

COMMITTEE FOR INFORMATION, COMPUTERS AND COMMUNICATIONS POLICY

**GLOBAL INFORMATION INFRASTRUCTURE--GLOBAL INFORMATION SOCIETY (GII-GIS)
POLICY REQUIREMENTS**

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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FOREWORD

The Meeting of the OECD Council at Ministerial level in 1995 requested the OECD's Committee on Information, Computer and Communications Policy (ICCP) to develop recommendations for policies that fully exploit the contributions of advances in technology in the context of Global Information Infrastructures -- Global Information Society (GII-GIS). This background report examines developments in GII-GIS and provides recommendations on policies. The report, while addressed to OECD governments, recognises that all social partners need to play an important role in the transformation of existing economic and social structures, and places importance on allowing the private sector to take the lead in the economic and commercial development and implementation of the GII-GIS. The report also recognises that the development of a global information society can help government contribute to further enhancement of public goals.

The report was approved by the ICCP Committee at its meeting on 27-28 February, 1997 and subsequently Ministers endorsed the recommendations at the meeting of the Council at Ministerial Level on 26-27 May 1997 and recommended that the report be derestricted. The report was drafted by Dimitri Ypsilanti of the Directorate of Science, Technology and Industry and Louisa Gosling (European University Institute, Florence).

1. INTRODUCTION

“The smooth and effective transition towards the information society is one of the most important tasks that should be undertaken in the last decade of the 20th Century”, Chair’s Conclusions, G-7 Ministerial Conference on the Information Society¹.

Introduction

Industrial economies are at the threshold of potentially radical structural changes in their economic structures. Communication networks and interactive multimedia applications are providing the foundation for the transformation of existing social and economic relationships into an “information society”. Such an information society is viewed as resulting in a paradigm shift in industrial structures and social relations, much as the industrial revolution transformed the then agrarian societies.

The development of an information society is expected to have important beneficial impacts on economies and society; it is expected to stimulate economic growth and productivity, create new economic activities and jobs. As well, a number of social benefits are expected to develop through an information society, including improved education opportunities, improved health care delivery and other social services, and improved access to cultural and leisure opportunities. Unlike other technological changes, the rapid developments and diffusion of communication and information technologies and the emergence of interactive multimedia applications have the potential to affect all economic sectors, organisational and work structures, public services, cultural and social activities.

A number of OECD countries have put forward their visions of the information society². Countries have understood that the realisation of these visions is not simple. The private sector is expected to take the lead in the development and diffusion of new economic opportunities, but the rapid realisation of these economic opportunities will depend on governments designing and implementing a number of new policy frameworks, in particular through competitive market structures in the broadcasting and telecommunication sectors, reviewing a number of existing institutional, legal and economic policies, ensuring access and providing correct incentives to private enterprises. Harnessing the long term potential for economic and employment growth and social benefits also requires the active participation of labour and other social partners. Global co-operation will also be necessary given the increased globalisation of economies and the fact that new communication technologies and multimedia applications are not restricted by borders.

The objective of this report is to respond to a request of the 1995 Meeting of the OECD Council at Ministerial level to develop policies that fully exploit the contributions of advances in technology in the context of Global Information Infrastructures -- Global Information Society (GII-GIS). The report seeks to provide an overview of GII-GIS and of the benefits and challenges from these developments. Emphasis in the report is placed on elaborating a set of recommendations for OECD economies aimed at facilitating the transition from closed markets with no, or limited competition, such as in the telecommunication and

broadcasting areas, to open and dynamic markets. The report, while addressed to OECD governments, recognises that all social partners need to play an important role in the transformation of existing economic and social structures.

A recent report to OECD Ministers on Technology, Productivity and Jobs³ stressed that technology diffusion has an important positive impact on productivity and employment in large parts of the economy, while the report concluded that in terms of creating a coherent policy framework the key challenge is to boost productivity growth through increased knowledge-intensive economic activities, while maintaining social cohesion. It is in meeting this challenge that the development of a global information infrastructure and a global information society is important.

An overview of GII-GIS

The concept of global information infrastructures-global information society (GII-GIS) encompasses the development and integration of high speed communication networks, and a set of core services and applications in digital format, into global integrated networks capable of seamless delivery. Such networks provide fully interactive access, to network-based services within countries and across national borders. These services may be traditional voice services, data, video services, or more sophisticated combinations of these services (multimedia services) destined for business, government and residential users, as well as for social purposes⁴. The physical infrastructure of GII-GIS is not limited to any one technology; on the contrary implicit in the GII-GIS concept is the interconnection and interoperability of a range of competing and complementary infrastructures, applications and services made possible by digitalisation. Communication and computing technologies form the basis of GII-GIS, but hardware, software, multimedia skills, content and information also play a key role. A harbinger of GII-GIS is the explosive growth of the Internet.

The concept of GII-GIS also encompasses the notion of the transformation of existing economic markets to a market place where communication networks bundling together transport, access and market transactions will play a major role⁵. The driving forces behind economic growth and development in such a networked economy will not be natural resources or physical goods but based on information viewed as providing the foundation for the transformation of existing social and economic relationships.

While the GII-GIS will ultimately benefit all users, including individuals, governments and business, it is primarily the business sector which may be expected to provide initial stimulus and investment for the GII's development. Financial institutions, for example, have already developed ubiquitous and sophisticated infrastructures for the transfer of money and the conduct of financial services on a global basis. Other examples of networking accomplishments spearheaded by the private sector, include the travel industry, which has developed state of the art infrastructures, and the manufacturing sector, which has developed the ability to manufacture and source on a world-wide basis. As business continues to build and merge these structures to achieve its own goals the benefits will spillover to individuals and governments.

Underlying the notion of information infrastructures, and service delivery based on these infrastructures, is the fact that all information flows will, from the view point of transmission, be undifferentiated because they are digital in form. Further, information infrastructures and applications can, by the nature of the technology, provide services and be accessed on a global scale. In most cases, geographical and political boundaries do not pose barriers to these technologies. As a result, the legal, economic and social frameworks in which GII-GIS developments take place needs to be global in perspective. On the other hand national restrictions can have negative implications for investment and national development of applications and services.

From a definitional perspective it is difficult to differentiate global information infrastructure (GII) concepts from global information society (GIS) concepts since they are often used interchangeably. There are those who view the developments of the infrastructure, including the physical, service and policy infrastructure (GII) as a precursor to the emergence of a global information society (GIS); others view a GII concept as providing more emphasis on the economics of development of an information society, while GIS is viewed as providing emphasis on the social aspects of such a society. By placing equal emphasis on GII and GIS, OECD Ministers stressed the necessity of both the economic importance in developing global information infrastructures in terms of creating economic activity and jobs, and the necessity to use these developments to improve societal goals and aspirations.

Although references to an emerging “information society” can be found in economic literature of the early 1980s, it is only in the last few years, resulting from accelerated diffusion of information technologies and high speed communication networks, that policy emphasis has been placed on GII-GIS, and on the need to review existing policy frameworks to facilitate the transition to an information society. The development of the Internet and the World Wide Web has played a significant role in bringing these issues to the policy forefront. If visions are to become reality, it is necessary for governments to implement some fundamental policies in the near term, and it is these policies that this report focuses on.

The building blocks of the GII-GIS include:

- communication facilities (switches, transmission technologies), computing technologies, software and standards;
- terminals connected to the networks providing access for users to integrated services;
- services (i.e. information, electronic commerce, applications and content) available on these networks;
- software and interfaces tying together facilities, terminals and applications.

The identification of these building blocks is important since they provide the base which will generate aggregate productivity and real income growth, and they highlight the policy areas requiring consideration: some of these include, availability and interconnection of networks, the price of network access, standards and interoperability, ensuring the widespread availability of networks and conditions of access to services by users, and of service providers to users and the conditions within which services and content are provided, distributed and accessed. Electronic commerce represents the core element in realising these economic and social potentialities.

Underlying goals and policy requirements

There has been broad consensus that the development of GII-GIS needs to take place within a framework which supports dynamic competition, encourages private investment, supports flexible regulatory frameworks and allows for open access to networks and other essential facilities. These principles are the basis of the Chairman’s conclusion of the G-7 Ministerial Conference on the Global Information Society⁶ (Box 1.1), and have been further elaborated in the Information Society and Development Conference⁷.

The report “Europe and the Global Information Society”⁸ argued that the development of information infrastructures and related applications “is a revolutionary tide, sweeping through economic and social life.” The report recognised the global nature of new market opportunities based on information

infrastructures, and that to participate in these European enterprises needed to be efficient and markets should function properly. The basis for this was to develop a “common regulatory approach to bring forth a competitive Europe-wide, market for information services”. The recommendations put forward in this paper for change are echoed in the US’s “Global Information Infrastructure: Agenda for Co-operation”⁹ which stresses the global societal benefits that developments of information infrastructures can bring about. The OECD in its Special Session on Information Infrastructures also stressed the economic benefits that global information infrastructures would bring and that government needed to ensure that “road blocks to its implementation were removed”¹⁰.

As in any structural change, whether affecting particular industries or of a wider economic nature, the process of change results in economic friction, social costs and adjustment problems. Governments play an important role in mitigating any negative spillover while encouraging the wider diffusion of benefits. In particular, most governments have rapidly recognised that it is important to ensure that there is greater social cohesion and that the development of GII-GIS does not result in an underclass of citizens without access to the GII-GIS, and that cultural identities are maintained. The way information is acquired, used and transmitted by individuals largely determines their perception of their place in society and the world. Many people in a number of countries may have difficulty grasping the extent and nature of the changes being brought about by the development of the global information society, and the benefits it may bring to their lives. For many, these developments represent positive new opportunities and prospects. However, for some, they will introduce new insecurity and risk.

The diffusion of information infrastructures and their applications are likely to be incremental depending on how rapidly infrastructures and applications are put into place, but will also depend on changing demand structures and organisational and societal behavioural patterns. The role of government will be important, not only as one of the largest users of new networks and services, but also in ensuring that required frameworks are implemented rapidly as well as to remove barriers, and where appropriate provide conditions for diffusion of information infrastructures and their applications.

Productivity growth and the development of new activities will lead to new job creation, but will also result in the demand for new skills. In this context one of the benefits of broadband information infrastructures is to facilitate new forms of education and learning, and in particular allow for implementation of life-long learning processes to improve flexibility in the labour force.

GII-GIS is also expected to facilitate the process of reforming government institutions and more effective administration while reducing on-going budgetary outlays. The provision of government services, whether educational, health, or information services can also be improved significantly through information infrastructures. GII-GIS can also improve the transparency of governments. GII-GIS is also a factor in the development of cultural content and in diversifying leisure activities.

The development of information infrastructures may also be able to facilitate regional and rural development and reduce urban congestion by allowing for greater opportunities to telework, to partake in economic and social activities at a distance, and in market activities without the necessity of having physical market presence. There are also risks in the development of GII-GIS especially through creating a two-tier society of information rich and information poor.

1.1 G-7 Vision of the Global Information Society

Promoting dynamic competition
Encouraging private investment
Defining an adaptable regulatory framework
Providing open access to networks
while
Ensuring universal provision of and access to services
Promoting equality of opportunity to the citizen
Promoting diversity of content; including cultural and linguistic diversity
Recognising the necessity of world-wide co-operation with particular attention to less developed countries.

These principles will apply to the Global Information Infrastructure by means of:

- promotion of interconnectivity and interoperability
- developing global markets for networks, services and applications
- ensuring privacy and data security
- protecting intellectual property rights
- co-operating in R&D and in the development of new applications
- monitoring of the social and societal implications of the information society.

Source: Chair's Conclusion, "A Shared Vision of Human Enrichment", G-7 Ministerial Conference on the Information Society, 25-26 February 1995.

There is general consensus by many governments on the main principles and on the requirement for action. However, there is a need for stronger and more focused political support, policy goals and effective regulation, to speed-up implementation. The next several years will be crucial as countries change their regulatory frameworks, with the opening of the European Union to telecommunication infrastructure competition, and the implementation of the market access commitments in the context of the WTO agreement on basic telecommunications.

Alongside commitments to liberalisation and market opening there is also a need for intensified international co-ordination and co-operation as regards regulatory safeguards and allocation of scarce and/or global resources. Existing international organisations, such as the OECD itself, the WTO, ITU, WIPO and APEC are playing an increasingly important role in this context and further opportunities for co-operation and co-ordination between such international bodies need to be encouraged.

It is important for OECD countries to begin a more coherent dialogue with developing economies to provide them with experiences and lessons on regulatory structures and requirements and the appropriate training to implement these in order that they may leap-frog from their present status. Above all, in terms of GII, it is important to recognise the necessity of world-wide co-operation, as noted in the G-7 Vision, otherwise there is a risk that only regional information infrastructures will develop, and a large segment of the world's population will be excluded from the economic and social benefits which can arise from information infrastructures and related network-based multimedia applications. Full global connectivity and interoperability is of interest to all countries.

The G-7 recommendations provide the building blocks for the smooth development of a global information society. One of the more difficult tasks will be to build market and product competition, transforming sectors which have a long history of monopoly structures into competitive markets providing incentives to develop new services. Governments will play an important catalytic role in areas such as research and development. In this context international co-operation in R&D projects, such as those promoted in the G-7 framework, are of great importance. This should stimulate increasing investment activity, which mainly relies on the private sector, both within and across national borders

The essential characteristics of the information society concern the radically increased amount of information transmitted, stored, and accessed. A central aspect of this is growth of electronic commerce, that is commercial transactions conducted electronically over communications networks. These two related aspects raise a whole range of new issues regarding the adaptation of safeguards concerned with security and integrity, privacy and data protection and intellectual property.

Policy also needs to pay particular attention to the demand side. Many of the new growth areas will be end user services. Many may free the consumers from mundane everyday tasks, others will provide new services which will be more suited for a society where working hours may be significantly reduced and where there is no longer a premium on time.

2. THE EMERGING INFORMATION ECONOMY

Introduction

The development of the information economy is being driven by rapid innovation in communication and computing technologies which have reduced dramatically the per unit costs of switching and transmitting information on networks. For example, network digitalisation for OECD countries has increased from 49 per cent of main lines in 1991 to nearly 80 per cent by 1995. On transcontinental routes investment costs per voice path have declined from \$ 6 000 in 1989 to \$ 1 000¹¹ and on domestic markets the price of ISDN¹² connection which provides two digital access lines is approaching, in some countries, the price of access for residential customers to the public switched telecommunication network. Increases in capacity, speed and digitalisation, have provided possibilities to integrate graphics, text, video and sound (including voice) in applications, while the integration of computing and communication technologies has created possibilities of accessing and using interactively services and applications. Developments in data compression techniques, and high capacity storage technologies complement these other developments.

Convergence is taking place between technologies, infrastructures and at the content, service and application levels (figure 2.1). Convergence and digitalisation are creating new services, or significantly improving on existing “off-line” services. Significant reduction in entry costs resulting from distributed computing networks and low cost computers have opened-up important opportunities for small and medium enterprises for content creation and new services. Convergence, once policy frameworks allow for this, will also take place at the enterprise level.

The economic drivers

The main economic driver behind the sea of change taking place in information and communication markets and the development of interactive applications is the confluence of different technologies, including semiconductor development, computing, software, switching and transmission. Existing evidence points to continued rapid development in these areas. Convergence and related developments are being driven by enterprises who foresee new economic opportunities. Two main areas are driving change: infrastructure development and new service development. To a large extent these are supply driven. End-user demand, though viewed as important, has not developed to the extent that a single application or service or a set of services has emerged as a market driver. Nevertheless, consumer interest is growing rapidly especially for Internet services.

Infrastructure developments

Linked with technological change, a key driver in the emerging information economy is the development and diffusion of communication infrastructure. Network development in the OECD, as measured by main lines, has grown at an annual compound rate of 3.9 per cent over 1990-95 attaining an average of 47 mainlines per 100 inhabitants by 1995, and the per cent of digital mainlines has grown from

49 per cent in 1991 to 82 per cent by 1995. Significant growth has taken place in other infrastructures: for example, cellular mobile subscribers have increased at a compound rate of 45 per cent per year over 1990-95 reaching 71 million subscribers in the OECD area. Increasingly as competition increases across OECD countries new alternative networks are becoming available for the provision of services to the public. These include cable television networks which can be used for basic telecommunication services as well as providing high speed Internet access (for example, in the United Kingdom there are about 1.5 million subscribers to telephony offered by cable television operators). In addition, the development of new satellite systems, for example, satellite personal communications systems, will provide global digital communications services using a number of low earth orbit and medium earth orbit satellites. New services based on these satellites, such as Universal Personal Communications, means that national boundaries will begin to play much less of a role in the context of service provision.

In addition to switched telecommunication infrastructures, cable television access is important for residential markets as an alternative infrastructure to potential future markets. Diffusion rates, however, in a number of countries are still fairly low, compared to penetration of television terminals (Table 2.3).

The manifestation of new developments is most evident from the rapid growth in the Internet where the number of Internet hosts¹³ across the OECD has increased from 0.6 million in 1991 to 12.4 million by mid-1996 resulting in a diffusion rate of 12 Internet hosts per 1 000 population (Table 2.2). On the broadcasting side there has also been significant growth over the last decade. The average penetration rate for televisions per household is 90 per cent in the OECD, or about 54 sets per 100 inhabitants. Satellite and cable television have also brought about significant changes in traditional broadcasting services. For example, in OECD Europe the number of satellite channels has increased from 38 to 230 between 1990-1995.

Diffusion of information technology

In addition to the physical network infrastructure an important part of the infrastructure for the information economy is the computer base, software, peripheral information technology equipment, including the customer interface. The world-wide information technology market in 1995 was estimated at US\$ 514 billion. Between 1987 and 1994, it averaged twice the rate of growth of world-wide GDP (Figure 2.2). In OECD countries, the IT market has remained remarkably concentrated with the G-7 countries accounting for approximately 88 per cent. In recent years a number of countries have experienced strong growth especially as a result of increased PC distribution and the concurrent expansion in packaged software sales. There has been significant growth in the new categories of hardware since 1994, largely because data communication equipment sales have boomed due to the development of the Internet. The distribution of the world-wide information technology market by geographic area and by main market segment is shown in Table 2.1.

In terms of the installed PC base, there are significant differences between OECD countries: the United States averaged 30 PCs per 100 inhabitants in 1994, three times the penetration rate of either Europe or Japan (Figure 2.3). Penetration of PCs in the working place is significantly higher than for households: in 1994 all white collar workers had, on average, a PC in Norway, Switzerland, and the US, while the rate of diffusion in major European economies was between 60 to 80 PCs per 100 white collar workers. For Japan diffusion was much lower at 24 PCs for 100 white collar workers¹⁴ (Figure 2.3). A large proportion of the existing stock of PCs cannot be upgraded for multimedia applications in a number of countries and will need to be replaced in households and in the work environment.

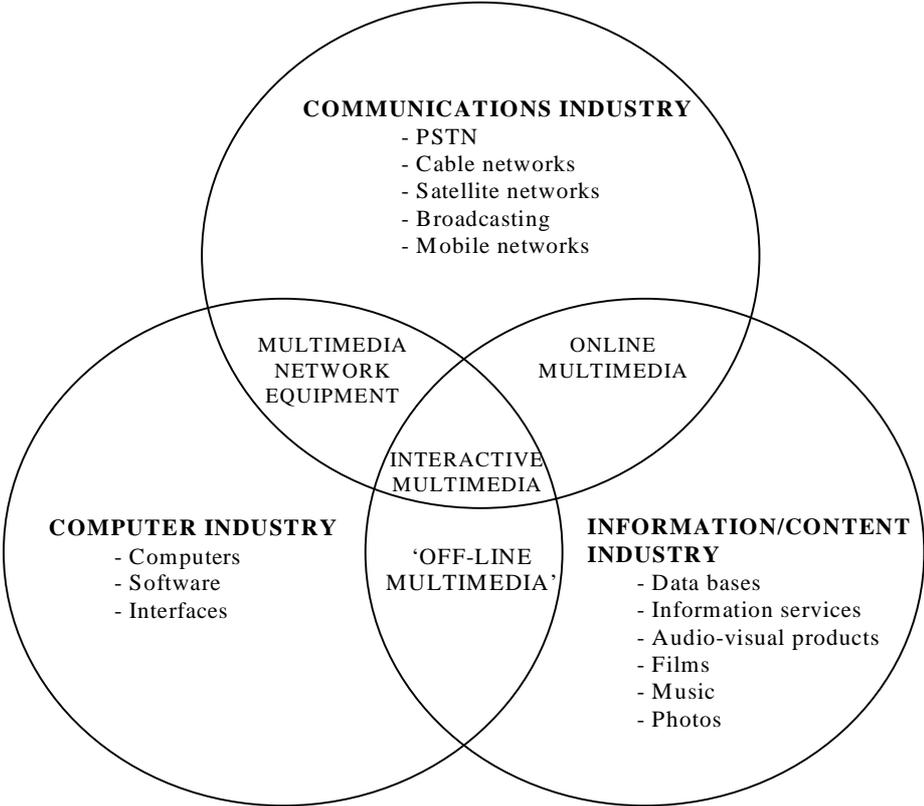
From these indicators it is evident that the infrastructure necessary to access on-line multimedia services is still insufficient across a number of OECD economies. As well, there is still an important gap, even in many of the OECD economies with high penetration rates for PCs, between different social segments of the population. Two examples from countries with the highest penetration rates for PCs in households illustrate this: in Canada the number of households with PCs increased from 10 per cent in 1986 to 25 per cent by 1994, however, while 44.5 per cent of the highest income quintile had PCs only 9 per cent of the lower income quintile had PCs and 15 per cent in the second lowest. In the US a recent survey shows that the poorest households exhibit the lowest computer penetration rates¹⁵. The US data in Table 2.4 indicate the important differences that exist between different socio-economic categories and age groups in computer penetration. Many governments have indicated concern that the transition toward an information society will lead to exclusion of sections of the population from advanced services. It is for this reason that universal service policies (see below) are so important, as well as competition which can help lower prices and therefore the cost of access.

