Forum

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Letter of submission by Professor Luc Soete,
Chairman of the Group

Maastricht, 15 April 1997

Dear Commissioner Flynn,

On behalf of my colleagues, I am pleased to provide you with this final report of the High Level Expert Group. Our report represents the collective thoughts, opinions and beliefs of the members of the group as agreed upon in our various interactions over the last two years.

Since the publication of our First Reflections Report one year ago, the debate on the social aspects of the emerging information society (IS), so we would argue, has developed rapidly. We believe that our "first reflections" of last year, in their own limited way, have already contributed to this debate. We hope that this final report will be a welcome contribution to this on-going debate on the European Information Society. Others will have to judge whether this report has also contributed. With the publication of this final report, our work comes indeed to an end.

We continue to recognize the variety of possible opportunities that the emerging IS could provide. As in our previous report, the importance of "social embeddedness" remains central to our vision of a socially inclusive IS. In this final report we hope to have taken the debate a step further by proposing a policy framework that considers the broad range of opportunities and challenges that the IS is bringing about. In doing so, we have attempted to sharpen our overall policy message and provide some of the core policy recommendations that we believe are required to build an IS that improves the quality of life for all of Europe's citizens.

We thank you for the continued trust and confidence that you have put in our group and for the opportunity to contribute to the European Commission's debate on the social aspects of the IS. You have said in the past that you were looking for independent advice on the trends and challenges that the new information and communication technologies could offer; fresh eyes for new challenges. We hope that our work has lived up to your expectations.

Finally, we would like to gratefully acknowledge the commitment of our dear friend and colleague Mrs. Birgitta Carlson who passed away shortly after the final meeting of our group. Birgitta's professional and personal contribution to our group was of tremendous importance. Her knowledge of a number of critical issues was essential to the production of our report, her optimism helped to support our group through the challenges of our project. We regret that she is unable to see the concluding phase of the project.

On behalf of the Group of High Level Experts,

Professor dr. Luc L. G. Soete
Chairman of the Group

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1. Introduction

In May 1995, the High Level Expert Group (HLEG) was established to analyze the social aspects of the Information Society (IS). Until that time, the debate on the emerging IS had been dominated by issues surrounding the technological and infrastructural challenges along with the regulatory economic environment most appropriate to enhance the diffusion and use of Information and Communication Technologies (ICTs). As noted in our "First Reflections" interim report published in January 1996[1], the relative neglect of the social issues was to some extent understandable.

The debate on the technological challenges following the digital convergence of ICTs follows a long tradition of European concern of lagging behind in major high technology areas such as semiconductors, microelectronics, and other ICTs considered crucial for Europe's overall competitiveness. Despite a succession of long term research support policies (the framework programmes[2]) during the 1980's, European competitiveness in these ICT-related areas deteriorated often in those areas most heavily supported by European Research and Development (R&D) policies[3]. In the 1990s, with the further harmonization of the large European market, the policy focus gradually shifted to the economic environment and in particular to the national regulatory telecommunication frameworks increasingly outdated in light of new information and communication services.

Today, with the policy discussion on the necessary deregulation and liberalisation of telecom operators coming to an end, the debate is entering into a third phase focusing on the many neglected, sometimes unexpected social aspects of the IS. By structuring the policy debate in this way, we do not claim that no research or policy debate has taken place over the years on these broader issues. Nor do we assert that the Commission has refrained from addressing many of these issues[4]. Rather, we infer that these issues have not been at the centre of the policy debate.

In our interim report we set out a vision recognizing the tremendous opportunities new ICTs could offer, such as the potential for substantial productivity increases and for

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"Building the European Information Society for Us All, First Reflections of the High Level Group of Experts", *Interim Report*, January 1996.

These so-called RTD framework programmes have systematically focused on Information and Communication Technologies (ICTs) as the priority area for European research support. The current 4th Framework programme allocates more than one quarter of total research support to ICT research programmes (IT, Telematics and ACTS). For us, the IS implies more than just using these technologies.

See e.g. the recent report "*Enabling the Information Society: Supporting Market-Led Developments*", Ministry of Economic Affairs, Booz-Allen & Hamilton, January-February 1997.

Starting with the 1994 Action Plan *Europe's Way to the Information Society*.

the emergence of many new and improved products and services. At the same time, we warned that converting this potential into actual gains in productivity, living standards and quality of life depended on a prolonged process of learning and institutional change. The technology in itself is neither good nor bad, so we argued, it is the way in which any technology is used which determines both the nature and extent of its benefits. Moreover these benefits do not accrue automatically to everyone in society[5].

Since the publication of our interim report, the Information Society Forum (ISF), a broad user expert group also set up by the European Commission, has produced its first annual report[6], arguing along similar and complementary lines. Their further reflections will undoubtedly lead to more detailed proposals and recommendations in forthcoming contributions. Other European and national expert and advising groups have also been established or are in the process of formulating policy conclusions[7]. At the end of 1996, the Commission adopted its own Action Programme "Europe at the forefront of the Global Information Society" pointing to the many social challenges brought about by the emerging IS[8]. The field has in other words expanded rapidly with the social aspects of the emerging IS moving to the top of the policy agenda. We very much welcome this shift in priority setting. Our hope is that the HLEG's first reflections report and the ensuing debate might have contributed in a modest way to this shift. Perhaps somewhat presumptuously, we dare to conclude that one of the first tasks we envisioned for ourselves has thus been realised.

While the above mentioned groups, along with other groups that are likely to emerge in the future, will develop new proposals, our work comes to an end with the publication of this final report. In our Interim Report we made many detailed proposals, some of which became the subject of policy and academic debate. Rather than repeat those here, we choose to sketch out what is in our view, the essential broad policy framework within which the debate on the emerging IS should take place and present a policy action programme

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Building the European Information Society, *op. cit.*, p.i

"Networks for People and their Communities: Making the Most of the Information Society in the European Union", First Annual Report to the European Commission from the Information Society Forum, June 1996.

Such as the High Level Industry Advisory Group of the Information Society (see their recent recommendations of January 1997); the Andersen-Ienm study on Strategic Developments for the European Publishing Industry towards the Year 2000, 1996 or the KPMG study on Public Policy Issues Arising from Telecommunications and Audiovisual Convergence, September 1996.

Such as the need for life long learning (referred to as "investing in the future"); and the importance of the quality of life and work (referred to as "people at the centre").

consisting of a limited number of core policy recommendations[9]. In doing so we hope to have somewhat sharpened our overall message and contribute to the on-going European debate on the social aspects of the IS. This message, it might be worthwhile to emphasize, is based on a complete consensus among the individual experts.

[9] As the information overloaded reader might have noticed we have shortened our report, referring the interested reader to the various analytical chapters commissioned over the last year. These contributions provided the group with a framework to base many of their policy recommendations on; they are listed in the Appendix and can be obtained from the European Commission.

2. The High Level Expert Group's vision: From an emerging Information Economy towards a Knowledge Society

How do we define *the* Information Society? The Information Society is the society that is currently being put into place which involves a general utilization of techniques of information and data storage and transmission at low costs. Such generalisation of information and data use is being accompanied by organisational, commercial, social and legal innovations that will profoundly change life at work and in society.

In the future there could be different models of Information Societies just as today we have different models of industrialised societies. They are likely to differ in the degree to which they avoid social exclusion and create new opportunities for the disadvantaged. In referring to a European IS, we wish to emphasize, in line with the White Paper on Growth, Competitiveness and Employment, the importance of the social dimension which characterizes the European Model[10]. A strong ethos of solidarity should also characterize the European model of the Information Society. This is not an easy goal to achieve since the traditional structures of the welfare state will have to undergo substantial changes. Furthermore, to adapt to these changes, an active rather than passive concept of solidarity is needed.

But before entering into these as well as other policy challenges, we elaborate briefly on two more conceptual features - the distinction between 'data', 'information' and 'knowledge' and the requirement of 'social embeddedness' - which are in our view essential for any discussion of the IS and are at the core of our policy analysis.

As also acknowledged by the Commission: " Europe is built on a set of values shared by all its societies and combines the characteristics of democracy -- human rights and institutions based on the rule of law -- with those of an open economy underpinned by market forces, internal solidarity and cohesion. These values include access for all members of society to universal services or to services of general benefit, thus contributing to solidarity and equal treatment." (COM(96)90 final), 28 February 1996.

A. From information to knowledge

First and foremost it is essential to make a clear distinction between 'data' and 'information' and 'knowledge'. From our perspective, the generation of unstructured data does not automatically lead to the creation of information, nor can all information be equated with knowledge. All information can be classified, analyzed and reflected upon and otherwise processed to generate knowledge. Both data and information, in this sense, are comparable to the raw materials processed by industry to make useful products[11].

One of the main effects of the new ICTs has been a billion-fold reduction in the cost and speed of storing and transmitting information thus "energizing", in the words of the Bangemann report, "every economic sector" (Europe and the Global IS, Brussels 1994). However, such ICTs have had no such effect on the generation or acquisition of knowledge, still less on wisdom[12]. One would hope of course that society would be shifting more and more towards a "wise society". In such a society, scientifically supported data, information and knowledge would be increasingly used to make informed decisions to improve the quality of all aspects of life. Such "wisdom" would help to form a society that is sustainable from an environmental perspective, that considers the well-being of all members of society, and that values social and cultural aspects of life as much as the material and economic aspects. Our hope is that the emerging information society will be developed in such a way as to contribute to this vision of wisdom.

One of the main challenges for the IS will be to develop the skills and tacit knowledge to make effective use of information. From this perspective, ICTs should be viewed as technologies that are in essence complementary with investment in human resources and skills. In this way, they differ from previous major technological transformations. Most previous major new technology clusters were complementary with physical capital accumulation. Thus, with "railroadification", for example, came a major induced boom of investment in the essential material and capital equipment inputs leading to a strong upsurge in overall economic growth. Similarly the mass consumption of motor cars, which "induced" demand for better roads, easily accessible motorways, and readily available petrol and car maintenance services, led to an upsurge of growth based both on the growth of final consumption and the many intermediate demands for materials and capital equipment.

At the same time and as emphasized below, it is essential to point out the difference between the production and use of tangible, raw materials and intangible information (data): the latter can be reproduced at little cost to the producer.

Which we identify as "distilled" knowledge derived from experience of life, as well as from the natural and social sciences, from ethics and philosophy.

Unlike previous technology clusters, new Information and Communication Technologies typically do not have such major linkages to intermediate demand for *physical, material* goods and capital equipment. Indeed, it is precisely this that makes data very different from traditional raw materials. Consuming information does not involve "usage" in the traditional sense. After being used information can still be used by others, more so, two or more individuals can use the same information at the same time. Rather than scarcity which our market economic systems have been geared towards solving, information will practically by definition lead to problems of information abundance and questions about how to develop tools to manage this abundance.

With respect to material hardware, it is difficult to see how the increased demand for computers, mobile phones, optical fibres or Internet connections, would lead to a major growth impulse following the "induced" demand for plastics in computers and optical fibres or iron oxide in semiconductors. Despite the heavy capital investments required for some of these products (e.g. semiconductors), the material, physical capital accumulation is no longer the essential "*complementary asset*" of these sets of new technologies. Rather, since the knowledge on how to use information typically depends on one's skills and what we called "tacit" knowledge, the new complementary asset to the growth and use of new ICTs is investment in human, immaterial capital[13].

For this reason we stress that it is essential to view the information society as a *learning society*. The learning process is no longer limited to the traditional schooling period, but is, as has been emphasized in the Commission's White paper on education: "Towards a Learning Society" (1995) and the OECD report on "Life Long Learning" (1996), a lifelong process, starting before the formal schooling age and taking place at work *and* in the home. Our point has, we believe, been well accepted[14]. However, we are concerned that in Europe the incentives to invest in such lifelong learning activities are weak[15]. Not surprisingly, therefore, we start our list of policy recommendations with those addressing this particular challenge, going well beyond the traditional requests for multimedia software applications and infrastructural support for education and training.

After the rapid increase in the supply of more qualified and skilled personnel over the post-war period, leading to a rapid decline in the ratio between physical and human capital, the ratio has fallen sharply over the last twenty years and is now estimated at around 2, as opposed to 5 in the 1920s or 3 in the 1970s (Figures for Germany, Büttler/Tessaring, 1993).

