General Distribution **OCDE/GD(96)101**

COMMITTEE FOR INFORMATION, COMPUTER AND COMMUNICATIONS POLICY

CURRENT STATUS OF COMMUNICATION INFRASTRUCTURE REGULATION

CABLE TELEVISION

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Paris 1996

FOREWORD

This report was presented to the Telecommunications and Information Services Working Party meeting in January 1996 and was recommended to be made available to the public by the Information, Computer and Communications Policy (ICCP) Committee in March 1996.

The report was prepared by Dr Sam Paltridge of the OECD's Directorate for Science, Technology and Industry. It is published on the responsibility of the Secretary-General of the OECD.

TABLE OF CONTENTS

MAIN POINTS

Competitive access to communication markets, through the competitive provision of infrastructure, efficient interconnection of networks, and where necessary regulatory safeguards, are fundamental to achieving many of the aims OECD governments have outlined in information infrastructure policies. This is particularly true in respect to expanding access to information infrastructure for business and residential users. Increased innovation in technology, services and pricing (and in some cases lower prices) are essential if many of the benefits foreseen by governments are to be realised.

It is increasingly clear that those countries that are best able to harness competition, to bring the same gains evident at the national and international level to local communication markets, will be best placed to capture the benefits for economic and social development. Without 'seamless infrastructure competition' new service suppliers will not be able to take advantage of all the alternative building blocks available to provide competitive access. Nor will public telecommunication operators (PTOs) be able to restructure their businesses to meet the formidable challenges they face in the new telecommunication environment. At the same time governments must ensure efficient access to existing infrastructure. Due to virtually all existing infrastructure being under the control of incumbent PTOs, governments must ensure competitors and their customers have efficient access.

To date, experience has shown that controlling local access facilities has had a tremendous impact on how competition in long distance markets has developed. Policy makers need to keep this in mind as they seek to extend the benefits of competition into local markets or open their markets for the first time. The development of local competition will be extremely slow without appropriate regulatory safeguards (such as ensuring number portability), fair and equal access to existing networks (at reasonable prices) and 'seamless infrastructure competition' which may require temporary protection of new entrants from dominant incumbents. Nevertheless in an environment characterised by competition and converging markets it will be necessary over time to ensure that incumbents do not face asymmetrical regulatory barriers in providing new services. The main principle which should guide regulatory practices is to deter the abuse of dominant positions rather than preclude incumbents from offering new services.

Fortunately the trend toward service and technological convergence can aid the liberalisation of communication markets. The convergence process enables telecommunication services to be delivered over infrastructures that have not formerly been part of the PSTN. One of the main 'alternative infrastructures' identified by new market entrants, PTOs and policy makers to provide competitive telecommunication services are cable television networks. **Yet, due to current regulatory policies in the OECD area, PTOs are twice as likely to be able to offer cable television services than cable television companies are of providing switched public telecommunication services**.

Where restrictions have been lifted, on the ability of new service suppliers to provide infrastructure for local telecommunication services, competition has either commenced or infrastructure is being developed to provide competitive local access. Aware of the competitive threat posed by cable communication in some countries a number of PTOs have been expanding their own services in this area. **From 1990 through to 1995, an increasing share of the cable television market was gained by PTOs in the**

OECD area. It should be a major concern, in terms of competition policy, that PTOs have more than 61 per cent of the cable television market, as measured by subscribers, in areas where they have PSTN monopolies.

PTOs in monopoly telecommunication markets are over three times more likely to own cable infrastructure than PTOs in competitive telecommunication markets and this could constitute a formidable barrier to the early roll out of competition at the local level. This suggests that policy makers in a number of countries with telecommunication monopolies should give urgent consideration to a number of actions or an opportunity, for faster and more efficient roll out of local competition, may be lost.

Many parts of the EU area are at a tremendous disadvantage compared to Canada, Japan and the US, in terms of the independent infrastructure available for the provision of local telecommunication competition, because most cable television infrastructure is owned by incumbent monopoly PTOs. There are some exceptions such as Finland, Sweden and the UK. The major policy implication, particularly for the monopoly markets most affected, is the additional importance of an efficient interconnection regime and the early introduction of 'seamless infrastructure competition'. Some positive steps that could be taken to boost the chances of an earlier roll out of communication (telecommunication and cable television) local competition include:

-- accelerate liberalisation by allowing cable communication operators, and other alternative infrastructure providers, the opportunity to offer public switched telephony services.