The development and diffusion of cable modems in the US and Canada is important in this context, especially for urban residential customers who can benefit from relatively low cost access to the Internet and other on-line services without having to purchase a PC. In the near future television would need to be supplemented by set-top boxes in order to provide interactivity and support encrypted programming.

Investment in information and communication technologies has now become a major requirement for the conduct of business by firms. In recent years, the share of information technology as a per cent of firms' total investment in capital equipment has accelerated: for example in the US to 30 per cent in 1990, and is estimated to expand to 40 per cent in 1996¹⁶. For Japan this has reached 18 per cent for 1994¹⁷. In recent years there has been a shift in investment from the process of computerising intra-firm functions to improving inter-firm networking capabilities. There has been, in general, increased recognition of the role of information and communication investment as an important factor for improving the competitiveness of firms and increasing dynamism in the economy.¹⁸

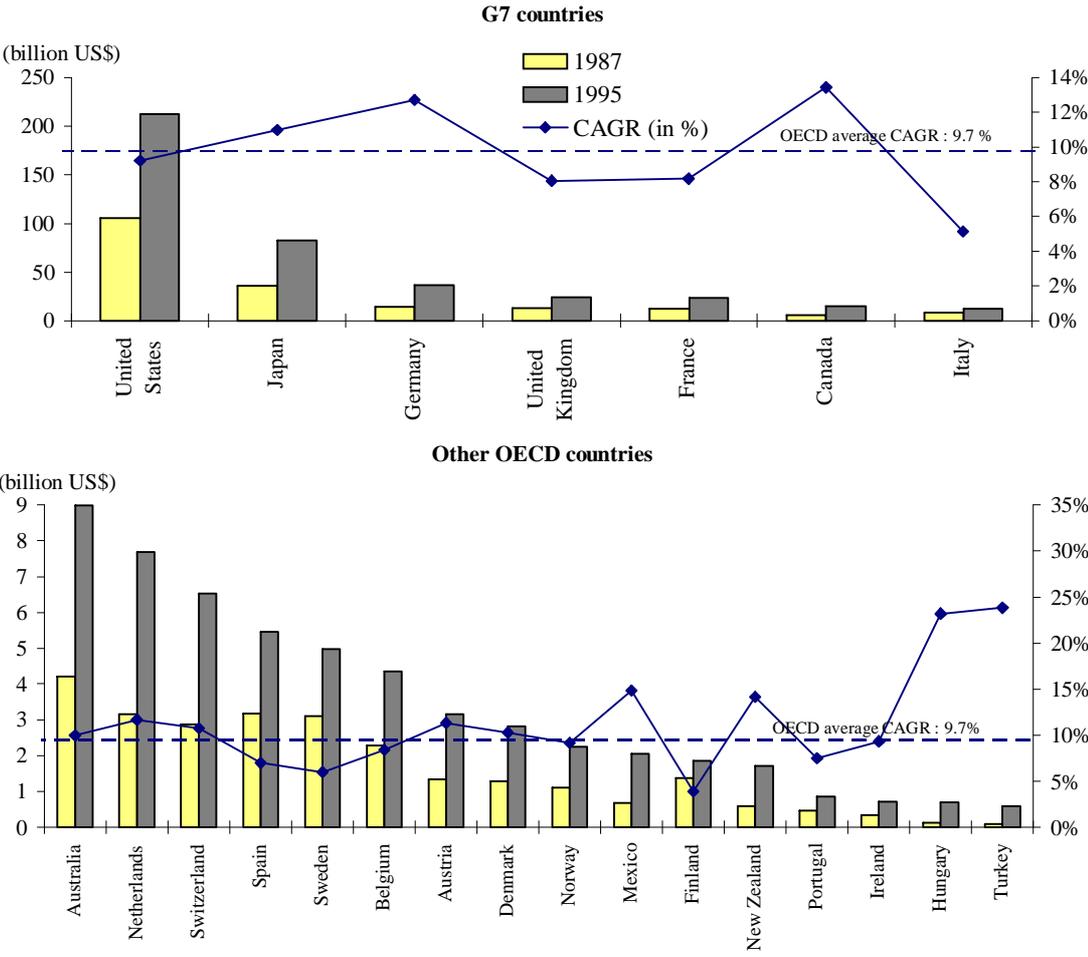
Although developments toward the information economy indicate an acceleration in the required building blocks, present data show that some OECD countries are lagging behind. These countries need to encourage investment in computing and communication technologies. In particular, increased networking of the installed computer base needs to be encouraged, which demands a more dynamic and competitive communications market than presently available.

Figure 2.1 The Process of Convergence



Source: Devotech "Developpement d'un environnement multimedia en Europe"

Figure 2.2 IT Markets, 1987-95
(in billion of US\$ and percentage)



Source: IT Outlook, 1997.

Table 2.1 Word-wide Information Technology Market Breakdown, 1985-95
(Percentages, except for total in billion current US\$)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1985-95 CAGR
by geographic area ...												
North America	59.2	52.7	47.4	44.2	43.7	41.9	42.2	43.2	45.4	45.1	43.5	9.4
Latin America	1.5	1.5	1.4	1.4	1.6	1.6	1.6	1.7	1.9	1.9	2.0	15.6
Western Europe	22.1	26.3	29.0	30.5	30.8	33.6	32.4	31.9	28.4	27.3	28.3	15.6
E.Europe, Middle East, Africa	3.1	2.8	2.7	2.5	2.6	2.5	2.7	2.6	2.6	2.6	2.6	10.6
Asia Pacific	14.0	16.7	19.6	21.3	21.2	20.4	21.2	20.7	21.8	23.0	23.7	18.9
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
... and by main segment												
PC & Workstations	20.9	21.2	21.8	22.9	24.2	25.0	24.4	24.8	26.7	29.0	30.5	17.2
Multi-user systems	29.5	28.7	28.1	26.8	25.3	22.9	20.7	18.8	16.3	14.3	13.0	4.0
Data Communication Equipment	3.0	2.9	2.9	2.9	3.0	3.1	3.3	3.6	4.1	4.3	4.3	17.0
Packaged Software	13.5	13.8	13.9	14.2	14.4	15.5	16.6	17.4	17.6	17.9	18.4	16.3
Services	33.1	33.3	33.3	33.2	33.2	33.5	35.1	35.4	35.3	34.6	33.7	13.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

Source: OECD Secretariat, compiled from IDC data.

Table 2.2 Diffusion of Internet Hosts per 1 000 Population

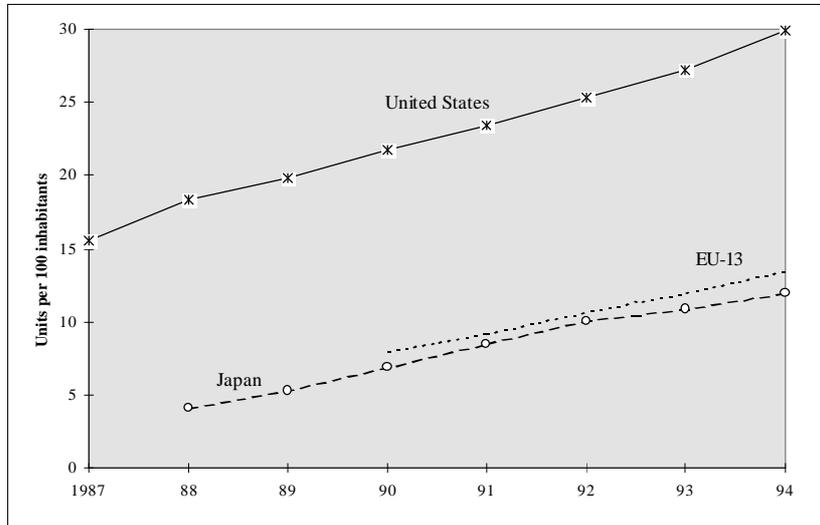
Initial Connection	Host	Jul-91	Jul-92	Jul-93	Jul-94	Jul-95	Jul-96 ²	Jan-97 ²
May-89	Australia	1.26	2.78	4.65	7.15	11.49	22.02	28.51
Jun-90	Austria	0.27	0.82	1.47	2.51	5.06	8.83	11.43
May-90	Belgium	0.03	0.15	0.43	1.20	2.34	4.27	6.37
Jul-88	Canada	0.69	1.37	2.45	4.36	8.87	14.33	20.38
Nov-91	Czech Republic	0.00	0.06	0.26	0.55	1.44	3.12	3.98
Nov-88	Denmark	0.30	0.53	1.19	2.33	7.07	14.72	20.37
Nov-88	Finland	1.74	3.12	5.34	9.75	21.90	54.27	55.51
Jul-88	France	0.16	0.33	0.69	1.24	1.96	3.26	4.22
Sep-89	Germany	0.26	0.54	1.13	1.83	4.29	6.71	8.84
Jul-90	Greece	0.02	0.06	0.13	0.28	0.53	1.21	1.52
Nov-91	Hungary	0.00	0.00	0.14	0.53	1.10	2.45	2.92
Nov-88	Iceland	0.75	1.53	4.75	12.24	25.47	40.49	43.70
Jul-90	Ireland	0.03	0.18	0.48	0.93	2.78	6.00	7.56
Aug-89	Italy	0.03	0.09	0.26	0.41	0.81	1.99	2.61
Aug-89	Japan	0.05	0.13	0.29	0.58	1.28	3.96	5.86
April-90	Korea	0.00	0.10	0.12	0.30	0.50	1.10	1.50
Apr-92	Luxembourg	0.00	0.21	0.47	1.06	3.67	6.97	8.49
Feb-89	Mexico	0.00	0.00	0.02	0.06	0.09	0.22	0.33
Jan-89	Netherlands	0.49	1.39	2.33	3.88	8.76	13.89	17.50
Apr-89	New Zealand	0.35	0.53	0.91	4.21	12.25	21.76	23.61
Nov-88	Norway	1.94	3.35	5.83	8.94	15.28	27.70	39.38
Nov-91	Poland	0.00	0.02	0.09	0.19	0.41	1.00	1.41
Oct-91	Portugal	0.00	0.13	0.20	0.46	0.88	1.77	2.63
Jul-90	Spain	0.03	0.09	0.22	0.54	1.02	1.59	2.81
Nov-88	Sweden	1.37	2.43	3.61	6.07	12.09	21.11	26.39
Mar-90	Switzerland	1.46	2.50	4.42	6.78	9.01	14.50	18.23
Jan-93	Turkey	0.00	0.00	0.00	0.02	0.05	0.13	0.21
Apr-89	United Kingdom	0.12	0.65	1.54	2.67	4.97	9.89	10.09
Jul-88	United States ¹	1.69	2.87	4.87	7.84	16.23	31.26	38.44
	OECD Total	0.57	1.04	1.85	3.06	6.24	11.97	14.94

Notes: 1. US figure comprises edu.com,gov,mil,org,net,us.

2. 1995 population data was used to calculate 1996 and 1997 hosts per 1000 inhabitants.

Source: Network Wizards at <http://www.nw.com/>

Figure 2.3 PC Installed Base for Selected OECD Countries or Regions, 1987-94
(average number of units per 100 inhabitants)



1. EU-13 includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Portugal, Spain, United Kingdom.

Source: OECD IT Outlook 1997.

Figure 2.4 Number of PCs per 100 White Collar Workers in 1994

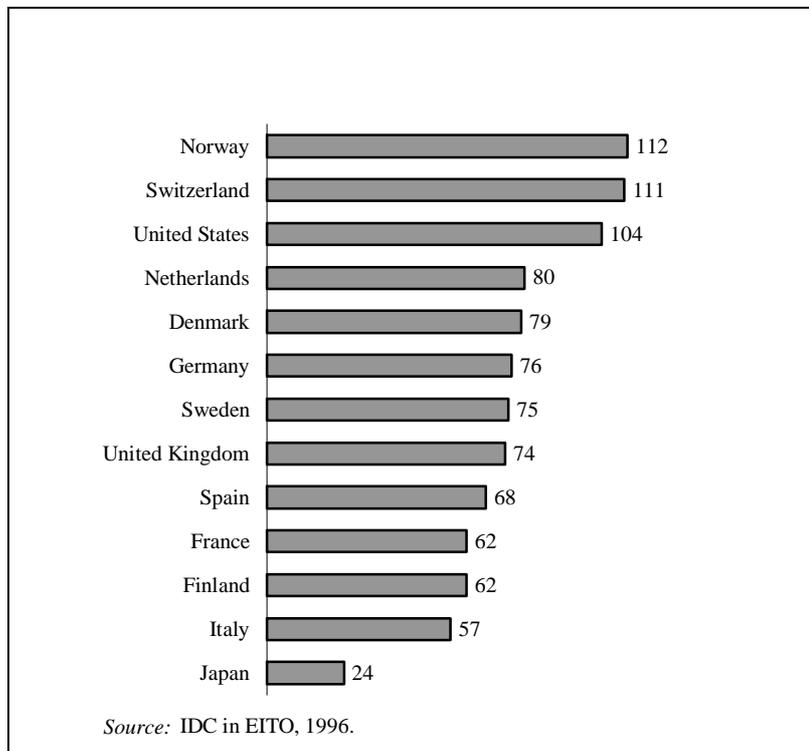


Table 2.3 Number of Television Receivers, Households, 1995

	Television receivers			Television households			Cable television households	
	Year	Total (000s)	per 100 inhabitants	Year	Total (000s)	% of total households	Year	% of total households
Australia	1994	8600	48.2	1995	5900	99.0	1995	0.0
Austria	1994	3800	48.0	1995	2628	96.5	1995	33.8
Belgium	1994	4590	45.5	1995	3400	99.0	1995	90.5
Canada	1994	18917	65.0	1994	10286	98.0	1995	99.9
Czech Republic	1994	3900	37.8	1995	3390	93.5	1995	16.2
Denmark	1994	2790	53.9	1995	2054	97.0	1995	71.0
Finland	1993	2550	50.2	1995	1866	96.0	1995	49.0
France	1994	33500	58.0	1994	20500	90.9	1995	..
Germany	1994	44700	55.1	1994	32314	88.1		..
Greece	1993	2200	21.2	1994	3349	93.0		..
Hungary	1994	5360	52.1	1994	2825	96.0	1995	39.0
Iceland	1993	84	31.8	1993	84	88.6		..
Ireland	1993	1150	32.2	1993	930	84.6		..
Italy	1994	24500	42.9	1994	15864	80.2		..
Japan	1994	77500	62.1	1994	35027	81.5	1995	..
Korea	1994	14408	32.4	1994	112000	92.3	1996	51.0
Luxembourg	1994	237	59.1	1995	155	99.0	1995	95.4
Mexico	1994	16500	19.0	1994	15100	77.4	1995	..
Netherlands	1994	7600	49.4	1995	5714	98.0	1995	93.0
New Zealand	1994	1800	51.0	1995	1009	94.0	1995	1.0
Norway	1993	1830	42.5	1995	1550	99.0	1995	34.0
Portugal	1993	2420	23.1	1995	3128	96.4	1995	9.0
Spain	1994	16900	42.7	1994	11620	95.4		..
Sweden	1994	4120	47.2	1993	3332	87.3	1995	..
Switzerland	1994	2850	40.0	1994	2589	75.3	1995	78.0
Turkey	1993	16000	26.9	1993	6760	56.3		..
United Kingdom	1994	26400	45.4	1995	20413	99.0	1995	30.0
United States	1994	203000	77.9	1994	95361	99.4	1995	66.8
All OECD		508038	52.5		319148	993		

Note: "All OECD" data does not include data for Czech Republic or Hungary. Total number of households is 1993 data.

Source: OECD, ITU, European Audiovisual Observatory

Table 2.4 Percent of US Households with a Computer by Age and By Rural, Urban and Central City Areas

	RURAL	URBAN	CENTRAL CITY
Under 25 years	12.3	20.7	21.0
25 - 34 years	22.3	27.8	25.0
35 - 44 years	34.7	36.6	31.4
45 - 55 years	32.5	36.8	31.8
55 years and older	1.9	13.8	12.0

Source: US Department of Commerce, Falling through the Net: A Survey of the "have nots" in Rural and Urban America, July 1995.

The economic and social impacts of GII-GIS

The impact of information infrastructures and multimedia applications is expected to be widespread touching all forms of economic activity, society and governmental activities. The new information and communication technologies and applications are not restricted to an individual manufacturing or service industry. They can be applied to agriculture, resource exploitation, manufacturing, the service industries, residential markets and public service markets. From the perspective of economic and social impact this widespread diffusion is important, but above all, the impact of information and communication technologies will arise from their capability to integrate a number of different functions in the production process, the ability to control, monitor and provide information as required in different processes, and their role in integrating different economic sectors and changing existing distribution channels. The capability to add intelligence to different tasks, manipulations and transactions in production and commerce will also be important. GII-GIS will not only have an impact because of the development and diffusion of new products and services, but it will impact on organisational structures within enterprises, on the delivery and content of public services.

GII-GIS should enhance the possibilities of improving delivery of health-care, widen access to culture and provide new opportunities to create culture. Finally, but not least, GII-GIS provides the means to better integrate societies at the national as well as international level. It is precisely because GII-GIS developments will affect so many economic sectors, and social activities that governments need to give priority to policy change.

While the positive potential of the GII-GIS in terms of both social and employment concerns should be stressed, the risks of certain negative effects, particularly in transition periods, should also be recognised and thereby avoided. It is possible, for example, that the rise of the information society, and the decentralisation of communication and employment could generate new forms of exclusion, dislocation and alienation for certain groups and individuals. This might concern, on the one hand, those who are “un-connected” to the information society (through lack of knowledge and/or lack of material or financial possibilities), and on the other, those who find themselves increasingly isolated in “cyber” communications by physical separation in work and/or social, community life. The recognition of such risks should lead to due emphasis being given to relevant policy solutions and focused programmes concerning education, training, public access points and services, review and adaptation of workplace regulations and safeguards and cultural and community projects. Such recommendations are explained and discussed in further detail in chapters 3 (universal services and public access) and 4 (cultural aspects, role of government as a catalyst and stimulating demand) of this report.

General aspects of the impacts of technology on employment have been examined in the context of the OECD Jobs Strategy: Technology, Productivity and Job Creation. In follow-up work the link between technical progress and transition problems is stressed and it is recognised that the design and timing of reform must incorporate this political concern. At the same time this work also points to the potential of technology policy to raise social cohesion to the extent that it enables job creation and is associated with broad-based job up-skilling.

A number of national studies have been undertaken which enumerate the positive economic impacts expected from the development of information infrastructures and network-based services¹⁹. Many of these studies are premised on having in place a market and policy framework which provides positive investment incentives to firms. These studies show that the magnitude of the economic impact of information infrastructures on economies has significant benefits.

However, the most important factor for policy makers is to understand the social costs of inefficiencies in non-competitive or insufficiently competitive markets. These costs arise, in particular, from lower rates of investment, slower development and diffusion of applications, higher prices and lower output in the less competitive markets. Empirical results have shown that spillover effects from information and communication technologies also have an important impact on the productivity level of the whole economy²⁰. Inefficient markets will limit these spillover effects.

Electronic commerce

The developments of GII-GIS are expected to fundamentally alter the way market transactions take place and by so doing restructure existing economic markets. The basis of these changes is the use of digital communication networks for economic transactions. The development of commerce through networks (electronic commerce), based on the use of interactive networking capabilities provided by the development of broadband information infrastructures, is expected to have a significant impact on existing economic structures, as well as stimulating the growth of a number of new markets. These include markets for new equipment as well as for services, applications and content.

Electronic commerce provides the means to transform existing transaction functions of business, governments and individuals from the present use of physical-based media to electronic form. Existing commerce is underpinned by a number of steps required for transactions including finance, logistics, procurement, delivery and transportation that require interchange of information, obligations, or monetary value between organisations and individuals. Electronic commerce facilitates established business-to-business commercial relations, sales by companies to consumers, as well as transactions between consumers. It, thus, potentially affects the business environment at national, regional and global levels, and generates major opportunities, as well as new challenges, for market growth and development of jobs, industries and services.

The concept of electronic commerce is much wider than payment issues, encompassing a range of transactions which are embedded in modern society²¹. The benefits of electronic commerce are mainly in:

- increasing internal organisational and management efficiency of enterprises;
- increasing transaction efficiency and reducing transaction costs both for suppliers and buyers;
- extending market reach of suppliers and increasing choice for both suppliers and consumers;
- providing complete information to improve service delivery such as in health provision or the provision of information to consumers.