See amongst others the request by the European Council in Florence to the Commission to elaborate an action plan on "Learning in the Information Society". The latter is now one of the main ingredients of the new Action Programme "Europe at the Forefront of the Global Information Society".

See also the Delors report: "Learning: The Treasure Within", Report to UNESCO of the International Commission on Education for the Twenty-first Century, UNESCO 1996.

B. From technological determinism to social embeddedness

The social integration vision which the HLEG espouses rejects explicitly the notion of technology as an external, exogenously given variable to which society and individuals, whether at work or in the home, must adjust and adapt. Rather it puts the emphasis on technology as a social process which[16] "by meeting real or imagined needs changes those needs just as it is changed by them. Society in this view, is shaped by technical change, and technical change is shaped by society. Technical innovation - sometimes impelled by scientific discovery, at other times induced by demand - stems from within the economic and social system and is not merely an adjustment to transformations brought about by causes outside that system" (OECD Sundqvist Report, p. 117).

An example, illustrating the importance of such social embeddedness can be found in the recent history of the ex-socialist Eastern European countries. Most strikingly these countries witnessed very little growth and development, despite massive investments in science and technology and higher education, in the twenty years before the collapse of the Berlin Wall and the transition process. Obviously, the lack of economic integration, more specifically the lack of a market separating the technically from the economically feasible, pushed the science and technology system into isolation. But the 'market' failure of the science and technology system in the ex-socialist countries is only one facet of this isolation. Another which we highlight here, was the total lack of social and organisational integration of technological change. As a consequence and in contrast to the so-called 'capitalist' societies, science and technology became much more *imposed* on society and workers in particular, with the resulting lack of efficiency improvements on the shop floor[17]. Technological disenfranchisement accompanied political disenfranchisement.

At the process level, rather than an externally given "change" factor, the technologically driven convergence of new information and communication technologies can be best described as a process of change which is "flexible in use"; i.e. its actual implementation and successful economic outcome will be crucially dependent on the particular conditions of application and use. While such flexibility in use limits the process by which "routines" can be set up to ease learning processes[18], it highlights the

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in the words of one of the first OECD reports on the socio-economic aspects of new technologies, the so-called Sundvist report: OECD, *New Technologies: a socio-economic strategy for the 90s*, Paris, 1989.

Whilst the current debate on the "information highways" and "global information infrastructure" has certainly been much wider and thorough-going in political democracies than ever before and certainly than it was ever in the former socialist countries, it is still in many respects a debate among experts.

which explains amongst others why the process of ISO certification has only led to very limited efficiency improvements, see a.o. Lasfargue, Y. "ISO, SADO, MASO...", *Le Monde*, 29 June 1994.

crucial importance of social and organisational "embeddedness". Ultimately, the latter will be a prerequisite for economic success and the creation of new jobs. At the product level, it is clear that the commercial feasibility of a new process or product is an essential condition for successful "economic" integration. But other contexts: social, ethical and socio-political do also play important roles. Here too, the innovation literature points to the lack of consideration of user needs as the single most important factor explaining innovation failure.

Once the argument is accepted that the creation of technological capabilities does involve a complex, endogenous process of change, negotiated and "mediated" in organisations and at the level of society at large, it is obvious that policies cannot nor should be limited to the economic "integration" of technological change, but must include all aspects of the broader social "integration" of such change. We thus reject the notion of technology as an external variable to which society and individuals, whether at work or in the home, must adapt.

In our First Reflections report, we emphasized the lack of social integration of the current European Information Society debate and criticized the often "technology deterministic" nature of much of the expert policy language and the room for policy action[19]. We claimed that the impression of a lack of public support for the Information Society was also a reflection of the "technology dominated" nature of the European Information Society policy debate. We continue to view this as our main contribution. Our group must illustrate that there are numerous social policy challenges associated with a future European Information Society; highlight that these transcend the simplistic notions of fast adjustment and adaptation to a technologically "externally" determined future where people have no influence or chance to participate in; and bring to the forefront the innumerable opportunities for engineering a European Information Society for us all.

Which we summarized as follows: "We are forced through international competition to adopt new information technologies as rapidly as possible. It is an illusion to think we would be able to govern the speed of such change. Consequently, the only relevant policy issue is one of liberalising and deregulating. Any delay would be extremely costly. At the social level, while there could be "local" employment destruction, the cost of such destruction is minimal when compared to the aggregate employment "price" rigid societies might have to pay in terms of loss of competitiveness when failing to adopt the new ICTs quickly enough. In other words, these employment losses have to be accepted as a minimal cost, outweighed by the positive global welfare impact of the IS and the employment growth in new areas." (First Reflections Report, p.2)

3. Building a European Information Society for Us All: the main policy challenges

We have, in this policy section of our Final Report, grouped the policy challenges around a number of characteristics which cut across traditional policy boundaries. Despite the innumerable analyses on the subject, it is still insufficiently recognized, in our view, that new ICTs embody a **radically different** set of characteristics for potential growth and development opportunities. These features represent, each in their own right, major policy challenges. We have listed ten such policy challenges: the particular importance of knowledge and skill acquisition; the changing role of public services; the emerging virtual value chain; the possibilities for decentralisation and the implication for work organisation; the increasing need to manage "time"; the implications of globalisation for employment growth and capital flows; the particular concerns of social exclusion; the potential to bridge geographical distance; taking advantage of European diversity; and last but not least the implications of growing transparency for democracy.

These challenges constitute in our view a broad agenda for policy action involving many actors sometimes at the local or regional level, other times at the national or European level. We present such a broad policy agenda, with only a limited number of specific recommendations, because we feel there is a need in the current phase of the policy debate for such a broad strategic vision.

A. Acquiring knowledge and skills

The transformation of the emerging information society into a truly "knowledge society" calls for a major effort by both the public and private sector in what we have described above as the essential "*complementary assets"*: training, education and life-long learning. While the new ICTs, and in particular computers, offer plenty of opportunities as new tools for learning at all levels of age, we believe a concerted effort is essential due to particular disincentives which increasingly operate with respect to traditional education and human resources investment in Europe:

- First, there is the simple feature of the greying of Europe's working population. A gap is clearly emerging between the rate of renewal of the working population (estimated at some 2% per annum) and the rate of knowledge acquisition in society at large (estimated by some as doubling every 10 to 15 years). Without additional training and learning over working life, the largest part of new knowledge acquisition will be concentrated in the next ten years in a minority of Europe's labour force. As the Green Paper *Living and Working in the Information Society: People First* puts it: "The workforce is ageing and the technology is getting younger." Acquiring knowledge and skills should therefore no longer be limited to formal schooling (basic, secondary and higher education), but involve all groups in societies: youngsters, middle aged and older people; people at all levels of professional qualification; people with a job as well as the unemployed[20].

- Second, knowledge acquisition, particularly in the emerging Information Society, is not a simple incremental accumulation process. In many information handling and processing areas such as, e.g. software engineering, the rate of obsolescence of knowledge is high. Knowledge acquired only ten years ago and not maintained has often lost much of its value. It explains why unemployment of people with qualifications, but outdated skills has become a characteristic of the nineties.

- Third, the increasing trend towards so-called "external" labour market flexibility, with greater mobility and transparency in labour markets, has undoubtedly made firms wary of investing in human resources if those investments are likely to benefit, in the first instance, other competing firms. The incentive to invest in general purpose knowledge and human resources has declined in many of Europe's largest firms. Countries and

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See amongst others Delors, J. *Learning: the Treasure Within*, 1996.

companies with high labour turnover tend to invest little in human resources[21].

- Fourth, the budgetary consolidation set in motion as part of the EMU budget convergence criteria has led many European countries to reduce the percentage of public spending on education and higher education research. This comes precisely at a time when such intangible investments are, as argued above, essential "complementary assets" for future growth and competitiveness in the emerging "global information society".

Consequently, the first set of recommendations focuses on the way new incentives could be set in motion to provide a major impetus for investment in skills acquisition, human resources and education. Such a major impetus on knowledge and skill acquisition ranges from direct public investment in new ICT equipment, and in particular computers, in schools and the education system more generally (not just in the hardware or networks) to public-private partnerships to design new maintenance and training systems. However, to be clear at the outset, while we consider such acquisition of knowledge and skills a necessary condition, we do not consider it a *sufficient* condition for employment creation.

RECOMMENDATIONS

1. Actively stimulating the acquisition of knowledge and skills

There is an urgent need to re-prioritise investment strategies in Europe in education, training and human resources and knowledge and skill acquisition more generally. This should consist of investment initiatives that combine public and private resources each with their specific responsibility and task, at the regional, national and European level. In addition, new policies are needed that aim at strengthening incentives for firms and individuals to invest in human resources.

a. Creating an education network

With respect to education, a major effort is needed to: link schools across Europe providing them with ICT equipment and preferential access; promote multimedia educational and training software development and production; and (re-)train and involve teachers in the design and development of such programmes. Such an effort will need to be a combined one, in which both private and public institutions provide resources and content. In so far as they are likely to involve the forging ahead of particular regions, there is a need for intra-European learning and catching up. Whilst national and regional policies will continue to vary, and be reflected in different educational policies based often on cultural diversity, we propose that a European Learning Agency and Network

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As highlighted by the OECD data from France and the US show a correlation between measures of tenure/turnover and training across industries. Roughly, training increases with employment stability, see *Employment Outlook*, OECD, July 1993, p. 148.

(ELAN) be established to promote and diffuse knowledge on leading edge applications of ICTs in areas of special interest to all-European education and training.

b. New financial incentives for training

With respect to training and human resources development, stronger incentive systems are needed at the level of the firm and individual through various support and valorisation schemes of private investment in the accumulation of such intangible assets. There is an urgent need to consider investment in immaterial capital such as human resources more fully as "real" capital outlays, reflected amongst others in the capital stock value of firms. We suggest that the Commission takes the lead in addressing questions related to linking lifelong learning financing to employment, as initiated by the OECD. As employees are more likely to change employers over their working lives, new forms of interactions are needed among higher education establishments, training organisations and individual firms. Maintaining and updating "human resources" will have to become the joint responsibility of both public and private institutions[22]. The new ICTs provide many opportunities for the development and expansion over full working life of "dual" training systems involving such close partnerships. At the same time, new ICTs provide opportunities for the development of training programmes addressing more specifically the needs of the less skilled unemployed, who might have special difficulties in acquiring computer literacy, and for all those groups that need to acquire basic ICT skills for use in the home, in a work environment or in public places.

c. Improving and diffusing knowledge on learning methods

With respect to lifelong learning, there is a need for more fundamental research on learning itself, including the ways in which ICTs affect learning. It is crucial to acknowledge that in the emerging Information Society, the learning process or the acquisition of knowledge will not take place at school or work exclusively. Learning through consumption, including entertainment, through communication, through interaction and more generally through social and other non-work activities, has increasingly gained in importance and often includes those general learning skills which appear essential in their complementarity with the more work related skills acquired on the job. Research should address questions such as: How do people "learn how to learn" instead of just remembering facts? What are the best methods to teach and develop the mastering of "cathodic" abstraction, virtual images, interactivity and fragility, including teaching those who "fear" the new technologies? We draw attention to the important distinction between these various forms of learning because we wish to emphasise that distance learning should not be a substitute for a school environment at the primary and secondary level. Schools serve functions of social and cultural development which cannot be attained by distance learning. General skills of communication, social integration and learning to use ICT itself requires the physical presence of most pupils and direct contacts with teachers and with each other. Collective learning and teamwork are often as advantageous as individualised learning.

d. Producing high-quality, low-price learning materials

One might think here of some of the ideas put forward by Europace (G. van der Perre, 1996, Higher education: matching the needs of the knowledge society with the tools of the IS, Dublin, People First Conference, October 1996) on the granting of degrees with "maintenance contracts" by higher education establishments.

The expansion of the education and training market requires governments to provide political and financial incentives to new operators in the field. This should combine a broad spectrum of learning and information materials, including news, entertainment, education, training, and other cultural and leisure activities. Access to high-quality, low-priced self-learning materials by all members of society is essential. However, in all fields of education and training, the costs associated with the conception and development of high quality self-learning materials are high: it is only through mass production that affordable final products can emerge. One should particularly avoid new exclusions emerging based on access costs to self-learning material.

