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# BRIDGING THE "DIGITAL DIVIDE": ISSUES AND POLICIES IN OECD COUNTRIES

**English - Or. English**

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## FOREWORD

This paper provides a review of the issues and national policies for the digital divide concentrating mainly on those policies relevant to infrastructure. The ICCP Committee agreed to declassify this paper through a written procedure at its meeting of 22-23 February 2001. The paper was prepared by Professor Patrick Xavier, Swinburne University, Australia.

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# BRIDGING THE "DIGITAL DIVIDE": ISSUES AND POLICIES IN OECD COUNTRIES

## Main Points

In OECD countries there is now rising concern over the so-called "digital divide" — a term that refers to the gap that exists in the opportunities to access advanced information and communication technologies between geographic areas or by individuals at different socio-economic levels.

Most OECD countries that have been concerned about the digital divide have instituted policies and programmes aimed at reducing aspects of the divide, particularly pro-competitive regulatory initiatives aimed at increasing network infrastructure competition. In some countries, the strategies being articulated and employed are as yet by way of very general 'vision' statements about the pursuit of universal access. But many OECD countries are further advanced and have recognised the need to install a range of specific strategies and programmes.

This paper focuses on the issues concerning the digital divide within a country and not on the divide between countries. Its specific focus is with the OECD countries. Its concern is with identifying issues and policy initiatives rather than with analysis of quantitative data. Since it is designed to complement other OECD work in this area, the paper has a relatively narrow focus in the sense that it is particularly concerned with infrastructure and the degree to which a competitive market can be depended upon to close the digital divide. The paper is structured as follows. Section 1 introduces the paper and discusses various issues relating to concerns over the so-called "digital divide". Section 2 discusses efforts being made to identify the nature, extent and evolving characteristics of the digital divide. It also examines the extent to which a competitive market is being relied upon to provide narrowband "dial-up" and broadband Internet access in various geographic areas (urban, regional, rural and remote) and socio-demographic groups (income, education, age, gender, race, disability, etc) in OECD countries. Section 3 examines approaches used in OECD countries to address the argument that the Universal Service Obligations (USO) for telecommunications should be upgraded to include access to the Internet. Section 4 examines approaches used in OECD countries to increase the provision of broadband Internet infrastructure. Section 5 looks beyond access to Internet infrastructure to examine approaches to address socio-demographic barriers to Internet access and usage. Finally, section 6 presents the paper's conclusions.

## Measuring and monitoring developments in the digital divide

The OECD has for several years published comparative indicators relevant to Internet access and performance. In addition, recognising that effective strategic policies to address the digital divide depend on good data, many OECD governments have initiated systematic reviews to ascertain the nature and extent of the digital divide in their countries. Agencies have also been established (*e.g.* Ireland's Information Society Commission, Australia's National Office for the Information Economy) to raise awareness about the benefits of the digital economy and to assist and catalyse policy development.

But governments are also displaying awareness that the detection of differences in rates of Internet access does not necessarily justify government action. Thus it has been recognised that the problem of "digital divide" should not be confused with "digital delays" in that with the diffusion of any new technology it is only to be expected that some less commercially attractive groups/areas will receive service later than others. Thus appropriate and effective strategic policies to address the digital divide depend crucially on good data, and many OECD governments have initiated systematic reviews to ascertain the nature and extent of the digital divide in their countries.

**Reliance on a competitive market**

OECD governments are placing primary reliance on competitive market forces underpinned by vigorous pro-competitive regulation to develop advanced Internet access infrastructures and stimulate Internet diffusion. This approach, based on recent experiences in telecommunication service development, is driven by evidence that competition in the supply of Internet access provides consumers with expanded choice, superior technology and quality of service, and lower prices with greater pricing options that serve to enhance 'affordability'. Governments consider reliance on the market a sensible approach since, to the extent that market forces serve to diffuse Internet access, the burden of any special programmes and subsidies that may be required is reduced.

New technology and market circumstances are developing, but the impact of this on the provision of services to regional, rural and remote areas and other less commercially attractive consumers is uncertain at this stage. Concerns over such potentially underserved areas have led a number of OECD governments to initiate Committees of Inquiry to identify technical, financial, institutional and other barriers and to advise on the development of strategies to address these barriers.

**Updating and streamlining regulation**

OECD governments are undertaking reforms to significantly update regulatory rules to the digital age. There is now clear recognition that regulation should be streamlined, competitively and technologically neutral, and be the minimum necessary to achieve specified goals since obsolete, inappropriate or disproportionate regulation can result in costly distortions. But some new regulations have been necessary, notably obligations on market dominant incumbent operators to "unbundle" the local loop.

***Upgrading Universal Service Obligations***

In some countries, a significant digital divide issue is that "narrowband" connection via the PSTN is unavailable and/or that the prices of data services are significantly higher in rural and remote areas than in urban and provincial centres. This has led to arguments from some quarters that the universal service obligations (USO) should be upgraded to include a minimum data speed capability at an affordable price. Indeed a few OECD countries have done so and a few have included ISDN service within the USO. But most countries have decided not to include Internet access within the USO at this stage. Debate has also begun as to whether universal service obligations should be changed to include access to high speed network resources. However, at present most countries view it as advisable to leave this to market forces rather than impose additional obligations on telecommunications operators.

### *Costing and funding diffusion of broadband access*

Recognising that decisions must be made in the context of programme funding and costing, some OECD governments have begun such estimations. In regard to funding, in the United States, operators are required to bear cost of providing subsidised access to schools and libraries. In Australia, some of the proceeds of Telstra's privatisation are being used. In the European Union, programmes to address the digital divide that are outside the specified USO activities are not prohibited but must not be funded through levies on telecommunications operators.

### *Beyond access to Internet infrastructure*

Apart from access to Internet infrastructure, a range of activities is required to increase awareness of the benefits of Internet usage and to enhance usage facilities and skills across communities, including the disabled. The success of such initiatives depends on an effective partnership between the private, public and community/people sectors. The private sector is seen to be responsible for Internet infrastructure and for driving the activities of the digital economy. Certainly, to ensure a viable workforce for the new economy, to broaden markets for e-business and to capture opportunities being spawned by 'convergence' and the new economy, the private sector has a shared interest with government to address the digital divide.

An increasing number of OECD governments are installing policy frameworks and re-inventing themselves to lead by example through numerous Government-to-Business and Government-to-Consumer online applications and services. The public, private and community sectors are beginning to work together on awareness, education and capability building programmes, so that the digital divide can be bridged in sustainable ways that provide digital opportunity for all.

## Monitoring and assessing developments in digital inclusion

In the face of a dynamic, rapidly changing situation, regulators in OECD countries are installing systems to regularly and systematically review developments towards digital inclusion, including the state of effective competition in the provision of Internet access and the extent to which competition is delivering promised benefits.

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But governments are recognising that apart from access to Internet infrastructure, a range of activities is also required to expand demand by increasing awareness of the benefits of Internet usage and enhancing usage facilities and skills across communities, including the disabled. The success of such initiatives is being boosted by partnerships between the private, public and community/people sectors in education and capability building programmes, so that the digital divide can be bridged in sustainable ways that provide digital opportunity for all.

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***Monitoring and assessing developments in digital inclusion***

In the face of a dynamic, rapidly changing situation, regulators in OECD countries are installing systems to regularly and systematically review developments towards digital inclusion, including the state of effective competition in the provision of Internet access and the extent to which competition is delivering promised benefits.

OECD governments are recognising that improved information is crucial for assessing the nature and scope of any problems and for developing well-targeted and cost-effective strategies for overcoming the digital divide. In particular, there is recognition that the barriers causing the digital divide and impeding digital inclusion need to be regularly measured, monitored, assessed and addressed.

# SECTION 1: INTRODUCTION

Only a few years ago, in the face of imminent market liberalisation and competitive entry into telecommunications markets, there was considerable concern over the extent to which Universal Service Obligations (USOs) would be maintained. In many OECD countries, this concern had been subsiding since programmes to address the needs of rural, lower income, aged and disabled subscribers were being successfully initiated either voluntarily by telecommunication operators or through regulatory requirement. However, the concerns about universal access to telecommunications have recently been resurrected, in fact, heightened, especially in developing countries with low penetration rates since "dial-up" access to the Internet continues to depend on access to a telecommunications connection. Indeed, as the importance of developing a knowledge-based information economy is recognised, the stakes are seen to be even higher than before. This has resulted in calls for a reconsideration of the nature and scope of USOs so that they are more adequate and relevant to an era of technological acceleration towards a networked information society. Moreover, as more and more elements of the economy, education, health, government services, information and entertainment are linked to electronic networks, there are increasingly concerns that a "digital divide" will develop. The primary concern is that if certain groups are excluded or left behind by being "unconnected" to Internet facilities, a divisive society of information 'have' and 'have nots' will result.

The concerns of many OECD countries were typically expressed by the Irish Information Society Commission. Pointing to the findings of a survey of 1 408 adults conducted on its behalf during 2000, the Commission concluded[1]:

> *"The greatest issue to be faced over the coming year is the digital divide. It is widely accepted that information and communications technologies can be used to overcome disadvantage in society, yet the results of this survey indicate that the technology itself could be a stimulus to further disadvantage unless issues such as training, education, and access are tackled as a matter of urgency."(page 91)*

The United Kingdom and Canadian governments' responses to concerns over the digital divide are typical of OECD governments. In the United Kingdom, the Blair Government recently announced the goal of Internet access for all residents by 2005. In October 2000, the Canadian Government announced its commitment to achieving the goal of high-speed broadband access to all communities by 2004 and established a National Broadband Task Force to develop a strategy and advise on how best to make high-speed broadband Internet services available to businesses and residents in all Canadian communities by that year.[2]

## 1.1 Digital Divide issues

### *What is the "digital divide"?*

The phrase "Digital Divide" is now in common use. However, the divide itself can have various dimensions. As used here, the term refers to the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access

information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities. The digital divide reflects various differences among and within countries. The ability of individuals and businesses to take advantage of the Internet varies significantly across the OECD area as well as between OECD and non-member countries. In essence the term “digital divide” is frequently used to refer to the gap between people who have the opportunity for regular access to the Internet and people who have irregular or no opportunity to access the Internet.

***The broadband divide***

Another concern is that the current divide between those with Internet access and those without will be exacerbated with the rollout of high-speed access and broadband services.[3] The "broadband divide" may be defined by those with rich, interactive audio and video services in the home and those with low-bandwidth, text-driven services. This divide will become increasingly important as the availability of advanced telecommunications[4] becomes essential to the development of business, industry, shopping and trade, as well as distance learning, telemedicine, and telecommuting.[5]

***Urban/rural divide***

Those without an enhanced data capability will be unable to access the benefits expected particularly in relation to education,[6] health[7] and government services.[8] This concern is seen to be greatest in relation to those living and working in rural and remote areas since the lower rates for data access for these consumers places them at a disadvantage in comparison to metropolitan consumers.

***The international digital divide***

The digital divide also exists between different countries, with the ability of individuals to take advantage of the Internet varying significantly across the OECD area and between OECD and other countries. There are concerns that unless access to and use of the information and communication technology (ICT) is broadened, the majority of people, particularly in the developing countries, will not enjoy the benefits of the new knowledge-based economy. Indeed, the digital divide was a key theme of the Group of 8 (comprising Britain, Canada, France, Germany, Italy, Japan, Russia and the United States) summit in Okinawa.[9]

## 1.2 Some sceptical views of the need for government action

***Digital divide or digital delay?***

There are those who argue that the digital divide is no different from other technology divides with different rates of diffusion according to household/individual by income, education, location, age, gender. While some accept that to some extent the digital divide is a “digital delay”, they remain concerned that in the digital age, the need to wait a “few years” for technology to trickle down can be a serious disadvantage. Each year of being connected is seen to be critical to economic and educational advancement and to community participation.

***Symptomatic of a broader divide?***

Some have pointed out that the digital divide is a symptom of much deeper social, economic and educational gaps that have long existed and the Internet has simply made these issues more pronounced. They ask why special programmes should be put in place for telecommunications and Internet access.

Where, for equity concerns, certain socio-demographic groups are deemed to require assistance, why should special telecommunications subsidies for these groups exist as a separate regime outside means-tested, targeted, general welfare programmes. For instance Sawhney argues: [10] "We live in a world fraught with inequalities. We have long accepted disparities between the "haves" and the "have nots" in all (many?) spheres of life. However, for some reason, we find the idea of a society stratified into the "information rich" and "information poor" particularly disturbing. What is special about information?" (p.161).

***Why should urban dwellers subsidise rural dwellers (any more than the converse)?***

Some have questioned whether urban dwellers should be obliged to subsidise high-cost rural Internet users, any more than rural residents should be forced to subsidise high urban rents? Because there are benefits of diffused Internet access does not necessarily mean that subsidies to meet those needs are necessary. They argue that as far as possible, the telecommunications needs of rural areas can be met through market forces over the course of time, as with the diffusion of other technologies.

These sceptical views/arguments about the need for government action are notable contributions to the debate since they prevail against exaggerated claims in favour of a judicious, systematic approach to determining the nature and extent of policies and programmes necessary to address the digital divide. The sceptical views have also led to strengthened demands that policies be based on sound data-based analysis of any current and prospective "digital divide".

### 1.3 Objective of the paper

The digital divide raises a number of questions. Where does it occur and why? What are its causes? How is it to be measured? What are the relevant parameters? What is its extent, that is, how wide is the digital divide(s)? Where is it most critical? What are its effects likely to be in the short term? In the longer term? What needs to be done to alleviate it? And what has been done thus far to alleviate it?

OECD work presented in other documents addresses many of these questions. [11]

In this paper, the focus is on the policies and programmes that have been developing in OECD countries (thus far) to address digital divide issues, particularly in regard to infrastructure issues. The objective is that OECD (and non-OECD) countries setting out to develop their own policies may gain some insights from the discussion of the examples of policies in other countries taking action to address the digital divide. To contain its length, the paper has not tried to describe all the measures initiated in each OECD country. Rather, the paper concentrates on describing the best example(s) of a particular type of initiative relating to the digital divide.

The paper is concerned with issues concerning the digital divide within a country and not on the divide between countries. Its concern is with identifying policy initiatives rather than with analysis of quantitative data.

## SECTION 2: RELIANCE ON MARKET FORCES TO CLOSE THE DIGITAL DIVIDE

This section begins with some background information about narrowband and broadband Internet access, then proceeds to examine how countries are placing the primary reliance on the market, including an examination of the barriers impeding digital inclusion through market forces. Developments resulting in changing market conditions that may facilitate market provision in some regional, rural and remote areas are considered.

### 2.1 Narrowband and broadband access to the Internet

In order to use the Internet, the user must establish an interconnection with the backbone, one of the high speed data pipes that makes up part of the network of networks that is the Internet. A large business might consider having its own dedicated link to the Internet, which would be fast but expensive. Instead, most users have a connection to an ISP, which then consolidates the upstream traffic to the backbone in a single connection for many users.