Electronic commerce will also allow for more rapid adjustment between supply and market demand, increased ability to access customers, the ability to customise client needs, and rapidity in product development and market testing. In terms of electronic payment benefits include reducing costs of cash transactions, more efficient payment processing, and faster completion of transactions.

Although a number of new services and applications are emerging²², many of the new markets will be substitutes, although with important value-added for existing activities. The potential impact of these applications can be significant in restructuring markets.

Electronic commerce will have a number of impacts. These include:

- shrinking the production and distribution chain by reducing intermediation and changing its nature. In addition, using networks to integrate end markets directly with suppliers and inventory-tracking procedures can help reduce costs, allow more flexible production methods providing more instantaneous response to changing customer needs.
- Virtual shopping facilities provide a means of changing concepts of retailing for a number of goods and services as well as enhancing the ability of customers to browse and choose new products and services.
- Market competition will increase as search costs for consumers is reduced through 'intelligent agents' and as market entry costs for suppliers is reduced. Market feedback loops allow for more rapid product improvement through on-line testing and customer responses.
- Reducing market entry costs for small and medium enterprises (SMEs) and extending their geographic reach to a much larger market at a much lower cost than possible in existing economic structures.

Multimedia content markets

A driving force underlying the general liberalisation of delivery systems in OECD countries is the expected growth and development of a range of new network-based multimedia services. These services combine the content of previously distinct audio-visual and data services in interactive digital formats and have the potential for widespread application in industry and the home. On the supply side, the rate of technological innovation and investment, economic growth and job creation in these new services is in some instances already impressive, and may counterbalance declining investment opportunities and employment in older sectors.

An important characteristic of multimedia services is that they increase the tradability of goods and services and can provide a means by which a wide range of goods and services (in tourism, culture, financial services, education, health, etc.) can be enhanced and can be more easily and efficiently produced. Furthermore, such multimedia services are changing fundamentally the production process of many services in that they allow for on-line assembly and sourcing, are not affected by geographic boundaries and may in fact, in many cases, have no fixed production location. They are also likely to have a taxation impact.

Many of the multimedia applications are being developed for the provision of services (financial services, banking, insurance, medical consultation), areas of supply which are highly regulated to protect consumers, assure public safety, and for other economic reasons at national level. Certain types of regulations, developed and appropriate for traditional (i.e. non-electronic) methods of distributing and consuming such services, may need to be adapted in order to allow for increasing availability of, and demand for, on-line versions of such services and electronic commerce more generally in order not to create unjustified barriers to electronic commerce. Generally, regulated commerce raises problems of incompatibility with diffusion by electronic means whether this is at the national or international level. For professional services which are regulated, the issues of on-line diffusion of services are more complex. Many countries have not adjusted their laws, regulations and administrative procedures to provide to teleworkers the full range of social benefits which office workers would obtain.

Closely linked to the development of multimedia products and applications are those of multimedia audio-visual content, which combine digital representations of sound, images (still and moving), or data in a single package. The development of new multimedia services is still at an embryonic stage, and network-based multimedia services are currently being developed by companies with content largely derived from existing printed, music and audio-visual services. National markets for these services exhibit vast differences, though production of music and audio-visual content tends to be highly concentrated in a few countries and amongst a few companies. However, a radical restructuring of content production and delivery practices may well be taking place. Content creation for large media companies is already often outsourced to small and medium sized enterprises (SMEs) for a range of printed and audio-visual products -- with content being produced and delivered by SMEs to large programme providers via digital networks. These SMEs have become in many cases the seedbeds of digitised content-creation. In addition, SMEs may themselves increasingly be able to deliver content to broad audiences via the Internet as easily as large enterprises. This opens the possibility that the traditionally heavy capital investments and personnel costs required for music and audio-visual production, and the subsequently large economies of scale needed to achieve adequate returns, may no longer be so vital to successful product and market development.

Significant job creation has also occurred in audio-visual media. The motion picture industry in the United States has since 1985 created over a quarter of a million jobs, with most of these being in production or distribution and video sales. In Europe, too, employment has grown in all countries in the audio-visual and related sectors, with the most notable increases occurring in those countries which have allowed an expansion of private broadcasters of audio-visual content²³. The move towards network-based (particularly Internet) services may reduce demand for labour in traditional media systems. But a study of multimedia producers for the Canadian government found that while reducing employment in retail sales channels, network-based distribution of content was expected to increase demand for technical, creative and management/administration and direct marketing staff²⁴. The skilled labour associated with digital authoring and networking skills is scarce and much in demand, raising wages. However, under certain conditions, significant economic growth and job creation in new media can nevertheless occur²⁵.

Employment and economic growth depends upon expanding market opportunities for greater economies of scope through meeting more specific audience tastes (and thus adding higher value) in different media. Multi-channel broadcasting has eroded the previously relatively closed structure of content markets in traditional media.

Developing economies

The development of the information economy is not only an OECD issue but is, and must, include the developing economies. Existing national voice and data communication networks are already interconnected world-wide. Satellite communications are central to the global coverage for telecommunication and in making television broadcasting available throughout the globe. An embryonic global information infrastructure has already emerged. It is embryonic because for a large number of countries and for a large percentage of the world population the infrastructure is undeveloped at national levels, rather than because it is underdeveloped at the international level: low income economies in the world have an average of 1.97 main lines per 100 inhabitants, the lower middle income economies 9.17 main lines per inhabitant²⁶ in contrast to 47 main lines per 100 inhabitants in the OECD area. The OECD area has 67 per cent of the world's telecommunication mainlines although its share of world population is just 17.5 per cent. These data demonstrate the pressing need for development of telecommunication access outside the OECD area. Important progress has been made over the last decade. For example, during the 1980s more than 60 per cent of new mainlines added each year in the world were in OECD countries. By 1995 the OECD share of new mainlines had fallen to around 38 per cent.

The exchange of information and knowledge which developing economies can gain from global information infrastructures, as well as the opportunities which they derive in using information infrastructure applications to diversify their economies, integrate more fully into the global economy, and better use their cultural and human resources, needs to be stressed. The information gap between the developed and developing economies needs to be narrowed and is to some extent dependent on narrowing the gap in the physical infrastructure.

Monitoring developments in the Information Society

In order to be able to effectively monitor the economic and social developments leading to an information society, to measure the impacts of information economy developments on society, and in particular employment, it is important to be able to provide effective indicators and measures on which to base policy and economic decisions. There are two interrelated issues here. The first is definitional in that, as noted earlier, definitions of information society are not precise and differ across countries. There are, however, a number of key sectors involved in the production, processing and distribution of information. These sectors are commonly viewed as those which are the main contributors to the development of an information economy²⁷. There are also a number of key areas where penetration rates and usage patterns will be important. Second, given rapid changes in the development of technologies and services it is difficult to develop a stable framework of indicators. Irrespective of these problems it is important for OECD countries to work together in building up a framework of data and appropriate indicators: this needs to cover the supply side -- equipment and services for broadcasting, information technology and telecommunications -- and the demand side -- diffusion of equipment and access to and use of services.

There are a number of challenges in measuring the development of GII-GIS. These include:

- rapid changes in the quality and specifications of goods and services which are difficult to measure;
- rapid introduction of new products and the short market life of many new products;
- the increasing importance of services, content and applications in economic activity raises difficulties in measurement and tracking market developments;
- as competition develops in industries which form the underpinnings of the GII-GIS, such as telecommunications and broadcasting, enterprises that provided data in a monopoly or highly regulated market structure are, for reasons of commercial confidentiality, reluctant to do so.

3. ACCESS TO THE GII-GIS

The dynamics of changing infrastructures

The development of GII-GIS is dependent on the availability and deployment of infrastructures, and the availability and diffusion of user-friendly applications and services. The threads that bind these two essential elements together are the policy frameworks which allow access and use to these infrastructures and provide the proper incentives for the development and diffusion of infrastructures, applications and services. In addition, computer literacy is an essential requirement in the use of new applications and services. This chapter treats issues relating to access to the GII-GIS and Chapter 4 deals with issues related to the applications and services themselves. It needs to be recognised at the outset that such a demarcation should not be viewed as being rigid but rather as a means to facilitate policy discussion. In a number of cases it is difficult to separate cleanly developments in infrastructure from those of services or applications, especially in relation to software.

Current regulatory structures, institutions and legislation distinguish between the telecommunications industry and the broadcasting industry, and between these regulated sectors and the information technology/computing industry. Traditionally the three sectors have involved quite distinct 'types' of market actors, customer terminals and related transmission methods for 'input' to such terminals. Up until recently such categories could essentially identify (for regulator and regulated alike) the appropriate regulatory framework. That is:

- The telecommunications industry is based on wired or wireless point-to-point telecommunication infrastructure for interactive two-way communication. This is run by vertically integrated licensed public telecommunication operators whose obligations involve neutrality and non-discrimination as concerns content and nature of communications. The industry is generally regulated by specific ministries and/or agencies, under specific telecommunications legislation. Primary concerns are universal service and network access (both to and for customers).
- The broadcasting industry's prime concern, and obligations relate to the content of point-to-multipoint one way communications. These are carried over wired (cable) or wireless (terrestrial or satellite) dedicated broadcasting networks to 'receive only' television terminals. Both public and private broadcasters are generally subject to specific broadcasting legislation and regulations, again carried out by separate ministerial departments and/or responsible agencies. The main focus is on content (culture, pluralism and diversity, censorship of indecent material) but scarcity of spectrum has been viewed as an important constraint.
- The conventional computing industry consists of hardware and software producers and service providers. 'Inputs' or services to the end customer are by way of purchased software applications, services and CD-ROMs introduced into personal computer terminals (although networked computers and the Internet itself have been in existence for many years, such

networks have essentially been available only to closed or very limited user groups, and not to 'the public' so that the computing sector has not been treated as a networked industry from a policy point of view). Apart from the application of general rules concerning fair trading/competition, consumer protection and intellectual property, the computing industry has been essentially unregulated as concerns both 'carriage' and content of services.

The convergence between broadcasting, telecommunications, content and information technologies which is being driven by technological developments, and is underway at the service and enterprise levels is putting increasing pressure on these existing *regulatory paradigms*. The traditional model of parallel and non-substitutable networks, and infrastructures providing only specific types of services is being replaced by networks capable of carrying at high speeds a range of data, voice and video services, and, moreover, two way interactivity. From a technical point of view this is blurring the boundaries outlined above, begging the question, for example, of the concept of 'broad'-casting as opposed to 'narrow'-casting or 'mono'-casting, and making such classifications more difficult for regulatory purposes.

One of the key characteristics of new communication technologies is that network access and provision of services are not constrained by geographic boundaries. New network structures are web-like with multiple entry and exit points.. The Internet exemplifies this structure. This process is accelerating with the emergence of digital satellite services and the eventual deployment of global mobile personal communications by satellite²⁸.

The multiplicity of services also implies a need to attain direct customer access, which focuses attention on essential facilities and the bottleneck position they may have in the market; in particular access to local loop facilities by service providers becomes important so that the rapid opening of the local loop to competition becomes a key challenge in developing GII-GIS. For such convergence to take place efficiently concepts of market and product competition must be extended to cover not only telecommunication markets, but all communication infrastructure markets, in particular broadcast and cable television infrastructures. Competition will accelerate the development and diffusion of new communication technologies and applications.

The ambiguity between telecommunication, broadcasting and computing increasingly draws in all the three aspects mentioned: market players, mechanisms for delivery of service and terminals. For example: broadcasters are (or will be) providing more interactive and point-to-point services, both cable and telecommunication operators are increasingly aiming to integrate telecommunication (two way) and broadcasting (broadband) services over the same infrastructure, major computer software producers are focusing resources on communication software and network interfaces (Internet and Intranet) and forming alliances and partnerships with telecommunication operators for the purposes of selling Internet service. At the customer terminal level, mass development of hybrid PC/TVs is envisaged in the longer term. Already the phenomenon of the increasingly 'encumbered'²⁹ television has emerged to allow for conditional access and interactivity, as well as the unencumbered PC or 'network computer' in the form of cheap terminals connected to modems exclusively for Internet access.

Convergence threatens to overtake communications regulation which could cause confusion for market players and consumers alike. Anomalies and, more seriously, communication regulatory barriers, which could result from lack of clarity in these areas risks retarding the development and deployment of new communication services, the creation of job opportunities and economic growth in the new information industries. There is, for example, increasing pressure in some countries to clarify access rules as concerns TV set top boxes (digital decoder conditional access systems). There is often regulatory and

policy ambiguity as to whether this is a broadcasting or telecommunication concern (or neither). For example, there has been concern expressed over whether new copyright proposals may limit the unrestricted use of Internet browsers.

Intensification of problems and tensions, creating considerable pressure for reform and clarification concern, in particular, the following:

- Risk of inappropriate, and/or overly restrictive, content regulation of new narrowcast audio-visual services (Internet, video-on-demand).
- Risk of inconsistent and/or asymmetrical regulation of market players based on increasingly anachronistic categorisation which identifies them by physical network 'type' or terminal.
- The question of broader application of regulation of open and non-discriminatory access to infrastructure, in particular to bottlenecks between the customer and service providers. To what extent, for example, can/should the relatively strict principles developed (or being developed) for 'telecommunication' networks migrate to such bottlenecks involved in the provision of audio-visual and Internet services? Depending on the answer this could impact both transmission resources (for example, cable networks, satellite transponder capacity, spectrum frequencies) and customer interfaces (conditional access systems, operating system and software).

Related to the above is the need for fresh considerations of rules on cross-media and cross-sector ownership and alliances. In particular, line of business restrictions need to be reassessed in the light of both convergence and increasing liberalisation of markets. Pressure for reform concerns both the goal of establishing efficient competition and that of ensuring pluralism in this context.

A progressive review of the traditional separation, as regards regulatory frameworks including licence conditions, between telecommunication infrastructures, broadcasting facilities and cable television networks is recommended. The development of new regulatory distinctions between the issues concerned with pure carriage services from the policy issues concerned with content services might be considered in this context.

Whilst taking into account the specific nature of certain types of networks, it is recommended to examine the conditions and timing to extend the general principles of market and product competition to all communication infrastructure markets.

Access to the Information Society

The core structural feature of the GII-GIS economy, as described in Chapter 2, is that this is first and foremost a networked economy. An inherent characteristic of this is that multiple services on the one hand, and multiple users on the other, share ubiquitous common resources to access each other. The very 'raison d'être' of networks is indeed to facilitate access for such a mass of customers to service providers (including communications service to other customers), and for such a mass of service providers to customers. This is the essential ingredient to the dramatic growth potential for communication, information and entertainment services. Access to the information society depends on access to networks.

The structure of networked economies is such that economic activity and social interaction depends on the ability to access infrastructures, applications and services. Access may be restricted where there is insufficient competition. From the perspective of policy makers it may in certain cases be difficult to judge when markets are competitive, especially in a situation when industries are converging.

This presents particular policy challenges which need to be recognised and addressed, especially as concerns the possible problem of access to “essential facilities”³⁰ in the presence of ‘bottlenecks’ in the vertical supply chain. The problem can be exacerbated if companies controlling these bottlenecks in the information economy are vertically integrated and dominant in the dependent downstream market. For many Member countries the most immediate access issues emerging in the context of GII-GIS concern critical sections of the network infrastructure, in particular the local loop and gateways to international facilities, and access to the customer interface in the form of operating systems³¹. These facilities display the common characteristics of involving very high up front fixed investment costs³² and very low incremental costs along with strong positive ‘network externalities’. In the case of communication networks it should, however, be recognised that alternative networks, particularly involving wireless technologies may be expected to increasingly ease certain bottleneck and related access problems.

While different regulatory and institutional solutions will suit different OECD countries depending upon varying legal and political traditions, the globalisation of information infrastructures and services is creating pressures for international co-operation and co-ordination of essential safeguard and access principles. The inclusion of basic telecommunications services and networks in the framework of the WTO has already resulted in the development of a set of common regulatory principles on access rules which would be accompanied by relevant market access commitments. Furthermore, new services such as digital satellite and Internet defy territorial boundaries so that purely national solutions will become increasingly inadequate.

Governments should review whether the extension or adaptation of access principles, already being developed in many OECD countries as regards telecommunications networks, is appropriate for other parts of the GII.

A key general principle recommended for the success of the GII-GIS is that essential communication facilities should charge cost-oriented prices for access services and should provide non-discriminatory treatment to service providers.

Access scenarios: telecommunications, digital TV and on-line services

The final link or interface with the customer is an essential requirement and an area of concern for policy in a networked economy. This involves not only the mechanisms of access -- switched network, set top box, Internet browser -- but also control and use of customer information and subscriber management. It also includes the applications programme interfaces (APIs) and operating systems (for both PCs and, increasingly TVs) and the extent to which they may restrain or bias customer choice in favour of particular services affiliated with the controller of the interface.

One of the important characteristics of the most recent developments in digital TV and Internet services is that the key access issues between service providers and customers are increasingly located outside the actual transport network and are, rather, concentrated in the software and operating system in the customer 'terminal' which controls the final customer interface. A key question with regard to regulatory implications is whether this interface is defined as a facility or a service.

The general access principle for the success of the GII-GIS is the need to prevent monopoly prices being charged for services or preferential treatment being given to affiliated or favoured service providers in the dependent market. Clearly those who make the significant and risky investment in new technologies as well as networks should receive a fair return for their investment so that access rules need to ensure that adequate account is taken of such investment and of property rights, so as to avoid dampening investment incentives.

The local loop

Access between telecommunication service providers and their customers is primordial to new entrants in liberalised telecommunication markets, whether they are network operators, resellers or enhanced service providers, given that they are faced with potential bottlenecks at the local customer access level. This affects both choice and availability of services for customers and, likewise, access to the customer base for services and applications providers. In nearly all cases, providers of the major part of the local infrastructure are vertically integrated companies (i.e. providing access and telecommunication services) often competing directly with those in the dependent markets.

In some OECD countries local competition is progressing, especially via use of alternative cable TV networks for telecommunication services and, more recently, via wireless technologies. But in the majority of instances the traditional local loop will represent an essential facility for some time to come.

In certain Member countries, the incumbent telecommunication operations are restricted from extending services or making cross investments into the cable TV and entertainment sector. This has generally been seen to be in the interest of encouraging independent investment in parallel cable local loop infrastructure, preventing extension or leverage of market power and/or ensuring an alternative platform for customer access for telecommunication and multimedia services. In other countries no such restrictions exist. In some cases this is because there is no cable broadband infrastructure. In other cases this has resulted in the incumbent telecommunication operator controlling much of the cable market so that it enjoys a double strength gatekeeper position as regards wired customer access.

The most important pressures for change on these various regimes are the liberalisation of infrastructure and services and the consequent initiative to encourage local loop competition to improve access and the technological and commercial developments of convergence and the potential provision of new multi-media services by both cable and telecommunication operators. Where liberalisation is already in place, and alternative local infrastructure already established, it may be appropriate to relax competitive safeguard controls on the PTO. On the other hand, where liberalisation is imminent or in very early stages, such controls may be at their most critical. Where no cable infrastructure yet exists, this may indeed be essential for ensuring a degree of investment in new networks at the local level. Where cable networks are already established but controlled by the incumbent national PTO, governments may consider the need to oblige structural separation or divestiture of the cable business in the interests of allowing effective local competition in telecommunication and multi-media networks.

Competition in the local loop is crucial into the success of the GII-GIS. Significant efforts must be made by regulators to stimulate competition especially through alternate technologies, regulatory measures, and where necessary, structural solutions.

Conditional access systems

Access between digital broadcasting services and the customer for new digital broadcasting services, terrestrial or satellite, may involve conditional access systems³³ as the final link, including the related applications programmes and subscriber management services. In order to access services, customers may need to purchase digital decoders in the form of 'set-top boxes'. The operating systems within these boxes will generally include decoding and decryption (that is for those services chosen and paid for by the particular customer), increasingly sophisticated functions for interactivity and electronic programme guides. The control of the conditional access system will tend to include control of the applications programme interface (API).

Competition and choice for both broadcasters on the one hand and end customers on the other, as regards conditional access operating systems should be encouraged. Significant demand from service providers and customers likely will drive such systems to be open to the reception of a broad range of digital services. Where proprietary technical interfaces impede interconnection or access, and the results impose substantial costs upon society in terms of reduced innovation and less consumer choice, consideration may need to be given to ensuring such access. Ordinarily proprietary technical standards and specifications are made available under open, non-discriminatory licence, on fair and reasonable terms, to the broadcasters and operators requiring conditional access systems to reach their customers. It is important to have competition in the manufacture of set-top boxes.

In a number of countries pro-competitive market structures and pricing of conditional access services are viewed as critical to digital service providers as is access to the local loop for telecommunication services. If market conditions warrant, these countries are considering imposing obligations on companies controlling access to customers and examining the implications of their vertical integration in the broadcasting and programming services market. Use and misuse of privileged subscriber information will also need to be watched closely.