B. The changing role of the public sector

As the previous case illustrates, the role of the public sector in the emerging IS as safeguarder of competitive forces, "creating the conditions in which investment, markets and services can flourish", but leaving the development of the IS to the private sector, as originally espoused in the Bangemann report (1994) and subsequently elaborated in many official EU reports, corresponds, in our view, to a too minimalistic approach of the role of public authorities in the future IS.

1. Regulating the emerging information society markets

Undoubtedly, governments play an essential role in safeguarding competitive forces in the emerging IS. The digital convergence between technologies for broadcasting visual images (television) and for the transportation of data and voice messages (telephony) raises some new fundamental regulatory problems. Typically, the creation, distribution and commercialisation of "information" involves many market failures, leading amongst others to market dominance and attempts at vertical integration between incumbents and new entrants across and in each of the various market segments: content creation, service provision, distribution network and hardware equipment producers. Regulating such a complex and moving field is a difficult undertaking. The Commission has played an important role in the telecom liberalisation process by removing many of the privileges of the monopolistic, national telecom operators and allowing competition in the provision of services over these traditional telecommunication networks. However, the question can be raised whether the Community regulatory approach and available regulatory instruments[23] are broad, capable and flexible enough to respond to current and future technological challenges of inter-network competition.

Already today, there is a clear trend towards increased horizontal concentration amongst the various market segments mentioned above encompassing the entire territory of the EU. To tackle these, as well as many other potential issues of market power abuse associated with the current broad convergence between audiovisual sectors and telecommunications, we would argue that the Commission should be granted extra power (e.g. for the promotion of "services of general interest", art. 3u) and that some transfer of regulatory power to the Community level will be required.

Directives based on Article 90(3) EC. Once the exclusive and special rights which Article 90(3) directives are designed to deal with have been removed, traditional competition policy provisions and harmonisation directives will have to be relied upon.

RECOMMENDATION

2. Coordinating regulation at the EU level

To tackle the many emerging regulatory issues associated with the digital convergence between information and communication technologies, there is an urgent need for the establishment of a European regulatory agency covering the broad spectrum of audiovisual content and service provision, distribution networks as well as more traditional telecom provision. Such an agency should be equipped with the appropriate regulatory instruments so as to become a real "safeguarder" of competition across the alternative information and communication networks throughout Europe. We argue in favour of the immediate setting-up of such an agency because of the rapidly increasing threat of market dominance and abuse in particular IC market segments; because of the way misconceived national regulation is putting a brake on technological development and ICT diffusion; and because of the way regulation directly affects the interaction between various IC market segments across the EU countries. Such a European (FCC-type) agency would imply that some regulatory power from national regulators would be transferred to the Community level. Today, increasingly, regulation policy must fully reflect the new international agenda formed by the emerging global information infrastructure.

2. Public information services: the new engine of growth in the IS?

Developing the appropriate competitive and regulatory framework is certainly an essential "enabling" role for governments. It is a prerequisite for an economically viable IS to emerge, -- as we argued above, the market will provide the essential conditions for the efficient "economic integration" of new ICTs. It is not however, a sufficient condition. To limit the role of the public sector to such an "economic" enabling role is, in our view, to grossly underestimate the role and importance of public agencies and services as information providers and information processors, in a multitude of economic, social and policy areas. We would rather view public services, in their broadest sense, i.e. including education, as one of the most promising engines of growth in the emerging European IS for the following reasons:

- First, as alluded to above, public administration, whether at a national or local level, is first and foremost an information service, often involving many private and public information features. This raises important questions about privacy, access and democratic control.

- Second, because the physical and human capital investments in such activities can often be substantial, such investments provide interesting opportunities for improved connectivity, standard setting, etc. Public administration might, in other words, take the lead in the IS given the high risks involved in investing in new, interactive information systems, and open up new market opportunities for private partnerships in the development, execution and maintenance of new information systems. Pilot projects could bring to the forefront the many organisational bottlenecks, and enable diversity at the local administration level. Such pilot projects, in the courtyard of government so to say, are likely to be much more promising in revealing more immediate solutions and insights into some of the practical organisational and local problems associated with the emerging IS. Again, this does not necessarily imply that these services must be provided by public authorities. Rather, the initiative should come from such authorities involving, where possible, partnerships between public administrations and private firms.

- Third, many of the areas we have focused upon: education, health, culture, media, are dominated by public authorities and public services providers. Many others, which we have not explicitly discussed, such as social services, immigration, police, libraries and many other local services, are all bound by the geographical limits of the country, region or town. Clearly, European, cross border inter-connectivity of such services is one of the greatest bottlenecks to intra-European mobility of workers and citizens. At the same time, it is one of the most promising areas for

European public procurement and new policy initiatives[24]. Within this context, we draw attention to the Delors' White Paper proposals for trans-european networks, providing the European information infrastructure backbone for such public information services[25]. Government as the leading edge customer could become one of the hallmarks of the emerging *European* IS and the major difference with US policy.

RECOMMENDATIONS

3. Public services as an engine of growth in the emerging IS

The wide variety of public information services provides a number of opportunities for information led growth, whereby such services might become the "killer applications" for new demand led growth. At the same time, the public sector can help to guarantee comprehensive and reliable information which has a high level of accessibility, user friendliness and affordability to all people.

a. Shifting public services from infrastructure to content providers

Rather than acting as an infrastructure provider, we view the role of public authorities in this area as one of *content provider*, opening up new market opportunities for private partnerships in the development, distribution and maintenance of new information systems while at the same time ensures that information is understandable and also available in a non-electronic form, provides insights into notions of user friendliness and addresses particular fears with respect to electronic communication in the public at large or amongst particular groups. We view the provision of such "public" services as the possible engine for new, local, information-led, employment-intensive demand growth creating on the one hand the minimum efficient scale for some of the new, upgraded, affordable information and communication infrastructures, while on the other hand, opening up the way for more market driven "private" services to emerge. Such an ICT-driven process of local employment creation corresponds in many ways to the "electronic" version of the personal services led "emplois de proximité" process suggested in the Delors' White paper and now in operation in many EU-countries. However, in contrast to such personal services subsidized employment creation, the proposed "electronic" version suggested here is likely to lead to more significant learning and re-skilling opportunities.

We look forward to the Green Paper on access to and exploitation of public sector information in the information society.

The Telecommunication 1996-1999 TEN allows for 250 MECU under B5 and some 720 MECU for content.

b. Making public services more effective: higher productivity leading to better service

The public sector as one of the most information handling and processing intensive sectors, provides many opportunities for new insights into some of the organisational problems and possible solutions involved in the introduction of new ICTs. These include internal organisational issues about how to handle the traditional bureaucratic control and accounting functions, as well as more general questions about information handling across different services and geographical borders. In many public services (immigration, police, social security and pension services, local services, etc.), the lack of intra-European information handling of such services appears to be one of the greatest bottlenecks for increased intra-European labour mobility and migration. Here too ICTs appear, at least at first sight, to offer many new opportunities. We propose that a range of pilot projects be established that cover a number of typical public services focusing on one particular issue and shedding light on some of the practical organisational and local problems associated with the introduction of new ICTs. Such pilot projects could illustrate practical ways in which public services could work together with enterprises to incorporate other private services such as electronic commerce or EDI. At the same time, we propose that the productivity gains made in public services following the introduction of ICTs be reinvested into the development and upgrading of other public, preferably local services, especially in education, health, environment, local and cultural sectors.

c. Public services as a model of service provision

The public service sector should be a model of service provision to the public: particularly in combining the utilization of access at a distance through communication technologies with the possibility of human contact for those citizens who desire. Information access systems must be developed that are adapted to the needs of the entire population. In other words, information access systems at a distance must be user friendly, guarantee access to all, grant access to public records or individual enquiries, etc. In addition, the possibility of direct access through human contact is critical to ensure that no one is excluded.

3. The case of health services

Many benefits from ICTs and related technologies for the development of health services are foreseen, including among others, the collection and analysis of health information, the identification of risk groups, better availability of services, new tools for health education and health information, the expansion of health services to remote and under-served groups, support for citizens' own activities for health, etc. The cost impact of ICT on the health sector is not excessively positive in view of the amount of absolute investment, but the cost-*effectiveness* is expected to be positive, i.e. the coverage, availability and quality of services can be improved with relatively reasonable costs.

Wider introduction of ICT-based technology to the health sector is thus justified and should be encouraged in view of improving availability, coverage and quality of services. When implementing such technologies in the health sector, feasibility, safety and cost-effectiveness of ICT should be assessed and ensured as well as the ability and competence of health sector personnel and other users, in the use of the new technology. Due concern needs to be given to the protection of confidential health data in ICT-based systems, as well as to the requirement of reviewing ethical codes of health professionals in light of ICT-based health practices.

RECOMMENDATION

3d. Improving health services

The possibilities provided by ICTs and tele-medicine in particular, should be used as effectively as possible to better prevent health hazards, to promote health and to improve coverage, availability and quality of services to all and particularly to under-served groups, such as people with special service needs, including the chronically ill, disabled and elderly, and to the groups not covered because of poor socio-economic situations or unemployment. The coverage of health services within Europe is not complete; variation among countries is found both in the quantitative coverage and in the content and quality of services. The need for training and education of potential users of ICT-based self-services requires consideration in order to prevent exclusion of otherwise potential users. The services should also be designed to encourage and support citizens' own activities for their own and families' health interests. Such activities need support in the form of health information, health education and counselling, training material and self-care instructions which all can be effectively provided with the help of telematic services and multi-media. Appropriate measures should be undertaken to ensure reliability and to protect confidentiality of health data and information in the ICT-based health systems. The ethical codes for health practices should also be reviewed.

C. Exploiting the virtual value chain

A major feature of the emerging IS is the shift in value towards immaterial production and consumption, sometimes also referred to as a trend towards "dematerialisation". Such a shift in value is characteristic of the process of technological change in the storage, handling and memorisation of information and communication, i.e. in the ICTs themselves. It is not yet characteristic of the way we manage immaterial production and consumption, which continue to be based on out-dated and biased industrial concepts and measures.

1. Measuring immaterial production

ICTs play an essential role in what has been called the "codification" of knowledge[26]. In contrast to codified knowledge, tacit knowledge refers to knowledge which cannot be easily transferred because it is has not been stated in an explicit form. As argued above, skills are one important kind of tacit knowledge[27]. The most important impact of new ICTs is that they shift the border between tacit and codified knowledge. It becomes technically possible and economically attractive to codify different types of knowledge which so far have remained in a tacit form. In material goods, this embodiment of codified knowledge has been characteristic of the dramatically increased performance of many new capital and consumer goods, incorporating new electronic information and communication devices. The resulting quality and performance improvements of these high-tech electronic consumer goods has been accompanied by sometimes significant price declines: the computer being undoubtedly the most dramatic illustration of this double impact of rapid technological change and codification. Such an impact can be described as a "technology value paradox": a more and more codified knowledge gets "embodied" in such goods, nominal "value" appears to evaporate.

In services, by contrast, while the codification of knowledge will make such knowledge more accessible than before to all sectors and agents in the economy, its immaterial nature will imply that the codification process will never be complete. The codification process will rarely reduce the relative importance of tacit knowledge in the form of skills, competencies and other elements of tacit knowledge, rather the contrary. These latter activities are the ones that will become the main value of the service activity: the "content". While part of these services might be based on pure tacitness, such as

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The latter implies that knowledge is transformed into 'information' which can either be embodied in new material goods (machines, new consumer goods) or be easily transmitted through information infrastructures. It can be best described as a process of reduction and conversion which renders the embodiment or transmission, verification, storage and reproduction of knowledge especially easy. See amongst others Foray and David, *STI Outlook*, OECD, 1995 and *Technology, Productivity and Job Creation*, OECD, 1996.

The skilled person follows rules which are not known as such by the person following them. They are linked to activities acquired through learning but often of a non-routine kind.

talent or creativity, the largest part will greatly depend on continuous new knowledge accumulation - or learning[28].