#### *Narrowband*

At the present time, 'dial-up' is the most readily available method for accessing the Internet. That is, most users dial-up to their ISP using a modem over a standard PSTN connection (public switched telephone network). This uses traditional twin copper wires to carry data in analogue form. Because of the limit on the speed at which data that can be sent via this medium, it is known as "narrowband". The users employ a modem to convert the digital data from their own computer to an analogue signal that can be carried over the telephone network. The data is then reconverted to digital by the ISP's modem.

#### *High-speed broadband access*

There are a number of alternatives to the narrowband dial-up connection, technologies collectively known as "broadband" defined by the FCC as "having the capability of supporting, in both the provider-to-consumer (downstream) and the consumer-to-provider (upstream) directions, a speed (in technical terms, "bandwidth") in excess of 200 kilobits per second (kbps) in the last mile."[12] The FCC uses the term "advanced telecommunications capability" to refer to "high speed, switched broadband telecommunications capability that enables users to originate and receive high quality voice, data, graphics, and video telecommunications using any technology". Oftel defines broadband as: "… higher speed access (typically faster than 500kbit/s) to the Internet (using a variety of technologies) that enables advanced services ranging from enhanced Web browsing through to true broadband services such as the ability to watch and interact with video over the Internet. Broadband access is usually provided as a permanent 'always-on' connection, allowing more flexibility and allowing users to access the Internet without having to repeatedly dial in to their service provider."[13]

## 2.2 Reliance on market provision

OECD governments are relying primarily on market provision to expand Internet access, including access to high-speed broadband networks. Many countries have adopted the position that leading the market is inadvisable since selecting particular services or technologies for preferential support would:

- Interfere with market choices among a widening range of options.
- Risk making wrong choices.
- Add barriers to innovation and competitive entry.

***United Kingdom***

The UK government's policy stance is typical in pronouncing a long-term strategy for developing Internet access that, while placing primary reliance on market competition, [14] maintains a commitment to act where this is considered necessary to:

- Encourage the development of a fully competitive market.
- Encourage a more rapid introduction of competitive forces in regional, rural and remote markets.
- Address fundamental quality of service issues, particularly in areas that do not yet fully enjoy the benefits of competition.
- Help ensure that the particular needs of disadvantaged groups are addressed.

Rapid rollout of high bandwidth communication networks, providing fast 'always-on' connections directly to business premises, homes and public access points in libraries and similar community institutions is a key objective of the Government. However, UK Government action to achieve this, where considered necessary, would be incentive-based and aim at encouraging operators to meet actual customer needs, rather than through rigid service obligations. [15]

***United States***

In the United States, diffusion of access to advanced services (including to those identified as being particularly vulnerable to not having timely, affordable access to high-speed services) is promoted by encouraging competition, promoting infrastructure investment and addressing the affordability of advanced services. Among efforts in pursuit of this goal, the FCC has recommended that: [16]

- Rules should be examined to ensure that competitors can access remote terminals.
- The equipment approval process for wireless and customer premise equipment with advanced telecommunications should be streamlined.
- There be consideration of whether and how more can be done to promote high-speed connections in schools, libraries, and the surrounding communities.
- More spectrum be made available for broadband service – both licensed and unlicensed.
- Consideration be given to the need to establish a national policy to mandate access by multiple Internet service providers to a cable company's platform.

***Canada***

The Canadian government is also placing primary reliance on market forces while committing, "where market forces fail to provide a minimum level of access, to step in to ensure affordable access to essential services for all Canadians, regardless of their income or geographic location". In October 2000, the Canadian Government established a Task Force[17] to consider how best to achieve this aim by 2004, including an examination of the technical, institutional and financial barriers which could delay provision of such services by the private sector and the role governments might play in overcoming these barriers.

***Sweden***

In Sweden, the acquisition of IT infrastructure with a high transfer capacity is "primarily to be achieved through market channels". Competition, low prices and rapid development are to be fostered by a large number of operators and IT companies being given the opportunity to use networks. Central government, however, accepts overall responsibility for ensuring that IT infrastructure with a high transfer capacity is available nation-wide. [18] A new IT Bill was passed by the Parliament in March 2000 to:

- Create an information society for all through universal accessibility, including remote areas.
- Develop IT confidence (through improving security, online government, regulation).
- Increase IT competence through enhanced education and training.

***Norway***

"A major *eNorway* initiative was announced on 29 June 2000 by the Ministry of Trade and Industry. As part of the follow up on the initiative, an Action Plan on Broadband Communication was launched on 11 October 2000. The Action Plan relies on two pillars: (i) stimulating competition in the broadband market, and (ii) stimulating public demand for broadband networks and services. The government emphasises primary reliance on market forces for broadband development. However, it is recognised that special measures might be required where market players cannot establish access on a commercial basis (*e.g.* in remote and underpopulated areas)."[19]

The government's objective with eNorway is to create a green knowledge economy and an Information Society for all. To achieve these objectives, three basic pre-requisites must be installed: *access - knowledge - confidence.*

The government will endeavour to:

- Help ensure that everyone has access to the new technology.
- Increase people's knowledge and understanding so that individuals will be capable of using ICT as a tool according to their own needs and desires.
- Implement actions that increase confidence. ICT must be secure and available for all, regardless of the level of expertise.

The government's policy initiatives are aimed at ensuring that everyone has access to information and communications technology irrespective of where they live, their age, economic circumstances or level of education. ICT will be utilised to facilitate access to the knowledge and experience resources administered

by cultural institutions and mass media. A uniform policy for a sustainable knowledge society will be prepared, based on environmental information, an increased use of telecommunications to replace transport, a green product policy and green public-sector procurements.

The Government supports the voluntary organisation "Senior Net Norway", which makes important contributions in assuring the participation of the elderly in the information society. A working group has also been established to consider co-ordinated efforts to increase the opportunities for handicapped persons in the knowledge society.

## 2.3 Identifying the nature and extent of the digital divide

In order to help ensure the development of effective policies to address the divide, several OECD countries have embarked on efforts to identify more precisely the nature and extent of the digital divide and the nature of barriers to digital inclusion.

### *Canada*

As noted above, in October 2000 the Canadian Government, when expressing the goal of making high-speed broadband Internet services available to businesses, and residents in every Canadian community by the year 2004, established a Task Force,[20] requiring it to conduct an examination of:

- The needs and characteristics of communities which without government involvement will not likely gain access to private sector-delivered high-speed services by 2004.
- The technical, institutional and financial barriers which could delay provision of such services by the private sector.
- The role governments might play in overcoming these barriers.
- The carriers and other organisations that may be receptive to deploying these services in such communities and what the government would need to do to get them to do so.
- The arrangements that governments might use that are neutral with respect to technologies and maximise the role and risk-taking of the private sector.
- Whether or not pilot projects would be useful to provide both the private sector and governments with insights and experience that would usefully inform an approach to a broader effort and if so what aspects the pilots should test.

### *United States*

In the United States, the NTIA has issued several reports analysing the nature of the digital divide and developments in the divide. The first report, *Falling through the Net: A Survey of the "Have Nots" in Rural and Urban America (July 1995)*, surveyed household telephone, computer, and modem ownership. A later report: *Falling Through the Net II: New Data on the Digital Divide (July 1998)*, presented updated data on household access to telephones, computers, and the Internet. A third report: *Falling Through the Net: Defining the Digital Divide* (July 1999) provided new data on household access to communications technologies, and also provided new information on individual Internet access and usage. The most recent NTIA report *Toward Digital Inclusion* (September 2000), found that in the United States, the number of individuals owning a computer or who have access to the Internet, whether from home or other places, has increased across geographic regions, income, racial and educational levels.[21]

The FCC also has focused on whether the deployment of Internet infrastructure to provide advanced services to all Americans is "reasonable and timely". This was assessed by looking at three major factors: *i*) subscribership levels, and how they have changed; *ii*) levels of investment and projections of future growth with advanced telecommunications capability; and *iii*) choices available to consumers today and in the near future, looking at both choices among service providers and among technology options.

The FCC reached the conclusion that advanced telecommunications capability is being deployed in a reasonable and timely manner in the United States with significant investment in the facilities needed to provide advanced telecommunications capability, steadily rising subscription rates for advanced services, and a proliferation of providers in the marketplace. [22] However (as with any technology, particularly in its early stages), deployment of advanced telecommunications capability has not been uniform across the nation. While economic forces have driven deployment as markets develop, consumers in certain areas of the country may be particularly vulnerable to not receiving timely access to advanced telecommunications capability, if deployment is left to market forces alone, including:

- Rural Americans, particularly those outside of population centres.
- Inner city consumers.
- Low-income consumers.
- Minority consumers.
- Tribal areas.
- Consumers in United States territories.

An NTIA/RUS study[23] also examined the availability and deployment of advanced telecommunications capabilities, particularly to those who live in rural areas, including:

- Investment in telecommunications facilities with advanced capability in rural areas compared with non-rural areas, including an assessment of the various levels of capability being deployed under different technologies and the bandwidth capabilities of such deployment.
- Availability of telecommunications backbone networks and last mile facilities with advanced capability in rural areas compared with advanced telecommunications backbone networks and last mile facilities in non-rural areas.
- The rate of deployment of advanced telecommunications capability in rural areas compared with the deployment of such capabilities in non-rural areas, identifying specific geographic areas where advanced telecommunications capabilities are being deployed at a significantly lower rate than elsewhere.
- The feasibility of various technological alternatives to provide last mile advanced telecommunications capability in rural areas.
- The capability of various technical enhancements to existing wireline and wireless networks to provide last mile advanced telecommunications capability in rural areas.
- The effectiveness of competition and universal service support mechanisms to promote the deployment of advanced telecommunications capability and the availability of advanced telecommunications services in rural areas.

The study concluded that in the United States, a major problem with regard to broadband access in rural areas lies primarily with last mile connections rather than access to the backbone network. DSL and cable modems are the most widely available last mile broadband technologies. However, their deployment in rural areas lags that in urban areas. New technologies hold promise for broadband access in rural areas but may be years away from widespread availability. While a number of last mile facilities that connect the user to the network (cable modems and digital subscriber lines) are being deployed rapidly, others (such as fibre to the home and terrestrial and satellite wireless) are in the relatively early stages of deployment or are being tested with the expectation of deployment in the next few years.

***United Kingdom***

In the United Kingdom, Oftel monitors and publishes market data on narrowband Internet services, as well as higher bandwidth services in order to increase transparency in the market and assist policy making. [24] Specifically, Oftel's aim is to:

- Monitor and publish data on consumers' access to higher bandwidth including breakdowns by region and social class.
- Monitor and publish United Kingdom prices and how they compare with international competitors.
- Conduct and publish research into consumer preferences and demand.

***France***

In France, the Bourdier Report, [25] issued in March 2000, by the Ministry of Economy, Finance and Industry, outlined France's current broadband environment, provides strategic analysis of current activities, identifies obstacles, and makes specific proposals towards the goal of extending broadband access throughout France (including government support for extending regional networks).

***Korea***

In Korea, work to identify the nature and extent of the digital divide included issuance of a White Paper on Internet Policy. [26]

## 2.4 Changing market characteristics and Internet access

Access to basic telecommunications infrastructure is fundamental to any consideration of the digital divide since a telecommunications connection is required for access to the Internet. The telecommunications market has undergone far-reaching structural change in recent years, with major transformations both on the demand and supply sides of the industry that are expected to further enhance the potential of the market to expand access. [27]

On the demand side, the growth of demand for new services, most notably for mobile communications and for data transmission, has significantly expanded the industry's revenue base. This has allowed the fixed costs involved in market entry to be spread over a wider base thereby lowering a barrier to entry into the market. Moreover, with demand growing quickly, any excess capacity is more rapidly absorbed, so that financial break-even occurs sooner. Also, with demand becoming more differentiated, the scope for new entrants to differentiate the services they supply from those provided by incumbent suppliers has increased, again facilitating the competitive entry process.

On the supply side, the rapid development of new technologies has lowered the capital costs involved in market entry, not only in the inter-exchange network but also in the customer access network. The range of technologies that can be used to compete has also expanded, including a wide range of wireline and wireless alternatives. Some of these technologies differ significantly in their cost characteristics (such as the proportion of fixed to variable costs) allowing entry to occur on scales that can be more finely adapted to various market segments, including those in regional, rural and remote areas.

In short, recent technological developments are reinforcing new market entry possibilities by:

- Lowering the costs of establishing alternative network infrastructure.

- Offering a wider range of infrastructure possibilities, thereby enabling new entrant competitors to more effectively target particular markets than existing providers (who may be reluctant to scrap or upgrade outmoded infrastructure).

- Providing new entrants with opportunities to make use of wireless technologies that are more easily scaleable thereby allowing the initial costs of entry to be lowered while retaining a capacity to expand with market growth.

- Increasing the options for bypassing existing networks, thereby reducing the dependence of new entrants on access to existing infrastructure.

Despite the emergence of new technologies in dealing with the delivery of broadband services to regional areas, particularly with the "last mile" issues, the potential impact of some of the technologies on the digital divide is still uncertain. Service supply in rural and remote areas continues to present difficulties. The distinctive features of these areas, such as low population and revenue base, and physical isolation from capital cities, are a significant disadvantage for service supply industry based on economies of scale. The cost per customer of supplying terrestrial services in these areas will remain significantly higher than in more densely populated areas. Also, the current major fixed line infrastructure-based telecommunications service providers see these areas as markets of marginal significance, far less commercially attractive than securing a market share in metropolitan and regional centres. Servicing rural and remote areas may be seen in social rather than commercial terms. Indeed, the past reliance on the universal service obligation as a means of ensuring supply to such areas probably reinforces this view.

However, the emerging satellite services may have the potential to address disadvantages of isolation and low population density. Although some of the most appropriate satellite services have been experiencing some start-up problems, satellite systems that can offer cost-effective service to rural and remote users could develop in the medium- to long-term relative to terrestrial wireless solutions.

***Prospective new technologies***

Changes in technology are happening quickly although the PC remains the most traditional means of using e-mail and accessing the Internet. The speed of technological development and technology-convergence could allow such services to be accessed through other devices such as the TV. The development of digital TV is particularly significant in this respect. Digital TV can be used for the delivery of Internet based services such as email, Web-browsing and on-line shopping which will allow for integration of content and relevant services. Web TV is already available to a limited extent through the cable companies, and more services are being launched onto the market. The ideal scenario would be where every individual has access to electronic services in their own home through a device such as their television set that is familiar and easy to use.

Digital, interactive television services will enable widespread, low-cost solutions to consumers' needs for data communications, since many homes already have a television set and it is a 'user-friendly' medium. The introduction of digital television and the auction of national/regional datacasting licences could enable broadcasting services to be a dominant broadband gateway into the home – particularly in regional areas where other delivery mechanisms are hampered. However, the widespread availability of digital television is still some years away.

***Using power lines for high-speed Internet access***

There are a number of other access possibilities, among which is access via power lines. The potential use of powerlines to provide high-speed broadband access is of considerable interest to this paper since if the technical difficulties are overcome, powerlines offers the capability of having, if not broadband access, then still widespread access at a significantly higher speed than by traditional methods, and at reasonable prices.