-- for those Member countries considering privatising an incumbent PTO to sell their cable subsidiaries as separate entities.

-- to prevent further acquisitions or mergers by PTOs in their 'home markets' where this will lead to an increase of dominance.

-- where they have not done so, introduce safeguards to ensure PTOs are not cross subsidising the expansion of cable television networks from monopoly PSTN services in advance of competition.

-- For the transition to a fully competitive market, ensuring a stable regulatory framework to encourage investment in alternative infrastructure and to ensure incumbent PTOs can not use their dominant positions in unfair ways.

Some PTOs and CCOs note that the obligation to provide infrastructure access to all requesting parties, based on the unbundling of network functions and capabilities would make it mandatory for them to provide access to any or all of these functions and capabilities. In those instances such additional costs should be recovered by the infrastructure operator in the prices charged to the requesting parties (which will normally include the incremental cost element plus a reasonable rate of return of capital investment). These charges should be transparent and non-discriminatory, in particular with respect to the infrastructure access provider's own competing retail service arm where applicable.

Accordingly this document presents a stocktaking of current policies and the current dimensions of the cable television industry in the OECD area.

COMMUNICATION REGULATION, MARKET STRUCTURE AND LOCAL ACCESS

For much of the history of telecommunication a fundamental element of most regulation has been defining which suppliers could provide facilities for different types of service. Until relatively recently all infrastructure for public switched telecommunication networks (PSTN) was provided by monopoly PTOs. In the 1960s a gradual liberalisation of terminal equipment, that users could connect to the PSTN, commenced and this gained momentum in the 1970s. As this process developed, parallel liberalisation was introduced in the services people could provide over the PSTN using their own equipment. These services became known as value added services and today they are fully liberalised in all OECD countries for provision at the national level.

The growing awareness of benefits of competition in the provision of terminal equipment and value added services led to liberalisation of the provision of PSTN infrastructure for long distance telecommunication (including international). In the 1980s Japan, the UK and US led this wave of liberalisation. However competition, for PSTN traffic, was largely confined to the long distance markets in these countries, even in Japan and the UK where the local loop was no longer a monopoly. The infrastructure for local services was still overwhelmingly provided by incumbent PTOs. This was either because regulation precluded (or did not encourage) new market entrants from providing facilities at the local level or because the new operators chose to focus on the long distance markets. At this time policy makers opted to structurally separate the provision of 'local' and 'long distance' PSTN facilities (as in the US) or regulate the incumbents such that new suppliers could connect their facilities to existing customer access networks (Japan, UK and US).

By the 1990s a growing number of OECD governments realised that competition could be harnessed to provide benefits in all telecommunication markets. When liberalisation was introduced in Australia, Canada, Finland, New Zealand, and Sweden new regulatory regimes not only stipulated interconnection arrangements (through a mix of encouragement for commercial negotiation and regulatory oversight) but sought to increase the role of markets in deciding the level of competition for the provision of local PSTN infrastructure. One reason for this new emphasis on 'seamless infrastructure competition' was the belief that the models employed by the pioneers of competitive telecommunication were not appropriate to expand the benefits of liberalisation to all market segments. Indeed, by this time a fundamental reassessment of telecommunication market structures was underway in Japan the UK and US.

In the US an increasing number of States are acting to open local markets and by November 1995 some 35 States allowed some form of competition compared to 17 States two years previous.[1] In Japan a review of the future status of NTT was underway during 1995 with a decision expected in early 1996, and trials were underway using cable television infrastructure for telecommunication services. In the UK the government decided to increase liberalisation by ending the 'virtual monopoly' in the local loop by encouraging competition via alternative infrastructures such as cable television networks, wireless facilities, existing private networks owned by utilities and from new market entrants. This was accomplished in the UK in 1991 by ending the duopoly which had produced bottleneck access to long distance infrastructure and by preventing the dominant PTOs from providing broadcast entertainment over their existing national networks before 2001, and then only if effective competition has developed.