The shift in value from manufactured goods embodying increasing amounts of "codifiable" knowledge towards service based "tacit" knowledge activities is typical of the emerging IS. It raises some fundamental issues about where "value" is being created and how it can be extracted, as well as by whom and how it is distributed. There is a strong presumption that much of this value is currently unaccounted for; it "evaporates", at least in its monetary form. The policy challenge raised by the IS is in this context a formidable one: it questions the material based accounting systems of most of our economic measures along with the increasingly "blind" policy making dependent on increasingly unreliable industrial based economic indicators. Furthermore, it raises fundamental questions about the way the benefits of the new technologies are being distributed throughout the economy or throughout society. Some of these benefits are fully accounted for and captured in increased sales and incomes, including tax incomes; others are not appropriated effectively and the newly created wealth evaporates as a non-monetized social benefit.

RECOMMENDATION

4a. Measuring intangible performance

A reassessment of the indicators used for economic policy-making purposes is urgently needed. At a time when both policy makers and markets appear to rely more and more on such apparently "objective" economic performance measures, there are severe questions which can be raised concerning the measurement bias implicit in the reliance on material production in constructing such measures[29]. This includes attempts at a more correct measurement of "real" inflation and "real" output growth, taking more fully into account ICT based quality improvements, as well as the rapidly growing number of information products and services.

This will typically be based on the spiral movement whereby tacit knowledge is transformed into codified knowledge, followed by a movement back where new kinds of tacit knowledge are developed in close interaction with the new piece of codified knowledge. Such a spiral movement is at the very core of individual as well as organisational learning.

See amongst others "Is Inflation Dead?", The Economist, September 28th 1996 and "Towards a More Accurate Measure of the Cost of Living", Final Report to the US Senate Finance Committee from the Advisory Commission to Study the Consumer Price Index, December 4th 1996.

2. Removing obstacles to electronic consumption

The growing convergence between manufacturing and services, coupled with the fact that service activities correspond on average to two thirds of economic activity in EU countries, have made services appear increasingly important in their own right. In fact, in a growing number of areas, services dominate manufacturing rather than the other way around. In particular, the emergence of ICTs and their impact on the "tradeability" of many service activities, have helped the latter to emerge as "core" value added activities. However, it is obvious that much of the expected growth potential of new services has been particularly slow to emerge within Europe. Many studies (McKinsey, 1995, OECD, 1996) emphasize the restrictive regulatory framework, often preventing the emergence of new ICT-based services in Europe. While not disagreeing with this viewpoint, we nevertheless emphasize here some of the intrinsic problems linked with the exchange of information goods and services.

Substantial barriers exist for producers **and** customers to use online-services for electronic commerce purposes. For firms there remain crucial issues related to security, privacy and encryption. In practice the level of robustness and reliability of ICT-systems leaves much to be desired. Systems can be unreliable because of technical failures, environmental hazards and invasion by determined crackers and hackers. One cannot yet fully assess the economic and social risks associated with such threats. The increased choice and availability of goods and services through information networks clearly increases consumer surplus. It provides consumers with more opportunities to acquire goods and services at competitive prices and to do so when and where they choose. But here too substantial barriers exist: for one, consumers will have to invest in a service without knowing the value of it. The value can only be judged after the customer has used the service. In other words, the new services are 'experience goods'. Currently the highest growth rates are therefore in sectors where the customer does not have to learn and where a traditional product is replaced by a new one[30].

Just how to create a flexible and safeguarded economy of information sharing and electronic transactions is not well understood for all sectors, goods and services. Whilst some sectors, particularly the financial services, are a long way down this road, they nevertheless experience many problems developing new electronic products and services for lack of a practical understanding of how the information should be regulated and by whom in order to promote maximum confidence in the new world of on-line electronic commerce.

[30] Such as the tape by CD.

RECOMMENDATION

4b. Creating confidence in electronic commerce

We propose that the work of the various groups[31] set up to deal with information security, privacy, intellectual property as well as potentially harmful and illegal content of on-line services be synthesized and their implications for SMEs and consumers be drawn out. There is an urgent need for action in this area creating more flexible and dynamic systems of procedures, codes, standards, regulation and self-regulation. The aim should be to increase confidence in the IS on both the producer and consumer side by reducing and codifying the risks of sharing information and ensuring fair trade in electronic markets for information. In particular, the effectiveness of existing EU initiatives that encourage SME participation in electronic commerce should be assessed. Gaps in the provision of effective infrastructures for SME training and technology transfer need to be identified and filled. It is important that SMEs have the opportunity and expertise to foster electronic linkages with their trading partners which meet their own needs, and fit with their own information handling procedures, rather than having inappropriate systems imposed upon them by trading partners who are larger, more powerful or have more IS expertise.

such as the working group on illegal and harmful content on the Internet as well as the communication on electronic commerce to be discussed at the interministerial conference "Global Information Networks: Realising the Potential" to be held in Bonn in July 1997.

3. Managing abstraction

Many questions can be raised about the impact of a generalization of abstraction on our lives. Human activities will increasingly be based on representations of reality, rather than on reality itself. There are significant advantages to this evolution, but there are also risks. Virtual life is not real life and the representation of reality is not reality. There is concern that the abstract nature of much ICT use leads to a similar abstraction of reality.

RECOMMENDATION

4c. Mastering the impact of virtuality

There is a need to gain a better understanding of the effect of "virtuality" on people's lives. As more and more activities at work, at home, or at leisure are becoming abstract-based, questions can be raised about the overall social impact of such generalized abstraction. More generally, investigation into the many diverse personal consequences of ICTs, not only in terms of their design but also in the ways in which they are used, is urgently needed. The aim should be to identify guidelines for the design and implementation of anthropocentric ICT systems and to raise the general awareness of the need to consider the social context of ICT use in the home, in the community and at work. Another aim should be to identify how ICTs can reinforce conviviality and avoid isolation.

D. The changing nature of organisations and work

A particular feature of the new ICTs is the increased flexibility and transparency they highlight in the way firms are organising production and the costs and benefits of particular forms of organising work. The IS has often been identified with new, more flexible and decentralized forms of work organisation, including new opportunities for self-employment (as exemplified in the concept of micro-businesses), the downsizing of large firms with a trend towards the outsourcing of particular functions and activities, as well as with new forms of work at a distance, so-called telework[32]. Such changes in the organisation of activities do not only raise questions with respect to organisational change and changing work patterns, but also raise policy challenges with respect to the traditional organisation of labour markets, their institutions and negotiation between employers and employees.

1. Towards the "flexible" organisation

Over the past twenty years, many European firms have made considerable investments in new technologies. However, for much of this period, widespread diffusion of technologies has not been accompanied by increases in productivity, and there is increasing evidence that the application of new technologies alone is insufficient to secure such benefits. Thus, many European firms have been unable to improve their competitive position to any significant extent. Instead, they have tended to make partial modifications to their working arrangements, leaving the overall organisation of work unchanged. Indeed, it has been argued that industrial and public policy in Europe has for too long been preoccupied with 'technical fixes'.

As we already argued above, purely technological visions of 'organisations of the future' have clear limits. Costly mistakes have been made by organisations which have spent large sums of money on high technology systems, without realising the importance of their human capital. More than ever, organisations have to rely on highly skilled and motivated workforces, and on their co-operation. Only through a coherent and interactive innovation process can the benefits of implementing new technology be derived. In tandem with the introduction of hardware and software, organisational structures and practices need to be reviewed, so that innovation becomes an integrated process involving technological, organisational and social arrangements.

To benefit from their investment in new technologies, European firms need to address not only the technological environment within which they operate, but also their relationships with suppliers, customers and other trading partners, systems of production, physical arrangements of machines, and the utilisation and development of

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For a detailed overview, see Castells, M., *The Information Age: Economy, Society and Culture. Volume I: The Rise of the Network Society*, Oxford: Blackwell, 1996.

labour and of skills. Organisational change in the IS should therefore ideally consist of a set of closely-related developments in the structure of firms, in production and work processes, in labour and in skill requirements, and in technological systems. Here, we wish to re-emphasize the importance of considering these developments in totality, and give voice to concerns about strategies which focus purely on the implementation of new technologies and ignore their organisational contexts. Such strategies are not only ineffective, they are also very costly.

In this context, it is clear that ICTs have the potential to improve processes of innovation within organisations. To date in Europe, firms and organisations have tended to concentrate on productivity improvements at the shop floor level. ICTs can, however, also support improvements elsewhere in the value-added chain and promote product innovations with closer linkages between R & D and manufacturing. This particular feature of firm behaviour could well explain the difference at the more aggregate level between European and US productivity growth, product innovation and capital/labour substitution.

ICTs not only facilitate the development of new forms of work but also alter existing forms of work and work organisation. Here too, efficiency and the ability to innovate cannot be improved through isolated modifications to work organisation. To be successful, elements of a flexible work organisation such as staff versatility, training, flexible hours, new pay systems, more team work, and flatter hierarchies, must be embedded in the broader structures of the firm. Any changes, including the introduction of new ICTs, are only sensible if they are consistent with the overall situation and conditions of a firm.

Somewhat paradoxically, however, the importance of person-to-person communication requiring physical proximity has not necessarily declined in the working world. Rather the contrary. New approaches to management stress the importance of inter-personal communication while the decentralisation of responsibilities have increased the need for direct communication.

RECOMMENDATION

5a. Collecting successful case studies of organisational innovation

The EU should further collect evidence on successful case and pilot studies of organisational innovation. Such case studies, showing how ICTs impact the structure of firms, should cover a wide range of industrial sectors, including some of the new cross-sectoral activity areas, as well as include how internal IT networks change company communication and how employees and their representatives can use these networks for communication amongst themselves. In particular, we look forward to the forthcoming Green Paper on work organisation.

2. Coping with outsourcing

With the new ICTs, communication can take place in "real" time and over vast distances offering new opportunities for outsourcing. Virtually all companies are reviewing their range of activities and transferring certain activities to outside suppliers. There are several reasons why firms choose to outsource: some companies form strategic alliances, some concentrate on core activities, and some exploit cost-differences between in-house and external production. In the emerging IS, outsourcing will undoubtedly be a major growth factor for new specialised firms with a highly specialised workforce. However, some suppliers have been downgraded to mere suppliers of parts. Competition from low-wage countries are seriously threatening the viability of such organisations. Small and medium-sized suppliers are under particular pressure, and will only survive if they develop expertise as partners in the production and development of new products and services. Such strategic expertise can be developed through cooperative relationships with other firms thus allowing them to free themselves from "electronic hierarchies" by building up their own networks. As argued below, organisational and technological innovation by SMEs is highly dependent on support within the region, through for example, training or technology transfer centres.

In the course of the outsourcing process, employees are sometimes faced with a choice between dismissal without compensation or acceptance of their new self-employed status. In the latter case, the self-employed status is often merely illusory as workers have no opportunity to organise their working time and means of production. Almost all social legislation (regulations on working time, health and safety at work and social security contributions) is based on the notion of "dependent" employment.

RECOMMENDATION

5b. Handling outsourcing

There is a need to examine in greater detail the relationship between outsourcing and ICTs. The objectives should be to:

- promote a higher level of awareness and debate over the challenges and opportunities of tele-mediated outsourcing;
- analyse with documentation, the different experiences in industries which have pioneered ICT-based outsourcing, such as the automotive sector, as well as in the more recent case of services;
- develop best practice models of the design and implementation of material flow systems to sub-contractors which are both highly productive and are accompanied by acceptable working conditions in supplier firms;
- create good conditions of work and pay in SMEs by supporting projects which enhance their independence and profitability through the establishment of tele-mediated partnerships and non-hierarchical electronic data interchange systems;

- discover ways to increase the quality of working lives for the new breed of externalised self-employed, through an expanded scope of labour and social legislation.

3. Flexibility and security

Flexible work patterns, such as part-time work, working at or from home, self-employment, fixed-term and temporary employment, outsourced work, and work relocation across borders and flexible employment contracts are becoming increasingly prominent in the shift towards the IS. While many forms of flexible working patterns have significant potential benefits for both employers and employees, there are, however, limits to flexibility, including physical health limits. Flexibility of work organisation for the firm may, e.g. signal insecurity of employment and working conditions for the employee. It might also lead to new forms of occupational health risks, such as mental stress. The implications of such new forms of employment for the security of employees, both in the sense of employment "tenure" and occupational "safety", will have to be carefully assessed. In particular, the effects on the human development prospects of female employees, for whom the growth of flexible employment has been particularly significant, requires consideration.