Power companies are recognising the opportunity to provide broadband carriage infrastructure along and through their easements and rights of way. Experiments with the use of power lines for data transmission have been conducted in the United States, Germany, the Netherlands and Sweden. Germany, for instance, actively encourages the development of electricity grid and other new transmission media.

A problem with high-speed data transmission via power lines is evidently that "noise problems" may arise in the form of disturbances to other radio-communication because there is a high emission of signals from power lines. However, new second-generation transmission equipment is expected to reduce the noise problems significantly. If the technical aspects can be clarified, a significant commercial interest in developing high-speed access via power lines can be expected. As power lines extend to nearly all households, including regional, rural and remote ones, such lines may supplement and be an alternative to ADSL and cable TV modems for fixed network access.

Box 2.1 summarises technology options for the supply of Internet access.

## 2.5 Constraints to market provision

The relevance of developments in technology and new market conditions pertaining to service provision seems greatest in regional centres, and notably in those areas where economic prospects are reasonably good. In sparsely populated areas and in smaller rural centres, especially those suffering from shifts in population to larger towns, demand is less likely to be sufficient to absorb new infrastructure, especially if it is mainly intended to provide specialised or niche services. As a result, while the new market conditions might result in improvements in particular regions, they are unlikely to resolve concerns about nation-wide equity. Rather, they might even accentuate the disparities between regions. This is not to disparage the importance of the new market conditions. Certainly, intermediate volume users – who might have been less well served by traditional operators whose focus is more naturally on the largest customers in regional areas – could well benefit. Nonetheless, the needs of customers in less favoured parts of the country are unlikely to be adequately addressed by the developments in technology and new market conditions.

## Box 2.1: **Summary of Technology Options**

| Access Technology | Infrastructure | Range (from local exchange or base station to customer premises) | Indicative Digital Transmission Rates | Comments |
|---|---|---|---|---|
| **ADSL, HDSL, VDSL** | Copper wire | 5km | Upstream: 256kbit/s Downstream: 6Mbit/s | Requires Copper wire local loop<br>Cost effective for urban areas only |
| **DAMA** | Geostationary satellite | No limit | 9.6kbit/s, 16kbit/s, 19.2kbit/s | Radio spectrum required |
| **DRCS** | Fixed radio | 50km<br>Up to 9 repeaters<br>50km apart | 2.4kbit/s | Not suitable for digital transmission<br>Radio spectrum required |
| **HCRCS** | Fixed radio | 50km<br>Up to 9 repeaters<br>50km apart | 14.4kbit/s, 19.2kbit/s | Radio spectrum required 28.8kbit/s planned(c) |
| **HFC** | Optical fibre & co-axial cable | Local (a) | Up to 10Mbit/s | Cost effective for urban areas only |
| **ISDN** | Copper wire | Up to 5km from exchange | 64kbit/s, 128kbit/s, 2Mbit/s | |
| **LEO** | Orbiting Satellite | No limit | 9.6kbit/s | Radio spectrum required |
| **Microwave Radio** | Fixed radio | Multiples of 40km-no limit | Up to 155Mbit/s | Radio spectrum and line of sight required |
| **MEO** | Orbiting satellite | No limit | (b) | Radio spectrum required |
| **Powerline** | Electric power lines | Limited to existing electricity network | Up to 1Mbit/s | Commercial viability yet to be proven |
| **PSTA via modem** | Copper wire | Up to 5-10km from exchange | From 2.4kbit/s to 56kbit/s depending on condition of the local loop | |
| **VSAT** | Geostationary satellite | No limit | Upstream: up to 512kbit/s Downstream: up to 30Mbit/s | PSTN & ISDN can be used for upstream links Radio spectrum required |
| **Wireless Local Loop (WWL) (narrowband)** | Fixed Radio | 70-90km | Wireless IP 19.2kbit/s | Radio spectrum required |
| **Proprietary** | | | Asynch. 28.8kbit/s | |
| **CDMA** | | | 64kbit/s | |
| **Wireless Local Loop (broadband)** | Fixed radio | Limited | Up to 6Mbit/s | Radio spectrum required |
| **LMDS** | Fixed radio | Limited | Up to 155Mbit/s | Radio spectrum required |

a) Range determined by number of people using the service rather than the characteristics of the cable.
b) No indicative transmission rates available as no service yet in operation.
c) HCRCS is now capable of 14.4kbit/s and 19.2kbit/s. Over time it is expected to be capable of 28.8kbit/s.
*Source*: The Allen Consulting Group and Telstra.

***Pricing obstacles to access and take-up of access***

Affordability is a significant barrier to households going online and accessing data capability benefits. Concerns relate not only to the level of actual prices but to the structure of prices for accessing the Internet. However, it is open to question if the appropriate response to the challenges of the digital divide in regard to price is to mandate particular tariff structures (*e.g.* unmetered access). Some governments are recognising that this would be a retrograde step that would return policy makers to setting telecommunications tariffs, and that instead other policy options are available, including:

- A greater range of tariff options, in particular, pricing favourable to "always-on" capabilities necessary to support electronic commerce.

- Infrastructure competition.

- Unbundling the local loops.

The competitive development of high-speed options for Internet access.Because of the long history of legal monopolies, incumbent operators provide almost all the local telecommunications lines used for Internet access. These operators have shown a marked reluctance to offer a variety of pricing options largely because the absence of competition in the local loop enables dominant operators to disregard or delay meeting the changing needs of business and users. [28] Nevertheless direct intervention by governments to impose tariff options that appear to be more favourable runs counter to allowing telecommunication carriers to manage tariff structures.

Rural customers can be significantly disadvantaged compared with urban customers in regard to prices. In some countries usage rates in regional areas are calculated on timed/distance tariffs, rural customers pay more than the local call connection rates enjoyed by urban customers and those who can access points-of-presence. This can apply to customer equipment expenditure as well. To access faster data rates, rural customers may require more expensive customer equipment to overcome quality of service problems inherent in existing infrastructure.

Regional, rural and remote centres are not seen as commercially viable ventures and, as a result, market forces are less likely to operate adequately. There is frequently only a sole provider of telecommunications infrastructure in these regions and government intervention may be required to enable lower connection and data access prices and improved quality/reliability of service. Certainly, quality of service/reliability can be a significant barrier preventing customers from benefiting from technological improvements in telecommunications and Internet access, particularly in rural areas.

**Unbundling and pricing the local loop**

The key element in addressing the digital divide within a country (as well as the international digital divide) is support for infrastructure competition since this is fundamental to providing a framework that encourages tariff innovation and responsiveness to user demands. Notwithstanding this, the drawback of solely relying on this policy is the significant time it takes to roll out competitive infrastructure in local access networks.

Support for unbundling local loops has the advantage of accelerating the competitive provision of local access service. [29] At the same time, policies that mandate favourable interconnection rates, and that

encourage innovation in retail tariffs, can also be important. Some countries view as a potential drawback of such action the fact that it may discourage investment in alternative infrastructure. For this reason a number of OECD governments are tackling this issue by offering phased withdrawal of incentives to enter the market while new entrants build their own infrastructure. Other countries believe there will not be any drawback as long as unbundled elements of networks or interconnection are correctly priced.

In regard to local loop unbundling, policy frameworks are now in place for the majority of OECD countries to implement unbundling so as to allow operators to install their own equipment enabling them to provide services in direct competition to the incumbent's ADSL products. In some countries, the declaration of unconditioned local loop services into regional markets has been a major factor in the rapid overall growth in numbers of new carrier licences issued.

In May 2000, Oftel made a decision requiring BT to make available an unmetered wholesale Internet access product called "FRIACO", [30] to enable other operators to offer their own unmetered Internet access products in competition with BT, by collecting traffic from BT's local exchanges. Oftel is currently undertaking a review of price controls that will include consideration of the treatment of FRIACO as part of the Network Charge Controls. The telecommunications regulator in Germany, RegTP, also concluded that the incumbent was required to offer wholesale flat-rate access to Internet Service Providers by 1 February 2001.

Recent work by the OECD found that the level, and structure, of pricing for Internet access is one of the major constraints facing users and potential users. This analysis concluded that the key to greater tariff innovation to support electronic commerce is to increase competition. Where competition is most advanced, at the local level, the benefits of pricing innovation are increasingly evident.[31] Whereas at the beginning of 2000 users in only five OECD countries had the option of unmetered dial-up Internet access from the incumbent telecommunication carrier, by the beginning of 2001 this number had been extended to 12 countries.

### 2.6 Role of government/regulation

The changes in demand and supply have been accompanied by significant changes in the policy and regulatory environment designed to:

- Enhance competition/market provision as far as possible.
- Reduce cost.
- Provide incentives to use appropriate technology.
- Increase pricing options.
- Foster market conditions conducive to the provision of affordable communications services.

Restrictions on entry are being eliminated and a regulatory framework strongly supportive of competition is being put in place, with stringent controls being exercised to ensure that entrants can access the networks and facilities of the incumbent carrier. There is broad recognition that any intervention should be competitively neutral and should not lead to inefficient, competition-distorting outcomes. Governments are re-examining telecommunications policies to ensure that they are not artificially limiting the development of new modes of service provision, or in other ways limiting competition and efficiency.

## 2.7 Monitoring and periodic review

A dependence on a competitive market and the dynamic circumstances of today's unparalleled technological developments demands considerable effort to monitor and assess market effectiveness and a preparedness to periodically revisit policies and programmes. This highlights the need for good data. Indeed, improved information is crucial for assessing the nature and scope of any problems and for developing well-targeted and cost-effective strategies for overcoming them. Monitoring the extent to which competition is delivering its promised benefits is a critical task. In this context, the set of indicators Oftel uses as a framework for monitoring the degree of effective competition in telecommunications markets set out in Box 2.2 is of interest since it is applicable to Internet service markets.

Policy makers are monitoring progress to determine whether there are disparities in access, quality of services, or pricing that need to be addressed. Performance indicators and measurements to track progress toward reaching targets are being established. In particular, it is being recognised that the barriers causing and sustaining the digital divide need to be regularly measured, monitored, assessed and addressed.

### Box 2.2: **Indicators of Effective Competition**

| | |
|---|---|
| Consumer outcome | Whether the market conditions consumers face compare well against consumers in similar economies |
| | Whether a wide range of services is available to consumers |
| | Degree of consumer satisfaction with the quality of service received |
| | Extent to which prices broadly reflect underlying costs (*i.e.* absence of persistent excessive profits) |
| Consumer behaviour | Extent consumers can access information to help make effective choices |
| | Whether consumers are confident/knowledgeable in using information and in taking advantage of market opportunities |
| | Absence of barriers to consumers switching suppliers |
| Supplier behaviour | Active competition in price, quality and innovation |
| | Absence of anti-competitive behaviour |
| | Absence of collusion |
| | Extent to which consumer needs are being met |
| | Efficient provision of services |
| | Recent entry |
| Structural | Limited entry barriers that would make the threat of entry a competitive discipline |
| | Absence of inefficient suppliers |
| | Limited ability of operators with market power in related markets (through vertical or horizontal integration) to lever this market power into the market segment being reviewed |
| | Changes in market structure over time, especially a tendency to reduce concentration |

*Source*: Oftel, Implementing Oftel's Strategy: Effective Competition Review Guidelines, August 2000.

In some countries regulators are requiring regulatory reporting on carrier performance including carrier response times to customer requests for higher bandwidth data services, particularly in regional, rural and remote areas. In addition, measures of carrier responsiveness in the provision of broadband services and market data on narrowband Internet services and on higher bandwidth Internet services are being monitored in order to increase transparency in the market and assist policy making.

There is also increasing awareness of the need for vigilance that traditional government monitoring and control processes do not become sluggish and indeed, ineffective or, worse, counter-productive and that accordingly, monitoring processes need to be re-engineered to fit the new environment.

# SECTION 3. OECD GOVERNMENT INITIATIVES TO EXTEND ACCESS TO INTERNET INFRASTRUCTURE

## 3.1 Upgrading the USO to include Internet Access

Provisions relating to the supply of "Universal Service Obligations" (USOs) for telecommunications are now widespread in OECD (and other) countries. In essence, USOs constitute a requirement that telecommunications operators provide basic voice 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.[32] A major issue relating to the digital divide is whether provision of broadband service into regional, rural and remote areas should be mandated, and if so, whether they should be offered at a subsidised price as part of a universal service offering, to ensure affordability for all.[33] Applying such a traditional USO approach to higher bandwidth services would mean giving all consumers the right to a telecommunications connection above a stated (higher) data capability speed[34] on reasonable demand at affordable prices.

### *Arguments against extending the USO to broadband*

Incorporating a minimum data requirement into the USO is likely to require a significant investment in upgrading the operator's customer access network. This can impact adversely on the development of competition in the industry, both by any imposition of higher USO levies on an incumbent's competitors, and by further entrenching subsidisation of the incumbent's services in USO net cost areas. Such a development may well have the perverse effect of dissuading innovative alternative providers from entering regional markets (since high-speed data services can be delivered through a number of different platforms, many of which are offered by new competitors).

> *The delivery of new services on a highly cross-subsidised, uniform price basis reduces or eliminates the prospect of competitive entry and discourages the incumbent from further investment and service improvement in non-profitable or less profitable areas of the market. At the same time, the maintenance of a cross-subsidy based regime results in prices in more profitable areas of the market being higher than would otherwise be necessary. Such an approach runs the real risk that the supply of new services to meet the real needs of regional, rural and remote areas is either further delayed or simply does not materialise.*[35]

Communications access is taking an ever-wider variety of forms, and there is a broad range of information transmitting and processing capabilities. An expanded USO overlooks the most promising feature of the new competitive marketplace: the enhanced ability to tailor the price and capability of service to specific user needs and socio-economic constraints. An expanded USO will simply waste a vast amount of resources on sub-optimal solutions. Further, it may discourage the market from discovering and supplying the solutions that are optimal for various groups. The USO mechanism, which assumes a common set of needs and can limit competition, would be ineffective in promoting equity of choice.

## 3.2 Country positions on upgrading of USO to include data capability

***European Community***

Within the framework of current EU law, Member States shall ensure that a defined minimum set of services of specified quality is available to all users in their territory, regardless of geographic location, and, in light of specific national conditions, at an affordable price.

The minimum data speed set by current EU Directives is 2.4 kbit/s. As a result of the 1999 Review[36], the European Commission proposed in July 2000 that this harmonised minimum be removed and that Member States should be able to set data rates that permit Internet access. The Commission was not convinced that extending the scope of universal service to broadband services at this stage would be advisable.

However, in considering whether a review of the scope of universal service obligations is necessary, the Commission proposal refers to the following options which the Commission may consider:

- Propose a change or re-definition of the scope of universal service obligations but require that any net costs are financed only via general government budgets, or

- Propose a change or re-definition of the scope of universal service obligations and permit any net costs to be financed by a mechanism to compensate undertakings for these net costs from the general government budget, or to share the net cost of universal service obligations which may be based on a Universal Service Fund.

Alternatively, the Commission may propose that specific services should become mandatory services to be provided under cost oriented obligations and not be included in the scope of universal service obligations.