One reason for the reassessment of initial market structures, in Japan and the UK, was that the new facilities based carriers had only been able to capture a fraction of the overall telecommunication market. This was largely attributed to the market power incumbent PTOs derived from the control of local access networks. In Japan, after nearly a decade of national long distance competition the combined market share of NTT's rivals was 31.3 per cent in inter-prefecture calls but less than 2 percent for intra-prefecture traffic (local and short distance). As a result, in 1994 the overall share of Japan's new common carriers was only 7.2 per cent of switched telecommunication traffic in the domestic telecommunication market. Similarly in the UK after a decade of competition Mercury Communications had captured 12.8 per cent of national switched telecommunication traffic but only 3.1 per cent of local traffic. In total, including international telecommunication, the market share of BT's rivals was less than 8 per cent by 1994.[2]

In the US the divestiture of AT&T created a commercial separation between local (infrastructure for local access and regional services) and long distance telecommunication markets (infrastructure for long distance and international services). Long distance telecommunication was open to all market entrants and, because regulation stipulated that there should be fair and equal access for PTOs, the competitors to AT&T were able to capture 36 per cent of long distance traffic by 1995. The structural separation of the national and international facilities from regional and local facilities enabled a more competitive long distance market because the incumbent (AT&T) did not have control over the local networks through which competitors (such as MCI and Sprint) had to access customers.

On the other hand local services were, in the main, virtual monopolies with the Regional Bell Operating Companies (RBOCs), GTE and several hundred smaller independent companies owning and managing local access networks. In 1993 local and intrastate traffic made up 86 per cent of all public switched telecommunication in the US while interstate traffic contributed 14 per cent.[3] Accordingly the overall market share of all new telecommunication carriers, such as MCI and Sprint, largely mirrored the relatively small share gained by new market entrants in Japan and the UK.

One reason the long distance carriers in the US are at a relative disadvantage in markets that are now being opened to greater competition, such as the intrastate market, is that where competition is permitted customers sometimes have to dial lengthy additional prefix numbers to access services. For example, until local toll competition becomes effective, callers wanting to use AT&T for local toll services within a state have to dial 10-ATT (*i.e.* 10288) before dialling the number they are calling. However the trend is toward equalising access for customers. By December 1995, 13 US states allowed business and residential users to choose a company for local toll calls without them having to dial additional digits.[4] US long distance carriers have also claimed that it has been difficult to negotiate anything more than 'token discounts' from local exchange carriers (compared with the large discounts they themselves offer to resellers at the national level), such that without installing their own facilities they are priced out of the market.[5] These examples highlight the advantages ownership and operation of local access to customers gives to incumbent PTOs for marketing local services.

The most recent example of the market power that can result from incumbent PTOs controlling the 'local loop' occurred in Finland. After less than a year of competition the rival consortium of companies to Telecom Finland, the previous monopolist for long distance and international services, had captured a combined market share of 58 per cent for long distance traffic and 25 per cent for international traffic. Telecom Finland's competitors had won a market share far in excess of the experience of the rivals to BT and NTT in a fraction of the time. The principal difference was that Telecom Finland's main rival in the long distance market, the ATC consortium, provided 70 per cent of the local access lines while Telecom Finland provided only 30 per cent. What the cases of Finland, Japan, the UK and US show, although starting from different points, is the tremendous importance of owning and managing access to customers.

Both BT and NTT could retain market share because of their control over local access while in Finland, the ATC companies were able capture a huge market share (53 per cent of long distance traffic) almost overnight because of their greater access to customers than the incumbent long distance monopolist. **ATC's long distance market share after one year was more than four times greater than Mercury's share after 10 years.** This is why some of the long distance companies in the US have advocated that they should be allowed into the local market prior to the local exchange carriers being able to enter the long distance market.[6]