Innovations and new schemes for encouraging the establishment of new types of firms, and particularly of small firms and micro-businesses are emerging. As these sources of employment develop, there is a need to consider their implications in terms of employment status. The social security, legal, and health and safety status of many newly-growing forms of employment is uncertain, but it is particularly ambiguous in the case of the self-employed. In some countries of the EU, moves are being made to clarify the status of the self-employed, either by making it incumbent upon employers to demonstrate that the people who work for them are not direct employees, or by treating them as employees unless they are registered as self-employed.

These issues of status need to be clarified across the EU. Labour and social security law may need to be extended to cover self-employed teleworkers, or alternatively legislation specific to them may be necessary. It is not yet clear how this balance will be achieved, and the precise nature of the equation still has to be elaborated. Nevertheless, one of the major priorities of EU policy, through its Structural Funds, must be to develop systems of employee protection in the context of flexible systems of work organisation.

RECOMMENDATIONS

5c. Towards security in flexible work

A balance must be reached between employment and employee security. In particular, new forms of contractual relationships, employment protection and worker participation need to be explored. Investigations need to be made both by the European Commission and by the social partners within and across member states. Their findings, together with the report of the European Parliament on the Reduction and Adaptation of Working Time, should be used to inform Commission policy in this area.

5d. Dealing with the new occupational risks at work

There is a need to adapt ICTs to the worker at the workplace and not the other way around. More broadly, there is a need for integrating more fully the many occupational mental health and safety aspects into the design and implementation of ICTs to any workplace, including the home, in order to facilitate the smooth adaptation to the change in work that is associated with such implementation. In implementing ICT-intensive work patterns, ways should be found to fully use the current research knowledge on occupational health and safety, including the data on work organisation, ergonomics and the psychology of work. Furthermore, the principle of participation should be duly considered to facilitate the implementation of ICTs. The earliest possible involvement of users (and in some cases, clients) has been shown to substantially improve the acceptability and productivity of ICT usage.

4. The IS and different forms of "teleworking"

Teleworking is perhaps one of the most widely discussed emerging forms of work organisation in the IS. Teleworking is based upon the use of ICTs and can involve working from home and from a conventional office, mobile working using portable technologies or working from a teleworking centre. Teleworking offers many new opportunities. The Commission has, in recent years, undertaken a range of activities promoting the development of telework. However, as this is one of the major forms of new work modes which will be established in the IS, concerted action should be taken to make sure that these new forms of work are encouraged within a framework which reduces as much as possible the negative aspects of telework.

In general, we would like to see a much higher quality of debate on teleworking. The process of re-examining the legal and social protection basis of teleworking should be conducted in such a way as to raise the general awareness of teleworking. This awareness raising should have the aim of making sure that potential teleworkers and managers know better the pros and cons of the different forms of teleworking.

Although various forms of teleworking are already developing without any special promotion, environmental considerations as well as the need for coordination of a wide variety of local, urban, regional and national initiatives, are likely in the future to require more systematic policies for the growth and promotion of telework within the EU. General government policy "push" strategies or the setting of quantitative objectives are, however, unlikely to be helpful. In the end, the development of teleworking will depend on the initiative of enterprises and individuals. The Commission can at best help with experiments illustrating the particular modalities, and in particular pointing to the importance of (re)creating local social human networks, involving the social partners concerned.

RECOMMENDATION

5e. From promoting to socially integrating telework

We call for the updating of regulatory systems to extend to teleworkers, particularly those who are self-employed, providing the same protection as that of workers in traditional workplaces. Legislation should make it possible to consider various forms of teleworking - both at the company and employee level - on a neutral basis. Collective agreements should be extended to telework, and the solidarity of teleworkers, particularly home-based teleworkers, should be reinforced, through innovative forms of collective organisation. The convention and recommendation on the protection of workers in home-work of the International Labour Conference 1995 should be considered. This should be examined as a potential model for European guidelines. We thus recommend that the EU document "best practice" of collective bargaining and of practical experiences. This material should be presented to the Social Partners in the Social Dialogue.

We would like to see a detailed assessment of the numbers of men and women currently involved in telework, the activities they are engaged in, the skills required and the social consequences. Such assessment should lead to concrete proposals for preventing particular groups (e.g. women) from being concentrated in low-skill activities and to more consideration as to how training requirements are met, particular in the context of lifelong learning.

5. Negotiated change

Social dialogue in the IS will be important in achieving a fair and sustainable balance between the interests of workers and the interests of management. The main areas in which such balances have to be found concern directly many of the subjects discussed above: the changing work roles and skills required of employees in the IS; the introduction of more flexible employment patterns; and, participation in the implementation of ICTs. Effective social dialogue is essential if such changes are to take place smoothly and with mutual satisfaction. We view social dialogue not as a cost which firms have to bear, but

as part of the process of working out approaches to technical and organisational change which seek to enhance working lives and firm performance at the same time.

Collective agreements will continue to be vital in the IS. Such agreements are a necessary counterweight to the increasing individualisation of contracts. Individual contracts may be more in line with the new flexible work patterns of the IS. However, individualised agreements can reduce solidarity amongst workers and make it hard to establish a clear idea of what constitutes "best practice". Collective agreements, therefore, provide a valuable framework within which individual arrangements can be viewed, although their role will shift as new forms of work and working practices become more widespread.

RECOMMENDATION

5f. Social dialogue in the IS

As the IS develops it is important that the Commission stimulates and supports community-wide social dialogue so that joint efforts can be made to overcome the negative effects of the changes in the structure of employment and labour markets. Employee participation and consultation must be central to the process of structural and organisational change.

We believe that employee participation, not marginalised representation, should be a key element in the emerging IS. In addition, improved communication, central to our vision of organisation change in the IS, requires improved processes for keeping employees and their representatives informed. To this end, ICT facilities must be made available to employees allowing them to communicate with management and with each other.

E. From time to work to time to live

One of the most distinguishing features of the current ICTs is their enormous potential for the rapid transfer of digital information. This opens up many new opportunities for more flexible production and quicker responses to changes in demand. In some service sectors the speed of response has become the essential ingredient of economic value[33]. In other sectors, interactivity, facilitated by digital communication, has created new trading opportunities. Time is also needed to develop and maintain human capital: workers will need more time for retraining. "Time" has become, more than ever before, a crucial and scarce "production factor".

But time has unfortunately none of the traditional characteristics of a simple production factor. Time cannot be "accumulated", it cannot in any real sense be "saved". Time spent today is lost for ever. It explains why contrary to the simple "rational" economic view, that as time is used more efficiently at work or in the home, people will be better off, every minute of "saved time" allowing them to produce or consume more, there could well be increasing evidence of a "time paradox": as people have effectively more time available, living longer and working less, there is an increasing impression of time pressure and shortage.

The new ICTs certainly contribute in a significant way to this time paradox. Whether it is at work or at leisure, in production or in consumption, traditional patterns of time use are being challenged raising fundamental challenges for society, economic activity and for the individual.

1. Time to Work

In sectors dealing with the production, transportation and distribution of material goods, new ICTs allow for a reduction in the time/storage dimension between production and consumption. Many of the most distinctive characteristics of the new ICTs are related directly to the potential of the new technology to link networks of component and material suppliers, thus allowing for reductions in storage and production time costs. In addition, certain activities can be outsourced to places far removed from the assembly or final point of production. In transport and logistics, the new technologies facilitate more efficient usage and flexibility in the delivery and transport of goods. In distribution, the increased flexibility associated with the new technologies allow for a closer integration of inventories with demand, thus reducing the firm's storage and inventory costs.

The speed of response for a firm like Reuters is said to be within the time slot of 6 seconds.

But, the new ICTs do not only tend to restructure the old traditional forms of production; they also question the accepted conventions of place and time of work. The nature of work and its role is likely to undergo major changes. Although the nature and extent of these changes varies markedly from place to place, the general dimensions are an increase in part-time work, an increase in the unpredictability of working hours, an increase in 'casualised' forms of work (temporary or fixed term contracts, etc), increasing participation of women in work, and a decline in the expectation of a career for life.

On some dimensions the increased use of ICTs both increases the salience of these trends and provides scope for new policies to improve the integration of working life into the rest of our lives. For instance, the much more rapid rate of obsolescence of existing skills is undoubtedly endangering the employability of older workers and might increase their unemployment rate. Those that have interruptions to their careers, most often women, find it increasingly difficult to keep abreast of the fast changing skill requirements and often find themselves in peripheral jobs. An economy that is increasingly based on high quality products and services cannot afford to have an increasing proportion of the workforce in peripheral and atypical jobs. If this occurs, human capital is unnecessarily wasted and social cohesion is reduced, both of which we find unacceptable. Lifelong flexible work can increase the opportunities for learning to preserve employability and facilitate the reconciliation of work and family.

RECOMMENDATION

6a. Structuring flexible work time

Flexible working hours are needed to improve efficiency, increase job opportunities, promote life long learning and to reconcile work and family life. We encourage more proactive approaches to flexible working hours and believe that a set of measures can be found making flexible working hours attractive to workers and simultaneously widening job opportunities in a framework of negotiation. The EC should collect evidence on successful case studies and measures which include:

- parental leave schemes to reconcile work and family;
- job rotation schemes, sabbaticals, training leave, etc. to improve lifelong learning;
- best practice examples of annualized working time contracts;
- new types of work sharing, such as time off in lieu, for overtime, night and weekend shift supplements or temporary working time reductions to prevent redundancies;
- flexible working hours.

2. Time to consume

In contrast to some of the traditional sectors involved in the production and distribution of material goods, many services activities are characterized by a simultaneity of production and consumption. It is this simultaneity feature which has generally limited productivity improvements in such activities.

As we argued above, ICTs, almost by definition, will allow for the increased tradeability of service activities. By bringing in a time/storage dimension, information technology will make possible the separation of production from consumption. It is this latter feature which is behind the enormous new potential for the tradeability of communication and entertainment services reflected in the growth of multi-media. The fact that the 'consumption' of such services can take place at a different time than the production allows these services to be much more widely distributed.

However, contrary to the traditional 'time saving' nature of the sort of capital embodied in new manufacturing technologies, this postponed consumption of such services will become 'time consuming'. The new demand generated by ICTs does not only allow, in other words, more immediate communication and quick responses and interactions, it will often also require time-consumption ("chronophages").

RECOMMENDATION

6b. In search of time

The debate on the reduction of working time needs to be re-evaluated. The focus should shift from issues not only related to the distribution of work but instead concentrate on the increased time required to consume new ICT goods and services, including training and re-skilling. Despite the relative material affluence in our societies and the availability of numerous time-saving household equipment, there is still, in most households, a dramatic shortage of time (estimated at an average of some 20 hours a week) for non-work activities.

3. Time to live

The dramatic increases in the amounts of information available and the time required to filter through this vast information makes the management of time ever more important. According to most recent surveys, while patterns of consumption have not changed radically with the arrival of the new products, every choice seems to be more and more facing competitive pressure from alternative time uses. The time budget pressure is building up as all final commodities are put in balance with a variety of new enlarged opportunities. The time constraint is, at times, topping the budget constraint. Although a typical pattern for the wealthy, it seems now to concern a much larger part of society. One might think of youngsters having an increasingly difficult time to manage the time constraint between school education, home education, TV, multimedia entertainment, physical entertainment and contributions to household work.

There is little doubt that the possibilities of further mechanization and automation at work and in the home (washing machines, dish washers, electric household appliances) have, over the last two decades, reduced the amount of physical work and saved time, eliminated a number of un-ergonomic conditions and protected workers from hazardous processes and exposures with the help of remote controls. However, the new time pressures for doing things in parallel and for quick responses, often requiring a coordinated use of the sensory system, visual sense, fine psycho-motor functions of hand-arm systems, and most of all the human brain, bring about new forms of stress.

A major characteristic of the IS, which could be called the "screen and chair society", is the permanent utilisation of the cathodic video screen: at work, for leisure, in front of the television, for culture, banking, etc. The position "being seated on a chair in front of a screen to look at a virtual representation" becomes a quasi-permanent position for many, even those with physical problems, e.g. of backache. The overall trend is towards more sedentary lifestyles with less time for physical activities and with increased load to visual and musculoskeletal systems. If largely distributed among populations such immobile lifestyles, often associated with 'unphysiological' time schedules, may increase the risk of inactivity-related diseases such as obesity, musculoskeletal disorders and cardiovascular diseases. The potential health impact of non-ionizing electromagnetic radiations emitted by several ICT sources is not well established, but at present the risk is assessed to be extremely low. On the other hand, ICTs will enable the "activation" of people through health information and health education and can thus be used as a tool for health promotion.