It is important that the broadest possible range of suppliers can reach their prospective audiences so that viewers can access a wide range of digital services and programmes regardless of the method of delivery to the TV screen and without the expense and inconvenience of multiple set top boxes. It may be important in certain cases that governments, in co-operation with industry, standards setting bodies and other market participants in the international arena, develop conditional access principles, including those of open access, open standards and open interfaces. For example, in the EU it has been found necessary to require operators of conditional access systems to offer to all broadcasters technical services on a fair, reasonable and non-discriminatory basis. As well, the holders of industrial property rights to conditional access products and systems are required to grant licences to manufacturers of consumer equipment on fair, reasonable and non-discriminatory terms³⁴.

Software operating systems

The final access point between information services and end customers is increasingly via the browsing software and servers which can apply to the Internet, to electronic commerce applications, etc. Consumers soon may have the option of having these access points increasingly integrated within the overall PC operating system. Potentially this represents a rapidly expanding market for Internet software, applications and content services. Due to the low entry barriers and start up costs this market is currently

characterised by relatively small innovative independent players. However, there is already a trend for dominant players in both telecommunications transport and PC software markets to vertically integrate with certain types of Internet services, either by alliance/exclusive partnership agreements or by extending their own range of services.

The balance of customer benefits of such integration versus the risks to competition in independent service provision is a complex one. Governments should not interfere to avoid or pre-empt such a development per se. Certain governments, for example, view it as necessary to be watchful to ensure that competitive markets are maintained where bundling of software and services for 'free' to capture customers is practised, as this may tie both suppliers and buyers with conditions which exclude competitors on new integrated products.

On the one hand the move towards greater vertical integration and concentration in the Internet industry by major operators may indeed be the result of market forces and pro-competitive strategies based on real, sustainable competitive advantages and synergies. For example, a more organised and co-ordinated end-to-end telecommunication service for Internet communications can solve problems such as the need to better co-ordinate management of networks in order to organise a more managed system for prioritisation of packets and for security of information and the need to develop more efficient pricing and charging practices. On the other hand, it may raise concern for open access between services and customers, and therefore it is important to ensure competition is sustainable.

Significant efforts must be made by regulators to stimulate competition at the local loop especially through alternate technologies, regulatory measures, accounting separation and, where necessary, structural solutions. Where access bottlenecks remain, obligations should be placed on access providers to ensure non-discrimination, transparency, cost-oriented pricing and, as far as possible, unbundled access to services and facilities.

Where cable infrastructure is undeveloped, governments need to first take into account the requirements and incentives for independent investment and establishment of alternate platforms for customer access, before going on to encourage the potential for convergence which can be realised once a competitive environment has been established. Where cable systems are established but controlled by the incumbent telecommunication operator, competition policy concerns may motivate governments to consider structural separation or divestiture of the cable business in the interests of establishing competition in multimedia networks.

Competition in the provision of conditional access systems is important so that viewers can access a wide range of digital services and programmes regardless of the method of delivery to the TV screen and without the expense and inconvenience of multiple set top boxes. Under certain market conditions, governments may need to consider taking appropriate steps to ensure open access and ensure that the broadest possible range of suppliers can reach their prospective audiences.

In such a new and dynamic market as the Internet, it is recommended that Government measures, where necessary, facilitate the development of the market, while preventing anti-competitive practices on the part of dominant players regarding access.

Competitive safeguards and access

The areas and situations involving access to the GII include, inter alia, consumer equipment elements, software operating systems as well as various transmission networks. Furthermore, the structure and characteristics of these markets are particularly dynamic and fluid. Considerable work has already been done in many Member countries as regards the type of competitive safeguards needed within the telecommunications sector to protect new telecommunication service providers from any potential abuse of dominant position. However, further examination and analysis may be called for as regards applicable competitive safeguards between adjacent markets, in particular between dominant network operators and information/content service providers. These factors would suggest that the application of broad and flexible principles would be appropriate. The safeguards which are being developed for liberalising telecommunication markets will, as broadband infrastructures develop and as infrastructure convergence takes place, continue to be necessary, but may in some cases require review and extension to take into account new developments some of which have been described above. Four key areas include interconnection, numbering, licensing and interoperability.

Access problems which may arise from the type of bottlenecks and vertically integrated players described in earlier sections result in a number of problems including refusal to supply access, discrimination in terms and conditions of supply, excessive pricing, predatory pricing and cross subsidisation, and tying and bundling. For these reasons it is important for regulators to implement effective competitive safeguards ensuring non-discriminatory treatment. Unbundling access to local loop facilities is already being ensured in some OECD countries for new telecommunication service providers through interconnection frameworks, and this has proved to be efficient in stimulating dynamic competition.

It is worth noting that often the element of high up-front costs and tying the customer into service contracts are inherently related. Vertically integrated players are in a position to exploit strategies involving subsidisation of expensive consumer equipment and selling it at a retail price set far below actual costs, in 'exchange' for the commitment from the consumer to sign up to their own related services for a fixed period of time. The policy concerns involve both the potential restrictions on customer access to retail service providers (such as service contracts tied to the sale of subsidised mobile telephone hand sets -- an issue that has been examined in the UK and by the EU) and restrictions on services and service providers to access end users.

Such strategies may benefit users, but regulators/competition authorities will need to focus attention on the potential for abuse and consequent risk of restrictions on competition. It is for these reasons, for example, that in the UK OFTEL is examining options for conditional access systems whereby tied service commitments would not be 'exclusive', nor would they be longer than necessary to 'repay' the cost of the original equipment. Other concepts are also being examined such as that there should be no unnecessary costs for switching to alternative service providers after costs were repaid. In this instance initiatives are aimed at encouraging (or ensuring) open standards interfaces so that the technology of the consumer equipment does not tie the user to the vertically integrated service provider³⁵.

One of the reasons why policy initiatives, in countries such as the UK, have been taken with conditional access systems for digital broadcasting is that it may be possible that a producer of a digital decoder may choose not to pass on the costs of the equipment itself to the consumer so that a critical mass of viewers is achieved as soon as possible³⁶. On the other hand, if the controller of the decoder and of the conditional access service is also vertically integrated in the broadcasting and content market, then it may

well use the fact of its significant investment as an argument for restricting access for other service providers to its technology. The policy solution being taken by some regulators to this type of issue is to mandate access to the set top box whilst allowing the access provider to charge broadcasters a fair price.

It is important to recognise that the ability to recover investment in developing intellectual property is critical to innovation. There is clearly a limit to the extent to which the owners of such access resources should be obliged to open up and unbundle the various elements of their systems or networks. However, it should be recognised that the greater the degree of bundling that is allowed to vertically integrated gatekeepers, the more limited the degree of innovation and flexibility left to other service providers to compete and react to customer demands.

Tying may also involve access gatekeepers as the buyers of content or application services setting excessive obligations on the upstream sellers of such service. In particular this involves the obligation on the seller to deal with one distributor (the ability of the latter to impose such exclusive dealing obligation rests on its overriding value to the seller due to its dominance of the downstream distribution market). For example, concerns have been raised in many OECD countries about the granting of exclusive rights to broadcast important events which can tie a certain content service to a particular transmission channel.

Where public authorities are called on to solve disputes, address potential market failures, or make decisions concerning restructuring in the industry, the key challenge will be that of weighing up risks and benefits for the consumers of the information society. That is, on the one hand, the true competitive advantages of synergies and efficiency gains inherent in vertical integration, and on the other the risks of harming or eliminating independent competition in the services and applications market.

Interconnection

Underlying the notion of information infrastructures is the concept of a number of interconnected communication networks both competitive and complementary. Under present market conditions with limited competition, customers are usually accessed by a single local access network. Increasingly as cross-sector service provision is allowed customers will be accessed through more than one local access network. The success of a competitive market structure for information infrastructures hinges on an effective framework being in place for interconnection and non-discriminatory access. It is especially important to allow other content providers access.

Principles of interconnection are beginning to be developed in many OECD countries. Meanwhile, at the international level a basic framework for fair interconnection rules has already been established in the context of the recent WTO agreement on Basic Telecommunications Services. In particular this concerns the Reference Paper on Regulatory Principles which was adopted by most OECD countries in the form of additional commitments to the scheduled offers access to basic telecommunications services markets.

The main principle of interconnection is that of non-discriminatory access. While physical interconnection appears to be a necessary condition for efficient competition, it is not sufficient in itself to allow new communication entrants to compete effectively if they cannot attain access to infrastructure on an equal basis. In a competitive information infrastructure market there will be several levels of interconnection and non-discriminatory access: between different network providers; between the carriers and resellers; between service providers and carriers.

Interconnection requirements will need to cover, in addition to technical and physical arrangements between operators, issues such as tariffication, billing arrangements, availability of capacity, at which level of the network interconnection takes place, etc. Access to directory listings and information, access to databases and associated signalling is also important to enhance competition. Information on changes to network configuration is also important. Consideration must also be given to how access to rights of way can be improved for new entrants.

Although there are different viewpoints as to the extent that regulators should play a role in the details of interconnection, there is a general agreement that regulators need to be able to arbitrate when private enterprises cannot reach a speedy agreement.

The most important factor for new entrants, from an economic point of view, is the access charge they pay to the incumbent for the conveyance of their traffic and the use of its infrastructure. The determination of access costs for information infrastructures will become a key issue and will be determinant in fostering competition. Interconnection charges can also be crucial in determining whether a new entrant invests in information infrastructure. At present much emphasis is placed on the need to unbundle costs to ensure that the different network component costs are transparent and by so doing identify interconnect costs. However, at the level of the infrastructure, with greater integration between infrastructures and the multi-service provision it may become increasingly difficult to unbundle costs. Thus, competition and transparency will be important elements to ensure equitable interconnect charges.

Convergence and globalisation may, however, change the debate on interconnection. At present, interconnection issues have mainly dealt with the obligations of former telecommunication monopolists to provide interconnection, and the rights of new entrants to obtain interconnection. Convergence and more open national and international markets raises a number of different interconnection requirements. For example, the issue of negotiating access to capacity in foreign markets. Different infrastructures will need to interconnect and the provision of different services on infrastructures will change concepts of cost allocation and determination of fair interconnect prices and conditions. Foreign companies will also want to interconnect to different national networks and, in many cases, as global alliances develop, national and international networks will become more integrated creating difficulty in unbundling network components.

It is recommended that Governments give due priority to implementing effective, and flexible competitive safeguards to facilitate entry by market participants in a timely fashion and provide the framework for the private sector to overcome access problems. Governments need to put into place as rapidly as possible interconnection frameworks with emphasis on non-discrimination, transparency and an effective arbitration process. Co-ordination is needed at the international level. In this context governments should support the additional regulatory principles they each incorporated in their commitments on basic telecommunication services in the WTO.

Governments also need to take account of the fact that convergence and global alliances are creating new challenges as regards interconnection issues and requirements

Particular consideration must be given to the problem of fair allocation of scarce resources, such as spectrum or rights of way, for new entrants to the market.

Numbering and addressing policy

Linked with interconnection and non-discriminatory access issues is that of numbering. The development of information infrastructures, new services, and competition will require the implementation of a framework for management of numbering resources and number portability. Policy issues on numbering need to be taken at an early stage in the process of opening markets to avoid that incumbent PTOs use numbers to slow down the competitive process. In this context an important initiative by countries would be to establish a consultative body to represent all users of number resources. Premium numbers will also increase in importance and their allocation needs also to be undertaken within a proper regulatory framework. Number portability which enables customers to keep their existing numbers when they change from one carrier to another fosters competition especially at the local loop. For long distance or international communications users should also be able to choose an operator either by dialling an access prefix or via preselection.

The process of convergence is widening the 'numbering' debate to include different addressing and identification systems. In the case of the Internet, because it is an international medium, addressing is a global issue since only one unique global domain name is provided at present. Present structures for management of Internet addressing are of concern in that there appears to be no proper administrative oversight at the national or international level. This contrasts starkly with telecommunication numbering where increasingly regulators are taking authority for number management either directly or through private sector groupings which have a wide membership. Thus, there is a need to review the system used at present to administer the domain name system and examine whether new address registers are needed, whether they can be administered globally and whether competition should be promoted in the assignment of domain names. Adequate mechanisms for dispute settlements are also required. A complication in Internet addressing is that, unlike telecommunication numbering, Internet domain names are closely linked with trade marks (a second tier of numbers exist in the form of host addresses).

In the context of electronic commerce addressing issues are raised in terms of name assignment and management service for names³⁷. Such name assignment is closely linked with use of names and certification of authenticity, and thus encryption issues. This issue needs close international co-operation in that electronic commerce will be transnational.

Governments should ensure, preferably through a consultative body including suppliers and users of number resources, that an effective non-discriminatory numbering framework is established. The management of numbering resources, number portability, operator selection and preselection, should be implemented as soon as possible.

Consideration needs to be given to frameworks based on private sector co-operation for the co-ordination and management of Internet domain names and the identification systems for Internet sites.

Together with appropriate private sector bodies, governments should begin examining international solutions for electronic commerce addressing in terms of name assignment and management services for names.

Licensing

Technological convergence by allowing different infrastructures to carry a range of services also may result in similar services being subject to different licensing conditions (under different legislation) purely on the basis of technical considerations. It is therefore important that licensing regimes are reviewed in order to be coherent and consistent supporting multimedia development and diffusion and a multi-platform environment.

In particular, a review of licensing needs to streamline procedures and to ensure that the technological and competitive distortions licensing policy can easily impose are minimised. As information infrastructures develop it becomes increasingly important to ensure that common operating licences are available for facility providers, and to unbundle such licences in order to differentiate between facilities and programming. In many cases it may be appropriate to examine the possibility of moving towards use of general authorisations instead of individual licences in order to encourage market entry and to avoid, wherever possible, placing restrictions upon the number of licences allocated. Lowering market entry restrictions with a more open and efficient authorisation procedure is critical to lower the barriers to the development of a global communications economy.

Existing national licensing regimes for infrastructures should be reviewed in order to ensure coherent and consistent policies which support multimedia development and diffusion, providing licences in a transparent and timely fashion. The separation of licensing of infrastructures and transport services, from those providing authorisation for the provision of services, should be examined in countries where such licensing is bundled. Wherever feasible, Governments should give consideration to introducing a system of general authorisation or class licences.

Limitations on the number of licences should be avoided except where justified for reasons of limited resources. The allocation conditions of scarce resources such as spectrum, and the way these resources are used can, nevertheless, be affected by the type of services diffused.

Interoperability and standards

The necessity of having seamless interoperability among network operators has become well established among the communication industry in OECD countries. The telecommunication industry has had a long history of reaching international consensus in standards whereas the history of the computing industry is characterised much more by de facto standard setting. Interoperability has emerged to a significant extent from the process of competition and co-operation which has characterised many firms in information technology and software sectors, as well as through licensing agreements which by creating dominant market positions have resulted in de facto international standards.

The technological convergence between the information and communication sectors and the rapid development of new technologies have led industry and governments from a number of Member countries to place emphasis on the need for common standards (interfaces, protocols) and interoperability for information infrastructures. In the quest for a highly developed information economy, interoperability is important, both in terms of compatibility between systems and services, and different applications and services, to ensure the development of applications and services and their diffusion across the economy.

The lack of interoperability can have important negative social and economic consequences. These include reducing competitive forces and thus increasing dominance in a market, reducing economies of scale and scope, and reducing innovation and the rate of diffusion of innovations. In turn this would negatively impact on the employment growth prospects in new sectors, their diffusion across economic sectors and their potential impact on improving productivity. Interoperability can help reduce market transaction costs, and can stimulate market size and this in itself provides an incentive to companies to cooperate. Vibrant competition in the emerging markets in information products and services has been sufficient, in the view of some countries, to achieve a great degree of interoperability without necessitating government intervention; whereas in other countries there is a view that governments have a role to play with regard to ensuring interoperability.

The Internet certainly provides a good example of networks and services where public standards, such as TCP/IP, and the opening of access to all services has allowed a market to grow and provided ease of access to users. The success of the Internet is dependent on the fact that the different participating networks are able to communicate and exchange data, as are all the computer hosts connected to the networks. By being based on protocols which are open the Internet facilitates interoperability irrespective of computing platforms being used. Governments need to strive to achieve such interoperability in the context of GII-GIS, through appropriate oversight where necessary. The roots of the Internet are not commercial and the basic principles underlying the Internet were put in place when it was purely a research and academic network. It is important to replicate such a model in a commercial environment.

The different processes through which standards are set are not necessarily mutually exclusive and may depend on particular standards and the level at which they are applied. Thus, the debate is not between whether standards should be mandated, should be agreed to through voluntary consensus, or should be the result of market forces. Rather the key policy question is whether interoperability can be left to industry to reach agreement and the degree to which governments should be involved in the process of ensuring that consensus is attained. In other words, from the public policy perspective the question is whether, and in what detail, interoperability is a public or private sector issue.

The basis of GII-GIS is the network infrastructure, terminals attached to these infrastructures and the application software. These all depend on a number of essential interfaces which are important for open access for other equipment, software and service providers. Industry supports both developing common open standards and the protection of intellectual property rights for proprietary standards. Many support the idea of voluntary industry standards but giving the government a role in “assisting” in the promotion of open and interoperable interface specifications. However, the idea of providing proprietary interfaces in an open and non-discriminatory way to competitors is sometimes challenged by those who view this as affecting their intellectual property rights by making available their key technologies to competitors. Certainly when opening proprietary rights to exploitation the question of appropriate compensation and fair price is important. Here again, there are different points of view with some governments holding the view that they have a role, for example, to encourage the development of open systems. Whereas in other countries existing private sector practices are viewed as sufficient.

On the equipment standardisation side there seems to be a greater consensus on the need for firms to agree on voluntary standards. For example, the US private sector in recognising the importance of reaching rapid agreements on standards set up the ATM Forum aimed at accelerating the development and deployment of ATM products and services. This group has also set up a working group to examine issues of interoperability requirements and quality of service for small business and residential customers. The Forum has over 750 participating member companies, research organisations, government agencies and users and includes foreign enterprises. Other such informal bodies exist (for example, the Digital Audio-Visual Council), usually including the user community, and these bodies have helped speed the process of

standards. At the formal level the international standardisation bodies, such as the ISO and the ITU have also been working on a number of relevant broadband and other standards. Rapid development of new applications and products often means, however, that the slower official processes of standards agreement are not sufficiently flexible to meet the requirements of a rapid changing market. Excessive slowness in the standardisation process may foster the emergence of de facto standards and could undermine efforts towards interoperability.

A more general problem thrown up by the dynamics of change of the GII-GIS is that of encouraging the optimal investment incentives and, consequently of recognising property rights. As already mentioned new access infrastructures and sophisticated conditional access and customer interfaces require significant up-front investment in R&D as well as relatively high risk. The demand for key network resources and operating system standards to be opened up and made available to competing services needs to be balanced by a recognition of the property rights of the creator/rightsholder.

Governments are placing emphasis on GII-GIS because of the significant network externalities which are expected to occur. Companies can reduce the benefits of externalities by trying to appropriate potential welfare gains for themselves. The primary role of governments with respect to interoperability should be, at a minimum, to facilitate where necessary the ability of industry to obtain a rapid consensus on appropriate standards in order to ensure interoperability and rapid diffusion of new products and services. Private sector initiatives need to be encouraged in this context and transparency and openness for all market participants need to be encouraged. Secondly, governments need to provide adequate oversight to reduce the risks of dominant positions emerging as a result of standards, and the exercise of this market power which may distort market development. At the same time, governments must recognise that intervention and regulation may delay and discourage full development of the GII.

Governments can also take a pro-active role in encouraging international initiatives. For example the G7 Brussels Conference on the Information Society, in recognising the importance of interoperability, had chosen as their second theme area for a pilot project “Global Interoperability for Broadband Networks”. The objective of this project is to “provide a means for developing and testing transnational applications that will support the promise of a Global Information Society”.

The primary role of governments with respect to interoperability should be to provide encouragement towards consensus on appropriate standards, and in particular to encourage international initiatives in this area. Private sector initiatives should be encouraged, and actively supported by public procurement, while ensuring that these procurements are open to all market participants on a non-discriminatory basis.

The development of open standards by governments and the private sector, with appropriate emphasis on fair compensation, is important. Governments may need to maintain an oversight role to ensure conditions of non-discriminatory access.

Universal service and public access in the Information Society

Universal service in the telecommunication service sector has been a fundamental policy objective for all OECD countries. In general universal service obligations have constituted a requirement that public telecommunication operators provide basic telephone service to all who request it at a uniform and affordable price even though there may be significant differences in the costs of supply. Universal

service has also implied obtaining the service at similar quality levels. The provision of uneconomic telephony services subject to universal service objectives has been through cross-subsidisation usually through relatively high long distance charges and low charges for local access and use. In addition the geographic postalisation of connection charges and monthly subscription rates has also been justified as part of the universal service concept.

As the information society develops and more and more elements of the economy, education, entertainment, information and services in general become linked to networks there is increasing concern that developments could lead to exclusion of less privileged members of society which could increase the already existing gap between rich and poor. Data presented in the previous chapter are indicative of the already apparent gap in the possibility for network access between different layers of society. A number of governments have, therefore, taken the position that the concept of universal service needs to be extended to take into account the development of a network society and to ensure social cohesion.