In considering whether the scope of universal service obligations be changed or re-defined, the EC takes into consideration the following elements:

- Are specific services available to and used by a majority of consumers and does the lack of availability or non-use by a minority of consumers result in social exclusion?

- Does the availability and use of specific services convey a general net benefit to all consumers such that public intervention is warranted in circumstances where the specific services are not provided to the public under normal commercial circumstances?

The position proposed by the Commission is that any review of the scope of the universal service obligations must be determined principally by user demand. An assessment of the scope of universal service will be based on a market-based analysis of the demand for, and widespread availability of, that service, and a political assessment of its social and economic desirability.

The Commission proposal not to upgrade the definition of universal service does not prohibit a Member State from taking its own initiative to make broadband services publicly available in its own territory. But in doing so, no compensation mechanism involving specific undertakings, operators or service providers may be imposed.[37]

Currently, the EU definition of universal service does not extend to the Integrated Services Digital Network (ISDN) since it considers that there should be no constraints on the technical means by which the connection is provided, allowing for wired or wireless technologies, nor any constraints on which operators provide part or all of universal service obligations.[38]

According to a proposed EU directive, connections to the public telephone network at a fixed location should be capable of supporting speech and data communications at rates sufficient for access to online services such as those provided via the public Internet. The data rate that can be supported by a single connection to the public telephone network depends on the capabilities of the subscriber's terminal equipment as well as the connection. For this reason it is not considered appropriate to mandate a specific data or bit rate at Community level. Currently available voice band modems typically offer a data rate of 56 kbit/s and employ automatic data rate adaptation to cater for variable line quality, with the result that the achieved data rate may be lower than 56 kbit/s. In specific cases where the connection to the public telephony network at a fixed location is clearly insufficient to support satisfactory Internet access, Member States should be able to require the connection to be brought up to the level enjoyed by the majority of subscribers so that it supports data rates sufficient for access to the Internet. Where such specific measures produce a net cost burden for those consumers concerned, the net effect may be included in any net cost calculation of universal service obligations.

The Commission's proposal involves removing the minimum data speed requirement from legislation allowing Member States to set levels appropriate to their own circumstances. [39] One reason for this is that the minimum data speed needs to reflect technical limitations of networks. For instance, where there are long connections between the exchange and the customer's premises, speeds in excess of 14.4 kbit/s may be difficult to achieve without significant network upgrades. The minimum would need to reflect such circumstances and be based on what is practicably achievable across the network. In addition to a minimum standard, the Commission considers that it may be appropriate to ensure that an operator responds to all reasonable requests for non-voice services including data communication services.

***United Kingdom***

In the United Kingdom, BT and Kingston Telecommunications are subject to an obligation to provide a minimum data speed of 2.4 kbits/s in accord with EC directives. However, since in practice most users (*e.g.* over 90% in the United Kingdom) experience much faster speeds of 28kbits/s from the end user to the Internet service provider such rates provide adequate speeds for reliable access to e-mail services and many current uses of the Internet.

While recognising that the user's modem speed and the capability of the service provider will affect the data speeds experienced by the Internet user, Oftel's position is that appropriate data speeds for networks should be set within the USO in line with the Government's goals of universal Internet access by 2005. The United Kingdom's submission to the European Commission's 1999 review of European legislation proposed that Member States should be given greater flexibility in setting minimum data speeds.

The United Kingdom government has resisted pressures to extend universal service beyond telephony-based services, which are currently seen as the only services which are "essential for full social and economic inclusion in society". Oftel, the United Kingdom regulator, has argued that the universal service regime is an inappropriate tool for preventing social exclusion from the Information Age:

> *"..historically universal service has been founded on the basic principle that the majority of consumers who use a telephone service can afford to cross-subsidise the limited, basic needs of a small minority that might otherwise miss out. That principle does not translate easily to the provision of expensive new technology at affordable prices, at least in the early stages of market development".* [40]

Oftel examined whether the level of universal service should be revised to include mobile and narrowband ISDN services, to enhance the ability to access Internet services and to cover higher bandwidth services (services provided at speeds greater than 384kbits/s) and concluded that, at this stage, it should not. However, Oftel believes that this does not exclude the possibility of universal service being extended to encompass high-speed broadband services in the future should they become essential for such social participation. Circumstances relevant to the future of the USO, including the emerging EC framework, impacts on investment, funding, cross-subsidies, consumer demand and means of supply are changing very rapidly. Accordingly, Oftel concluded that the issue of an extension of the USO to include higher bandwidth services should be kept under review. Oftel proposed that the basic definition of universal service be reviewed periodically to ensure that services be categorised as a USO if the level of penetration reaches a point at which "unacceptable social and economic disadvantage is placed on customers lacking access to those services". [41]

***Germany***

In Germany there is now considerable focus on expanding broadband infrastructure, with broadband defined as an ADSL having a level of up to 8Mbps. But no policies to upgrade universal service exist.

***Italy***

Even though the diffusion of Internet access is an important concern for the Italian government, no policy directed toward the extension or upgrading of existing universal service obligations has been formally proposed in Italy. At the moment Italian USOs conform to EC directives and ITU-T recommendations in the matter of basic telephony services. In particular, a minimum data speed of 2 400 bit/s is guaranteed over the Italian PSTN network.

In February 2001, the Prime Minister's Office – Information Society Forum published a report containing proposals for broadband in deprived areas. [42] The report maintains that within a few years, the concept of universal services must include access to the following infrastructures: ADSL for residential users; connections between 640 Kbit/s and 8 Mbit/s for schools, SMEs and offices; and industries and universities with connections between 8Mbit/s and 155 Mbit/s. Such objectives require further analysis regarding the possibility and limits of public intervention for the support of investment in infrastructure.

The report also outlines the role of various actors (such as the central government) in promoting the birth of a national forum for discussion, exchange of experiences, the co-ordination and promotion of policies to stimulate investment and remove administrative barriers that block initiatives. Territorial bodies have the role of preparing strategic plans for the cabling of deprived areas, where necessary creating mixed capital cabling firms. The Telecommunications Authority must enforce the rules for the promotion of competition and investment. Businesses should attempt to invest also in areas which seem to be less profitable. The report also focuses on the necessity of studying in depth the role of public demand for network access as an instrument for promoting the cabling of various areas.

***Australia***

In Australia, the universal service obligation (USO) includes:

- Access to a 64 kbps ISDN service on demand for 96% of the population.
- For the 4% living in rural areas not able to access ISDN on demand, the provision of an on-demand Internet-based asymmetric satellite service that delivers a satellite downlink service

comparable to the 64 kbps ISDN service; and reimbursement of 50% of the price of purchasing the necessary satellite receiving equipment.

This means that high speed Internet access is to be made available to all Australians on demand. For 96% of Australians, this will be via ISDN over the ordinary telephone line. For the remainder – mostly in regional and remote parts of Australia – it will be via satellite services. Telstra and other telephone companies will have an obligation to provide these services. Those in this last 4% will get a special benefit: they will receive a rebate of 50% of the cost of equipment necessary to receive the special digital data service.

Digital data service providers will also be required to prepare digital data service plans. These plans will include commitments on quality of service and connection times. There is a requirement for carriers to consult with the public on these plans before submitting them to the Minister for Communications for approval.

New USO arrangements were passed by the Australian Parliament in June 2000 providing for the government to conduct a tender in so-called "Extended Zones" in remote Australia for the provision of untimed local calls (already available to urban Australia). The winning tenderer will receive up to AUD 150 million for the provision of untimed local calls and, in addition, will become the universal service provider for those areas attracting a USO-related subsidy.

The losses that result from supplying loss-making services and from facilitating the satellite subsidy in the course of fulfilling the USO and digital data service obligation are required to be shared among all carriers. The Telecommunications Act 1997 provided that a universal service provider's net universal service cost as assessed by the Australian Communications Authority was to be shared amongst the universal service provider and other participating carriers on a basis proportional to the eligible revenue of each carrier.

In July 2000, further USO amendments were introduced to Parliament that provided for contestability in the supply of the USO, with multiple service providers (subsequent to authorisation by the ACA) able to compete for customers in defined geographic areas and to receive a per-customer subsidy. Importantly, carriage service providers (non-infrastructure owners) will be able to provide USO services in addition to carriers (infrastructure owners). Also, carriage service providers earning eligible revenue above a particular level (AUD 130 million) may be required by Ministerial determination to contribute towards funding the USO cost.

***United States***

In the United States, through mechanisms such as the high cost fund and access charges, the FCC has supported basic telephone service in high cost (primarily rural) areas. Other universal service mechanisms similarly target ordinary telephone service. For example, among the FCC's low-income assistance programmes, *Link-up America* provides support for up-front installation charges, and *Lifeline Assistance* helps defray monthly telephone bills for local service.

Section 254 of the 1996 Telecommunications Act requires (inter alia) that:

- Access to "advanced" telecommunications services be provided "in all regions of the Nation".

- "Low-income consumers" and those in "rural, insular and high-cost areas," have access to telecommunications services, including "interexchange and advanced services that are

reasonably comparable" to those provided in urban areas, at rates "reasonably comparable" to rates in urban areas.

– Schools, health care institutions, and libraries be eligible for special rates and other concessions to ensure that they have affordable access to advanced telecommunications and information services.

In response, the United States Congress adopted an expanded universal service policy. [43] Two primary components of the universal service mechanism include support for high cost areas and support for schools, libraries, and rural health care.

***E-Rate***

Section 254 of the 1996 US Telecommunications Act encourages access to advanced telecommunications and information services for all public and non-profit elementary school classrooms, libraries, and rural health care providers. Schools and libraries are provided with discounted telecommunications services, Internet access, and classroom connections known as the education or "E-Rate". Under the implementation method adopted by the FCC, this can include discounts on broadband applications if provided as part of a school or library's authorised technology implementation plan. Rural health care providers are provided rates comparable to urban rates for similar services.

The E-Rate programme provides discounts of 20% to 90% with the largest discounts given to schools and libraries operating in poor communities. Currently, over 90% of the nation's public schools and libraries have Internet access, in some cases broadband, and over 63% of US classrooms are now connected. Table 3.1 indicates the break-down of overall E-Rate funding.

Table 3. 1. **Overall E-Rate Funding by Eligible Service Type**

| Service Type | Total Dollars | Per cent of total |
|---|---|---|
| Telecommunications | USD 1 260 390 355 | 34% |
| Internal Connections | USD 2 138 274 551 | 58% |
| Internet Access | USD 278 265 275 | 8% |
| Total | USD 3 679 743 130 | 100% |

*Source:* U.S. Department of Education, Planning and Evaluation Service, *The E-Rate and the "Digital Divide"*, A Preliminary Analysis, September 2000.

Funding is derived from mandatory contributions to the federal Universal Service Fund by all telecommunications companies (local and long-distance carriers, resellers, cellular, paging, other wireless, and any other companies that interconnect with the switched network), but not Internet, on-line service, and cable companies.

Under the *Rural Utilities Service Telecommunications Program* (RUS), loans are provided to certain operators to provide local/last-mile access to rural areas. Under this programme, loans or grants are also provided for distance learning and telemedecine in rural areas.

Under the Department of Education's *Community Technology Centres (CTC) Program*, three-year grants are awarded to state or local agencies, institutions of higher education, or non-profit agencies to develop model programmes to demonstrate the educational effectiveness of technology in economically-distressed communities, inner cities and other low-income and rural/remote locations. The focus is on access and training programmes. The programme is seen as central to the development of "anchor tenants" for broadband infrastructure, services, and new applications.

***Canada***

In Canada, the Canadian Radio-Television and Telecommunications Commission (CRTC) requires local exchange carriers to provide individual line local service with touch-tone dialling, provided by a digital switch with capability to connect to the Internet via low speed data transmission at local rates. The basic service objective is independent of the technology used to provide service, and may change over time as service expectations evolve.

In 1999, the CRTC decided against upgrading the Canadian basic universal service obligation, pointing to the technical difficulties that would be faced by carriers in guaranteeing a data transmission speed, the cost associated with an upgrade to 28.8 kbps or higher, and the impact that cost would have on the operation of both profitable and unprofitable markets. [44]

The CRTC believes that, over time, competitive pressures and improvements in network technology will enable basic service to include faster transmission speeds.

As noted earlier, in October 2000 the Canadian Government announced its commitment to achieving the goal of high-speed broadband access to all Canadians by 2004 and established a National Broadband Task Force to advise on strategies to achieve this target. The work of the Task Force effects an expansion of the government's existing *Connecting Canadians* programme, [45] which has so far focused on funding connectivity – of any speed – for schools and libraries.

***Sweden***

Under the *Small Community Broadband Infrastructure Initiative* announced in March 2000, broadband access is extended to communities with a population of less than 3 000 (comprising some 30% of the national population). [46] The national government would subsidize local networks, private ones or in the absence of a market, community owned.

***New Zealand***

In December 2000, the government accepted selected recommendations of an inquiry into New Zealand's telecommunications regulation and policy. The government rejected direct subsidies for broadband development but will have Telecom NZ upgrade the network for universal low speed access. A private-public Information Society Initiative may provide direct subsidies in rural/remote locations in order to ensure access to broadband services that the market would otherwise not make available. [47]

### 3.3 The cost of upgrading the USO to include a digital capacity

Decisions about policies and programmes to address the digital divide must of course be made in the context of programme funding and costing. However, the protracted debates over the appropriate cost of providing USOs relating to basic telecommunications services warn of significant difficulties in ascertaining the costs of digital divide programmes.

For instance, there is the problem of costing methodology and its practical application. Acknowledging that basing rural subsidies on historical costs rewards carriers whose high costs result from operational inefficiencies, United States regulators opted for subsidy calculations based on "forward-looking costs" that approximate the costs a hypothetical efficient carrier would incur in constructing and operating its network. Those costs, minus a "revenue benchmark" taking account of all of a carrier's revenues, determine the subsidy amount. But in practice, forward-looking costs have proven to be notoriously difficult to determine varying from place to place and time to time.

Some governments (*e.g.* Australia's) consider that the difficulties of using cost models to determine the level of subsidies for telecommunications in high-cost areas might be avoided by using a competitive tendering approach. An auction could be held to decide who will provide universal service, with the lowest bidder getting the universal service subsidy.

Another issue is whether the benefits of serving underserved areas should also be recognised so that the cost estimate should be of *net* costs? For instance, Oftel estimated in 1997 that the benefits to BT as the universal service provider amounted to between GBP 102 and 151 million per annum (later revised to GBP 61 million per annum)[48] leading to the conclusion that *net* costs of delivering USOs were insignificant and could be borne by BT without the need to establish a universal service fund.

It would be arguable that there are similar intangible potential benefits to being the provider of programmes to bridge the digital divide and that these benefits should be recognised in costing digital divide programmes.

***Australia***

The Australian Communications Authority (ACA) in its 1998 Digital Data Inquiry report estimated that the cost of upgrading Telstra's customer access network to a minimum data speed of 28.8 kbps would be in the order of AUS 4 billion (about USD 2.1 billion). The ACA also found that an upgrade to a data speed lower than 28.8 kbps would incur very similar costs.