The problems associated with such changes can be partially solved by using the results of research on human physiology and psychology. This would strengthen efforts for the development of anthropocentric technology and work organisation, instead of

'technocentric' ones. To achieve this, more effective consideration needs to be given to user needs and user opinions than has been the case thus far. It is worth noting that such consideration will not only have health and safety implications but will also affect the acceptability of new ICTs and the productivity of ICT investments.

RECOMMENDATION

6c. Living healthy in the IS

The potential two-sided impact of the IS on the population's health needs to be considered. ICTs and the Internet have started to change time budgets and even time rhythms of people. Such changes are comparable with those that occurred 40 years ago with the introduction of television. This has led to reduced mobility, to increases in sedentary life-styles and to long visits to computerised environments or the virtual world with possible adverse health effects derived from sedentary life-styles and over-loading of the sensory systems, ergonomic problems of VDU and information overload. Users should be effectively informed on such possible adverse health effects and provided with advice on the avoidance of such hazards.

There is also a need for a better understanding of the many ways in which new ICTs consume "time" and are making people "virtual" time dependent, such as:

- The implications of being constantly on call, the potential need to go off line at times and the right to restrict access at some times;
- The limitation and negotiation of intrusions.

More broadly, there is a need for integrating more fully the many occupational mental health and safety aspects into the design and implementation of ICTs to any workplace, including the home, in order to facilitate the smooth adaptation to the change in work which is associated with such implementation. In implementing ICT-intensive work patterns, ways should be found to fully use the current research knowledge on occupational health and safety, particularly including the data on work organisation, ergonomics and the psychology of work.

Many positive health effects should be fully utilized starting with better provision of health information, and new tools for health education and information, and self-care. Finally, it is necessary to investigate both the physical effects on health of the 'screen and chair' IS (stress, backache, migraines, eyes) and the possible gradual diminution of certain senses (touching, smell) linked to the intensive use of virtual images.

F. Globalisation

One of the most radical features of the new ICTs is their ability to provide fast, interactive and cheap international access. While it might be something of a misnomer to talk about a "global" IS in a world in which half the population has no access to public telephony, the trend towards worldwide access is intrinsically linked with the **ability** of ICTs to codify information and knowledge over both distance and time. In areas such as finance, where this process has been accompanied by an institutional liberalisation and deregulation process, this globalisation process has been most rapid and is nearly complete: financial capital has in essence become an internationally mobile production factor[34]. In traditional manufacturing production, the decline in communication and information costs has further increased the international transparency of markets, reinforcing the scope for international location. Finally, in areas such as services, new ICTs are often for the first time allowing cheap "global" access to low cost labour locations thus facilitating the relocation of various service "routine" functions and activities. Firms and organisations have come to discover the benefits of international differences in labour costs in areas hitherto limited in their international tradeability.

ICTs contribute in other words to economic transparency and, in so far as they bring to the forefront the cost advantages of alternative locations, to international capital mobility and international “outsourcing” of particular activities. Furthermore, and as argued at greater length under section C, ICTs have also affected positively the international access to information and "codified" knowledge. "Codified" knowledge, including the economic knowledge of markets referred to above, becomes to some extent available on a world-wide basis. While the local capacities to use or have the competency to transform such "codified" knowledge will vary widely, the potential for access is there. ICTs, in other words, bring to the forefront the potential for catching-up, based upon the economic transparency of advantages, while stressing the crucial "tacit" and other competency elements required to access internationally codified knowledge.

Combined with the significant educational efforts in many East European and in some of the large Asian countries, ICTs are representing a major global structural transformation. It is important in this context to emphasize at the outset that the benefits to the world as a whole of such a more transparent, borderless "Global Information Society" are likely to be significant. To some extent, the new ICTs correspond to the international

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For instance, cross-border transactions in bonds and equities have increased in the OECD countries over the last 15 years from 10% of GDP in 1980 to between 150 and 250% of GDP in 1995. At the same time the world-wide volume of foreign exchange trading has increased to a turnover of more than $1200 bn a day (BIS, 1996, Annual Report).

economist's dream of allowing a more transparent global world, in which economic incentives are allowing countries to converge more rapidly and bring about a more equal level of development at the world wide level. However, at the same time, the speed of this globalisation process is likely to raise some fundamental policy challenges, particularly in Europe. If dismissed as of minor importance[35] or as something which is out of national policy control, the process of globalisation will either become increasingly resisted with all the dangers of a more closed and inward looking Europe as a result, or alternatively result in the often weakest groups in the labour force bearing the brunt of the adjustment through dismissal or declining wages. Recognizing the policy challenge to Europe of the increased globalisation linked to the use of ICTs, implies on the part of policy makers an active search for ways and means to socially integrate the benefits of such a globalisation pattern, rather than use globalisation as a threat forcing society to adjust.

We draw attention to two such policy challenges which are in our view of fundamental importance to Europe: the implications for employment growth and the implications for national taxation and welfare systems.

1. Jobs in Europe and the emerging Global Information Society

The use of new ICTs are likely to lead to major changes in employment in Europe, especially in the service sectors and particularly in those sectors and occupations hitherto largely "protected" from automation or "informatisation". The service sector, which today accounts for more than 60% of total employment in the EU, has traditionally been "sheltered" from international competition and has acted over the '60s and '70s as the main absorber of employment displacement in manufacturing and agriculture.

Some studies have predicted significant new employment creation with the rapid diffusion of ICTs and liberalisation of telecoms[36]. While we have no a priori grounds to doubt such "guesstimates", we see no reason why Europe's dismal employment performance over the last six years, effectively a period of jobless growth, would to any degree suddenly be reversed thanks to the impact of ICTs. As *The Economist* put it recently, Europe's

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As is the case when focusing on actual foreign direct investment flows in and out of Europe, which represent only a small fraction of the globalisation notion discussed here and are therefore unlikely to be meaningful.

See Bipe Conseil, Les Effets sur l'emploi du processus de libération dans le secteur des télécommunications, Rapport Final, October 1996. Under the scenario of rapid liberalisation and diffusion a total gain in employment in 2005 of some 1.3 million is predicted in the EU. Under the assumption of gradual liberalisation and slow diffusion the total gain in employment is limited to 228,200. The possibly more realistic European scenario of slow liberalisation and diffusion has not been presented. One can only assume that the employment impact is likely to have been negative.

comparative advantage remains intrinsically in products and crafts of the past, its specialisation in strong-demand, high-tech sectors remains weak. To shift such comparative advantage to new ICT sectors will require a prolonged effort at reviving entrepreneurial spirit, creating amongst others the appropriate financial and tax incentive structures, and supporting the creation and growth of new SMEs in such new sectors. The Green Paper on Innovation[37] already highlighted the broad scope of these policy challenges.

The new ICTs actually provide plenty of new opportunities for new forms of employment: in high value, high skill occupations; in new, information intensive industries such as multi-media; in new micro businesses where creative entrepreneurship thrives; in new information-intensive jobs as well as in many more traditional person to person jobs focusing on some of the communal and caring aspects of work and non-work. Many of the recommendations made in the previous sections should be viewed within this context of enhancing the "creative" employment opportunities of the IS.

But for these new employment and growth opportunities to emerge across Europe there is, in our view, also a need for a clearly agreed upon, minimal common social framework in Europe. It cannot be that new ICTs, and the increased transparency in production costs they are likely to bring about, are first and foremost used to delocalise production or service activities so as to avoid social costs, including social security payments and other tax costs in some locations and take advantage of the lack of such provisions in other locations. Such social costs or tax evasion has little to do with comparative advantage. If unchecked, this is likely to lead to a vicious circle of downward "adjustment" in social policy in Europe, with member countries and regions competing against each other on such a downward adjustment process. Given the lack of any exchange rate adjustment in a future EMU, a downward social policy adjustment (with the added advantage of little inflationary pressure) would in effect correspond to the ultimate form of "negative" integration[38]: harmonisation by erosion. The failure to achieve agreement on a set of common minimal social policy standards, will lead, in effect, to the erosion of the various different social welfare systems in Europe.

These intra-European concerns about the social erosion impact of new ICTs are of course not limited to Europe. As noted above, the world- and sector-wide impact of ICTs is speeding up the pressures for structural change and "creative destruction". Again, it cannot be that the only progress made at the international level is in terms of

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The Green Paper on Innovation, European Commission, 20 December 1995.

As opposed to positive integration, whereby integration is achieved on the basis of new common rules.

liberalisation of telecom markets and the world wide elimination of tariffs, such as the recent Singapore agreement. The "global level playing field" needed for the global information society to emerge also requires adherence to some minimal social rules such as the seven "core conventions" of the ILO.

The monitoring and implementation of a social dimension to trade liberalisation is of course an issue which has been at the forefront of many policy debates and one which goes beyond the scope of our report. However, here too new ICTs offer opportunities for more transparent and easy to implement monitoring and controlling instruments. Indeed, why limit the advantages of transparency brought about by the new ICTs to producers?National consumers have over time become a powerful group in rejecting the manufacturing process or the materials used in a particular product by starting to call for explicit boycotts of such products. Firms on the other hand have become wary about the subjectivity of the information diffused by various pressure groups with respect to particular products. Just as this need for better, harmonized information has led to a wide-spread use of "green labels" on products, one might imagine that a similar set of information on labour and social conditions could become "codified" in some "social label" on products and services allowing consumers to make a more informed choice.

RECOMMENDATIONS

7a. Enhancing employment growth in the IS

There is, in the view of the HLEG, an urgent need: first, to coordinate policies aimed at reaping potential employment benefits from the new IS, from the many policy proposals for reviving entrepreneurial spirit to support for new SMEs; second, to make fast progress (e.g. within the IGC) and at least in line with EMU, on a common minimal European social policy framework. Such a framework would give member countries, under the principles of subsidiarity, the freedom to have/keep/develop their own more sophisticated social policies; at the same time it would set the minimum social European playing field. Failure to achieve progress on this issue within an increasingly transparent IS is likely to lead to the erosion of the many diversified European welfare systems and increasingly undermine European social and regional cohesion.

7b. Towards a "social" global playing level

While most international policy attention has focused on the need for global liberalisation of ICT products and services, bringing about more competitive, open and transparent markets, relatively little progress has been made since the Copenhagen Social Summit on the establishment, monitoring and controlling of a set of minimal social conditions. There is a need to revitalize this debate, using some of the possibilities for increased transparency allowed for by new ICTs in terms of consumer information on "social production" conditions. Just as global transparency is likely to benefit economic welfare in terms of a better international allocation of resources and cheaper prices, it might also increase *social welfare* bringing about an improvement in social and labour conditions.

2. National welfare and taxation systems and the emerging global IS

The emerging global information society not only makes international differences in traditional economic production factors, such as wages, more transparent, it also makes clear the international differences in direct and indirect taxation and social security contributions.

In a number of areas, such as electronic commerce, the question can be raised whether existing consumption or sales taxes regimes (VAT in the EU) are still fully appropriate in a global IS. Historically, the material goods which were distributed and consumed were traceable and taxable. With the emerging global IS, economic activity is becoming increasingly concentrated in immaterial global information transactions, some of which appear invisible and only part of which are detectable and in the end used or incorporated in material goods or services. There is at least a suspicion that parts of the productivity and consumer gains from the new information and communication technologies have "disappeared" into the global networks and are not reflected in lower prices or higher profits or wages[39].

The HLEG is of the view that more research should be conducted into the feasibility of adapting existing tax regimes or developing alternative tax regimes which are more in line with the global nature of the IS and the increasingly intangible nature of the goods and services exchanged. In areas involving electronic shopping with the physical shipment and trading of goods or services[40], existing forms of consumption taxation might still be appropriate, but in need of reformulation and/or harmonisation. In the case of immaterial information services being exchanged, where notions of value are difficult to estimate or to monitor, such a tax base might well have to become based on the intensity

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See our argument above about the evaporation of consumer surplus.

including the invoices for these goods and services.

of electronic transmission, as e.g. in the case of a "bit tax"[41]. Finally, in areas such as the international relocation of financial capital flows, there will eventually be a need for stricter tax haven clauses, if governments want to avoid the generalized and widespread use of tax evasion possibilities. In all three cases, governments could be confronted with a need to find new "tax collecting" intermediaries, carrying out the monitoring of information, goods and services, while preserving and guaranteeing the privacy of individuals. Even in the first case, the traditional role of the local retailer or wholesaler as VAT or sales tax collector is likely to become of much less importance.