A point that recurs throughout the discussion in this document on the pressures for change engendered by the GII-GIS is that of the significant shift from service specific networks and transmission methods to that of increased choices between multiple alternative networks, each capable of delivering an ever broader range of services. This shift clearly has an impact on the way in which universal service should be conceived and organised. In particular the identification of a particular service (for example voice telephony or TV broadcasting) with a particular access network and network provider (for example the national incumbent telecommunications network, or the national terrestrial transmission infrastructure) should be reviewed in the context of convergence.

There are two issues, although interrelated, which arise in examining the concept of extending universal service definitions for the GII-GIS. The first pertains to the need to determine policies for residential customers, in particular low income, and disabled subscribers, for advanced communication services. The second issue is to determine policies for public access to GII-GIS, in other words providing access to education, culture, health and other institutions.

Universal service in telecommunications

The recent pressure to clearly define the scope and provision of universal service as regards telecommunication networks and basic telecommunications services has come from the dynamics of increased liberalisation and competition in these areas. It has now been established in most OECD countries that competition, far from threatening universal service, will, in the presence of minimum safeguards, actually enhance it: improving affordability with lower prices, facilitating access through rapid infrastructure development and stimulating the diffusion of network technologies and innovations. However it is also recognised that there needs to be a mechanism for sharing out the responsibility and obligation to guarantee access and basic service provision to all at a reasonable and equitable price once the incumbent telecommunication operation is subject to competition from other network operators.

In this context the *scope* of universal service is defined as a minimum safety net for all, alongside the many other service, network improvements and lower prices which will result from competition. Alongside access to a network capable of providing basic services (voice, fax, data) at a given quality and speed, this generally includes the voice service itself as well as emergency services, directory services, access to public payphones and targeted special services for particularly disadvantaged or disabled persons. This universal service is then guaranteed to all citizens at an averaged (i.e. equal) and affordable price, regardless of actual costs.

Although recent research has shown that the actual cost of providing such access and service is much less than originally assumed and is, indeed, shrinking significantly over time³⁸, the question of *financing* universal service is still an important one. Most recent policy initiatives in this area in OECD countries have tended to favour the setting up of a special universal service fund. Contributions to the fund are made by eligible operators depending upon their size or market share. The question of who is eligible to pay involves the weighing up of the benefits of greater dispersion of responsibility with the significant administrative burden of monitoring and collection. It also involves an assessment of whether too broad a sharing of the responsibility may be creating inefficient barriers to entry for new small players. On the whole there is some consensus on the principle that public network operators should be the main contributors. The question of who provides the actual service which is to be defined and subsidised as ‘universal service’ is related to, but should not be confused with, the categories involved in scope and financing.

The development of a networked economy, the growth of electronic commerce, and in new multimedia applications and services calls for a widening of existing universal service definitions to ensure that residential customers are able to access and interact with the range of new services. The difficulty in expanding definitions is that it is not simple to provide service specific definitions because of the wide and expanding range of services. Neither would it be useful to define a new universal service concept on the basis of access to particular network resources or which are defined by specific technical specifications since this could bias investment decisions and may negatively impact on fledgling technologies which have future promise to provide local loop access. Neither policy makers nor industry is in a position to reliably predict the implications of technological progress and commercial innovations over the coming years. Therefore, while regulators should be prepared to widen the definition of universal service, decisions should not be taken prematurely and care should be taken not to bias investment decisions.

Public access to the new services of the Information Society

Linked to the notion of a widened definition of universal service is the concept of “public access” to new services. The scope of such “public access” will include a variety of resources, components and services which extend far beyond that which is commonly described as telecommunications. For example, access to resources such as computer hardware and software, provision of education, electronic access to public and government services, may well be considered essential components for participation in the information society. This may involve:

- information, publicity and training to initiate the unconnected;
- education programmes for schooling and learning on-line;
- establishment of networks and data-pools for health-care professionals;
- public library reference information;
- Internet sites for museums, galleries and other cultural resources;
- electronic delivery of government services including up-to-date information on policy and regulatory developments, improving the transparency of government institutions and mechanisms.

This enhanced universal service concept, or public access, will thus tend to encompass and co-ordinate a much broader body of different policy frameworks and related funding mechanisms than the telecommunication element described above.

Furthermore, the question of ensuring the actual points of access for such services and resources may not necessarily (particularly in initial stages) be focused on the residential household. Public access points or service 'kiosks' might be set up in areas such as educational establishments, libraries, community centres and museums. These would provide access to resources which represent the gateway to the information society: computer terminals, software, applications and broadband access to the Internet and other on-line services.

Educational establishments and other public access points will have a variety of other needs including training, the setting up of internal networks and technical support. Telecommunications needs include access to a network of sufficient speed and capacity, affordable and predictable tariffs and maximum choice as regards bandwidth and network operation.

As concerns the communications needs of these public access points and services it may be advisable, at least initially, to give the industry an opportunity, and encourage them, to meet the requirements commercially. If it transpires that subsidies are required to provide adequate incentives for communication operators it may be appropriate that funding is found from broader sources than the communication universal service fund which is paid for by the operators themselves. In any case, there can be expected to be significant competitive incentives for communication operators to make high speed access available at special rates and conditions to the type of institutions outlined above. These include, for example the commercial benefit of increased publicity and positive public relations as well as the advantage over time of a large guaranteed user base.

However, governments should also be on their guard against anti-competitive incentives in this context, especially on the part of the dominant incumbent telecommunication infrastructure provider. In communication markets where competition is soon to be, or barely, established, the latter may have a strong incentive to capture such large public customers with attractive special deals simply in order to prevent their potential rivals from gaining a foothold in this market. For budgetary reasons, the public institutions, thus connected, will often not be in a position to change to more attractive operators or networks once competition has become more established. Certain safeguards might be borne in mind in this context, such as ensuring that the duration and terms of the contract between the institution and the telecommunication operator should be clear and transparent. Wherever possible it would be preferable to ensure open competitive tendering for such contracts i.e. where network competition exists or is soon to exist it should have the opportunity to match or better the incumbent's offer.

As concerns the non-telecommunication elements, such as provision of hardware, software, training and the information services themselves, funding may come from a variety of sources and government initiatives. These might include sponsorship of pilot projects, health, education and arts budgets and new co-ordinated information society financing frameworks. The UK, for example, has recently announced its Information Society Initiative which includes: support and guidance for small businesses, the creation of partnerships between the private sector, central and local government and voluntary organisations to raise awareness and promote access to IT among the public, the Education Department's Superhighways Initiative, the NHS (national health services) strategy for developing health data networks and the creation of a new Information and Communications Technology Fund to use proceeds from the National Lottery to provide and enhance the electronic and public provision of information and cultural services.

As the information society develops and more elements of the economy, education, information and entertainment are linked to networks it is increasingly important that the less advantaged and vulnerable members of society are not excluded or left behind by being “unconnected”. The concept of universal service needs to be developed and adapted to reflect the shift from service specific networks to that of multiple alternative networks, each capable of delivering an ever broader range of services.

As regards the scope of universal service it is recommended that existing concepts be reviewed to consider what new services may be necessary for people as citizens and consumers in the information society. Particular attention must be paid to ensure that all segments of society, and geographic locations within a country, have the opportunity to access advanced information services at a reasonable price.

Consideration should be given to setting up public access points in areas such as educational establishments, libraries, community centres and museums, providing new, open gateways to the information society: these would provide access to computer terminals, software, applications and broadband links to the Internet and other on-line services.

In definitions of universal service, the identification of particular services with a particular network technology or infrastructure should be avoided. Subsidies for universal service provision, if necessary, should be transparent. Consideration should also be given to mechanisms of competitive bidding so as to guarantee the best and most innovative operators and service providers are awarded associated subsidies and funding where appropriate.

Governments are encouraged to promote information society financing frameworks drawing on initiatives and support from various bodies concerned with, for example, education, health, the arts, information technology and computing.

As far as advanced telecommunications access is concerned the industry should be encouraged to meet the requirements of public institutions and associated public access points commercially. In this context safeguards concerning open and competitive tendering and transparent contracts may be relevant.

Pricing

Pricing structures and pricing policies may be one of the most important policy areas with regard to national and global information infrastructures. Network-based applications will only develop if the correct pricing signals are provided to service providers, and to users. The only practical way of identifying efficient, cost based prices in an economy characterised by shared network resources is through competition. Non-competitive markets suffer from a lack of responsiveness to new demands and do not encourage cost based pricing. The experience of the Internet is indicative here: those countries with competitive markets have tended to have the most buoyant growth in Internet hosts and in the development of Internet access because of lower prices and more innovative pricing packages.

In that the most efficient pricing structures will develop through a competitive market, the primary aim of policy and of regulatory frameworks should be to accelerate market competition. However, existing telecommunication pricing structures were formed within monopoly markets and do not in most cases reflect either efficient price levels or structures. Further, experience has shown that the development of competition in telecommunication, especially at the level of the local loop, is a lengthy process so that governments need to play an active role in ensuring that competition emerges. Non-competitive markets

present severe pricing problems since they do not encourage innovative pricing and responsiveness to new demands. Instead the tariff rebalancing that is occurring is making the local charges in these countries even more expensive relative to those with competitive markets. This will have negative implications on job growth and economic activity in those countries. Non-competitive markets have an economic interest to accelerate market opening since there are many new by-pass communication technologies emerging which will dilute revenue growth for their own operators while not providing their economies with the efficiency benefits from competition.

As argued earlier allowing open infrastructure competition, open access to services and promoting the emergence of alternative infrastructures can facilitate a rapid restructuring of prices to reflect costs. Often it is argued that the incumbent facilities-based operator needs to rebalance prices before competition is introduced. This argument has tended to delay reform and has usually not resulted in rapid and efficient price rebalancing.

The development of network-based services will change present usage patterns of communication networks quite drastically. Pricing structures based on relatively low and predictable usage are far from adequate for high levels of usage with less predictable connect times and peak times. Neither will present pricing structures be able to support lengthy applications such as file downloading or video programming. The use of time-based pricing structures on public switched telecommunication networks is in particular problematic in this context. In dynamic competitive markets, a firm's economic behaviour is forward-looking, that is, a firm takes action based on the relationship between market-determined prices and forward-looking economic costs. Prices based on forward looking costs give appropriate signals to producers and consumers, and ensure efficient entry and utilisation of the telecommunication infrastructure.

In the transition to a broadband environment governments should retain the possibility to control pricing, but should wherever possible allow the market mechanism to play the primary role. However, it is important for governments to have reserve power to control prices, if necessary, since it is conceivable that public switched network operators with dominant positions and broadcasting entities also with dominant positions could through pricing structures influence their competitive position.

These national pricing problems also have international spillovers in a GII environment. For example, a major reason that an insufficient amount of local content is available in some countries for information infrastructures, is because domestic producers and users do not have efficient access to networks and have therefore not developed a market attractive to national suppliers and users. The domestic production of content may, thus, depend in part upon economical access to distribution systems.

International tariff structures

The inefficiencies of the international telecommunication pricing framework, and especially the system through which operators compensate each other for the termination of international calls (the accounting rate and settlements framework), has for a number of years been singled out in OECD work as requiring drastic reform³⁹. In this area again the rapid introduction of competition would provide the best means to restructure international telecommunication pricing structures. However, even as markets open, incumbent operators are likely to retain an important market share and market power. Although new forms of competition, such as international simple resale, call-back, and Internet telephony, will place further pressure on revenues and their share of international traffic, regulators need to ensure that accounting rates

decline rapidly reflecting underlying costs of transmission and termination. In addition, as global alliances develop there will be a need to ensure that carriers with a dominant position in their home market do not use this position unfairly to gain international market advantage.

Inefficient international pricing structures can adversely impact on the development of a global information infrastructure and has negative implications for the development and diffusion of new network-based applications, and in stimulating new market development. Countries with closed markets are already feeling the impact of by-pass technologies on their international revenues.

International agreements on the principles underlying international interconnection will be of particular importance for OECD countries in the development of new principles for charging for the termination of international traffic. This will be critical to the transition period to a competitive market. Such policy initiatives need to be undertaken rapidly in view of the opening of many OECD markets to facility-based competition and of the recent WTO agreement on basic telecommunication services.

Market opening should take place in conjunction with price rebalancing but should not be unnecessarily delayed by such requirements. Since efficient pricing structures will be best achieved through competitive markets, governments should aim, primarily, to accelerate the process of competition. There may be reasons to maintain oversight on pricing issues until competitive markets have emerged.

New and flexible pricing structures need to be adopted to reflect the fundamental change occurring in network usage patterns, especially as regards time based pricing.

Special efforts must be made to attain cost-oriented international accounting rates and pricing principles for international access, although adjustment periods may vary according to differences in the development of the countries concerned. It should also be recognised that alternative international interconnection arrangements will become increasingly significant. The rapid introduction of competition in the international facilities market would provide the best means to meet the urgent need to restructure international telecommunication pricing practices.

Institutional and regulatory structures

Regulatory structures for communication markets in OECD countries need to mirror the market structures which they regulate. Most countries still have regulatory structures dedicated to telecommunication, and to broadcasting, supplemented by regulation for content. The different bodies concerned with regulation of infrastructures and services are shown in Table 3.1.

As stressed earlier, developments in network technology and digitalisation are resulting in a gradual but radical process of convergence between different technological platforms which will ultimately allow networks to be used in an undifferentiated way to provide transport to broadband and narrowband services. These infrastructure and related service developments imply the need for a parallel adaptation of existing definitions and concepts used in the regulation of these markets. This should lead to a fundamental review of the institutional and regulatory frameworks governing licensing, access and use of infrastructures and provision of services.

Table 3.1: Broadcasting regulatory authority in the OECD area

Country	Audio-visual policy	Carriage regulation	Frequency allocation	Content regulation	Others
Australia	Department of Communications and the Arts	Australian Broadcasting Authority (ABA), National Transmission Agency	ABA	ABA	Spectrum Management Agency
Austria		Federal Chancellery/Department for the media, Ministry of Science, Transport and the Arts	Ministry of Science, Transport and the Arts	Commission for the Observance of the Broadcasting Act (RFK), Regional Radio Authority and Committee for the Observance of the Radio Laws	
Belgium	Ministry of Culture, and Social Affairs (French-speaking Community), Ministry of Culture (Flemish-speaking Community)	Ministry of Culture, and Social Affairs (French-speaking Community), Ministry of Culture (Flemish-speaking Community)		CSA (Fr.), Media Council (Fl)	Advertising Standards Committee (Fr.), Commercial Advertising and Sponsorship Council (Fl)
Canada	Department of Canadian Heritage	Canadian Radio-television and Telecommunications Commission (CRTC), Industry Canada	Industry Canada	CRTC, Canadian Broadcast Standards Council (CBSC)	
Czech Republic		Czech Telecommunication Office	Czech Telecommunication Office	Council for Radio and TV Broadcasting	
Denmark	Ministry of Culture	The National Telecom Agency	The National Telecom Agency	Local Radio and Television Board, The Satellite and Cable Board	Advertisement Commission
Finland	Ministry of Transport and Communications and Ministry of Education	Ministry of Transport and Communications	Telecommunications Administration Centre	Ministry of Transport and Communications, and Ministry of Education	Ministry of Finance, and Government acting as a whole

Table 3.1. Broadcasting regulatory authority in the OECD area (continued)

Country	Audio-visual policy	Carriage regulation	Frequency allocation	Content regulation	Others
France	Ministère de la Culture, Ministère des technologies de l'information et de la Poste	ART	CSA	CSA	Conseil Supérieur de la Télématique (CST)
Germany	Federal Ministry of the Interior Federal Ministry of Economics Federal States (Länder)	Federal Ministry of the Interior Federal Ministry of Posts and Telecommunications Federal States (Länder) Supervisory authorities for private broadcasters (Landesmedienanstalten)	Deutsche Telekom AG Supervisory authorities for private broadcasters (Landesmedienanstalten)	Federal States (Länder) and several Federal Ministries	
Greece	Ministry for the Press and the Mass Media	Ministry of Transport and Communications	Ministry of Transport and Communications	National Council for Radio and Television	
Hungary		Ministry of Transport, Communications and Water Management, Hirkozlesi Fofelugyelet (Telecom Superinspectorate)		Radio-television National Council	
Iceland	Ministry of Communications, Ministry of Culture and Education			Audiovisual Commission	
Ireland	Department of Arts, Culture and the Gaeltacht	Independent Radio and Television Commission (IRTC)	Telecommunications and Radio Divisions	Department of Arts, Culture and the Gaeltacht	Broadcasting Complaints Commission
Italy	Ministry of Post and Telecommunication	Ministry of Post and Telecommunication	Ministry of Post and Telecommunication	Parliamentary Supervisory Committee, Office of the Guarantor for Radio Broadcasting and for Publishing	
Japan		Ministry of Posts and Telecommunications	Ministry of Posts and Telecommunications	Ministry of Posts and Telecommunications	

Table 3.1. Broadcasting regulatory authority in the OECD area (continued)

Country	Audio-visual policy	Carriage regulation	Frequency allocation	Content regulation	Others
Korea	Ministry of Information and Communication (in Ministry of Information)	Ministry of Information and Communication (in Ministry of Information)	Ministry of Information and Communication (in Ministry of Information)	Korea Broadcasting Commission	
Luxembourg	Premier ministre (The Media and Broadcasting Department)	Ministry of Communications	Ministry of Communications	National Council for Programmes	
Mexico		Ministry of Transport and Communications	Ministry of Transport and Communications	Direccion General de Radio, Television y Cinematografia de la Secretaria de Gobernacion	Secretaria de Educacion
Netherlands	Ministry of Education, Culture and Science	Ministry of Transport & Public Works and Water Management	Ministry of Transport & Public Works and Water Management	Commissaat voor de Media	
New Zealand		Communications Division, Ministry of Commerce	Communications Division, Ministry of Commerce		Broadcasting Commission, Broadcasting Standards Authority (BSA)
Norway	Ministry of Cultural Affairs	Norwegian Telecommunication Authority (NTA)	NTA	The Mass Media Authority	
Portugal	Secretary of State to the Presidency of the Council of Ministers, Prime Minister	Secretary of State to the Presidency of the Council of Ministers, Prime Minister, Ministry for Equipment, Planning and Territorial Administration	Ministry for Equipment, Planning and Territorial Administration Portuguese Institute of Communications (ICP)	High Authority for Mass Communication	
Spain	Ministry of Public Works and Transport	Ministry of Public Works and Transport	Ministry of Public Works and Transport	Conseil de l'Audiovisuel	Ministerio de Educacion y Cultura

Table 3.1. Broadcasting regulatory authority in the OECD area (continued)

Country	Audio-visual policy	Carriage regulation	Frequency allocation	Content regulation	Others
Sweden		Radio and TV Authority		Radio and TV Authority, Broadcasting Commission, Chancellor of Justice / Attorney-General	
Switzerland	Federal Department of Transport, Communications and Energy (DFTCE)	Federal Office for Communications (OFCOM) , Swiss PTT	OFCOM , Swiss PTT	DFTCE, Independent Authority for Examining Complaints about Broadcasting	
Turkey		Ministry of Transport and Communications	Ministry of Transport and Communications	Radio and Television Supreme Council	
United Kingdom	Department of National Heritage	Department of National Heritage, Independent Television Commission (ITC), Radio Authority	Radiocommunications Agency	Department of National Heritage, ITC, Radio Authority	BBC , Broadcasting Standards Council, Broadcasting Complaints Commission
United States		Federal Communications Commission (FCC) , PUC in each state	FCC	FCC	NTIA

Note: The authority involved in both telecommunication and broadcasting is shown in bold.
Source: OECD, Dossiers de l'audiovisuel, Médias et Sociétés, Télévision in Europe.

The consensus that the transition to an information society based on information infrastructures will take place via competitive market structures implies, as well, that the task of regulators will need to shift from restricting market access to encouraging it. Their task will be to allow and provide the proper incentives for the interconnection of broadband networks, ensuring appropriate conditions for access and use of these networks, and oversight of pricing in the market and competitive performance of the market.

Since it will become increasingly difficult to have technical or practical separation between broadcasting and telecommunication markets, and given the dynamics of convergence of infrastructures and services, a review of the existing regulations, and the maintenance of distinct administrative bodies and procedures, should be considered. Even though many OECD countries have only recently adopted new telecommunication legislation, the development of converged markets and growth in multimedia services may require further changes to institutional and regulatory frameworks.

Technological trends, including convergence, affecting electronic delivery systems, have also raised concerns regarding the means for achieving national goals and objectives, notably those surrounding content production and distribution. The development of multi-channel transmission, and the subsequent dedication of individual channels to particular “thematic” (in contrast to general) programming (such as sport, news, films, etc.), may necessitate the adaptation of current broadcasting regulations, including those concerned with television and radio transmission of foreign and domestically produced content, as well as restrictions of foreign ownership of broadcasting entities. In addition, in that information infrastructures (such as the Internet) will support a range of integrated services this may make it technically difficult to maintain the existing service distinctions as well as differentiate between the different types of information carried on these networks, but it may also make it technically difficult to distinguish the origin of services carried on networks. Therefore, it is difficult today, to foresee how content will be regulated both as to the type of content as well as in terms of its cultural origins given the expansion in number of channels, and the globalisation of networks and services. The potential diversity of content, the fact that content can be ‘assembled’ on line raises questions of whether it will be technically possible to ascertain where a particular programme was produced and the extent of its ‘national’ content. However, governments retain the responsibility to ensure public safety and national security, the protection of citizens and the promotion of cultural diversity.