None of the foregoing is to imply that tremendous benefits were not obtained during the first decade of PSTN liberalisation. On the contrary, very large gains were made for users who enjoyed lower prices, greater innovation, increased responsiveness and better quality if service.[7] Indeed, much of the gains were derived by improved performance from incumbent PTOs spurred on by new market entrants. Accordingly, by themselves, statistics on market share do not indicate how much has been achieved in competitive markets. In this sense indicators of market share should not be used as an arbiter of whether liberalisation has been successful. Nevertheless, because experience has shown that controlling local access facilities has had a tremendous impact on how competition in long distance markets has developed policy makers need to keep this in mind as they seek to extend the benefits of competition into local markets or open their markets for the first time.[8] In short, without appropriate regulatory safeguards (such as ensuring number portability), fair and equal access to existing networks and 'seamless infrastructure competition' the development of local competition will be extremely slow.

Access to customers through local networks is the key strategic infrastructure asset of public telecommunication operators (PTOs) and vital to the success of new market entrants. This is why, from a policy perspective, allowing the market to play a greater role in determining how access to information infrastructure is provided is crucial to the success of all government policies in this area. Competition in the provision of local access networks and competitive access to users are fundamental to OECD governments achieving many of the aims outlined in information infrastructure policies particularly in respect to network pricing and innovation [OCDE/GD(96)73].

Those OECD countries that are best able to harness competition to bring the same benefits evident at the national and international level to local markets will be best placed to capture the benefits for economic and social development. Without 'seamless infrastructure competition' new service suppliers will not be able to take advantage of all the alternative building blocks available to provide competitive access. Nor will PTOs be able to restructure their businesses to meet the formidable challenges they face in the new telecommunication environment. Both these situations could place many of the aims governments have as part of their information infrastructure policies at serious risk of not being realised.

Fortunately, the trend toward service and technological convergence can aid the liberalisation process which is fundamental to the efficient provision of information infrastructure. The convergence process enables telecommunication services to be delivered over infrastructure that has not formerly been part of the PSTN. One of the main 'alternative infrastructures' identified by new market entrants, PTOs and policy makers to provide competitive telecommunication services are cable television networks. In some OECD countries hybrid cable communication networks, using fibre optic and co-axial cable (and sometimes copper wire in parallel for residential telephony connections) are being used to provide telecommunication services. Cable modems are expected to be widely available toward the end of 1996, at prices of between US$200 and US$300, which will allow greater access to communication services. Several large cable television operators in the US have already placed orders for cable modems and plan for services to commence in 1996.[9] PTOs are also looking to provide video services over upgraded PSTN and cable networks with the aim of generating new sources of revenue. Accordingly this document presents a stocktaking of current policies and the current dimensions of the cable television industry in the OECD area.

REGULATION OF CONVERGING COMMUNICATION SECTORS

Status of local access competition and regulation

Although competition in the provision of telecommunication infrastructure has been permitted in some OECD countries for more than a decade, competition in the provision of local access services is still very underdeveloped. At the end of 1995 less than 0.4 percent of local telecommunication mainlines were provided by suppliers other than former monopoly PTOs.

Where restrictions have been lifted on the ability of new service suppliers to provide infrastructure for local telecommunication services in eight OECD countries, competition has either commenced at the local level or infrastructure is being developed to provide competitive local service. In Australia Optus Communications plans to offer local telecommunication services over its own infrastructure to residential customers via a broadband access network it is now building. In Sweden Kablevision, the cable television subsidiary of the Kinnevik group, has announced new investment in a network in Stockholm capable of offering interactive services, Internet access and standard telephony, with services commencing in 1996.[10]

The outstanding example is in the UK where the number of telecommunication mainlines used by customers of cable television operators (hereafter cable communication operators or CCOs) surpassed one million in 1995. Basic service is here defined as the minimum tariff a consumer can pay for cable television service. Premium services, such as a latest release film channel or pay per view sports channel, are optional to the customer. This number of cable telecommunication customers was almost entirely achieved in less than three years. Since 1992 CCOs in the UK have invested more than US$3.7 billion compared to a total investment of US$1 billion between 1986 and 1991.[11] The UK Cable Communications Association says its members plan to invest a total of US$15.7 billion.