European governments should be concerned by the "enabling role" of new ICTs for tax evasion. The tax revenues from income out of capital have already fallen significantly across the EU. In many European countries, significant consumption tax (VAT and excise duties) revenues could now also become eroded. At the same time many European governments are confronted with the fact that the financing of their social security system, which has so far been closely linked to employment through contributions from employers and employees, is also becoming undermined. Such contributions represent, in an increasingly global and economically transparent world, an employment tax reducing international competitiveness.

In each of these areas there is a need for reflection, research on alternative, as well as adaptations to existing tax regimes more appropriate to the emerging global information society and in some areas policy action.

RECOMMENDATION

8. Maintaining national government revenues in a increasingly global environment

There is a need to adapt taxation to the changing economic structure of the information society and the increasing importance of information transmission. In the internationally mobile IS, member countries will have increasingly to address the question of various forms of direct and indirect tax evasion. As goods and services, including financial flows, have become more mobile, the basis of national government revenues is becoming undermined in particular areas. While bilateral agreements between

[41] The proposal for a “bit tax” applied to all interactive digital services (Cordell, A. and T. Ide, The New Wealth of Nations, 1997) and based on a simple count of bits flowing over telecommunications lines follows directly from the "information highway" analogy. As in the case of the automobile, when gasoline or bridge tax is paid on physical highways, on the information superhighway digital traffic is taxed per unit of electronic transmission, e.g. a "bit". While the obvious difference is that in the case of the bit tax the compensation is not apparently related to some negative external effects such as environmental damage but to a simple broadening of the national tax base, it can be argued that the negative externality of "free information" such as the Internet could well be some form of "information pollution" and congestion.

member countries can help avoiding particular tax loopholes, in some areas, such as capital income tax, a more focused European approach is clearly needed. In the case of consumption (VAT) taxes, there is a need for more fundamental reflection and research on alternative taxation systems. The "bit tax" could be such an alternative, although its features and implementation aspects need more study. As our economies are becoming more and more characterised by the global production, distribution and consumption of intangible goods and services, it seems relevant to question to what extent our existing consumption tax systems are still appropriate.

G. "Including all": the cohesion challenges

The issue of what we have referred to as "inclusion" is central to the emerging IS. We associate inclusion or in more common Eurospeak "cohesion" with the extent to which any individual is able to participate in society.Whether rich or poor, at a distance or at the centre, one would hope that in a future IS individuals can take full part in the social life of the community. Ideally, the IS should help to reduce exclusion, not increase it.

In the Green Paper "Living and Working in the Information Society: People First"[42], concern is expressed that new ICTs will reinforce rather than reduce existing inequalities, with the risk of a two-tier society also becoming apparent with groups of information "haves" and information "have-nots".

1. Social inclusion

The issue of social cohesion in the emerging IS is a broad and complex one. ICTs have undoubtedly an important role to play in supporting more cohesive and integrated communities and providing opportunities to reduce the exclusion facing disadvantaged or peripheral groups. At the same time, however, many ICTs are still rather hard to use; social acceptance can only be enhanced through greater efforts to involve users in the design and implementation of these technologies.

There is nothing automatic in the way various individuals of different capabilities or different educational qualifications will access or are likely to respond to new ICT opportunities. The fear of increased social exclusion is very much based on the many problems "less favoured" groups (such as the handicapped, unemployed, elderly, and immigrants) are currently facing in their daily participation in economic activity. In a relatively "static way", this fear of increased social exclusion assumes that the current exclusion problems of these groups will remain by and large the same in the future IS. The optimistic view by contrast, focuses on those new ICT opportunities for the currently excluded groups and attempts to identify cases whereby ICTs might become truly "enabling" technologies allowing such groups to overcome their handicaps. What is not at issue in this debate, however, is that these latter opportunities are with a few exceptions not forthcoming simply through the market. "Excluded" groups, as the name suggests, do not generally form commercially interesting "consumer groups".

At the same time, the danger that the IS might increase *individual* isolation must be seriously examined, even though some evidence would point to new forms of conviviality and human interaction centred around these new technologies. The way that the virtual

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See further Green Paper "Living and Working in the IS: People First", COM (96) 389, 22-070196.

domain created by these new technologies alters our perception of concrete reality is, likewise, important. In both cases, more knowledge about the real effects of ICTs is needed, rather than more speculation.

In our view, it is essential that people, or groups of excluded people, should not be forced to adjust to the new technologies. Rather, the technologies must become more adjusted to human needs. The IS should not create new categories of excluded but instead should improve social integration and the quality of life.

RECOMMENDATIONS

9a. Increasing social participation

The various possibilities for increasing the rate of development and adoption of ICT applications to increase social participation and to improve the quality of life should be examined in more detail and must be actively pursued. In particular, attention should focus on provision or adaptation in those areas where the market is unlikely to meet needs. The involvement of the target groups in the design, development and implementation of technologies is critical, as is the participation by voluntary bodies and NGOs representing such groups.

9b. Avoiding exclusion/targeting specific needs

Particular policy emphasis should be directed towards those groups that currently face a high risk of exclusion and where the new ICT tools might provide opportunities for reintegration. One may think of the elderly, early and "active" retired people and the unemployed. However, before such major targeted policy actions are launched, the specific needs of such groups must be analyzed and better understood. In particular, adaptations to the education system are required which address their non-vocational interests and needs in adapting to the IS.

9c. Providing technological tools to social actors

To permit the participation of all in the IS, a dedicated effort must be made towards social actors. The Commission should encourage agreements amongst professional organisations and enterprises to facilitate the use of technological systems and company resources by employee representatives and in particular union representatives.

2. Enhancing employability

One of the particular features of the IS is that it has the potential to increase the accessibility of employment to sections of the community that are disadvantaged in terms of traditional workplaces and work systems. With the move toward an increased used of ICT, as with the introduction of any new technologies, there are, however, likely to be changes in winners and losers. Certain groups in society may have difficulties in attaining employment in the future IS. In general, there has been a decreasing demand for people with lower levels of skills, which is likely to increase as ICTs become more widely diffused. Other trends, such as the increased restructuring of organisations and involuntary early retirement, for example, will also contribute to the unemployment of certain groups. Action will be needed not only to reduce the impact of existing forms of exclusion, but also to create pathways to integrate people who are major potential losers. There are, of course, existing European funds, such as the European Social Fund (ESF), which could be redirected to address these "new" issues.

Recent reviews of active labour market policies question the impact of mass programmes of training and work experience on employability[43]. The evidence which is emerging indicates that these interventions have to be accurately targeted so that they meet the different needs of different groups. In particular, pathways to integrate less well qualified people need to be constructed which allow them to incrementally upgrade their skills so they can break through to long term employability.

As already discussed within the framework of Section 1, many employed people will also need help to maintain employability in face of the rapid change of technologies, the decline of many traditional sectors and occupations and the emergence of new cultures of work. Firms might have difficulties in upgrading workers' skills in time to remain competitive, and in many cases, people might need help to make the transition from old practices to new practices and from old to new technologies. As emphasized elsewhere in this report, the technologies get younger as the workforce gets older. The issue here is not simply the need for continuing, workplace based training, but a better integration of the internal and external labour market to improve the position of people in the labour market.

The ultimate, long term aim should be to create high performance labour market institutions which adopt a lifetime approach to employability and would mirror on-going attempts to create new systems of lifelong learning. Some countries are already

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See amongst others OECD (1996), Enhancing the Effectiveness of Active Labour Market Policies, May, mimeo and Fay (1996), Enhancing the Effectiveness of Active Labour Market Policies: The role and evidence from programme evaluations in OECD countries, OECD, mimeo.

emphasizing employment and training counselling at key transition points in people's careers. These systems should be provided in a more coherent and systematic way with a view to developing people throughout life so that they can meet the continuing demands for new skills which will typify the IS. Here the new ICT-based job matching services systems which are already being deployed should be encouraged as they will make an important contribution to openness and flexibility. However, new issues of access and equity are raised by the introduction of these systems and we emphasize the importance of the `human touch' in helping people to plan out their training and employment strategies. In the IS this guidance role is likely to increase, rather than decrease in importance.

RECOMMENDATION

9d. Towards an "employability focused" European Social Fund

In our view the European Social funds should play a crucial role in the coming Millennium by demonstrating how active labour market policies can adapt to the challenge of the IS. ESF will be needed to support experiments which aim to find out how the employability of different social groups (such as redundant workers, the long term unemployed, women returning to the labour market, older workers who are unfamiliar with the new technologies, under-qualified young people and so on) can be enhanced in the context of the IS especially as regards: the development of new forms of training and learning using the new ICTs; identifying emerging skill demands (which will include new basic levels of cognitive and social skills in addition to new technical competencies); introducing innovative ways to upgrade existing skills through training and work experience (especially through increasing the involvement of employers as partners in longer term developmental approaches to learning); and the further development and promotion of new systems of study and accreditation which are incremental as well as more open and flexible. In order to make sure that labour market interventions have a strong positive impact on employability, however, we call for systematic evaluations of existing IS-related active labour market policies, especially training and work experience interventions which are costly and not always very effective.

H. The death of distance

The "death of distance" associated with the new ICTs leads quite naturally to a focus on the new growth and development opportunities in regions which have hitherto suffered most from geographical development barriers. Within the framework of regional cohesion and the emerging IS, it is crucial to make the distinction between less favoured and peripheral regions. Analyses of and policies for both sets of regions seem often to be consolidated under the heading "regional cohesion". We believe that there is a clear distinction to be made between these two types of areas. Less favoured regions are regions which are confronted with major problems of poverty and development. Peripheral regions, on the other hand, have problems related to their geographical position. Regional policies must address the specific problems that less favoured and peripheral regions are confronted with.

As in the case of social cohesion, it is clear that in the case of regional cohesion, for both peripheral regions and less favoured regions, grasping the opportunities offered by the IS will not happen automatically. In order to access the benefits of the IS, a number of pre-requisites will need to be in place; the most obvious being access to information infrastructures. In the past, the "universal service" obligation (USO) or provision has been used in an attempt to resolve the problem of access to telephony. An "updated" version of USO allowing affordable access to all for advanced telecommunication services, will need to be designed. This has formed the centre issue of much of the policy debate in Europe. However, in contrast to past experience, the issue is now much more complex, given the rapid technological change in communication technologies and the increasingly liberalised framework within which new information services are being provided. The simple extension of USO to include the new IS technological possibilities, such as broadband to all premises, would not only be extremely costly, it would also be quickly outdated. There is, in our view, a need for an alternative, less technical and more functional approach to "universal service".

But the issue of liberalisation, and its possible countervailing impact on regional and peripheral development, will also need examination. In terms of policies for information infrastructure access, the differences between less favoured regions and peripheral regions are again relevant. Less favoured regions often have high population densities while peripheral regions often have low population densities. The information infrastructure and information use lag in less favoured regions is often an integral part of their development lag. The potential for catching up in information and communication infrastructure is often very significant; new entrants might be willing to invest because of the significant potential demand associated with high density areas. The ability to recover costs and make profits is often substantial. The lack of development of these regions does not imply that there would not be significant economies of scale advantages

which can be reaped. Liberalisation is likely to make much more transparent these potential scale and agglomeration advantages. Insistence on USO will, however, often undermine such commercial opportunities. Whereas connecting the central high density areas in an LFR might promise commercial opportunities, the additional obligation to universal service might well render the whole process unprofitable.

Peripheral regions by contrast suffer in the first instance from their geographical periphery situation. Here too the potential of ICTs to bridge distance could provide new growth and development opportunities. However, the active participation of these regions in a future IS will crucially depend on access and USO. Given their geographical peripheral location and the relative, low population density nature of such regions, taking advantage of the "death of distance" feature of ICTs will depend on the universality and quality of the information infrastructure available. Liberalisation will not necessarily help. New commercial opportunities leading to greater price and quality competition will focus in the first instance on those most commercially interesting activities - the "cherries" of little relevance to those regions. The importance of "universal access" differs in other words across regions. A generalized European directive on an extended USO is from this perspective unlikely to contribute in any real sense to regional cohesion. Rather regional policies should become much more focused on particular targets, hence increasing the efficiency of regional development policies.