A review of the institutional and regulatory frameworks governing licensing, access and use of infrastructures and provision of service may be required. Such a review would need, in particular, to take a fresh and forward looking perspective on the implications of the changing relationship between the service of carriage or transmission of communications, and those services which are essentially concerned with the provision of the content of such communications for public consumption.

Given the phenomenon of convergence, governments should review, if necessary, their existing regulatory structures in order to streamline them and ensure that they are adapted, where necessary, to continue to achieve in the most effective way the given policy goals.

Developing economies

Access to the GII-GIS is a global issue which must include all communities and in particular the developing economies. Just as when considering the issue of universal service there are network diseconomies when segments of society are disconnected, so at the global scale when a large percentage of the world is disconnected there are similar diseconomies. It has already been recognised that the challenges of integrating the less industrialised countries of the world into the GII-GIS are substantial but that they must be met, primarily through forms of international co-operation. In 1996 South Africa hosted the Information Society and Development (ISAD) Conference which accomplished three primary objectives regarding the GIS: to launch a dialogue both within the developing world and between the developed and developing worlds; to initiate the process of defining a shared vision; and to work towards “Common Principles” and “Collaborative Actions”. The ISAD participants resolved to continue the dialogue, in particular, committing to fostering partnerships between the public and private sectors and to a process of national information society planning in each country. Developing countries that made offers in the context of WTO negotiations on basic telecommunications may benefit from increased investment funds as their markets open. The ITU also plays an important role in relation to issues for developing countries concerning standardisation and global resources such as spectrum and orbital slots. Furthermore, the World Bank is providing significant assistance in the provision of the financial resources for network development.

For the ITU the GII has been recommended as a priority area to include actions which facilitate the introduction of competition, private investment and market-opening reforms in domestic and international telecommunications. In this context ITU Members have placed emphasis on the need to take appropriate measures to ensure that there is an orderly transition from the existing accounting rate mechanisms to a new set of arrangements, and to address issues arising from the convergence of the telecommunications, computer and broadcasting sectors, and to provide a forum for continuing to discuss and develop the concept of the GIS on a truly global basis.

The concept of GII is important in helping to diffuse the message of the role of communications and information technologies in economic development and expansion, to help in the process of formulating effective national and regional regulatory frameworks and policies by developing common principles, and in helping to enhance and strengthen economic linkages. It is also a recognition that global economic links are changing rapidly with the new possibilities and challenges arising from the rapid development of new network-based multimedia applications. Thus, the emphasis on open markets is not intended to suggest that the only concern behind global information infrastructures is to eliminate barriers to trade. On the contrary, the concept of global information infrastructures must be viewed also as a mechanism to enhance world-wide co-operation in the development of infrastructures and multimedia applications among the developed economies, and especially between the advanced and the developing economies. Part of the policy framework by OECD governments must, therefore, be to explore ways to enhance co-operation with developing economies. Projects, such as the Asia-Pacific Information Infrastructure (APII) initiative can help in this regard.

Such co-operation needs to be built on, in some cases through continuing co-operation on pilot projects, in other cases through more practical implementation of global projects which have important social or economic spillovers. Exchanges of information in a number of areas are also essential to hasten the process of change: these could include experiences in regulatory reform, problems and benefits in different fields of applications, the economic and social impact of applications and new technologies and the appropriate administrative structures.

Alongside pre-competitive research and in exchange of information, training is in particular important for developing economies. Ensuring co-operation by local companies is also necessary in a number of application areas, and in the determination of standards for new applications. Developing economies encompass a range of economic, social and technological conditions which therefore influences their capacity to move toward GII-GIS frameworks.

An increasing number of developing economies, which lack even a basic telephone infrastructure, may wish to open their markets and be guided by the principles of the G-7 conference in Brussels, which were acknowledged by the South African Information and Developing Countries Conference. Over the last several years there has been an increasing number of developing countries which have rejected inefficient monopoly market models for telecommunications services, and have put emphasis on building up their infrastructure through competitive markets and attracting foreign capital and know-how. Experience has shown that each nation that has opened its telecommunications markets to competition has both increased its investments and benefited its consumers and businesses. More importantly, such countries have accumulated benefits throughout the economy at large from applications that are based on these infrastructures. In this context the significant achievements of many of these countries to table progressive market access offers in the framework of the WTO basic telecommunications agreement should be commended.

The problem of accelerating development of national communication infrastructures of the developing economies has been a key policy issue for well over a decade. Much more needs to be done, than in the past, to close the development gap and especially to ensure that developing economies in trying to build their networks are investing in appropriate technologies for the information economy. This renewed effort is in particular important because of the danger that the development gap may increase as a result of OECD economies rapidly building up their broadband infrastructures. The capital deepening process in OECD countries is already accelerating, and could move significantly faster than the capital expansion process in many developing countries.

The aim of developing economies should be to develop their networks as rapidly as possible so as to reap the benefits from the GII-GIS.

OECD countries need to use their regulatory experiences to assist the development of infrastructures and applications, in countries still lagging behind. There are both positive and negative lessons which can be learned from the process of infrastructure development in the OECD area. Above all, developing economies need to leap-frog into the present economic paradigm emphasising economic efficiency, flexibility and competition. The continent of Africa needs to be given special emphasis given that on average, its infrastructure development is extremely weak relative to the rest of the world.

The emphasis on infrastructure development, while important, must not detract from the main goal which is the creation of conditions to transform existing societies and economies toward an information society, and develop and diffuse network-based applications which can help improve social and economic conditions. Information infrastructures and the development of network-based multimedia applications allow developing countries to use their knowledge-based skills and culture to create new employment opportunities, and ultimately to rely less on a development model based on resource exploitation.

As part of the GII-GIS policy framework, OECD Governments must explore ways to enhance co-operation with governments and social partners in developing economies as a matter of some urgency. This needs to involve the co-operation of both local and foreign commercial interests.

OECD governments should provide regulatory training to developing economies, either bilaterally or through regional organisations. This must include exchange of information, know-how and experience as well as practical training.

4. APPLICATIONS AND SERVICES IN THE GII-GIS

Introduction

The increase in productivity and jobs in the GII-GIS will depend on the development and diffusion of applications and services. While closely linked with the general development and access to information infrastructures, the growth of applications and services is also linked to policy issues concerning the production and distribution of multimedia content. The digital technologies involved in the switching and transmission of information services and entertainment services are also changing how content is produced, delivered, and shared. Interactivity and digitalisation change fundamentally many existing data and information services, as well as entertainment services and products.

New economic growth and job creation in network-based services will be largely dependant on the process of devising appropriate institutional and policy reforms to support the distribution and sale of these services. These frameworks can significantly affect the speed of investment and innovation in new services on the supply side, and can stimulate demand for new services and related products.

Government policies and the process of regulatory reform for new network-based services need to be considered within a broad perspective. In contrast to traditional media, the digital technologies underlying the production, storage and delivery of information and entertainment content within the emerging GII-GIS will be provided by rich interactive multimedia. These interactive capabilities impact on, and bring about the convergence of, many social and economic interests in new ways. Therefore, in undertaking decisions for applications, such as electronic commerce, or new public services, the process of government decision-making must be transparent. The achievement of broad goals must be undertaken through an open, dynamic and competitive process. The changing nature of content production has eroded the traditionally distinct definitions of many textual, audio, and visual services broadening the range of economic interests concerned with how intellectual content can be valorised under different market and regulatory conditions.

OECD countries are seeking to stimulate service development within a general framework of overall market liberalisation of delivery systems. Global production, marketing and distribution do not fit well with national initiatives which limit foreign access to content markets.

Multimedia content and intellectual property rights

Governments have recognised the importance of content markets for the growth and development of the GII-GIS. The administration of intellectual property rights assists in defining content markets, and affects how content might be produced, shared and traded. Such measures either implicitly or explicitly embody concepts of social and economic value. While such definitional measures will be even more vital in an information economy, new network-based production and distribution of digital content sometimes may pose challenges to traditional definitions of intellectual property and national enforcement of intellectual property rights. Many of these challenges have been successfully met by the reaffirmation

and further development at the recent WIPO Diplomatic Conference of the international framework embodied in the Berne Convention and the TRIPS Agreement. But the resolution of some potential difficulties still remains uncertain within existing frameworks.

The emphasis in GII-GIS on developing content as a new growth sector has brought the issue of intellectual property protection⁴⁰ explicitly to the forefront of how the economic value of services' content is created and optimised in a network-based digital environment. Global information infrastructures will likely result in a significant expansion of markets for creative material to be traded globally. At the same time, the very technologies stimulating new growth are also increasing the possibility to take advantage of multimedia content without the necessary authorisation or remuneration. The ability to access content globally, declining copying costs and increasing ease in copying, creating perfect copies and in transferring original content, ease in integrating original content in other products and services, are factors that need to be considered as and rightsholders determine how their works should be used.

Investment and high quality content will only emerge on information infrastructures if adequate, and balanced, protection regimes are in place and are enforced. The existence of balanced, effective copyright protection will encourage the creation, promotion and distribution of new works. However, it is sometimes argued that if protection for existing rights holders is made too tight, creation and diffusion of new products, and particularly new combinations of existing content could be deterred.

There is already a long-established international framework for the protection of intellectual property involving numerous international conventions and international organisations.⁴¹ The protection of copyrights and related rights in works transmitted over information systems in digitised form was recently addressed in two new treaties concluded in December 1996, under the auspices of the World Intellectual Property Organisation - the WIPO Copyright Treaty and the WIPO Performances and Phonograms Treaty. Broadly speaking, both treaties ensure that existing copyright and neighbouring rights concepts respect both the granting of rights and the limitations and exceptions to them.

The ability to access content, ease in distribution and multiple transmission channels which are being developed globally are naturally of concern to content providers. The Internet, by its nature, is an open medium and copyrighted material is made widely accessible. However, it is still undecided in most OECD countries how the burden should be shared for ensuring the integrity of content, its proper use and remuneration. In some countries the opinion is held that, in addition to content providers, infrastructure operators and Internet access providers, whose role is to transmit digital information and facilitate access, should bear some of this burden. Other countries believe that the burden to ensure the integrity of content should not be the responsibility of infrastructure operators and Internet access providers to the extent that they provide technical intermediation. Over 150 governments decided not to address this issue at the recent WIPO Diplomatic Conference. Nevertheless, some governments have expressed a desire to address this issue. Provision may be made in certain special cases to permit reasonable uses that do not conflict with a normal exploitation of the work or phonogram and which do not unreasonably prejudice the legitimate interests of the rightsholders.

The development of information infrastructures and multimedia capabilities is providing content providers and copyright holders with the potential to gain access to an enormous market. This potential presents content owners not only with new opportunities, but also with new challenges to the protection of their works.

Digitalisation may be seen as not only presenting problems for copyright, but also as offering solutions. It facilitates its own administration with the sophisticated manipulation and encryption of the data which it makes possible. Effective technical responses in this vein include "locks" (limiting the

scope for subsequent reproduction) and “fingerprinting” which can track down reproduction. Some solutions involve encryption whereby computer programs are applied to convert material into an unrecognisable encrypted or “scrambled” form and from which the original cannot be recovered without application of a suitable code or key.

Identification and remuneration of copyrights

The practical complexity of managing the large number of copyrights (from the information, entertainment and computing industries) in multimedia products is sometimes cited as a problem facing the development of new services. In the UK, for instance, a typical on-demand service will be governed by the Copyright Designs and Patents Act 1988 as amended by the Broadcasting Act 1990 and secondary legislation enacting European Union law as a "compilation" or "film", both defined in relatively wide terms.⁴² However, the problem of rights clearance for multimedia products has also been successfully surmounted in a number of cases by creators of multimedia products. The challenge for Internet-based products is that multimedia services incorporate content covered by different degrees and kinds of copyright. This is a particularly difficult question in regard to international trade in services, as rights for different contents differ between countries; greater harmonisation of IPR regimes in different countries would facilitate this process. However, because Internet-based network services enable world-wide access to, creative interaction with, and delivery of content for new multimedia services, the problem could become more acute as technologies develop in sophistication. The complexities of copyright clearance will need to be taken into account by both copyright owners and users.

Increasing the complexity is the question of defining simple licensing procedures for different forms of content so that they can be quickly incorporated into multimedia products. Some countries (such as in the European Union) believe that this includes the means for identifying the licensee, and ensuring that mechanisms exist for managing remuneration processes, in a timely way, given the rapid competitive conditions for production and trade in new, digital network-based services. Again international processes of production and remuneration are becoming increasingly important but may prove difficult if copyright procedures are only left to national determination.

In the case of intellectual property, the inability in Europe to patent computer programmes is sometimes viewed as a brake on development in this area. For trademarks, it is viewed as necessary by some countries to resolve problems of conflict linked to the allocation of domain names on Internet and use of names which have a trademark where there are a number of holders of identical marks for different products and services.

Governments should adapt intellectual property law as appropriate to reflect the changes which digitalisation of works has brought about. In this context Governments should bear in mind the interests of creators and of rightsholders in content for an effective copyright regime, as well as taking into account the interests of distributors and users.

In adapting intellectual property laws, Governments should also recognise and encourage new technological solutions becoming available to meet the challenges brought about by increasing digitalisation and network diffusion of content. Such adaptation should take account of the globalisation of networked digital content and the extent to which it can ignore physical territorial boundaries.

In this regard Governments should take note of the recent WIPO Conference on Certain Copyright and Neighbouring Rights Questions whereby, in December 1996, two new Treaties were adopted: the WIPO Copyright Treaty and the WIPO Performances and Phonograms Treaty. The new WIPO framework provides a response to the new challenges raised by GII-GIS.

Electronic commerce

The ability to use communication networks for interactive applications has led to the development of electronic commerce which allows for online transactions for the exchange of goods and services. The types of transactions undertaken can be wide-ranging from informal personal correspondence, to exchange of information, exchange of formal documentation, to transactions involving payments. Where transactions become commercial and take on value, monetary or otherwise, then the complexity of their treatment on networks increases. This is because existing commercial transactions are based on well entrenched conventions, regulations, laws and administrative procedures, obligations and trust.

The steps required by business, governments and consumers for transactions include a number of activities such as finance, logistics, procurement, deliveries and transportation. Each of these activities require interchanges of information, obligations, or monetary value between organisations and individuals. Thus, the concept of electronic commerce, although it includes payment issues, is much wider, encompassing a range of transactions which are embedded in modern society⁴³. The development of commerce through networks will require that existing commercial procedures and, above all the trust and protection engendered through use of these procedures, be replicated in a different form for use on network infrastructures. The issues can be covered under the heading of transaction safeguards.

The physical and software defined building blocks for electronic commerce are⁴⁴:

- the communication networks and computing infrastructure;
- the enabling infrastructure service layer; and,
- the application layer.

The rapid development and diffusion of electronic commerce applications therefore depends on ensuring the availability of the infrastructure and of access to and use of infrastructures for applications and services. There is also the necessity for interconnection and interoperability between network infrastructures, applications and services in each of the different layers. The second, or systems layer, of the electronic commerce model provides the communication services, including system security, authentication software, processes to ensure confidentiality, message delivery reports, etc., which are not subject to repudiation. The services and software in this layer need to be able to integrate with a range of terminals and networks.

The third layer of electronic commerce must be capable of interlinking a range of applications, and must be simple and transparent to users. Also for suppliers ease in managing data, responding to requests, addressing, etc., is necessary. This layer provides the transparent interface between buyer and seller providing the means to enter into transactions, and complete these transactions while ensuring confidentiality, security (e.g. through cryptographic solutions), signed receipt of orders and of payments, and the necessary electronic audits of transactions. In short, all requirements necessary for a buyer to purchase or to sell goods or services.

These three layers are reflected in the G-7's pilot project on SMEs⁴⁵ which places emphasis on the contractual and financial aspects, the payment and allocation of ownership rights (intellectual property), privacy and security, and multilingual support.

For all forms of electronic money network integrity and security of transactions remain necessary. It is also important that governments encourage market participants to develop compatible hardware and software standards allowing for interoperability of the different electronic payments systems. Particular stress needs to be placed on open standards to facilitate new entry into the market.

The policy role of governments in electronic commerce is multifaceted with issues relevant to a range of government policy areas, including money supply and other financial instruments, banking, taxation, consumer protection etc., and assessing the impact of electronic commerce on existing entities, institutions and microeconomic structures. Given the importance attached to electronic commerce in terms of the creation of new economic activities and jobs there are several major issues where policy needs to focus:

- first, there are issues related to the provision of infrastructure and access to and use of these infrastructures by market participants (covered in the previous Chapter);
- second, issues related to the protection of suppliers and consumers;
- third, issues related to financial instruments and payments.

A key requirement in building trust in electronic commerce is the resolution of disputes and the question of legal jurisdiction. Given the global nature of electronic commerce, and the difficulty in the event of legal dispute to determine which national laws would apply, dispute settlements will also be necessary at the international level. Present international commercial bodies should be in a position to formulate dispute procedures to cover electronic commerce.

Without prejudicing existing frameworks for commercial transactions, mechanisms and legal frameworks, particularly concerning the requirements for trust and integrity, will need to be adapted for new network based transactions and for the storage and manipulation of commercial data in digital electronic form.

The fast rate of technological change and innovative development of applications implies that policy frameworks regarding electronic commerce must remain flexible. There needs to be a continuous dialogue between government and the private sector on developments which impact on security and integrity of networks and commercial services.

Furthermore, given the global nature of electronic commerce and the difficulty of determining national jurisdiction in the event of legal disputes, dispute settlement mechanisms will be necessary at the international level. OECD governments need to encourage present international commercial bodies to formulate effective dispute resolution procedures for electronic commerce.

Transaction safeguards

Commercial transactions have different requirements: for example, some require anonymity, while for others it is important that they are well documented. Some require complex documentation, acknowledgement and registration, and others more simple processes. Market participants may wish to use different payment mechanisms for each of these transactions, much as existing financial transactions use cash, cheques or credit/debit cards. Auditability is important to protect buyers, sellers and for

governments. For consumers certification of goods and services is necessary. Thus the whole range of safeguards which already exist to protect buyers in the market, as well as those required by government to ensure proper record keeping, etc., need to be adapted for on-line transactions.

Existing concepts of trust and integrity will need to be mirrored in network-based transactions and in the storage of information in electronic form. For this, the main transaction safeguards are the need for *security and protection of personal data and privacy*⁴⁶.

Security of applications

Governments, as well as the private sector, have an important role to ensure security on networks both from the perspective of curtailing criminal and illegal activity, and to ensure confidence in economic structures and activities. The concept of security covers a number of requirements:

- The networks and applications used need to be secure from a systems perspective so that technical malfunctions will not jeopardise records.
- Security is required from the transactions perspective in registering orders, that is, authentication is necessary by the receiving party for document or payments transactions. Verification is also necessary as proof-of-payments and to provide evidence that a transaction took place (i.e. transactions must be non-refutable).
- Security is necessary for files, documents and payments to keep information confidential.

The development of a network-based economy creates risks: physical risks because of technical network problems, and economic risks because of breaks in security procedures allowing access to information. The security issue, from the perspective of illegal access, is international and for this reason the OECD in 1992 negotiated and adopted Guidelines for the Security of Information Systems which provide an international framework for the development and implementation of coherent security measures, practices and procedures in the public and private sectors.

The market, in recognition of its importance, has already developed a number of procedures and systems to improve security. This has taken place both at the physical infrastructure level and at gateways through, for example, firewalls for local area networks. Continuing solutions to security issues will be found through mixtures of technology, legal and regulatory processes. Security issues are also linked with those of intellectual property since inadequate security will have important negative implications for intellectual property protection.

A 1997 survey of the 1992 Security Guidelines presently underway will provide a status report on how the Guidelines have been implemented by the public and private sectors during the five years since their adoption. In many countries it has been found useful to have a continued exchange of information on security issues by private companies and governments. The creation of any new programme in telecommunication and information systems security can, where practicable, draw upon voluntary, international standards, testing, and certification systems which serve consumer and industry needs.

Companies should be encouraged to continue exchanging information with governments as appropriate on security and security solutions.

Security of services: cryptography

Cryptography provides a powerful tool to meet many of the requirements of electronic commerce. Cryptography is a tool, which when properly implemented can ensure both the confidentiality and integrity of data, and it provides mechanisms for authentication and non-repudiation of data; its use will depend on business enterprises and consumers having trust in the quality of cryptographic methods and services and the safeguards they offer. Cryptography issues have at the initial stage been policy sensitive; it is now recognised that there are legitimate governmental, commercial, and individual needs and uses for cryptography and thus it is necessary to balance legitimate commercial needs for encryption against the requirements of law enforcement where there may be a requirement to lawfully access information. Cryptography will be an important element of security, privacy and intellectual property protection provisions in the GII by providing mechanisms for secure electronic commerce and electronic authentication. Market forces should serve to build trust in reliable systems, and government regulation, licensing and use of cryptographic methods may also encourage user trust. Key management systems, which may involve the use of “trusted third parties”, could provide a basis for a possible solution which could balance the interest of users and law enforcement authorities; these techniques could also be used to recover data when keys are lost. In seeking to balance the various interests at stake, consideration of the OECD Cryptography Policy Guidelines should assist governments in developing policies that will contribute to enhanced electronic commerce and GII development.