The stimulus for the growth of cable communication in the UK was the abolition of the duopoly. Equally crucial to those funding infrastructure investment in a market pioneering local telecommunication competition was the commitment that BT and Mercury, the existing dominant PTOs, could not offer broadcast entertainment services over their existing national networks at least until 2001, and then only if effective competition has developed. Since BT had its own local network it had little incentive to encourage the development of alternative local carriers. This placed Mercury in a very strong bargaining position vis-à-vis companies that would eventually emerge as competitors. After the end of the UK duopoly cable communication companies could interconnect with any of the new long distance carriers, other cable companies or the newly responsive BT and Mercury. **Less than 2 300 local telecommunication connections were made between 1986 and 1991 by cable communication companies. Since the end of the duopoly more telecommunication subscribers are added to cable networks every two working days than for the entire period between 1986 and 1991.**

In fact telecommunication services have become the main driver encouraging the expansion of networks enabling some customers to receive a telephone service for the first time and others to receive cable television. The Cable Communications Association says that around 15 per cent of its customers are new

subscribers.[12] **Moreover since the end of the telecommunication duoply more cable television subscribers have been added each year than in the entire period between 1986 and 1991.**

While the CCOs provided service to less than 5 per cent of the UK market at the end of 1995, their success in adding an average of 50 000 new telecommunication customers per month has not escaped the attention of PTOs in other countries both as a competitive threat and an opportunity. In the UK cable communication companies are providing new services, pricing innovation and vigorous competition to an incumbent at the local level. A critical factor in their success is that they own and operate customer access networks in a stable regulatory environment which has encouraged investment in the rollout of those networks. Interconnection (including fair and equal access to existing networks), is, of course, crucial so that customers of cable networks can communicate with those of PTO networks. However the main advantage CCOs have over the pioneers of telecommunication competition, in the long distance and international markets, is substantial access to customers over their own local networks.

The UK experience underscores the tremendous potential upgraded CCO networks have for an effective competition policy. Between 1990 and 1994 the number of cable television subscribers in the OECD area increased from 82 million to 106 million **(Table 1).** This represented the equivalent of one cable television subscriber for every four telecommunication mainlines in OECD countries. As liberalisation is increased over the next several years this would appear to be a formidable platform for introducing competition into the market for telecommunication services. However a number of things need to be taken into account including the capabilities of existing networks and the extent to which current systems are owned by PTOs.

Where PTOs have already rolled out cable communication networks there may be less incentive for the entrance of new CCOs. One of the prime reasons for the rollout of local cable networks in the UK has been that CCOs have been able to draw on two sources of revenue -- cable television and telecommunication. This is in no way to imply that local competition will not develop if PTOs already serve an area with cable communication and traditional PSTN networks. On the contrary the opening of the local market is likely to give a very large boost to competitors using fixed wireless technology in the short term, and mobile wireless technologies in the longer term, to provide less expensive local access for telecommunication services. Nevertheless these markets will need to be won from PTOs with existing local access to customers.

It is also true that cable television services had yet to commence in a substantive way in Australia, Greece, Iceland, Italy, New Zealand and Portugal by the end of 1994. If the experience in Australia is an indication, once the starting gun is fired in countries without established cable communication infrastructure, the PTOs will be very active participants. By introducing cable television in 1995 Australia has started much later than many other OECD countries. In the relatively short time work has been underway Telstra has passed 600 000 homes installing more than 7 000 kilometres of coaxial cable.[13] In late 1995 Telstra was passing up to 5 000 homes per day with coaxial cable. In the UK, as at October 1994, the Cable Communications Association estimate some 29 000 kilometres of cable had been laid -- the vast bulk of which occurred after the abolition of the duopoly.

Aware of the competitive threat posed by cable communication in some countries a number of PTOs have been expanding their own services in this area. A major reason for this is the need of PTOs to develop new sources of revenue from multi-media services. At the same time the potential benefit of reaching a critical mass that may prevent other service suppliers from being able to economically justify the rollout of broadband infrastructure may also be a strategic consideration for incumbent PTOs. Certainly, from 1990 through to 1995, an increasing share of the cable television market is being gained by PTOs.