RECOMMENDATIONS

10a. Towards a universal community service

Rather than getting lost in minimal technical standards, we would argue that the discussion on universal service has to get back to the "functionality" of the services and alternative technologies. As in other areas, we favour a much more socially dominated debate rather than the current technological one. From this perspective, there is a need to investigate in greater detail whether in order to avoid exclusion and preserve regional cohesion, the current notion of "universal service" should not be shifted in the direction of a notion of "universal community service" extending universal service provision to incorporate a basic level of access to new information services,[44] but limited in its universality obligation to educational, cultural, medical, social or economic institutions of local communities. Such a "community" USP concept would in effect mean a return to the historical notion of "universality" as introduced last Century in the US with the advent of the telegraph.

[44] This could be specified in functional rather than technical terms such as possibilities for electronic networking, data and mail interchange, access to new business and information services available world wide and in core regions. etc.

10b. Rethinking regional cohesion policy

More broadly, there is a need for a fundamental rethinking of "regional cohesion" policies within the framework of the emerging IS, from policies with respect to telecom liberalisation in geographically peripheral countries and regions to the development of programmes tailored to the specific needs of lagging regions. Community Funds aimed at regional development should become more focused, targeted to those areas/regions where the benefits of liberalisation are unlikely to filter through. Such funds should be used, in other words, as supporting demand-led regional policies filling in regional "black holes". In doing so, the regional policy would bring more clearly to the forefront the benefits of the increased transparency of costs in LFRs, particularly in the more densely populated areas, and become a more effective regional cohesion policy instrument, focusing its support on relatively narrow targets[45] for specific groups in rural or remote areas.

[45] As an example one might think of access to ISDN services in rural areas.

I. European diversity - taking advantage of the many emerging information societies

A full recognition of the importance of the social aspects of the IS implies to some extent the need for a much broader policy shift away from the old industrial scale advantages and regulatory harmonization needs associated with economic and monetary integration. Obviously, achieving the minimum scale advantages in the numerous information services and products will be an essential condition for the commercial success of many such services and products. The economies of scale in many information goods will often be even more dramatic and significant than in the case of manufactured goods. The lack of a harmonized European market in many of these services is a major barrier not just for the rapid diffusion of information services but also for the emergence of a competitive European multi-media industry.

RECOMMENDATION

11a. Developing a high quality multi-media industry

"Industrial" policy in this area appears, perhaps paradoxically, necessary for the development of a thriving European multi-media and "content" providing industry. Given the dramatic economies of scale in many of the most rapidly developing market segments, there is, we would argue, a need for "infant industry" support in this area. Contrary to old industrial policies, such policies should focus on an integrated approach which recognizes the need for a diverse and strong European production sector feeding into the distribution sector. The distribution channels might also need regulation at a sub-European level, to ensure that access to high-quality media is available across the whole Union. More generally, the rapid development of the media industry now calls for a rapid action plan in this area which should strengthen the competitiveness of European quality media products and, at the same time, strengthen the economic and cultural pluralism in the sector.

But the fundamental challenge of the European IS is undoubtedly the search for competitiveness based on cultural, educational and social variety. From this perspective, the emerging IS signals the need for a new, different economic integration process. This process no longer puts the sole emphasis on the need for the standardisation and harmonisation of products and services, access to "open" infrastructure, and

improved transparency of markets across Europe. Instead it recognizes and nurtures the many differences in tastes, cultures and talents[46].

The extent to which the IS can enhance the "productive" potential of Europe's enormous variety into competitive advantage is the central question that must be addressed in the coming years. In addition, the degree to which the size advantage of the more than 350 million inhabitants is not only translated into the satisfaction of common material and information needs at lower prices, but also into a productive creativity potential and communication and exchange needs of diversity and variety, is also central. For that reason we insisted on having this report translated into all European languages, including the so-called "lesser used" European regional languages.

RECOMMENDATION

11b. Nurturing multi-cultural Europe

A multicultural vision of Europe could be supported within the IS through the use of ICTs: as a focus for the cultural development; for the transmission of cultural ideas and artifacts; for fostering direct contact between diverse (and often widely dispersed) groups; for supporting the multilingual nature of European society. Cooperation with similar programmes outside of Europe might be pursued along with the obvious need to coordinate policies with international bodies active in this area.

Obviously, within the European Union, the region or local community is the natural place where variety can express itself most clearly. For this reason, we have emphasized the local and regional policy aspects of the emerging IS. It is not only because of the newly created potential for bridging space and distance associated with the new ICTs but also because the local community and region is the place par excellence where variety can be nurtured, enhanced and integrated within the global community. It is also the feeding ground for education and training institutions.

In the words of Sir David Putnam at the People's First Conference in Dublin, "A leading businessman was enthusing that the true value of the single market lay in its having brought together 300 million customers. Surely, I asked him, isn't the real value of the single market that it offers us new ways of making Europe a more productive society? Our long-term future is not going to be decided by how much we consume but by what we produce, the way we produce it and the extent to which the process of production includes the eighteen million of our fellow citizens who presently find themselves unemployed and therefore excluded both as consumers and as producers".

RECOMMENDATION

11c. Celebrating the local

A vital step in the reinvigoration of the spatial community is to promote cultural production and consumption at the local level. This is important as part of helping to reassert a sense of place and pride, to develop people's natural creativity (especiallyin remote or peripheral areas) and as an educational process. It is important, therefore, that when cultural services are devised that they counter, rather than reinforce, centralising effects. Once again, the natural place for cultural expression is in the public sphere, and policies for the IS should be avowedly committed to developing the public spaces and shared celebration of culture.

J. Transparency and democracy

The ability for increased transparency brought about by new ICTs is not limited to economic variables. It covers also many other areas, which we have grouped here under the heading of "democracy". We earmark two particular areas for policy attention and focus: the trend towards media concentration and the implications for pluralism and access to public information and the increased opportunities for much wider public participation in political decision making.

1. Media concentration

The media have always had an important role to play in supporting pluralism and openness of government. We are concerned, however, that the internationalisation and simultaneous concentration of the media could lead to a democratic deficit. The internationalisation of the operations of the media increasingly transcend the regulatory capacities of national administrations and the concentration of the media could lead to a privileged group of effective lobbyists and political actors being able to canalise the media and through that public attention. At the same time certain forms of media have evolved, such as the Internet, that foster the decentralisation of expression. Such developments allow an individual to easily convey a message or opinion to many others.

Public access to high-quality and neutral information is necessary to the proper functioning of democracy. Without unbiased news concerning affairs in the community, the country or the wider world, citizens cannot play an active part in the governance of society or make informed choices in elections. The information we receive, however, is not decided in a totally neutral and transparent manner. Ownership of the media is becoming more concentrated: one media conglomerate may control a variety of newspapers, television stations, news programmes, etc. With only a few organisations deciding what information viewers are exposed to and the lack of transparency about who owns what in the media, we are concerned that media concentration could be detrimental to cultural and political pluralism in Europe. The complexity of these issues raises the need for an organisation that analyses the new issues that are arising in relationship to the media, democracy and the IS.

Several EU countries have established legislation on media concentration: it is necessary to coordinate and harmonise such legislation at the European level to ensure, in the first instance, that competition amongst member countries is not distorted. The EU and the European Council are among the principal international organisations that could provide a forum for discussing such issues.

RECOMMENDATION

12a. Maintaining pluralism

To ensure that a pluralistic media picture is available, that freedom of speech is maintained and to strengthen the democratic debate within the EU, an independent European Media Council should be established. This body would have a number of roles including: observing developments in the media; ensuring complete transparency with regard to cross-ownership; promoting discussion and debate on topics related to the distinction among information, knowledge and entertainment, the media's influence on the young, and the impact and consequences of ICTs, such as for example the Internet, on media and political issues.

In addition, we support the draft media concentration directive in that it will help to allow member countries, despite trends in the internationalisation and commercialisation of mass media, to develop their media in their own language thus maintaining their national identity.

2. Including all: deepening a "democracy project"

ICTs create new opportunities for greater public participation in and awareness of the political process. There are already examples of on-line government in which the transparency of government procedures and accessibility of government officials are increased. The new communication technologies can make the polling of public opinion easier and, with care, more comprehensive. However, the best ways to implement such systems have yet to be identified and will vary from place to place given the different democratic traditions within Europe. There is even a danger that too much information and debate, especially if presented more as media speculation, could detract from the serious business of government to create a 'confetti democracy'. As we have said before with respect to the confusion between data transmission, inter-personal communication and the acquisition of knowledge, there is a danger of confusing "data transmission" and "public debate".

Within the new technologies, there is the potential for an enlargement of the democratic processes of decision-making. However, because of educational, financial and employment differences a social gap may emerge between those who are able to use the new technologies and thus seek out more information, and those who are not. Participation in social debate is dependent on accessing information. For this reason we believe measures must be taken to ensure that the less favoured groups in our societies have access to the information and services of the IS.

Access to information is not, however, enough. An essential task in the IS is to use ICTs to bring the government closer to all people and especially young people. The art of politics is often seen as remote, opaque and boring to young people. Yet, decisions that affect all our lives are made in these circles. Ways to make the democratic process more

transparent and vital in the eyes of the young are both desirable and necessary. In addition, the citizens of the EU need to acquire knowledge on how to best use the new forms of media. This process should begin at school allowing children and young people to be introduced to both the world of politics and the role of the media in opinion formation.

RECOMMENDATION

12b. A democracy project

In order to strengthen the democratic development within the IS, the EU should carry out a "democracy project". The objectives of such a project would be to understand how ICTs can:

- strengthen interactions between politicians and citizens and increase citizens' participation in political debates and decision making;
- gain a better understanding of how to approach in the IS issues related to human rights, xenophobia, social values, etc.;
- add to the knowledge and the transparency of the democratic process in both national and EU institutions.

Again we highlight here the need for a "community" universal service policy. This would ensure that all members of society have access to electronic information coming from public institutions or public service media. In addition, we suggest that education about the media be available to all members of society, especially the young. If properly introduced to the working processes of the media-sector, to the special kind of "edited reality" which all media presents, (picture-manipulation, electronic manipulation of texts, pictures and images), and to the difference between reliable and unreliable sources, then future generations will be able to use all kinds of media with a more developed sense of criticism.

4. Conclusions

As the previous section has illustrated, the Information Society signals more than a major change in the **technological** paradigm underlying our societies. ICTs have the potential to affect every aspect of the economy and large parts of social, cultural and political life. The policy challenges they raise are similarly pervasive.

In our report we have concentrated upon the specific challenges associated with this broad paradigm shift, not because we wish in any way to underscore the many opportunities the new technologies are likely to offer in terms of renewed growth and employment opportunities, but because the emerging IS raises major policy challenges: the sooner these are addressed the better. We strongly believe that these policy challenges transcend the simplistic notions of fast and quick adjustment and adaptation to a technologically "externally" determined future in which people have little or no say.

We hope that the vision presented here, with the list of major policy challenges which our societies face, will push the IS debate beyond the futuristic, expert descriptions of the possible new technological opportunities associated with new ICTs, and will help policy makers addressing the many and urgent new policy challenges.

5. Appendix - List of analytical chapters

The Use of ICTs in Large Firms: Impacts and Policy Issues
Mark Hepworth & John Ryan

Work Re-organisation
Gerhard Bosch, Karl-Heinz Rödiger & Hans-Jürgen Weißbach

Employment in the IS: Analytical and Policy Challenges
Pascal Petit & Luc Soete

Big Futures for Small Firms? SMEs and the IS
Mark Hepworth & John Ryan

Towards the Learning Labour Market: Labour Market Policy in the Information Society
Hanne Shapiro, Ken Ducatel & Teresa Rees

Gender and ICTs
Juliet Webster

Regional Development in the IS: a Review and Analysis
James Cornford, Andy Gillespie, and Ranald Richardson

ICTs in Education and Training
Gill Kirkup & Anne Jones

Health and the Information Society
Jorma Rantanen & Suvi Lehtinen

The Impact of the Information Society on the Media
Gabrielle Kreutzner

The Impact of ICTs on Democracy
Pierre Chambat

Home ICTs and the Information Society
Roger Silverstone & Leslie Haddon