Businesses, governments and individuals may wish to use cryptography for a variety of purposes that will be stored and transmitted on global networks. Users of cryptography should be free, to the extent allowed by the applicable law, to determine the type and level of data security needed, and to select and implement appropriate cryptographic methods, including a key management system that suits their needs. However, in order to protect an identified public interest, such as the protection of personal data or electronic commerce, governments may implement policies requiring cryptographic methods to achieve a sufficient level of protection. Nevertheless, it is important even in those circumstances to allow users and market forces to determine the appropriate safeguards in accordance with applicable laws and taking into account the OECD Cryptography Policy Guidelines.

Where cryptography is used to verify the integrity of data or the authenticity of the sender of the data, it may be necessary for governments to play a role in determining with the private sector the appropriate technical structure to support certification mechanisms which could provide for global, interoperable digital signatures and time-stamps. Whereas electronic signatures take a variety of forms, such as digitised images of paper signatures, electronic mail origination headers, and typed notations of signatures, these simple electronic signatures are distinct from digital signatures. Digital signatures use cryptographic algorithms to provide a means for establishing that data has not been modified (“integrity of data”), establishing the validity of a claimed identity of a party (“authentication”) and limiting the ability of a party to effectively deny having performed a particular action related to data (“non-repudiation”). Industry in consultation with governments, should be a major player in the development of standards for the technologies to be used for digital signatures. Governments should update laws to provide legal recognition of digital signatures. To take full advantage of these cryptographic solutions for making enforceable electronic contracts and secure payments, governments should work together to harmonise a technical framework for recognition of digital signatures to support electronic commerce.

Cryptography can also provide technical solutions for the protection of intellectual property in digital form. As noted previously, the ability in a digital world to generate perfect copies can result in exploitation of property rights without compensation unless these rights are adequately protected, and unless adequate identification is available on those accessing intellectual property. Cryptography provides the tools to assist in the protection of intellectual property rights in such circumstances.

Many of the cryptographic applications described above involve the use of public key cryptography, in particular mechanisms for authentication, non-repudiation and ensuring data integrity, which provide means for electronic payment and electronic commerce. Public key systems require that suppliers and users have confidence in the management of public keys. System suppliers, commercial entities, and users need to be involved in ensuring that different electronic transactions systems and payment systems are interoperable and do not impose unnecessary barriers to new market entrants or confusion for users.

As in many of the policy areas related to the development of GII-GIS, it is necessary to examine the need for international co-operation with regard to the use of cryptography, since different national solutions may not meet the requirements of global technologies and applications. National differences in provisions for data security could penalise countries where it is perceived that inadequate protection exists. It is recommended that the OECD Cryptography Policy Guidelines be taken into consideration by Members in the formulation of cryptography policies at the national and international level in order to facilitate growth of electronic commerce and open global markets.

Market forces should serve to build trust in reliable systems, and government regulation, licensing and use of cryptographic methods may also encourage user trust.

Markets need to develop solutions for data security. However, in order to protect the public interest, such as the protection of personal data or electronic commerce, governments may need to implement policies requiring cryptographic methods to achieve a sufficient level of protection, while responding to the needs of law enforcement authorities. Nevertheless, it is important even in those circumstances to allow users and market forces to determine the appropriate safeguards, while respecting existing legislation.

It may be necessary for governments to play a role in determining with the private sector the appropriate technical structure to support global, interoperable digital signatures and time-stamps. OECD governments need to encourage relevant bodies to consider how to facilitate dispute resolution.

OECD countries should take note of the OECD Guidelines on Cryptography Policy in order to encourage the development of internationally compatible frameworks as soon as possible, and to facilitate the growth of electronic commerce and open global markets, taking into account the need for governments to maintain their existing responsibilities.

Protection of privacy and personal data

For the most part privacy laws were implemented by OECD countries in the early to mid-1980s within a different technological context. There are several privacy requirements in the development of electronic commerce. First, irrespective of whether payments are made, consumers will be reluctant to use network-based services, even to browse, when there are insufficient guarantees that no records are being maintained of their activities. Similarly, when small payment transactions are made, consumers need

assurances that no 'electronic trail' is maintained of these transactions. Even where a trail is deemed necessary (as for large purchases) consumers want this information to be kept commercially confidential to those requiring the information.

There are already significant amounts of personal and business-related information gathered, stored and transmitted electronically by governments, public institutions and businesses. The development of new applications and services on global information infrastructures will increase the amount of information, including sensitive data that is gathered and transmitted and which can be assembled into profiles of individuals or companies. Development of GII is making it even easier to collect, analyse, distribute data, and forward them across national boundaries, resell or reuse them, or integrate them with other databases collected for unrelated purposes. Thus, open networks, such as the Internet, may without adequate safeguards, pose serious privacy problems.

The approaches to protection of privacy adopted by a number of countries have many common features. These include: setting limits to the collection of personal data in accordance with the objectives of the data collector; restricting the usage of data to conform with openly specified purposes; creating facilities for individuals to learn of the existence and contents of data and have data corrected; and the identification of parties who are responsible for compliance with the relevant privacy protection rules and decisions. Generally speaking, statutes to protect privacy and individual liberties in relation to personal data attempt to cover the successive stages of the cycle beginning with the initial collection of data and ending with erasure or similar measures, and to ensure to the greatest possible extent individual awareness, participation and control.

There are several important privacy issues in this context. These include protection from the uninformed or surreptitious collection of information about network usage patterns, or other intrusive methods of data gathering, confidentiality and integrity of information, and protection from unsolicited communications. Governments and the private sector need to respond to increasing public concerns about privacy. Efforts should be made to ensure that protection of privacy is achieved without imposing unnecessary burdens on business and the community. There must be transparency as to the use of personal data and limitations may be needed on the secondary use of personal data. Rights of the individual to access personal data should be clarified and made public, as well as the requirements to ensure accuracy of data.

Governments and industry need to work together to manage issues relating to privacy and personal data, conducting these efforts according to the OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data. These Guidelines have been found extremely useful even in the present context since they are sufficiently flexible and technologically neutral. The global nature of new multimedia services and electronic commerce means developing privacy and personal data protection policy cannot be solved exclusively at the national level. The tremendous increase in data flows across national borders and the creation of international data banks (collections of data intended for retrieval and other purposes) have highlighted the need for further review. At the same time, arguments in favour of free flows of information should be balanced against requirements for data protection and for restrictions on their collection, processing and dissemination. International co-operation will be necessary to ensure that there are no difficulties in transborder transmission of personal databases.

One basic concern at the international level is to reach consensus on whether the OECD Privacy Guidelines are sufficient in the context of GII-GIS and whether a new consensus is required on fundamental principles on the protection of the individual. Such a consensus could diminish reasons for regulating the export of data and could facilitate resolving problems of conflict of laws. Moreover, it could constitute a first step towards the development of more detailed, binding international agreements,

and could foster the adoption of national and international business codes and self-regulatory efforts regarding privacy in order to put such principles into business practice.

Taking note of the complexity of dealing with privacy questions in the context of the GII, Governments need to respond to increasing new concerns about privacy. At a minimum, Governments need to ensure broad national guidelines or modifications of existing national guidelines on privacy in accordance with the 1980 OECD Privacy Guidelines. Guidelines should be based on the principle of protecting individual privacy without imposing unnecessary burdens on business and community. In particular: (i) transparency must be ensured as to use of personal data; (ii) limitations, where required, should be imposed on the secondary use of personal data and (iii) rights to access and to correct one's own personal data must be clarified, and requirements to ensure accuracy of data must be set forth.

In order to allow for open transborder transmission of legitimate and useful personal databases and to address the issue of restrictions on the export of data in general, consensus is urgently needed at the international level on whether the OECD Privacy Guidelines are up to the challenge which lies ahead on the GII and/or whether further international principles on the protection of the individual are required. This could constitute a first step towards development of more detailed, international agreements and could encourage development of national and international business codes of privacy and other self-regulatory initiatives.

Illegal and harmful content

The development of the GII-GIS can significantly contribute towards the positive promotion of diverse social identities and values. But the ease in distributing content, copying it and accessing it -- as exemplified by the development of the Internet -- has also raised concerns about the diffusion of material viewed as pornographic or offending social norms. These developments have led some to stress that networks and interactive multimedia applications may potentially be used in ways which are not viewed as beneficial to society.

It is clear that the traditional means by which governments have attempted to regulate illegal and harmful content are being challenged by digital means of production and distribution. The traditional restrictions on such content have usually been embedded in *broadcasting* legislation, and the individual consumption of offensive material has traditionally been considered a private right (subject to certain limits). The digital production and delivery of content has altered this relatively straightforward distinction by allowing increasingly targeted and closed delivery of content ("narrowcasting" to "closed user groups") which is neither broadcasting nor simply individual consumption, also by making access to material international, interactive and indirect via the Internet. Furthermore, social norms which can differ quite extensively globally cannot be maintained in the face of global access to content.

In this context much attention and publicity has been given to the use of the Internet for dissemination of what is considered as illegal and harmful content. Such concerns should not be exaggerated. They are not new: each time new services, such as premium rate telephone services, the Minitel in France, etc., were provided, they had to face similar issues. Experience has shown that, while it is necessary to implement policy responses to the use of networks in disseminating harmful and/or illegal content, these policies need to be proportionate to the problem and should ensure that the benefits that can derive from the development of new services are not jeopardised and are in fact encouraged in order to

outweigh any negative aspects. Many countries are considering various approaches to address issues of content on the Internet which reflect their individual concerns. Care should be taken to ensure that the application of measures which are adopted does not constitute unintended barriers to market entry.

In the case of GII-GIS, and specifically Internet developments, it has been recognised that the problem of access and use of the Internet for illegal and harmful content is transnational. International co-operation is therefore required to find appropriate solutions.

Governments are considering various approaches to dealing with these issues and a number of policy initiatives have already been started. For example, the EU Working Party's Report on Illegal and Harmful Content on the Internet included the following conclusions:⁴⁷:

- Any action taken to deal with atypical use for illegal and harmful content should not have a disproportionate impact on Internet users and industry as a whole.
- Information on the Internet should be allowed the same free flow as paper-based information. Any restrictions should respect fundamental rights such as free speech and privacy.
- Responsibility for dealing with illegal content remains with police and the courts.
- Appropriate structures and technical resources can help both the police and the courts to deal with illegal content and users to avoid harmful contents.

Governments are also realising, in particular, that the problem can only really be adequately addressed through the co-operation and participation of Internet service providers in defining classification and software-based systems which allow adults to be forewarned of the nature of the content contained in any particular service. This approach then allows the users themselves to control access and to impose their own restrictions. Some governments prefer a completely voluntaristic approach, in which individuals would be able to choose their own censoring devices or proxies. Other governments have called for a more definitive role for government in deciding what is appropriate material⁴⁸. The Australian government is currently considering the establishment of a national regulatory framework for on-line service providers which would include both self-regulation and government involvement. It is proposed that the framework be based on codes of practice developed by the on-line industry and that the Australian Broadcasting Authority act as industry regulator. It is also proposed that the framework will include a complaints mechanism and a penalty regime backed by legislative sanctions. In other OECD countries, such as the UK, Canada, and Japan, voluntary Codes of Conduct have been adopted by the relevant Internet service providers associations.

Following a proposal by France the OECD will review national initiatives in this area and examine the necessity and eventual possibilities for increased international co-ordination.

While governments need, together with service and access providers and users to reflect on appropriate procedures, they also need to stress the benefits that developments of GII-GIS (including the Internet) can confer, and to establish support for the rapid growth of firms developing quality on-line services within a reasonable framework of commercial practices for standards of decency, advertising, and intellectual property protection. The private and public sector need to co-operate on this issue nationally, and at the international level.

The issue of illegal and harmful content over global electronic networks needs to be addressed in a manner which is proportional to the problem and which recognises the importance of the principle of free speech. The identification and implementation of appropriate and effective global solutions requires international co-operation.

Although unfortunately open to certain forms of abuse in this context, it needs to be emphasised that the Internet is still in an early formative stage. It is a fragile and highly dynamic medium whose growth and development, together with its promise of enhancing economic productivity and social well being, could be severely stifled by excessive and/or premature regulations. Governments need to bear this risk in mind in carefully considering which regulatory tools are appropriate or relevant to the Internet.

On the other hand, positive developments which should be considered by OECD governments include self regulation initiatives by Internet service provider associations together with software based classification systems which allow users to control access and impose their own restrictions. Furthermore, increasingly sophisticated technological means are available to track the “electronic trails” by which illegal activity in this medium can be identified. Serious consideration should be given to technical tools to filter out content that they might find offensive or that should not be accessed by minors.

Consideration should be given to the concept that information on the Internet should be allowed the same free flow as paper based information and any restrictions should respect fundamental rights such as free speech and privacy.

Responsibility for dealing with illegal activity over the Internet should remain with the existing competent authorities such as the police and courts. These may be significantly aided by international co-operation and new technologies applicable to solving electronic crime.

Cultural and linguistic diversity

As mentioned earlier media ownership restrictions in OECD countries have traditionally involved not only the goal of ensuring a degree of pluralism within the national boundary, but also, of protecting national and regional culture. The latter has often been expressed in restrictions on the foreign ownership of newspapers, radio and TV broadcast channels. Such ownership restrictions may be expected to come under pressure vis-à-vis their effectiveness in a global information society. Given the globalisation of investors and assets as outlined above it will also become more difficult to define the nationality or extent of foreign ownership of the larger media companies. Alternatively, positive and focused means of encouraging and promoting local and national culture and content in OECD countries may prove to be increasingly efficient. These would include, for example, financial assistance and sponsorship for training and production, government encouragement of private financial investment in media production and partnerships or support of public radio or television stations which have a public service mandate.

Open competitive markets must not be viewed as antagonistic to concepts of cultural and linguistic diversity. On the contrary, in these markets where there is vibrant competition, low prices and rapid service diffusion, domestic industries have an incentive to produce content at a much more rapid rate, and of higher quality, than in closed markets which tend to be limited in size.

The development of a multi-channel environment has, when instituted within a regulatory framework which ensures liberal and open access to service providers, resulted in increased opportunities for ethnic minorities. Governments may in fact reserve some channels precisely for these purposes in licensing arrangements. In the longer term, the Internet, with its potential for the development of services at radically reduced costs relative to traditional broadcasting, may expand this opportunity even further. Governments wishing to promote cultural and linguistic diversity internationally should therefore encourage the development of these new multimedia services. The example of the Internet clearly indicates that those markets with vibrant competition also have significant growth in applications and services on the Internet which can help enhance cultural and linguistic diversity.

Maintaining and enhancing cultural and linguistic diversity will continue to be an important policy goal for governments. However, the most effective means with which to achieve this may need to be progressively adapted for the new GII-GIS environment. In particular, pro-active policies which provide positive encouragement for culture creation in competitive markets may prove to be increasingly successful in comparison to defensive strategies of protection and market closure.

Dynamic competition could be one of the important means to promote cultural and linguistic diversity and rapid development of new, networked multimedia services through enlarging the market base and through price effects. Cultural and linguistic diversity is important in the development of global electronic commerce.

Maintaining and enhancing cultural and linguistic diversity will also continue to be an important policy goal for governments. Current mechanisms may need to be progressively adapted for the GII-GIS environment. Initiatives and projects which provide positive inducements and support for content production in the context of dynamic competition are recommended. In a competitive environment the preservation and diversification of cultural and linguistic diversity may require use of different means amongst which it will be necessary to find an appropriate balance.

Pluralism, culture and cross-media ownership rules

Cross sector rules have a variety of policy goals. The discussion of access and vertical integration is essentially concerned with conditions for fair and efficient competition and thus control of excessive market power. Restrictions on horizontal cross investment tend to go further than this in being concerned with protecting pluralism and culture from concentrations of influence over content and impact on public tastes and opinions.

Pluralism is normally perceived to be an essential element of society in OECD societies. It refers generally to ensuring a level of diversity of opinions, ideas and information available to the public to enable them to make relatively informed choices. In nearly all cases policies for pluralism also include elements of competition goals and economic efficiency, especially in so far as these are often complementary to the pluralism goal.

Cross-media ownership restrictions

In general, cross media ownership restrictions on the traditional media of television, newspapers and radio, are concerned with the degree of governmental responsibility for major impacts or influences on public opinion. On the whole this means that cross media ownership rules have been stricter than general

competition laws, for example, in some Member countries competition rules are activated at a threshold of around 25 per cent market share based on revenue, whereas media ownership rules based on pluralism have a lower threshold, for example 15 per cent of audience share.

The key factors of the pressures for change and review of cross-sector and cross-media rules in the context of GII-GIS are the following:

- *Massive expansion of the television programming market*: this has been the result of increasing globalisation of content provision, particularly in expanding pay TV markets in OECD countries. An important impact of this is that, in order to compete effectively, national broadcasters and programmers need to be able to benefit from increased economies of scale. Thus, in the interests of undistorted competition, there is pressure to relax restrictions on their entering new content markets.
- *Scarcity is much less of an issue* as regards spectrum and capacity availability for transmission of broadcast (TV and radio) services: Hundreds of channels may now be made available thanks to advances in digital and compression technologies, where only a small fraction of this was possible in the analogue environment when most cross-media ownership rules were established. Thus the impact of holding a licence for one particular channel is declining. This effect is clearly amplified by the increased take up of cable, satellite and, soon, digital terrestrial subscription services alongside the traditional free to air services. The result is an increased awareness that the number or type of media licences is no longer the same unit of measure vis-à-vis impact or influence on the public.
- *New services are not covered* by existing media ownership and licensing rules in a number of countries. This concerns, in particular, digital television services and on-line and Internet services. Information/content products which are not consumed en-masse (such as magazines, journals, trade press etc.) may be considered in a different category than TV and radio broadcasting and newspapers as concerns regulatory frameworks targeted at pluralism.
- *Digital satellite (broadcasting) services*, which already commenced in a number of OECD countries (Table 3.2), may be subject to the same rules and restriction as non-digital satellite services. However, *digital terrestrial services* will tend to introduce significantly new elements to warrant reform of cross ownership rules concerning terrestrial channels. In many cases this may in fact represent a catalyst to reviews which are in any case called for by the tide of change of the last decade. In general this may imply the need to relax and refocus restrictions concerning the number and type of broadcasting licences. It may, for example, be appropriate, given new technologies and commercial structures, to make a clearer distinction between the holding of a digital multiplex licence (which essentially grants control of a transmission facility) and the provision of programme services over that multiplex⁴⁹.
- *Globalisation of media* companies, service and markets is also, in itself, creating pressures for reform and review of media ownership rules: This phenomenon includes for example the globalisation of the companies which own and control the media outlets in most OECD regions; globalisation of the actual media services themselves; and the expanded geographical boundaries created by technological developments such as direct-to-home satellite and Internet which create audiences straddling across national boundaries. This creates a variety of pressures on media ownership rules.

Table 3.2 Digital Television Broadcasting Initiatives

Country		1994	1995	1996	1997	1998	1999	2000 ---
Australia	Satellite		◆ January					
Belgium	Satellite			◆ May				
Canada	Satellite	---- Licensed ----			---- Implementation: to be decided. ----			
	Terrestrial			△ September				○ 1999-2000
Denmark	Satellite			◆ June				
	Terrestrial	---- Licensed ----			---- Implementation: to be decided. ----			
Finland	Satellite			◆				
	Terrestrial					○		
France	Satellite			◆ April: Canal Plus, TDF				
Hungary	Terrestrial							○ 2005
Japan	Satellite			◆ September				
	Terrestrial							○ early 2000s
Korea	Satellite			◆ KBS				○ 2001
Norway	Satellite				○ Telenor			
Sweden	Terrestrial				---- Launch in 1997 ----			
UK	Satellite				○ BskyB			
	Terrestrial				○ BBC: 1997-1998			
USA	Satellite	◆ June: DirecTV/US Satellite Broadcasting			---- 2 additional licenses granted ----			
	Terrestrial			□ Unified specification for terrestrial ATV.		Application for ATV licenses.		○ Simulcast: 2001 Around 2010: full conversion to ATV.

Symbols:

- ◆ Service commencement
- △ Licenses granted
- Planned start of implementation
- Standards setting

Source: OECD

- Current *cross-sector* or cross-media restrictions assume *distinctions* between the media markets concerned: that is, radio broadcasting, TV broadcasting, satellite/cable pay TV, newspaper publishing and telecommunications services. These assumptions are becoming less valid because producers and packagers of information and entertainment content have an increasingly broad range of transmission media to choose from which is not generally recognised by such distinctions. On the other hand, this means that a new type of distinction may be becoming important, both for competition and pluralism concerns, which is that between control of transmission and programme delivery systems and that of rights to and packaging of content services⁵⁰.