Between 1990 and 1994 the percentage of cable subscribers to PTO cable networks, in areas where those PTOs also provide telecommunication services, increased from 15 to 19 percent of total cable subscribers. These numbers, understate by a large degree, the number of subscribers receiving service from cable systems in which PTOs have invested, or own outright, in domestic and foreign markets. An example would be investment by North American PTOs (*e.g.* Regional Bell Operating Companies, Bell Canada) in the UK cable communication market. Another example would be investment by PTOs such as US West in Time Warner (a leading US cable company). US West also has cable investments in France, Norway, Spain and Sweden. If these investments were included in **Table 1** the pace of PTO market gains would be much faster.

The reason PTO investment in cable companies outside their area of telecommunication service are not included in **Table 1** is that these developments can be seen as increasing competition. For example, Bell Canada's investment in the US based cable communication company Jones Intercable can be seen as increasing the ability of cable companies to compete with incumbent PTOs in those areas of the US where Jones Intercable provides service. Bell Canada Enterprises has a 30 per cent stake in Jones Intercable with an option to purchase a controlling interest within seven years.[14] **Of more importance, and more concern in terms of competition policy, is the fact that PTOs that have monopolies over public switched telecommunication, are also increasing their share of the cable communication market in the same area of service. Looked at from this perspective, on average, PTOs with PSTN monopolies have 61 per cent of the cable communication market as measured by subscribers (Table 2).**

The PTO share of the cable communication market is increasing in countries with monopoly markets. In 1995 Telmex purchased 49 per cent of Cablevision, Mexico's largest cable television operator while France Telecom purchased a number of local networks auctioned by Caisse des Dépôts, a state investment institution.[15] **By 1995 the share in monopoly markets would most likely exceed 61 per cent compared with an OECD wide average of around 20 per cent.**

In the near future the policies of some OECD governments seem set to increase the cable infrastructure ownership of monopoly PTOs. In Greece, although service is yet to commence, a recently passed law mandates that the development installation, operation and management of any kind of infrastructure for cable television broadcasting is exclusively the right of the Hellenic Telecommunications Organisation (OTE). OTE shares the exclusive rights to providing cable television services over this infrastructure with the National Radiotelevision SA (ERT). Because alternative networks need at least several years to roll out their networks the current policy in Greece will close off the potential for competition at the local level for over a decade. This would substantially eliminate the benefits local competition could bring to the development of information infrastructure in Greece. **No persuasive arguments have been presented at the OECD to show why new monopolies should be granted in the provision of information infrastructure.**

The expansion of PTO cable subscribers has largely not been as a result of PTOs competing with cable communication companies but rather monopoly PTOs expanding their cable networks and investing in cable companies in those areas where they provide local telecommunication services. The reason that this trend has not been greater is that several countries with competitive PSTN markets (Canada, Japan, UK and US), and some with monopoly markets (Austria, Belgium, Luxembourg, Spain, and Switzerland), have placed restrictions on what certain PTOs can do under certain circumstances **(Table 3)**. Nevertheless the fact that PTOs in monopoly markets are three times more likely to own cable infrastructure in their telecommunication service areas than the OECD average could constitute a formidable barrier to the early roll out of competition at the local level. The major policy implication, particularly for the monopoly

markets this affects most, is the additional importance of an efficient interconnection regime and the early introduction of 'seamless infrastructure competition'.

Regulatory status of PTOs providing cable infrastructure and services

It is true that some OECD governments in competitive markets, in an endeavour to promote competition, have placed restrictions on certain incumbent PTOs providing cable television infrastructure or services. In the main these restrictions, in so far as they are industry specific rather than as a result of general competition law, refer to what PTOs can provide over new communication infrastructure (*i.e.* building parallel co-axial cable networks). In those countries that restrict PTOs from providing cable television over parallel infrastructure it is often the case that the PTOs concerned are permitted to offer common carriage and new services over existing PSTN networks.