Telstra estimates the capital cost of upgrading its network to provide a minimum data speed of 33.6 kbps would total AUD 4.486 billion. Telstra did not provide an estimate of the operating and maintenance costs, although these could be expected to be small since it already incurs such costs with its existing network.

Drawing on the analysis by the ACA (in its Digital Data Inquiry report) [49] and information provided by Telstra, the *Australian Broadband Inquiry* estimated that the following costs would be incurred in providing all customers with 64 kbps using ISDN:

- The capital cost of network upgrades to Telstra's access lines which cannot currently access ISDN, is approximately AUD 2.5 billion.

- The cost of upgrading customer equipment to enable the supply of ISDN is AUD 1 240 per customer.

The Inquiry estimated the cost of upgraded customer equipment at about AUD 11.5 billion. The total cost of the upgrade was estimated at approximately AUD 14 billion.

The Communications Research Unit (CRU) of the Australian Department of Communications, Information Technology and the Arts (DoCITA), were also asked to provide an estimate of the likely cost of upgrading the USO to at least 64 kbps. The CRU advised that the likely cost would be in the order of AUD 20 – 30 billion[50] based on costs arising from three areas:

- Capital costs for customer equipment in the order of AUD 10 billion (the CRU assumed the use of a number of technologies, including ADSL).
- Network upgrade costs for both CAN and backbone in the order of AUD 10 billion.
- Operating costs in the order of AUD 6 billion.

Despite the variation between the cost estimates for an upgrade to 64 kbps, it is clear from these estimates that the total cost is large.

***United States***

In the United States, in compliance with Congressional intent that support be explicit, the FCC has adopted a mechanism for the high cost areas served by non-rural local exchange carriers based on forward-looking cost, *i.e.* what it would cost to build a telephone system today. The US Telecommunications Act 1996 permits tendering but evidently for the present, the FCC is concentrating on the forward looking economic cost model.

***France***

The French regulator, *Autorité de régulation des télécommunications* (ART), currently uses an historic cost model to estimate the cost of the USO. ART estimated about FRF 200 million per annum of benefits accruing to the universal service provider. [51] However, there has been heated debate about the actual cost and the basic costing model that the regulator should use and the universal service costing and funding arrangements have been reviewed.

***Sweden***

Sweden, a country with a small geographical area, has budgeted to spend a significant amount to bring broadband access nation-wide. SEK 5.25 billion has been earmarked for regional network development and remote/rural broadband access. Substantial (30 to 40%) subsidies are to be paid to carriers for regional/remote broadband access development. The government will also fund SEK 3.2 billion, including SEK 1.2 billion for tax credits to end users, and SEK 1.2 billion for municipal broadband expansion.

## 3.4 Funding an upgraded USO

***Australia***

In Australia, the *Networking the Nation* (NTN) programme receives a portion of the revenue generated from the partial sale of Telstra to provide a mechanism for meeting the needs of telecommunications consumers, particularly in regional, rural and remote areas. The government has primarily used NTN funding as a catalyst for promoting investment by the commercial sector in marginal or uneconomic markets. Commercial organisations are ineligible to apply for NTN funding. Projects funded through NTN have an identifiable community need. Where infrastructure has been funded directly, *e.g.* the provision of Internet points of presence, additional funding is usually provided for services and facilities to encourage use of the infrastructure.

The NTN programme is not only about infrastructure but about bridging the gap between having infrastructure and being able to utilise it, including training and awareness *e.g.* the opportunities that teleworking provides for people who live remotely.

***The 'Extended Zones' tender***

In Australia, approximately 40 000 telecommunications consumers who live in generally sparsely populated areas known as "Extended Zones" (covering about 80% of the Australian landmass) have no (or limited) access to untimed local calls (unlike consumers who live outside these Extended Zones who do have a legislated right to untimed local calling).

In passing legislation to extend the right of untimed local calls to the Extended Zones, funding of up to AUD 150 million over three years was provided for an infrastructure upgrade commencing in 1999-2000 through a tender process. The successful tenderer is declared the universal service provider and is eligible for exclusive USO subsidies for three years. But other service providers may provide services in the Extended Zones during the contract term.

The AUD 150 million allocation is used to leverage a better communications outcome for rural and remote Australia. The "beauty contest" style tender for provision of the standard telephone service in the Extended Zones provides the opportunity to test the competing claims of Telstra and other service providers regarding their capacity to serve rural and remote Australia. The enhanced contestability reduces barriers to entry, particularly in regional areas, and leads to increased competition and service improvement.

The Australian Department of Communications, Information Technology and the Arts (DoCita) has announced that a number of tenderers (amongst which were AAPT, CWO, Datafast Telecommunications, Heartland, Pacific Telco, Telstra and Vodafone) had offered a range of high speed data and other services that would significantly improve the quality of telecommunications services in the Extended Zones. For instance, Cable and Wireless Optus (CWO) indicated that it would provide a wide range of services in the Extended Zones if successful in the tender and will bring down the costs of satellite customer equipment substantially. CWO indicated that a data capability of 28.8 kbps would form part of its standard service offering under the tender, with higher data speeds and other additional services, such as pay TV, access to free to air TV and radio and multiple lines to one customer comprising optional service offers.

Another tenderer, Heartland Communications, announced it would offer a range of enhanced services to regional, rural and remote Australia regardless of the tender outcome. Heartland's goal is to provide regional Australia, particularly regional businesses, with broadband telecommunications solutions encompassing two-way satellite technology and wireless local loop solutions.

***Pilot schemes for competitive delivery***

Two trial pilot schemes for competitive delivery of the USO in regional areas will be conducted. Both trials will enable carriers to compete with Telstra for subsidies to provide standard telephone services that would otherwise be commercially unattractive.

The so-called *Greater Green Triangle* (GGT) received funding support under the Government's AUD 70 million *Building Additional Rural Networks* (BARN) programme, which supports the development of innovative market models for the delivery of regional communications services, including new kinds of community-owned or regionally-based carriers. [52] This pilot programme is designed to help test the importance of supplementary funding in facilitating contestable USO arrangements.

All universal service providers (USPs) will be able to offer alternative telephone service, such as mobile services or a service providing enhanced Internet access that would be eligible for the subsidy. Consumers

are able to choose either the standard Telstra offering, or an alternative offering from Telstra or a new service provider. Measures have been put in place to prevent "cherry picking" (servicing high but not low value customers) in contestable areas.

USPs supplying the standard telephone service will be required to meet standard regulatory requirements in relation to the service. These include an untimed local call option, pre-selection and emergency facilities, and disability equipment where relevant.

Telstra will be required to remain in the pilot areas as the primary USP, and must continue to offer its existing standard service, thus ensuring all consumers continue to be served. Telstra will be able to exit the market only when another carrier agrees to take its place.

***Canada***

Canada has a "contribution" system, which includes universal service subsidies. Long-distance carriers pay contributions in proportion to each carrier's share of traffic minutes. These contributions currently include both the cost of serving high-cost areas at controlled prices and the cost of meeting price controls on access in the rest of Canada (in some other countries, *e.g.* the United Kingdom and Australia, this impost is called the access deficit contribution). However, in 1997 the Canadian regulator (CRTC) unbundled the local loop, opened up all markets to competition and froze existing contribution levels until 2001. Any local exchange carrier serving a high-cost area is entitled to receive subsidy on a per-customer basis (calculated depending on which "band" their high-cost customers are in), in effect making the universal service subsidy "contestable".

The CRTC considered a bidding process but concluded that it would make administration more complex, and would unduly slow the implementation of basic service in certain high-cost areas. The CRTC was of the view that – in view of the small number of Canadians without access to telephone services – establishing a new bidding mechanism to provide basic service is not warranted. In any case, the CRTC concluded that incumbent local carriers, with their widespread infrastructures, are likely to be the only providers of service to these areas in the foreseeable future.

***United States***

The 1996 Telecommunications Act conferred authority on the FCC to mandate access to telecommunications services for schools and libraries. To pay for this, telecommunications companies (and hence their customers) were required to raise USD 2.25 billion per year. Mandates to benefit rural health care providers led the FCC to ask for an additional USD 400 million. The 1996 Act also requires explicit subsidies for local, residential, and rural telephony, the traditional beneficiaries of universal service obligation.

The fund for high-cost rural areas has been growing. The Office of Management and Budget and Congressional Budget Office estimates project the total fund growing (from about USD 3.3 billion) to USD 13.4 billion. To pay for subsidies, carriers are required to make contributions to a Federal government central high-cost fund in proportion to their share of revenue. Most States also propose to move towards a State central high-cost fund to cover subsidy requirements.

As part of reforms initiated by the 1996 Telecommunications Act, funding was made contestable, or "portable", to any carrier that provides service to a customer in a high-cost area. This recognises that otherwise, rural areas would not benefit from competition and choice, since a new carrier would find it very difficult to compete for customers in rural areas against a subsidised incumbent.

# SECTION 4. GOVERNMENT INITIATIVES TO EXTEND ACCESS TO HIGHER BANDWIDTH SERVICES

## 4.1 Government initiatives to diffuse broadband access

There have been a number of OECD government initiatives to promote broadband access. [53]

### *European Community*

Within Europe, the European Commission continues to be a driver of E-conomy strategies. The EU launched the *eEurope*[54] initiative in December 1999 to accelerate the uptake of digital technologies across Europe and to ensure that all Europeans have the necessary skills to use them. An Action Plan and set of targets to measure progress towards the objective of "bringing Europe on-line" was established. [55]

The broad range of measures included in the initiative includes the following key objectives:

- Bringing all Europeans into the digital age and online.
- Creating a digitally literate Europe, supported by an entrepreneurial culture.
- Ensuring that the process is socially inclusive[56] and builds consumer trust.

### *Austria*

Austria has undertaken a number of measures to stimulate the take up of Internet[57]. A major initiative of the *Go on!* project[58] included:

- Raising awareness of the Internet and the need for further training.
- To demonstrate concrete individual use and benefits of the Internet.
- To raise Austria's competitiveness by lowering online-access costs and removing access barriers.

State (*land*) initiatives have also started. For instance the Salzburg *Land* provides a so-called Internet cheque of ATS 1 000 for 10 000 citizens to facilitate on line access.

***Germany***

The government is to shape the migration to the information society by a comprehensive programme that targets all citizens,[59] including groups such as SMEs, libraries, women, youth, seniors, etc. Core strategy elements include:

- Increasing the speed of broadband technology with the aim of being world-leading by 2005.
- Meeting the goal of access to underserved groups.
- Expanding and improve IT education and training.
- Expanding R&D.
- Expanding the diffusion of broadband infrastructure.
- Migrating all government services on-line.

***Italy***

Since 1996, the Italian Government has launched numerous projects for the development of the Information Society, with particular attention paid to schools. In 1997, the legislation that liberalised telecommunications created a single regulator for all sectors involved in technological convergence (www.agcom). This authority is divided into two commissions: one for infrastructures and another for services and content, with the authority's council dealing with matters of a more general nature.

In 1999, the Government instituted the Committee of Ministers for the Information Society and also the Information Society Forum at the Prime Minister's Office. The Forum has been given the task of promoting a culture of innovation, co-ordinating various public activities to promote and broaden social inclusion to include various individual areas. A bilingual Website (www.governo.it/fsi) was immediately created by the forum along with a bi-monthly newsletter (available in both Italian and English), which may well be the first electronic newsletter published by a public institution, and which now reaches thousands of readers throughout the world.

Numerous individuals and bodies (firms, trade unions, universities, the non-profit and financial sectors) have been actively encouraged to get involved in the Forum's activities. In other words, a "bottom up" process of participation and preparation of public decisions has been created.

Italy has contributed to the preparation of proceedings for the eEurope 2002 action plan and is currently dedicated to achieving the objectives laid out in the plan. Also to be noted is that in June 2000, the Committee of Ministers approved an Action Plan for human capital development and one for e-government. In 2001, the Government decided to earmark 10% of proceeds from the UMTS licence fund for the development of the Information Society, paying particular attention to deprived areas.

The allocation of these funds was as follows:

- ITL 267.5 billion (USD 138.2 million) towards the prevention and reduction of electromagnetic pollution.
- ITL 50 billion (USD 25.8 million) towards the creation of a training credit card for Italians who are 18 in 2001.
- ITL 800 billion (USD 413.2 million) towards the e-Government action plan, approved by the Committee of Ministers for the Information Society on 23 June 2000.
- ITL 900 billion (USD 468.8 million) towards scientific and technological research as well as 200 billion (USD 103.3 million) towards the "CampusOne" project.
- ITL 200 billion (USD 103.3 million) towards helping new innovative businesses with training and the equipment of IT instruments according to the Action Plan for the Information Society.
- ITL 50 billion (USD 25.8 million) for co-financing with regional authorities and universities as outlined in the *Programma straordinario contro la disoccupazione intellettuale* (Special Programme Against Intellectual Unemployment).
- ITL 57.5 billion (USD 29.7 million) towards libraries and multimedia centres outlined in the Action Plan for the Information Society.
- ITL 150 billion (USD 77.5 million) towards the training needed to equip teachers with the IT skills necessary.

In addition to this, the Government and individual regions are to allocate a significant chunk of the European Union's Structural Funds to the development of the Information Society along with innovation in deprived areas.

Finally, the book "e-Italia. A project for Italy and Europe, a Contribution to the International Community. Report by the Information Society Forum" was published in October 2000. [60] Emphasised in the report is the necessity to reduce the digital divide that exists between developed and developing countries. The book proposes a comprehensive overview of a modern society capable of offering the same opportunities to everyone.

***Australia***

In Australia, key initiatives have included: [61]

- Establishing a National Office for the Information Economy (NOIE).
- The creation of an Australian Online Council (set up 1997) to develop a strategic "national policy framework" to maximise and evolve the e-economy.
- A National Bandwidth Inquiry in 1999 to determine: the demand for bandwidth; bandwidth availability; and competitive pricing and an appropriate regulatory framework.

- Making the market more competitive in order to ensure that broadband access is affordable. There is a strong emphasis on the need to maintain a competitively priced bandwidth network, in order to enable broadband access to mass information provision and maximising e-commerce in business. Broadband access is considered to be especially important to those living in rural areas as well as in metropolitan areas.

A government report, *The Commonwealth Government's vision for Australia in the Information Age*, 1999, recommended a number of key policies to improve access to a cost effective broadband network to enhance and develop an accessible information network access for all Australians, for example, the Health Online programme. In 1999, the National Office for the Information Economy was charged with the responsibility for creating a database detailing groups most in need of Internet exposure. This is used to target training initiatives and projects to integrate the Internet into the daily lives of various socio-economic groups, including older and indigenous Australians. The NOIE has placed a strong emphasis on improving Internet access for the consumer, including commissioning research to determine the benefits of Internet access to households. AUD 3 million of public money has been allocated by the government for a national campaign to increase public awareness of the benefits of being online, with over 30 "Online Australia" summits to allow regional communities to explore the opportunities and benefits to be gained from the Internet and e-commerce. Government funding for community projects such as *telecentres* and *cybercafes* to improve access and stimulate interest in the Internet.