As concerns the goal of pluralism, reforms of cross ownership rules may be needed both to reflect and encourage development of new multimedia markets. This does not necessarily imply simply lifting or relaxing restrictions (although in many cases this may be found to be appropriate) but a refocusing of instruments, particularly as regards measurement of control and influence over public opinion. Pluralism concerns are often closely linked to limits on foreign ownership participation in national broadcast markets. The developments cited above also, given their global nature, warrant a review of foreign participation in domestic markets.

In a number of OECD member countries who are progressing in this vein, this has meant giving greater consideration to audience share of given media or licences, instead of cruder mechanical rules based simply on the numbers and categories of licence. Given the rapid developments and flux outlined in the points above the only reliable point of reference for measuring impact on public opinion and choice, must be the consumer. Such a focus is also compatible with the overriding trend in all these technological and commercial developments in media markets, which is, the potential for empowerment of the consumer.

The review and, if necessary, the reform of cross-ownership rules is called for. This needs both to reflect and encourage the development of new multimedia markets. This does not necessarily imply simply lifting restrictions (although in many cases this may be appropriate) but rather a refocusing of instruments, particularly as regards the measurement of control and influence.

Over time, as convergence progresses, assumed distinctions between markets based on the technical nature of the transmission media could require revision. The implications of the distinction between broadcast and narrow or monocast service may need to be re-considered.

Government as a catalyst

The government's role in providing the optimal conditions for the development and deployment of infrastructures, applications and services is not limited to the establishment of the appropriate regulatory framework and safeguards. The Government also has an important role to play as a catalyst for enhanced use and development of the information society. Most importantly it should promote and encourage investment by the private sector and stimulate new demand. Governments should promote strategic research and development programmes, launch user-oriented pilot projects and promotional activities, provide test-beds for experimentation and promote international co-operation in these areas.

As a large potential user of information and communications services the public sector itself has an important role to play in stimulating the development of and investment in new network-based services and information infrastructures through providing the critical mass for new applications. This also implies improving the productivity and efficiency of its internal administration by introducing and extending new electronic delivery systems and services, as well as enhancing and expanding the awareness of government programmes and information, and facilitating the filing of government documents such as tax returns.

This should also extend to significant improvements in the quality and scope of the core services which governments deliver to the public, involving, for example, education, training, housing or healthcare. The use of information infrastructures for service delivery provides governments with the means to enhance and add value to many of the existing services it provides. Related to this, governments have a role in stimulating public demand for on-line services and encouraging adaptation to the new electronic environment via public information and training programmes on the increasing range of services and public access points available. This is central to the policy goal of promoting lifelong learning and improving health services and standards of living for all citizens.

By using information infrastructures and on-line applications, new and better forms of education and training are possible. These infrastructures enable institutions to support a more diverse range of curricula and expand access beyond local teaching resources. As well, by stimulating the use of information and communication technologies in education and training, school children, students and employees become familiar with new technologies which enhances their job skills. In other areas, such as in the provision of telemedicine, governments can achieve budgetary savings and extend the coverage of scarce expertise. Various applications are being examined by governments such as telemedicine, distance education, on-line government information, and electronic delivery of government benefits.

It has been recognised that initial costs of installing and applying information and communication technologies can be high, but nevertheless with improved costs-performance ratios of equipment it is expected that longer term budgetary savings can be achieved. Moreover, by becoming a leading-edge user of information infrastructure and applications, governments can assist in accelerating the diffusion of new network-based services and associated skills and can provide an important stimulus to market demand.

Experiences support the view that the benefits of information and communication technologies are not automatic and that organisational and managerial capabilities must be accompanied to fully exploit the benefits of these applications. Requirements for successful implementations of network-based information services include providing widely accessible and affordable computer networking to the public such as through distribution of computer resources and financial support for the installation of computers in community centres, schools and libraries. As well, delivering services electronically requires an unprecedented degree of co-ordination and co-operation between government departments and agencies.

The catalytic role of government needs also to extend to the stimulation and participation by government in research and development and pilot projects in key application areas. For example, governments can play a leading role in stimulating electronic commerce by implementing public key infrastructures to secure transmission of financial and sensitive information of its own operations. Different projects in Canada, the European Union and the United States are already doing this. Given the global implications of GII-GIS consideration might also be given to international pilot projects where appropriate, much as has been undertaken through G-7 initiatives (Table 3.3).

Governments should play an important role as catalysts in promoting and encouraging investment by the private sector and in stimulating new demand. Governments should promote strategic research and development programmes, launch user-oriented pilot projects and promotional activities, provide test-beds for experimentation and promote international co-operation in these areas.

Governments are encouraged to use new electronic delivery systems and software to provide the means to significantly enhance the internal efficiency and productivity of public administrations. These should also be used externally to enhance public awareness of Government programmes and facilitate filing and submission for citizens of government documents and applications.

Governments are also encouraged to use the new electronic media to the greatest possible extent for the delivery of their core public services. In particular this would concern public information and cultural resources, databases for health services, web sites at local, regional and national levels and public libraries and databases.

Governments have a role in stimulating public demand for on-line services and encouraging social adaptation to the new electronic environment via public information and training programmes on the increasing range of services and public access points available. This is central to the policy goal of promoting lifelong learning and improving health services and standards of living for all citizens and relates to the previous recommendations concerning universal access to public gateways and resources of the information society at public access points.

Stimulating new demand

Alongside considerations of supply side policy reforms for the development of the GII-GIS, demand side initiatives and concerns also need to be addressed. This has two aspects.

On the one hand Governments must adapt, both structurally and substantively, a broad range of policy areas and regulations in order to create the right conditions for the market to meet the already existing and growing demand for new consumer services and new ways of doing business. As has been described in preceding chapters, this may involve the adaptation of regulations and restrictions concerning professional services such as medicine, legal and financial services for a networked electronic environment; ensuring necessary safeguards with regard to new problems involving copyright, security, trust and privacy and reviewing institutional and policy distinctions in the light of convergence.

On the other hand, Governments may also find they have a role to play in stimulating and encouraging demand for the new services which the GII-GIS is making available. As noted in the preceding section, this would involve raising awareness of what is and could be available through publicity campaigns and information dissemination; practical and technical training and education for citizens and business consumers and consideration of social or psychological 'road blocks' creating inertia on the demand side.

An understanding of the significance of these two aspects of the demand issue and the government's role in either reacting to, or stimulating demand for GII-GIS services implies the need for further, vigorous and extensive research. Governments need to establish the framework for an ongoing flow of information as regards the awareness, intentions, preferences, requirements and frustrations of citizens, communities and consumers. Are they aware of what is available and the advantages it could

bring to their work or leisure time? Do they know how to access and use it? Are there requirements and desires for services which are being stifled or frustrated by unnecessary restrictions, or, on the other hand, by a lack of sufficient safeguards?

Clearly the market itself (i.e. the commercial service suppliers) would normally be expected, themselves, to have a primary incentive and role for discerning (and stimulating) such demand factors. Indeed it may be advisable that Governments consult with such private suppliers regarding their data resources and market research initiatives on demand trends. On the other hand, it should be recognised that governments have broader public goals and perspectives vis-à-vis certain demand issues and how to address them.

The role of this particular report in this context is not to attempt to address such demand side questions, but to introduce and highlight their importance as an area for future research and analysis.

Governments need to examine the issues which relate to conditions which may encourage or retard growth in the demand for GII-GIS applications and services, as a means of further accelerating the creation of wealth and employment in the information society. Since data in this area is limited at present, this implies the need for a greater priority to be put on further research and analysis in this area.

In this respect governments should strengthen the economic, regulatory and statistical analysis as regards demand. In addressing these issues the OECD can play a vital role. In this context the OECD has already established a new Working Party on the Information Economy and a statistical panel which is also focused on these issues.

Table 3.3 G7 Pilot Projects

THEME	OBJECTIVE
Global inventory project	To create and provide an Internet-based multimedia inventory of information regarding national & international projects.
Global interoperability for broadband networks	To provide a common basis for the promotion of joint R&D, demonstration and pre-commercial trials of advanced high speed services and applications.
Cross-cultural education and training	Network-based intensive cross-cultural education and training.
Bibliotheca Universalis	To advance international co-operation toward the establishment of global electronic library systems.
Multimedia access to world cultural heritage	Interoperability of multimedia cultural heritage databases, availability of software products and services on telecommunication networks, & a better appreciation of world cultures.
Environment and natural resources management	To increase the electronic linkage and integration of sources of data and information relevant to the environment and natural resources.
Global emergency management information network initiative	Develop and implement systems to acquire, process, manage, display and disseminate information to support decision-making for natural, technological, biological and humanitarian disaster responses, environmental monitoring and risk management.
Global healthcare applications	To facilitate the work of public health institutions to fight against infectious diseases, to help increase efficiency of epidemiological and clinical studies, the establishment of a global teleconsultation system, nomenclature, coding and standards with tools for navigation and access to networks with harmonisation of security standards for patient related data exchange.
Government online	To promote collaboration in the area of best practices and to improve public services through the increased use of online systems.
Global market place for small and medium-sized enterprises	To contribute to the development of a global electronic environment for the open and non-discriminatory exchange of information for the benefit of SMEs, and to expand electronic data interchange /electronic commerce to enable enterprises to carry out their business.
Maritime information systems	To demonstrate the potential and benefits of applications for a broad range of maritime activities in fields of safety, protection of the environment, exploitation of marine resources and increased competitiveness of maritime industries.

5. FROM VISIONS TO REALITY

The economic and social benefits of information infrastructures and of multimedia services and content are dependent on the development of a market structure being in place which supports diffusion of new services, supports convergence of industries and services, supports efficient pricing structures, and supports employment creation and productivity growth. Inefficient markets, high prices, and insufficient competition will all slow down the development and diffusion of new applications and, in turn, significantly dilute the benefits of GII-GIS.

Present communication market structures and policy frameworks in many OECD countries are not conducive to support the rapid and efficient development of information infrastructures and multimedia applications or the development of electronic commerce. The adoption of competitive telecommunication market frameworks is a necessary but not sufficient condition to support GII-GIS. The development of a network-based information economy requires:

- the availability and diffusion of high speed interactive infrastructures;
- fair access to and use of infrastructures for both customers and service providers;
- the interconnection and interoperability of infrastructures and services;
- growth and development of multimedia services;
- transaction and information safeguards which ensure privacy, confidentiality of information, and security of payments, and protection of intellectual property.

Above all, there is a need, in a large number of policy areas, to examine issues within the context of the development of global markets and thus in the context of international co-operation.

Governments need to take a pro-active response to GII-GIS developments and applications. They also need to take action now as new services and applications emerge and are being formulated. At the same time it is important to understand that the dynamics of change are largely private sector driven. The responsibility for putting a number of the building blocks together needs to come from enterprises and from joint initiatives between firms. Government response needs to ensure that opportunities are opened up and available to firms and should avoid excessive or heavy-handed interference in new developing markets while ensuring their traditional role in maintaining public order, protection of the individual and promotion of cultural diversity.

Government action is important since the developments taking place in the information economy can be harnessed to better meet some of the key challenges they face such as the need to stimulate sustainable economic growth, the need for greater social cohesion and issues arising from an ageing population.

This report has focused on, and made recommendations in four main policy areas which come within the mandate of the Committee for Information, Computer and Communications Policy:

- those directly related to the development and diffusion of information infrastructures, nationally and on a global scale;
- those related to the access and use of these infrastructures; and, linked to this;
- those related to the multimedia content and applications using the infrastructures;
- those related to electronic commerce.

Although these policy areas are viewed as key, the challenge in the development of global information infrastructures and global information society is that nearly all areas of the economy are being impacted. GII-GIS will impact on labour markets, fiscal and financial markets, on education policy and health policy and will have macroeconomic implications.

The OECD in its work on “Technology, Productivity and Job Creation” argued that, by facilitating the transition to a new growth model, OECD countries could stimulate long term productivity growth and employment. It is this vision which can become reality by taking concrete and rapid changes to make appropriate reforms for implementing global information infrastructures and global information society.

Given that it is and will be primarily the private sector providing the stimulus and investment in the GII-GIS, it is important for governments to devise and maintain policies in each applications sector which will continue to promote robust business investment and development, and to progressively open all information society sectors more widely to all private investment.

It is, in general, recommended that governments begin a fundamental review of how developments in GII-GIS can be harnessed in a number of different areas and industry sectors, and what policy changes may be required to facilitate change and use technological changes to optimally enhance economic welfare.

NOTES

- ¹ Brussels, 25-26 February, 1995.
- ² Special Session on Information Infrastructures, Towards Realisation of the Information Society, 3-4 April 1995, OCDE/GD(96)28, OECD, Paris 1996.
- ³ The OECD Jobs Strategy, Technology, Productivity and Job Creation, OECD Paris 1996.
- ⁴ Information Infrastructures: Their Impact and Regulatory Requirements, OECD/GD(97)17, Paris 1997.
- ⁵ Mansell, Robin, The New Telecommunications, A Political Economy of Network Evolution, Sage Publications 1993.
- ⁶ Chair's Conclusion, G-7 Ministerial Conference on the Information Society, 25-26 February 1995, Brussels.
- ⁷ Chair's Conclusions, Information society and Development (ISAD) conference, Midrand, South Africa, May 1996.
- ⁸ Europe and the global information society, Recommendations to the European Council, Brussels, 26 May 1994.
- ⁹ Global Information Infrastructure, Agenda for Co-operation, Al Gore, Vice-President of the United States, Ronald H. Brown, Secretary of Commerce and Chairman Information Infrastructure Task Force, February 1995.
- ¹⁰ Chairman's Closing Statement, ICCP Special Session on Information Infrastructures "Towards Realisation of the Information society", 3-4 April 1995, Paris.
- ¹¹ TeleGeography 1996/97, Ed. G. Staple, Washington, 1996.
- ¹² Integrated Services Digital Networks.
- ¹³ An Internet host is defined as an identifiable computer with a direct connection to the Internet.
- ¹⁴ Source: IDC, EITO.
- ¹⁵ US Department of Commerce, Falling Through the Net: A survey of the "have nots" in Rural and Urban America, July 1995.
- ¹⁶ Data Stream.
- ¹⁷ MITI, Japan.
- ¹⁸ See, for example "Program for regaining the dynamism of industries by making use of electronic technology" by MITI Japan, Oct. 1995.
- ¹⁹ See, *inter alia*, Report for the Study on Communication IO Table Configuration, MPT, Japan 1993; Economic Benefits of the Administration's Legislative Proposals for Telecommunications, June 1994, Executive Office of the President, Council of Economic Advisers; The WEFA Group, Economic Impact of Eliminating The Line-of-Business Restrictions on the Bell Companies, July 1993; An Evaluation of the Economic Benefits of Narrowband and Broadband Communications, Economic Strategy Institute, Washington 1993; Cattaneo, Gabriella, TEKNIBANK, The Macroeconomic Impact of Advanced

Communications in Europe, Paper presented to OECD Workshop on the Productivity Impacts of Information Technology Investments, November 11-13, 1993; European Community, Perspectives for Economic and Social Impacts of Advanced Communications in Europe - PACE 1994; Breton, Thierry, Les Téléservices en France, Quels marchés pour les autoroutes de l'information?, La documentation française, 1994.

20 See, for example, Measuring Intersectoral Spillovers from IT and non-IT Sectors: French Evidence by Hans van Meijl, MERIT, University of Maastricht, 1995; and Hausman, J. and T. Tardiff, Valuation and Regulation of New Services in Telecommunications, Draft paper presented to the OECD Workshop on the Economics of the Information Society, Toronto, 28-29 June 1995.

21 In terms of payments, electronic commerce must meet the same criteria as present payments transactions in terms of acceptance of the medium of exchange, divisibility of the medium of exchange, and convertibility into money used off-line. From a global perspective electronic monies would also need to be convertible into other currencies.

22 Various estimates on the potential market for electronic commerce indicate an expansion from current levels of US\$518 million to US\$ 50 billion by 1998, and to several hundreds of billion dollars by the year 2000 (Killen and Associates, Active Media, and Forrester are the examples).

23 Note that the European figures compared to the ones for the U.S. include audio-visual activities. This makes comparison difficult, but is relevant in so far as a large proportion of content production in Europe is carried out by broadcasters, whereas in the U.S. there was until recently a legal barrier preventing this.

24 DJC Research with Quantum Leap Inc. in association with Industry Canada Information Technology Industry Branch, "IMAT: Survey of the Multimedia Industry in Canada" (Toronto: DJC Research, June 1995), pp28-29.

25 According to a recent study by Coopers & Lybrand, total new media employment in the New York Metro area was 71,500 workers in 1994, and the other leading centre in the U.S., San Francisco, had over 2 200 new media companies employing 62,000 workers. The study also estimated that the size of the new media industry in the New York metropolitan area had more than doubled in the last year to become a \$3.8 billion a year business.

26 International Telecommunication Union, World Telecommunication Development Report, 1995.

27 One definition of the information economy is that it "refers to the economic contribution of a limited number of industries and should not be confused with the broader definition of the knowledge-based economy which increasingly includes the entire industrial fabric of the economy"; page 3, Measuring the Global Information Infrastructure for a Global Information society, Concepts and Performance Indicators, document submitted by the Delegation of Canada to the ICCP Committee, September 1996.

28 These are proposed mobile satellite systems operating in non-geostationary orbits and offering voice communications and other narrowband services on a global basis. A number of other proposals exist including for the provision of multimedia broadband services.

29 That is, with the addition of the set top box and control panels resembling key boards.

30 This means a facility or infrastructure without access to which services cannot be provided to customers. It is not viably duplicated for practical, technical, economic or regulatory reasons.

31 The most important customer interface operating systems now emerging concern conditional access for digital broadcasts as well as PC application and Internet software.

32 Aside from the straight material/equipment costs this includes research and technological development (software and operating systems) as well as costs of laying down (fixed) or launching (satellites) network infrastructure.

33 Conditional access systems enable broadcasters to prevent viewers from receiving channels or individual programmes if they have not paid the requisite subscription fee. Sound and pictures are transmitted scrambled and can only be unscrambled by inserting a smart card in a set top box connected to the TV. The smart card is generally provided by the broadcaster on receipt of a subscription fee.

34 Article 4 of the European Union Directive on the use of standards for the transmission of television signals (Directive 95/47/EC, 24.10.1995).

35 In the case of GSM handsets, the European Commission has ruled on a competition complaint in this area relating to the 'Simlock' case concerning security devices within handsets which effectively locked the customer to the service provider. The Commission's recent decision ensured that such devices should be unlocked at no expense or inconvenience to the customer.

36 In particular, this may be linked to advertising revenues which demand a certain audience share.

37 The ITU-T has already undertaken work in this area in the context of X.509 Recommendations.

38 The UK and Australian telecommunication regulators have, for example, published findings to this effect over the past two years. See also OECD, *Telecommunication Infrastructure: The Benefits of Competition*, Paris 1994.

39 OECD, *International Telecommunication Pricing Practices and Principles: A Progress Review*, ICCP No. 36, 1995 and, ICCP 34, *International Telecommunication Tariffs: Charging Practices and Procedures*, Paris, 1994.

40 Intellectual property is a collective term used to refer to new ideas, inventions, designs, writings, films and others, protected by copyright, patents trademarks, etc.

41 These include the World Intellectual Property Organization (WIPO), the World Trade Organization (WTO) and the United Nations Educational, Scientific and Cultural Organization (UNESCO).

42 Office of Telecommunications, "Beyond the Telephone, the Television and the PC" Consultative Document (8/95), Ch. 4.

43 In terms of payments, electronic commerce must meet the same criteria as present payments transactions in terms of acceptance of the medium of exchange, divisibility of the medium of exchange, and convertibility into money used off-line. From a global perspective electronic monies would also need to be convertible into other currencies.

44 Electronic Commerce in the NII, June 1996 (<http://www.cnr1.Reston.VA.US>).

45 G-7 Pilot Project on "A Global Marketplace for SMEs".

46 Early recognition of the importance of transborder data flows and the computerisation of information resulted in 1980 in the OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data (adopted by all OECD countries), followed by the 1985 Declaration on Transborder Data Flows. Other instruments in the field of protection of personal data and privacy at the regional level include the 1981 Council of Europe Convention for the protection of individuals with regard to automatic processing of personal data and, in 1995, the European Parliament and Council issued the Directive on the protection of individuals with regard to the processing of personal data and on the free movement of such data.

47 European Commission, Working Party on Illegal and Harmful Content on the Internet: Report and Recommendations were adopted in December 1996 which aim to present concrete proposals and possible measures to combat the illegal use of Internet or similar networks.

48 Green Paper on the Protection of Minors and Human Dignity in Audio-visual and Information Services, (Brussels: European Commission, October 1996). In Japan the Telecoms Service Association (TSA), an entity of telecommunications companies including Internet Access Providers, has been studying self-regulation guidelines regarding the treatment of the content on the Internet since last year.

49 The UK 1996 amendments to section 2 of the Broadcasting Act include the following changes: no numerical limits on the holding of television licences; a maximum of 3 digital TV multiplex licences; and a points scheme which limits the provision of programme services on the same multiplex.

⁵⁰

These types of issue are already being addressed, for example, in the UK, inter alia in the recent OFTEL consultation on the competition issues in terrestrial broadcasting transmission which concerns the sale of the BBC transmission network which will be licensed under the UK Telecommunications Act.