Most restrictions are for defined periods of time, and there is a growing recognition that they will not be sustainable, or desirable as industry specific requirements, due to technological and service convergence. In future it might be expected that OECD governments would increasingly rely on general competition law, intervening only when acquisitions or mergers substantially increase a firm's dominant position. The four principal reasons given for existing restrictions on PTOs from providing cable television infrastructure or services are:

-- to promote competition by not allowing incumbent local telecommunication service providers to add to their bottleneck control of local access networks;

-- to encourage PTOs to open their local networks to competitors by 'rewarding' them once they have complied with fair and equal access provisions;

-- due to undertakings given by government to investors in new cable infrastructure that CCOs will have monopoly rights to exploit this infrastructure for limited time period to promote investment in the rollout of alternative infrastructure;

-- because broadcasting communication regulation does not allow certain telecommunication companies to offer broadcasting services, when this is defined to include cable television services.

In the OECD area restrictions based on the above reasons are the exception rather than the rule. In fact, there are restrictions on monopoly carriers providing cable television carriage and services only in Austria, Belgium, Italy, and Luxembourg. In terms of also prohibiting incumbent telecommunication monopolists from providing cable television services Spain and Switzerland can be added to these countries. In most other countries with monopoly provision of telecommunication infrastructure PTOs are allowed to provide directly, or through a subsidiary, cable television infrastructure and services. In Norway, for example, Telenor is allowed to provide cable television services but they must be completely separated from those telecommunication services for which the company has a monopoly (the company's cable television subsidiary is Telenor Avidi AS). Similarly in the Netherlands, KPN's subsidiary (CASEMA), in which it has a 75 per cent stake provides cable television services.

In countries with competitive provision of telecommunication infrastructure the situation is more complex with the exception of those countries where all markets are open (Finland, New Zealand and Sweden). In Australia, the two licensed general telecommunication carriers (Optus and Telstra) are permitted to provide infrastructure for cable television services provided they do so in a manner which is consistent with current

communications and trade practices legislation. The Telecommunications Act of 1991 specifically reserves the right, except in certain circumstances, to install and maintain a reserved line link (that is, cable) to licensed carriers or agents acting on their behalf. This duopoly over infrastructure provision will be abolished in 1997.

The UK does not prevent the existing PTOs from investing in cable infrastructure. BT, for example, has wholly or partly owned subsidiaries with interests in various CCO franchises. BT, along with other dominant PTOs, is however, unable to use its existing national infrastructure to provide broadcast entertainment services until the year 2001. On the assumption that effective competition develops, this position will be reviewed then, but not before. The UK believes this will ensure that cable entrants have sufficient protection and stability to underpin investor confidence, allowing new networks with local customer access to be built. Competitive pressures have begun to develop on the dominant operators and BT has announced plans for a very large investment programme to upgrade the broadband capability of its network down to the level of local street cabinets.

Australia's two licensed carriers are also permitted to provide cable television services but must obtain, under the Broadcasting Services Act of 1992, a subscription television broadcasting licence (for the delivery of non-satellite pay television services from the Australian Broadcasting Authority (ABA). In determining whether a license should be granted the primary concern of the ABA, in consultation with the Australian Competition and Consumer Commission (ACCC), is whether this action would encourage diversity of control in Australian broadcasting services. This element of Australian regulation, highlights the fact that the 'new rules of the game' for the converging communication sector are not only being derived from telecommunication but from some of the traditional concerns of broadcasting and media regulation.

In Canada, subject to regulatory approval, PTOs can and often do lease telecommunication facilities to cable television operators. In addition, as of September 1994, the Canadian Radio-television and Telecommunications Commission (CRTC) has authorised PTOs to provide 'video-dial-tone' platforms (two-way switched broadband facilities) for the carriage of broadcasting or other video services, acting solely as a common carrier. This infrastructure could be leased by a cable television provider. No video-dial-tone tariffs have yet been filed with the CRTC. Under existing regulation cable television distribution operations must, unless otherwise authorised by the CRTC, own some elements of their infrastructure.[16] This means that a cable television company must obtain prior CRTC approval before leasing any of these infrastructure elements from a PTO.

On the other hand Canadian regulation restricts PTOs from providing cable television services except in remote or under-served areas. In 1995 most PTOs in Canada were prevented either by law, regulation or policy from holding broadcasting licences, including cable television. Recent Canadian Government policy strongly supports the introduction of competition in the provision of communication services. A report by the CRTC on the implementation of this policy has recommended that PTOs be allowed to provide cable television service as soon as the regulatory barriers to effective competition in the provision of local switched telephone service have been eliminated. The CRTC estimates that the regulatory proceedings to remove these barriers will be completed between June and November 1996.