***Networking the Nation***

The Networking the Nation programme[62] was launched by the Australian Government in June 1997 to assist the economic and social development of rural Australia by funding projects that:

- Enhance telecommunications infrastructure and services.
- Increase access to, and promote use of, services available through telecommunications networks.
- Reduce disparities in access to such services and facilities.

The Government originally set aside AUD 250 million for the programme (the General Fund) adding a further AUD 214 million in June 1999, funded from the proceeds of the sale of a further 16.6% of Telstra, to establish a number of additional elements:

- Building Additional Rural Networks (BARN) (AUD 70 million).
- Local Government Fund (AUD 45 million).
- Internet access (at least equivalent to untimed local call access) for regional and rural Australia (AUD 36 million).
- Meeting the telecommunications needs of remote and isolated island communities (AUD 20 million).
- Mobile phone coverage on key major national highways (AUD 25 million).
- Additional mobile phone coverage in South Australia, Tasmania, and Western Australia (AUD 3 million).
- Networking schools in the State of Tasmania (AUD 15 million).

***Building Additional Rural Networks (BARN)***

BARN is providing AUD 70 million over five years (1999/2000 to 2003/4) to support the development of new networks and new network services and products, with an emphasis on the adoption of innovative solutions and leading edge technologies, and strong participation of new telecommunications carriers and service providers in project implementation. Of the AUD 70 million, AUD 10 million is being provided to each State, with a further AUD 10 million to be provided for the territories, including the Pacific and Indian Ocean Territories.

The funds provided for the territories will not be further sub-divided between the territories, but will be allocated by the Networking the Nation Board based on the merit of project proposals against the Selection Criteria and Project Priorities and on the demonstrated needs addressed by proposals.

Examples of infrastructure and services that could be supported under BARN include:

- Backbone data carriage services.
- Wireless local loop systems.
- Network management systems.
- Innovative satellite services.
- Network hardware components.
- Technical support services.
- Training and skills development services.
- E-business and e-commerce systems.
- Online service delivery.
- Video-conferencing.
- Internet service delivery.
- Mobile telephony.

BARN projects are implemented in close consultation with state and territory governments, to ensure that funded projects reinforce state strategies, including in such areas as demand aggregation.

***Selection criteria***

The *Networking the Nation* General Guidelines set out the framework under which BARN operates, including the selection criteria to be applied. In brief, these are:

- Meeting needs: That the project promises to meet an identified need within the targeted area.
- Support for the proposed project: That the proposal is well supported by all relevant parties.

- Providing value for money: That the project promises to provide good value for money.

- Ensuring project management skills: That the project would be well managed.

- Ensuring sustainable services: That the project service outcomes are sustainable, or are aimed at supporting the development of sustainable services.

- Competitive neutrality: That the project approach is competitively neutral.

Guidelines have been established to ensure that projects seeking to develop innovative products and services compete fairly with existing services of a similar nature, and that rigorous, transparent processes will be applied to ensure that private sector partners in projects are selected on an open basis.

***Project priorities***

BARN supports the development and implementation of innovative telecommunications and IT infrastructure and services in regional Australia. Funded projects are aimed at:

- The development, trialing and implementation of new services and products capable of leapfrogging present price and service quality parameters.

- Enhancing competition in the supply of such products and services to regional users.

- The development of new market models for delivery of regional communications services.

- Providing broad and lasting benefits for rural telecommunications users.

- Promoting the economic development of regional areas.

- Complementing commercial opportunities arising from possible tendering of USO obligations by encouraging delivery of USO service through cost-effective, leading edge technologies.

Key priorities for projects funded under BARN include innovative infrastructure and services; and private sector commitment to ongoing involvement and support. Priority is also given to:

- Projects which are consistent with State and local governments' strategies.

- Projects which aggregate existing and new demand in regional areas, and therefore improve the business case for enhanced services (a number of projects of this type are currently being funded through Networking the Nation); and projects with a regional, state or national scope, and which are supported by regional bodies or by state governments.

To be eligible for funding under BARN and other Networking the Nation programmes, a project must be located outside the capital city of a state or territory. (Projects located in remote and isolated island communities are also eligible for funding, under the Networking the Nation Remote Islands Fund).

***Private sector involvement***

The Australian Government uses BARN funding to encourage the entry of new telecommunications providers into regional telecommunications markets. At the same time, projects are used to promote new models for service delivery across a range of regional markets. Projects funded under BARN also have a strong focus on meeting community needs and need to be supported by target communities. BARN funded projects are likely to have significant private sector involvement, consistent with the Government's objective of encouraging competition in telecommunications. New infrastructure resulting from projects may be owned either by the project organisation or by the private sector participant. In most cases, new products and services supported through projects are vested in the private sector, either at the outset, or through a planned ownership transfer, during or after the completion of the project.

The Networking the Nation programme is explicitly demand driven, depending on community-based development of funding proposals. The Government is also funding programmes to provide different incentives to the market. Programme measures too can be more clearly aimed at encouraging competition.

The government recognises that as a significant purchaser of telecommunications services it can help implement demand aggregation strategies with substantial benefits, particularly in regional areas, through:

- Improving the quality and reach of communications services to regional users.

- Requiring contracted carriers/service providers to provide additional benefits to the regions – either as wholesale services to regional service providers, or as retail services to the general public.

To avoid any tensions between these strategies and regional initiatives, there is significant effort to consult and co-ordinate the various telecommunications-related funding programmes to ensure activities are not inconsistent with regional service improvement strategies. The government considers that appropriately structured and targeted funding programmes can play a positive role in assisting communities to meet their communications needs.

***Canada***

In Canada, the CRTC directs all incumbent local carriers to file service improvement plans for Commission approval, or to demonstrate that the basic service objective has been and will continue to be achieved in their territory. Plans filed are required to indicate how incumbent local carriers will reinforce their existing networks where necessary to improve service or extend service to unserved areas. Subject to network design and cost limitations, these plans are designed to:

- Incorporate least-cost technology.

- Target larger communities or areas first.

- Serve unserved areas prior to providing upgrades.

- Serve permanent dwellings before seasonal ones.

Multi-year plans to improve service, developed by incumbent local carriers and filed for approval with the CRTC, aim to be administratively simple to implement and allow for comment by the public. It is considered that such programmes can also allow communities or regions to participate in proposed service upgrades. For instance, if a telephone company begins construction in an area, it may be able to offer inexpensive service improvements beyond the basic service objective to other nearby homes or communities. Knowing in advance the timetable for construction projects near their area, individuals, communities or regions may choose to take advantage of any cost-saving opportunities. They may be able to budget their own resources or obtain government grants to enhance services.

***Denmark***

In 1998, the Minister of Research and Information Technology established a committee to prepare a new Information Society programme to replace the IS 2000 programme initiated in 1994. During 1999-2000, a new agreement on telecommunications policy was reached between the Minister of Research and Information Technology and a majority of the political parties in Denmark.[63] High-speed access is seen to be a key aspect of: "…the Danes admission ticket to the networked society". The agreement outlined a number of goals, including:

- All Danes being ensured access to modern communication technologies.
- Reliance on the market to meet the increasing demand for larger bandwidth.
- Stimulating competition in the telecommunications market leading to innovation and growth.

***Norway***

The Norwegian Action Plan on broadband communication states two goals: Through increased competition and demand, help provide a) favourable market offerings that enable broadband connections to all primary and secondary schools, public libraries, hospitals and local authority administrations by the end of 2002; and b) favourable market offerings that provide broadband connections to all Norwegian households by the end of 2004.

A broadband development programme (HØYKOM), aiming at making local government services more efficient, is in its third year of operation. The programme is supplemented by developmental programmes targeting each of the four prioritised sectors (schools, libraries, hospitals and local municipal administrations). Several examples of municipalities setting up collaborative broadband projects can be shown. In Finmark, the northernmost county in Norway, and among the most sparsely populated areas, a private company is collaborating with several energy suppliers in broadband development in the area. The consortium plans for 35% of the population to have broadband connection by 1 June 2001.

***Sweden***

During 2000, the Swedish Government introduced IT legislation containing measures for encouraging the establishment of and access to broadband networks. The legislation has the expressed overall policy objective of making Sweden the first country to create "an information society for all". The objective is that households and businesses in all parts of Sweden have access to IT infrastructure with a high transmission capacity over the next few years. This would be achieved primarily through market channels, but the government accepts overall responsibility for ensuring that a high transmission capacity infrastructure is available in all parts of the country.[64] The measures and regulations are designed to achieve competitive neutrality and diversity in the networks without major regional differences in accessibility,

prices and capacity. To achieve this goal, the legislation proposes investments in broadband networks amounting to SEK 8.3 billion, of which SEK 3.2 billion would be set aside for tax relief to stimulate such investments. The support includes a government funding of SEK 2.6 billion that would be available for the establishment of regional networks and to facilitate access to broadband networks in sparsely populated areas. The Swedish National Electricity Grid was directed to undertake a project of SEK 2.5 billion for the construction of a backbone network to be extended to all municipal centres in Sweden.

***Finland***

In Finland, the government is keenly supportive of initiatives to close the digital divide[65] but assistance for Internet access is indirect in the form of income support to eligible households to help pay for basic needs such as food, electricity, television licenses – and telecommunications.

***Hungary***

During 2000, Hungary established a state subsidy programme to help boost the penetration of computers and Internet usage by families. Under the scheme, 1 400 families will get computers and 20 hours Internet access a month for two years at cheap rates. Only 9% of Hungarian families have Internet access. High prices for Internet services and a low PC penetration have been the bottleneck development, but improvements are expected due to increasing competition between service providers, falling prices, improving living standards and government subsidies and customs concessions.

Established in 2000, the Office of the Government Commissioner for IT in the Prime Minister's Office has elaborated a number of projects to address the digital divide problem to be implemented in 2001-2002. These projects were designed to cover the main risk groups, including young (underprivileged) men through the introduction of IT training into the military drill; the handicapped through the setting up of instruction laboratories in their training facilities; institutionalised young people through the setting up of instruction laboratories in their training facilities; young mothers through the provision of infrastructure and training material to the Family Care Service.

***Ireland***

In Ireland, survey research conducted on behalf of the Information Society Commission found that in 1999, 41% of the general public had access to a PC with 33% having access to the Internet.

There are no specific programmes to subsidise Internet access. Full liberalisation of the telecommunications market is being depended upon to effect access and lower prices.

***Japan***

In Japan, 49.4% of those with an annual income of JPY 10 million or more are Internet users (up 9.9 points from the previous survey conducted during the end of March 2000), while only 11% of the JPY 3.5 million or less income group are Internet users (up only 0.5 points). The higher the annual income, the higher the Internet penetration ratio. Internet penetration rates and growth rates remain low, especially in the JPY 3.5 million or less annual income segment, with the gap between high and low income earners widening.

Furthermore, more than 20% of those earning JPY 3.5 million or more own i-mode or other Internet accessible mobile phones, while only about 10% of the under JPY 3.5 million annual income earners do. This indicates that lower income groups in Japan may be being left behind in regard to Internet use.

The spatial disparity in Internet use is also significant: 34.6% of the residents living in the cities designated by ordinance, 33.4% of the residents in the prefectural capitals, and 32.7% of the residents in the other local big cities have Internet access. In towns and villages, however, only 18.5% of the inhabitants use the Internet. This is almost one year behind the Internet use rate of 17.3% in the designated cities and prefectural capitals attained at the end of September 1999.

MITI and MPT are responsible for most activities to develop the Information Society. As in other OECD countries, there are regulatory efforts designed to lower interconnect charges and to introduce local loop unbundling as part of efforts to create greater competition in the local loop.

The Japanese government has engaged in a broad range of activities to help bridge the digital divide. For instance the Ministry for Posts and Telecommunications (MPT) has launched several initiatives, including:

- Plans to establish a new subsidiary programme for the provision of telecommunications and broadcasting services for people with disabilities in fiscal year 2001.

- Development of an assistant system to ensure Web accessibility and plans to conduct a verification experiment of the system in fiscal years 2001 and 2002.

- Establishment of a set of guidelines for accessibility to telecommunications equipment for the elderly and people with disabilities in October 1998. These guidelines address functions required of telecommunications equipment in order for the elderly and people with disabilities to be able to use telecommunications services smoothly.

- Conduct of demonstration projects for an info-communications system that enables Website-development assistant services for the elderly and people with disabilities in Kanazawa City, Ishikawa Prefecture, from December 1999 to March 2000. This system is now available via the Internet, providing such functions as automatic design, on-screen character enlargement and voice recognition.

- Subsidisation of local governments in the construction of information barrier-free telework centres since fiscal year 1998, in which the elderly and people with disabilities can telework with info-communications systems designed especially for them. This project supports R&D on IT equipment (hardware and peripherals) and IT-related software which is user-friendly for the elderly and physically handicapped, not only assisting them in overcoming their handicaps, but also opening the way for their active participation in the IT socio-economy.

To provide financial and personnel support for SMEs in responding to the IT revolution, MITI will conduct IT training and seminars for SME management and supply information, as well as laying the necessary foundations by bolstering policy finance for management innovation using IT (establishment of a special lending system) and developing a more objective approach to the skills of skilled workers, creating manuals on these.[66]

The Japanese government has attached importance to international co-operation and aid in the communications sector. A notable example is Japan's Comprehensive Co-operation Package to address the international digital divide which aims to:

- Provide flexible co-operation systematically combining all forms of policy instrument in a manner which complements the active efforts of the private sector.

- Ensure that efforts in target areas are coherent, encompassing the whole realm of IT-related policy in developing countries.

- Give special consideration in implementing action to the importance of co-operative relations with the Asia-Pacific region, while basing co-operation at a global level. Furthermore, duly acknowledging that "networking" is a vital key in disseminating IT world wide, to endeavour to enhance inter-regional co-operative alliances.

- Focus due attention on collaboration with relevant international organisations and other donors with a view to global co-operation and the promotion of network development.

Examples of other specific initiatives include:

1. R&D on networks to connect schools to the Internet with multi-type of access lines (November 1999). MPT and the Ministry of Education are promoting collaborative R&D on school access to the Internet. Approximately 1 000 elementary schools, junior-high schools and high schools in 30 areas in Japan will be connected to the Internet via multiple access lines such as optical fibre, xDSL, satellite communications, cable TV line, Wireless Local Loop (WLL), etc. A backbone network is being utilised for the research that consists of the central network centre and 30 local area network centres.

2. Towards widespread use and promotion of xDSL services (July 2000). The Japanese Government has, through MPT, the telecommunications regulator, taken various policy measures to promote xDSL services nation-wide to lower communications charges.

3. Next-generation Info-Communications Infrastructure initiative toward 2005 - A Report of the Executive Meeting on the next generation Info-Communications Infrastructure Initiative (19 July 1999). With the rapid growth in Internet use and the development of new services using the telecommunications networks, the expanding Japanese info-communications market is regarded as a key factor in the recovery of the Japanese economy. MPT is promoting next-generation info-communications network society, incorporating broadband access. The next-generation info-communications infrastructure in 2005 is expected to be mainly composed of high-quality routers. A variety of technologies for high-speed access will be introduced into the local loop in order to create a free and fair competitive environment for assurance of good-quality services to meet a variety of user needs.

4. MPT of the Regional Multimedia Highway Conference-21 (November 1999). One example of the conference activity is to demonstrate and experiment on wide-area networks with xDSL, FWA, etc. for easy use of the Internet. This conference is aimed at creating easy use of Internet environment in local areas.

5. R&D (June 2000). The project entitled "Desirable R&D on Info-communications in the 21st century", is led by MPT and will include broadband access technology as one of the categories of fundamental research.

***Korea***

Korea has a high penetration of Internet access and is promoting competition as a means of stimulating telecommunications and Internet penetration. To achieve the aim of having 75% of homes using high speed Internet access by 2005, the government has earmarked 1.9 trillion won for network upgrades while companies from the private sector will put in 38 trillion won.

The Korean Government's 1999 White Paper *Cyber Korea 21* highlights the importance attributed by the country's leaders to information infrastructure and sets out a number of policy goals.

The universal service obligation for basic telephone services is regarded as a first step toward universal access to information infrastructure. It is considered that, at least in the short term, the incumbent is able to shoulder the responsibility of providing universal service. In the longer term, the universal service compensation fund should be competitively and technologically neutral. However, the government considers that beyond basic services, universal access to more advanced equipment is likely to be better funded directly through general government revenue rather than by imposing requirements on telecommunications operators.

Improving equity of access to the Internet will involve the widespread training and access policies outlined in the Cyber Korea 21 White Paper – initiatives such as connecting 10 400 schools, teaching civil servants, housewives, students and military personnel to use computers; building Internet Plazas; and facilitating Internet PC purchases.

The Korean government has also encouraged working from home resulting in a sharp increase in the home usage of networked PCs. This has resulted in a significant growth in cable-based or ADSL broadband services in recent months. What has contributed to the popularity of working from home has been the availability of cheaper PCs resulting from a government-initiated Internet PC project that boosted the sales of PCs and notebook computers. The government's role in this has been one of promotion and not funding.

***France***

The French Government has declared a high priority Information Society action programme and believes that the public sector has a major role to play in implementing this programme. There is considerable emphasis on the benefits of the *E*-conomy being available to all French citizens. The focus of government action is on developing various types of broadband access, particularly broadband wireless, xDSL and cable modems simultaneously lower communications charges.

Aside from pro-competitive regulatory action, high profile speeches and some examples of public/private sector consultation, however, so far only limited examples of initiatives directly promoting broadband access are identifiable.

***United Kingdom***

To address the issue of broadband access to small and medium enterprises (SMEs) and consumers, in 1997 the British government developed a strategic plan to achieve growth in broadband networks. The strong emphasis was on encouraging successful business start ups, and maximising business opportunities for SMEs, and on a lesser scale improving access for consumers. To increase e-commerce opportunities the British government's specific goals and initiatives include:

- Roll out of broader-band networks on a national basis to make information networks more accessible.

- Appointment of an e-Minister and e-Envoy.

- Partnerships with major United Kingdom businesses to ensure that by 2001, GBP 75 million worth of funding is secured from the 5th Framework European Program for the promotion of an information society.

- A strong partnership with the United Kingdom regulator (OFTEL), to ensure a fair, competitive market and value for consumers and SMEs.

- Free narrowband Internet connections within the public sector (*e.g.* schools, colleges, hospitals) but no steps have yet been taken to extend this to broadband.

- Access through information and communications technology (ICT) to all groups.

- Target figures of 1.5 million SMEs linked to the digital marketplace and 1 million SMEs trading on-line (by 2002).

- Direct marketing – advertising and Direct Mail campaign targeted at SMEs – to increase awareness of e-commerce and the annual e-commerce award scheme to encourage commercial awareness and competition.

- Make advice more accessible, including the creation of an ISI Centre to give advice to SMEs on the use of ITC in business.

- Establishment of E-commerce Resource Centres to assist new start ups.

In addition to central government initiatives, the agencies are also active in trying to ensure that their regions do not miss out on broadband access. For instance, the Welsh Development Agency has allocated some EU funding to projects which will provide xDSL in parts of Wales faster than would have been possible by market forces alone. In addition to the market rollout, it is expected that local initiatives will support rollout of higher bandwidth facilities into areas where operators may not currently plan to offer such services because sparse population levels make a reasonable commercial return unlikely. For example, in Wales the Pathway Project, run jointly by Powys County Council and the Welsh Development Agency, and supported by EU Structural Funds, aims to upgrade the telecommunications infrastructure in rural areas to allow access to advanced telecommunications services by the end of 2001. Other Assisted Areas may be in a position, within European investment rules, to assist in the provision of higher bandwidth services to rural and remote communities, *e.g.* to public access points, schools and businesses. In very remote rural areas, initiatives would need to work within technical constraints associated with the delivery of higher bandwidth services.

In Scotland, Highlands & Islands Enterprise, an agency responsible for economic development in one of the more sparsely populated regions of the EU, has in the last few years been successful in ensuring that modern fixed and mobile networks are available across the region. It has done this through the use of EU funding and a partnership with BT and other telecommunications operators. It has also provided “anchor” customers, mainly educational establishments such as the University of the Highlands & Islands (a virtual academic institute) that provide enough network traffic to satisfy the on-going running costs of the network operators.

***United States***

The 1996 Telecommunications Act (section 706) directs the FCC and State Public Utilities Commissions to monitor the roll-out of advanced telecommunications capability and, if necessary, to take steps to ensure that all Americans have access to such capability on a reasonable and timely basis.

In 1999 the FCC announced the goal of achieving open broadband access. Later that year, the FCC disclosed that broadband deployment is increasingly becoming a top priority as it seeks to ensure that the benefits of the communications and information revolution extend throughout the United States. The National Telecommunications and Information Authority (NTIA) also plays a leading role in the government's Information Society activities.

In essence, the United States pursues a policy of relying on a competitive market and pro-competition regulation to achieve its goal of low cost telecommunications services for all, for broadband as well as narrowband service. The FCC's policy position is that the most important government action is to create the environment necessary for the further development of broadband access. The FCC considers that market dynamics and incentives will go a long way in ensuring that an open broadband platform develops.

Specific FCC initiatives include:

1. Annual reviews of the development of access to "advanced communications services", focusing particularly on consumers, SMEs and disparities between urban and rural access. As part of the first review in 1999, the FCC established a series of "on going broadband monitoring sessions" on the subject. Participants included local government representatives, public interest groups, investment analysts, cable and phone companies, ISPs, academics and others.

2. In 1999, the FCC established a Federal-State Joint Conference to promote advancement of broadband services. The Joint Conference provided a forum for an ongoing dialogue between the Commission, state regulators, and local and regional entities regarding the deployment of advanced telecommunications capabilities, *e.g.* Broadband. Its aim was to identify a set of "best practices from across the nation so that one community (in Vermont, for example), could learn how another county (*e.g.* in Nevada) collected and quantified aggregate demand sufficient to make the case for a local provider to invest in broadband technology.

3. In June 2000, the FCC and State regulators announced the development of a nationwide database of broadband deployment activities, including an interactive Web site to serve as a national clearing house for local communities to share news and information about their broadband deployment projects.

4. In November 1999, the FCC adopted rules to promote competition for advanced services, by directing local telephone companies to share their telephone lines with providers of high speed Internet access and other data services.[67] This Order is intended to ensure that as many companies as possible will be able to deploy new technologies on a faster, more cost-effective basis and designed to accelerate the ability of residential and small business customers to access competitive broadband services from their choice of providers.

5. In December 1999 the FCC launched a 12 day programme on the FCC Web site to raise awareness of broadband opportunities. Each day was devoted to a specific aspect of broadband use, including its potential use in areas such as education, telemedicine, news and information gathering, and shopping.

6. A variety of funding initiatives to promote Internet access in rural and some urban areas have also been developed by a number of government departments. Both narrowband and broadband access are considered. Examples include:

   – NTIA's Technical Opportunities Programme (TOP) which gives grants to public and non-profit making organisations for model projects in poor urban and rural areas. The recipient organisations in these areas have to contribute part of the cost of the projects themselves. The programme supports projects that demonstrate the value of broadband networks in rural areas.

   – The Economic Development Administration, an agency of the Department of Commerce, provides grants to support technology-driven projects facilitating economic development. It is currently supporting a project involving fibre deployment to create a distance learning network.

   – The Department of Agriculture Rural Utilities Service Telecommunications Programs has long supported the development of telecommunications in rural areas with fibre deployment eligible for funding support.

***Tax credits***

In the United States, Bills before Congress, such as S.2698 (The Broadband Internet Access Act of 2000), aim to bridge the digital divide by giving tax breaks to corporations for building infrastructure.

***Switzerland***

The Information Society Project Switzerland (ISPS) established in 1998 targets all citizens but contains government action aimed at education and training, creating on-line government services and fostering an open regulatory framework. The government has explicitly refused to fund infrastructure development.[68] However, in certain instances, cantonal/local government may subsidise access (*e.g.* for schools).

# SECTION 5. BEYOND ACCESS TO INTERNET INFRASTRUCTURE

## 5.1 Socio-demographic barriers to the take-up of access facilities

Evidence from many countries indicates that socio-demographic factors such as income, education levels, gender, age and disabilities are major determinants of Internet access and usage patterns.[69] Thus, as well as "supply side factors" such as access to hardware and software and an Internet connection, "demand-side" factors such as the skills to use the facilities are necessary. Importantly, as access to the infrastructure aspects of Internet connectivity is increasingly achieved, these socio-demographic barriers to the take-up of telecommunications and online services will become the more problematic aspects of the digital divide.

Government initiatives demonstrate an awareness of the importance of the socio-demographic barriers. The private sector too is demonstrating through its activities that it is increasingly aware that to ensure a viable workforce for the new economy, to broaden markets for e-business and to capture opportunities being spawned by "convergence" and the new economy, it has a shared interest with government to address the digital divide.

This section provides some information on initiatives to increase the take-up of access facilities taken by government, the private sector, and community organisations, including combined government/private sector/community partnerships that are not dealt with elsewhere.

## 5.2 Demand side measures

Demand-side measures are often overlapping and interlinking, but it may nevertheless be useful to organise issues into three streams:

- Demand stimulation measures.
- Demand aggregation measures.
- Sustainability concerns.

### 5.2 (i) Demand stimulation measures

Demand for services is a main driver of the deployment of advanced telecommunications capability. Thus programmes designed to increase consumers' interest in and use of advanced technologies and services can spur further deployment.

In designing demand stimulation measures, governments are being guided by the recognition that:

- Relevant local content, applications and services are critical for stimulating demand for online services.

- Demand generation strategies need to focus on identifying the real service needs of regional, rural and remote communities, and must recognise that the needs and priorities of different communities can vary widely.

In some OECD countries, government bodies as well as the larger private businesses with a commercial presence in regional centres, are playing an important role in establishing and maintaining demand for data services in regional centres. This core demand is a crucial factor inducing carriers to enter the market, thereupon also making their services available to small businesses and domestic users in the region.

***Community networks***

Community networking can and has provided the catalyst and the means for communities to collaborate amongst and within themselves at the regional level to effectively bring together the interests of government, business and volunteer-based organisations. A number of municipalities, school systems, and other institutions, with their own needs for advanced network services, are exploring options that leverage their infrastructure development plans, to extend broadband services to other organisations as well as individuals. Community partnerships that focus on the development of locally-based and focused content, are playing a vital role in stimulating demand for enhanced services.

### 5.2 (ii) Demand aggregation measures

The presence of a group of customers who can be served collectively can substantially reduce providers' customer acquisition costs. Thus the ability to aggregate customer demand for advanced services in order to demonstrate demand sufficient to warrant infrastructure investment can be valuable. This can be particularly important when seeking a provider in regional, rural and remote areas.

In the United States, Berkshire Connect[70] is an example of a successful demand aggregation effort. In rural Berkshire County, Massachusetts, a consortium of business, cultural, academic and local economic development leaders formed Berkshire Connect and created an attractive market by aggregating demand from all sectors and all levels of users. The consortium was able to attract several million dollars for the construction of new facilities. As a result, they are now able to purchase advanced services at rates comparable to those paid in Boston. The Massachusetts Community Network has taken a similar approach using the combined demand of local government traffic. The state government requested bids for T1 services to all of its municipal governments and schools. To win the contract, the bidder was required to offer the same price for T1 service to any customer, regardless of location. According to the project's management, the winning contract cut T1 costs in Massachusetts nearly in half, and guaranteed access to T1 services for all towns, villages and schools in the state.

In Australia some important considerations in constructing demand aggregation strategies are being put forward.[71] These include:

- Regions themselves must be the primary drivers of demand aggregation strategies, with government partners playing a supporting role.

- Demand aggregation strategies need to explore innovative service developments that have the potential to leapfrog existing technologies and services, and provide regions with cost-effective access to new services at urban price and service quality levels.

- Whole-of-government aggregation strategies can provide more cost-effective access to bandwidth for regional communities, particularly for remote areas. However such strategies

need to ensure benefits flow through to non-government communications users; and that whole-of-government arrangements do not impede the capacity of regions to aggregate demand at the regional level.

- In the more remote regions where there is a minimal level of infrastructure, USO tendering has a potential to provide a substantial base for demand aggregation.

- Demand aggregation strategies should explore all opportunities for infrastructure sharing, particularly using "anchor tenants", such as government service providers.

***Anchor tenants***

The reference to "anchor tenants" above warrants some elaboration. Essentially, a public entity, or other large customer, can use its demand to attract investment in infrastructure with advanced telecommunications capability. The infrastructure used to provide service to this anchor tenant can then be used by other business and residential consumers, or it can be the springboard for deployment of additional facilities. In some instances, public entities acting as the anchor tenant have put conditions on their purchase agreements, such as requiring providers to serve rural areas in a certain time frame.

In Colorado, the state government has acted as an anchor tenant. Colorado requested bids for high-speed service at each of its 64 county seats to carry the State's data traffic, such as data related to driver's license and registration and that related to public assistance benefits. A multi-year contract was awarded to the winning bidder in April 2000 on the basis of price and how quickly remote counties would be served. By 2003, all counties will be served with advanced telecommunications capability.

The state of Montana has undertaken similar initiatives, the most recent is called SUMMITNET II. This project connects nine Montana communities and carries the traffic of public and educational entities. In addition to providing direct benefits to the public customers involved, the project sponsors believe it will bring investment in advanced services capability to these communities.

There are examples of government initiatives being used to leverage market developments. For instance, in Australia, the Queensland Government disclosed that it had leveraged its own requirements to improve accessibility to digital data service and reduce tariffs for rural and remote communities. This network initiative influenced Telstra to invest in an additional 29 Dial Connect Points of Presence throughout Queensland that are available for use by all government agencies and communities.

Commercially negotiated programmes between governments and carriers have been used to increase the opportunity for regional and rural inhabitants to access data services – and additionally, these programmes have influenced carrier infrastructure roll out plans. The opportunity to aggregate content can also be useful since this can also lead to increased economies of scale, as well as a better marketing focus for regions.

### 5.2 (iii) Strategies to sustain demand and service delivery

Governments and regulatory authorities are recognising the need to ensure that not only short term solutions are sought from the opportunities provided by changing technologies, potential entry and new models of provision. However, ways must be found to provide incentives, or to ensure that there are suppliers practically focussed upon supplying the needs of local communities in the long term.

Tactical solutions are inadequate since solutions need to be sustainable over the long term. Policy focusing on the gap between those with Internet access and those without will assist. However, to improve the socio-economic status for disadvantaged groups, public policy should focus on bringing access to people in the home, in school and at work.

Governments are exploring various approaches, including a willingness to enter new strategic partnerships, and to encourage "social entrepreneurs" to "broker" such partnerships. It is also being recognised that careful management will be required to sustain the partnerships between the private sector and the community since there is likely to be an inherent tension between the objectives of the private sector and those of the community.

## NOTES

1. Irish Information Society Commission, Ireland's Progress as an Information Society: 1999 Research into General Public Attitudes towards Information and Communications Technology, www.isc.ie

2. This news release as well as all others issued by Industry Canada may be accessed online at: http://www.ic.gc.ca

3. The FCC defined broadband "as having the capability of supporting, in both the provider-to-customer (downstream) and the customer-to-provider (upstream) directions, a speed (in technical terms, 'bandwidth') in excess of 200 kilobits per second (kbps) in the last mile".

   In a later report, the FCC defines advanced telecommunications capability as infrastructure capable of delivering a speed in excess of 200kbps in each direction. The FCC denominates as 'high speed' those services capable of delivering transmission speeds in excess of 200kbps in at least one direction. Advanced telecommunication capability and advanced services thus are a subset of the larger 'high-speed' category. A service may have asymmetrical upstream and downstream transmission paths and still be advanced telecommunications capability as long as both paths are capable of speeds in excess of 200kbps to the network demarcation point at the subscriber's premises.

4. The term advanced (telecommunications) capability, the term advanced services, and the term broadband are used interchangeably/synonymously to mean the same thing. Advanced services are generally understood to mean digital information transmission rates (bit rates) that are significantly higher than the nominal 56 kilobits/second that can be transmitted through an ordinary, high quality telephone voice circuit. The FCC's definition of broadband is the capability of supporting at least 200 kilobits/second in the consumer's connection to the network ("last mile"), both from the provider to the consumer (downstream) and from the consumer to the provider (upstream). Because most consumers use the Internet to receive data, broadband service offerings are generally asymmetrical (*i.e*. the downstream link operates at a higher rate than the upstream link). The US NTIA and RUS believe that two-way capability is an essential element of broadband service because it enables an end-user to be a content originator or service provider.

5. This level of service is necessary for effective use of real-time video. There is increasing bandwidth intensity in the provision of many online services as demand is generated from more advanced levels of broadband access in countries such as the US. High-bandwidth services are expected to be increasingly important in:

   - Electronic commerce such as in the presentation of products using real-time video interaction.
   - Education such as in interaction between teachers and students.
   - Health such as for consultation and diagnostic purposes.
   - Service delivery such as "virtual call centres" using video as well as voice interaction.
   - Teleworking, permitting, for example, video as well as audio- and text-based interaction with work colleagues and others regardless of geographical location.

- Communications such as the development of “video phones”.

6. Education. The importance of an enhanced data capability in the delivery of education are said to include:

   - An improvement in the quality of education service delivery particularly to rural and remote areas thus promoting equity between country and city students and increasing participation rates of rural and remote students in secondary and tertiary education.

   - Enabling the effective delivery of an improved quality of professional development to education staff in remote areas through video linked training, in services and information dissemination.

   - Providing a more direct means of communication for schools. This was seen as having the potential to improve the quality of school administration and to promote the flexible delivery of distance based education.

   An enhanced data capability would enable cost-effective provision of distance based education. In addition, the fact that the data capability can complement traditional education delivery platforms was noted by a number of state governments and education-specific organisations.

7. Health. Health was identified as another area that has much to gain from an enhanced data capability. Telehealth and video conferencing are said to be able to be efficient and effective modes of health service delivery. Telehealth networks would promote equity in health service delivery by improving access to health services and information, particularly in rural and remote areas. The ability of video conferencing to encourage the relocation of medical practitioners and other professionals thus increasing the number and availability of services to small regional centres. Improved client health outcomes through decreasing patient travel time and improved speed of access to health services is cited. An enhanced data capability can supplement existing health programmes in rural areas and capitalise on the expertise of health care providers.

8. e-Government. E-government presents a tremendous opportunity for the use of information and communications technology in the provision of government services. It can significantly improve efficiency in service delivery and reduce costs and can also serve to educate people in the use of information and communications technology. Government must drive initiatives to ensure that information and communications technology offer opportunities for electronic citizenship.

   Delivering public services electronically will be critical to making information and communications technology more relevant to the life of every individual.

   In addition, if consumers are not educated and equipped to do business electronically then this could represent a serious impediment to the growth of e-commerce.

9. Okinawa Charter on Global information Society at http://www.g8kyushu-okinawa.go.jp/e/documents/itl.html

10. Sawhney H, “Universal Service: Separating the Grain of Truth from the Proverbial Chaff”, *The Information Society*, 16, 161-164, 2000.

11. OECD, Understanding the Digital Divide, OECD/DSTI, Paris 2001; Local Access Pricing and E-Commerce, DSTI/ICCP/TISP(2000)1/FINAL; Internet Infrastructure Indicators, DSTI/ICCP/TISP(98)7/FINAL; Building Infrastructure for Electronic Commerce – Leased Line Developments and Pricing, DSTI/ICCP/TISP(99)4/FINAL; Webcasting and Convergence: Policy Implications, OCDE/GD(97)221; The Role of Telecommunications and Information Infrastructures in Advancing Electronic Commerce, DSTI/ICCP/TISP(98)8/FINAL; *Universal Service and Rate Restructuring in Telecommunications, Information Computer Communications Policy, Number 23*, Paris

1991; *Universal Service Obligations in a competitive telecommunications environment*, Paris 1995; *Universal Service and Public Access in the Networked Society*, Paris 1997. OECD.

12. "Inquiry Concerning the Deployment of Advanced Telecommunications Capabilities", CC Docket No. 98-146, Report, 14FCCRcd2398,2406(1999).

13. Oftel, "Access to Bandwidth: Delivering Competition for the Information Age", A statement issued by the Director General of Telecommunications, November 1999.

14. United Kingdom online report at http://www.ukonline.gov.uk

15. Oftel, "Access to Bandwidth: Delivering Competition for the Information Age", A statement issued by the Director General of Telecommunications, November 1999.

16. Federal Communications Commission, "Deployment of Advanced Telecommunications Capability: Second Report", August 2000.

17. This news release as well as all others issued by Industry Canada may be accessed online at: http://www.ic.gc.ca

18. Swedish Ministry of Industry, Employment and Communications, "An Information Society for All", N.2000.018, March 2000.

19. Also see, Ministry of Trade and Industry, Action Plan, Broadband Communication 1.0, Oslo, 11 October 2000.

20. This news release as well as all others issued by Industry Canada may be accessed online at: http://www.ic.gc.ca

21. "Falling Through the Net, Toward Digital Inclusion", available at (http://www.ntia.doc.gov/ntiahome/digitaldivide/execsumfttn00.htm)

22. Federal Communications Commission, "Deployment of Advanced Telecommunications Capability": Second Report, August 2000.

23. NTIA & Rural Utilities Service (Department of Agriculture), *Advanced Telecommunications in Rural America: The Challenge of bringing Broadband Service to all Americans,* Washington D.C. April 2000.

24. Oftel, "Review of the dial-up Internet access market", October 2000.

25. Ministry of Economy, Finance and Industry, "Report on High-Speed/Capacity Networks: New Content, Applications, and Services", March 2000.

26. 2000 Korea Internet White Paper.

27. Network Economics Consulting Group, "New Market Models for the Delivery of Telecommunications and Online Services in Regional Australia", August 2000.

28. OECD, "Local Access Pricing and E-Commerce", DSTI/ICCP/TISP(2000)1/FINAL, Paris 2000.

29. Unbundling the 'unconditioned local loop' enables competitors to use copper cable between exchange facilities and each customer. Competitors can connect their own electronic components and switching equipment to the cable in order to supply telephony and high speed services for carrying data direct to end users. Declaration of this service provides new competitors with greater flexibility in developing and supplying new services to consumers.

30. FRIACO is short for Flat Rate Internet Access Call Origination. See Oftel, “Review of the dial-up Internet access market”, available at http://www.oftel.gov.uk/competition/iamr11000.htm

31. See, OECD, “Local Access Pricing and E-Commerce”, DSTI/ICCP/TISP(2000)1/FINAL.

32. The support for universal service for basic telecommunications is certainly not unanimous. See for example, Lawrence Gasman, “Universal Service: The New Telecommunications Entitlements and Taxes” Cato Policy Analysis, No. 310 June 25, 1998.

33. Arguments for an expansion of the USO to include Internet access into regional, rural and remote areas draw on support from the rationale of so-called ‘network externalities’. The externality occurs because all customers receive benefits when others join the network. Because these benefits cannot be reflected directly in individual transactions or met on strict commercial terms, there is a role for government in ensuring that the network is as extensive as is feasible at appropriate prices.

34. A 'data capability' refers to the ability of a carriage service to carry data expressed in terms of a data transmission rate which is what determines both the type of applications that a service can support and the responsiveness at which they operate. Hence, a higher data rate enables a data service to support a wider range of applications and to run those applications more quickly. Groups representing customer interests have suggested that the definition of a basic service should include a telephone line capable of local and inter-exchange data transmission at a modem speed of 28.8kb/s or higher. For instance, in Australia, the average data rate in rural and remote areas was estimated at somewhere between 2.4kbit/s and 9.6kbit/s, whereas urban rates averaged 14.4kbit/s to 28.8kbit/s. Many rural consumers made submissions to a government initiated inquiry stating that a data rate of 2.4kbit/s is inadequate for accessing online and other Internet applications. Rural customers perceive that they are doubly disadvantaged as it takes longer and costs more to complete identical tasks.

35. Australian Information Economy Advisory Council (AIEAC), “National Bandwidth Inquiry: Report of the Australian Information Economy Advisory Council”, Canberra, 1999, p. xi.

36. European Commission, “Towards a new framework for Electronic Communications infrastructure and associated services, The 1999 Communications Review”, Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions, COM(1999)539.

37. Commission of the European Communities, “Proposal for a Directive of the European Parliament and of the Council on universal service and users' rights relating to electronic communications networks and services”, Brussels, 12 July 2000 COM(2000)392.

38. The Commission, however, adopted a Council Recommendation (92/383/EEC of 5 June 1992) on the provision of harmonised integrated services digital network (ISDN) access arrangements and a minimum set of ISDN offerings in accordance with open network provision (ONP) principles.

39. One question that has been raised is whether there is a need for an upper ceiling for national minimum data speeds to ensure that regulators do not impose undue burdens on industry.

40. Oftel, “Review of the dial-up Internet access market”, October 2000.

41. OFTEL, “Review of Universal Telecommunication Services.” A consultative document issued by the Director General of Telecommunications, September 2000. Available at <http://www.oftel.gov.uk/consumer/uso0900.htm>

42. Available at www.governo.it/fsi

43. Federal-State Joint Board on Universal Service, Recommended Decision, Before the Federal Communications Commission, Adopted 7 November 1996.

44. Canadian Radio-Television and Telecommunications Commission, Telecom Decision CRTC 99-16 Telephone Service to High-cost Serving Areas, paragraphs 26 and 27.

45. More information on the Connecting Canadians programme can be found online at: http://connect.gc.ca/

46. Towards a Swedish Information Society for All, Report prepared for the conference "Stepping Stones into the Digital World" in Bremen, Germany, on 21-22 September 2000.

47. Savage, J, "International Public Programs to provide Broadband Access to the Internet", prepared for Industry Canada, 5 January 2001.

48. Ovum, "Calculation of the Intangible Potential Benefits of being the Universal Service Provider", Discussion Paper November 1999.

49. Australian Communications Authority (ACA), Digital Data Inquiry, Public Inquiry under section 486(1) of the Telecommunications Act 1997, Australian Communications Authority, 1998.

50. (Australian) Department of Communications, Information Technology and the Arts, Telecommunications Universal Service Obligation Review Of Funding Arrangements, August 1999.

51. ART, (Autorité de régulation des télécommunications), *L'Autorité détermine les conditions du financement du service universel des télécommunications, Decision 98-907*, November 13, 1998, Paris.

52. Department of Communications, Information Technology and the Arts, Regional USO Contestability Pilots, See factsheet available at <www.dcita.gov.au>

53. A detailed review of the availability of broadband access in various countries is available in, "The Status of Broadband Access Services for Consumers and SMEs", a report to Telestryrelsen, prepared by Ovum.

54. European Commission, *eEurope: An Information Society for All*, (1999), www.ispo.cec.be/eeurope-initiative.htm

55. Details of progress on each action line are available on the eEurope Web site at http://europa.eu.int/information_society/e-europe/

56. Ensuring that less-favoured regions can fully participate in the Information Society is a priority for the European Union. Projects encouraging up-take of new technologies must therefore become a key element in regional development agendas. Public investment in Information Society infrastructure in less favoured regions may be justified in cases of market failures, where private investment alone cannot be profitable. These investments must be made in a way that does not distort competition and is technologically neutral. Investments must be determined by each region and on the basis of their particular economic and social structure. The Commission has undertaken to increase priority of information society related projects within the structural funds. A similar revision of priorities has been announced by the European Investment Bank (EIB).

57. See "The Digital Divide in Austria", Report by the Institute of Technology Assessment and the Austrian Academy of Sciences, Vienna July 2000.

58. The full title is "*Go on! Österreich ans Internet. Eine Initiative des Bundeskanzlers*". See http://www.austria.gv.at/go on

59. Government of Germany, "Innovation and Jobs in the Information Society in the 21st century – The Internet for Everyone".

60. The English version is available at www.governo.it/fsi

61. More details are available at <http://www.dcita.gov.au>

62. More detailed information about the administration of Networking the Nation is available from the programme Website at http://www.dcita.gov.au/rtif.html.

63. Danish Ministry of Research and Information Technology (1999). "Digital Denmark – conversion to the network society". Copenhagen: Ministry of Research and Information Technology; Danish Ministry of Research and Information Technology (2000). Realigning to the network society. Copenhagen: Ministry of Research and Information Technology.

64. Towards a Swedish Information Society for All, Report prepared for the conference "Stepping Stones into the Digital World" in Bremen, Germany, on 21-22 September 2000.

65. "Finland as an Information Society", The report of the Information Society Advisory Board to the Finnish Government, 2000.

66. Further information is available at http://www.miti.go.jp/english/whatsnew/data/c2001polie.html

67. FCC, "Line Sharing" to Lower Cost and Increase Availability of Broadband Services Used for High Speed Access to the Internet, November 18, 1999.

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69. Booz Allen & Hamilton, *Achieving Universal Access*, London 7 March 2000.

70. http://www.bconnect.org

71. Australian Information Economy Advisory Council (AIEAC), National Bandwidth Inquiry: Report of the Australian Information Economy Advisory Council, Canberra, 1999.