In Japan, Type I carriers are permitted to enter the CATV market with the exception of the former monopolists NTT and KDD. At present, some Type I carriers are investing in CATV operators. On the other hand, CATV operators can provide telecommunication services by getting a Type I carrier licence and five CATV operators have done so. (three for leased circuits, one for frame relay and one for Internet access). Many CATV operators are planning to provide telephone service and some are commencing trials. Much the same situation applies in the UK where BT, Mercury and Kingston Communications (the

local operator in the City of Hull) are prohibited from delivering cable entertainment services on a national basis to retail customers. These UK carriers are free to apply for licences for the regional provision of cable television service, in the same manner as CCOs, and are allowed to provide video on demand over the PSTN.

In Portugal, the PTO (Portugal Telecom) is required to make the transport network (means of transmission necessary to conduct non permanent images and sounds from outside the distribution network origin to the centres of distribution of those networks) available; when they are unable to provide adequate means of transport, the cable distribution network operators may install the required infrastructure themselves. The distribution network is installed and owned by the operators of cable television.

In the US, historically, the only government restriction in this area has precluded local exchange carriers from offering cable television programming in their local telephone service areas. However, beginning in August 1994, a series of US courts have declared the so-called 'cable/telephone cross-ownership rule' unconstitutional. In January 1996, the US Congress enacted legislation establishing terms and conditions under which local exchange carriers may offer video programming in their local service area. Essentially, such carriers have three choices. First they can offer programming via a wireless system free from any government regulation, save the need to obtain a radio licence from the Federal Communications Commission (FCC). Second, carriers may choose to operate a conventional cable system and be subjected to the same regulations imposed on other cable systems. Third, the carriers may provide programming via an "open video system", and avoid many of the regulations imposed on conventional cable systems. Carriers operating open video systems must make a portion of their distribution channels available to unaffiliated programmers on reasonable, non discriminatory terms, in accordance with rules adopted by the FCC. The 1996 legislation also eliminated the requirement that local exchange carriers obtain FCC approval before constructing a facility for delivering video programming."

Regulatory status of CCOs providing infrastructure and services

At the end of 1995 the balance of regulation in the OECD area definitely favoured PTOs taking advantage of the process of convergence over CCOs. Recognising caveats apply in a number of countries with telecommunication infrastructure competition (Japan and the UK), PTOs are able to provide cable television services in 16 Member countries. By way of contrast CCOs are able to provide a full range of PSTN services only in half that number of countries **(Table 4)**. While, it is true that the restrictions over what CCOs can provide are gradually being lifted at the end of 1995 only eight countries permitted 'seamless infrastructure competition.' The markets in Finland, New Zealand and Sweden are completely open. In Finland prospective market entrants only require a licence while in New Zealand they need to commercially negotiate an interconnection arrangement with existing facilities based PTO(s). Perhaps due to the fact that New Zealand has a leading claim to being the most deregulated telecommunication market in the OECD area, commercial interconnection arrangements for some services have been protracted. While Clear Communications, has been relatively successful in national and international market, protracted interconnection disputes appear to have slowed down the development of competition at the local level. In the other five OECD member countries that do allow seamless infrastructure competition some caveats apply.

In Australia, a CCO can provide telephony services when it holds a general telecommunication carrier licence or the services are provided in accordance with a licence granted by AUSTEL using capacity acquired from general telecommunication carriers. The Telecommunications Act of 1991 permits a broadcaster to install and maintain a reserved line link (that is, cable) for the supply of public radio or

television broadcasting services. However a cable television service provider is not permitted to provide its own telecommunications services over its own cable network unless it is also a general telecommunication carrier. Such a cable broadcaster could resell telecommunication services over capacity acquired from Telstra and Optus.

In Canada cable television operators are free to provide telecommunication services. In 1995 most cable operators in Canada provide a limited variety of apha-numeric and signalling (security) services to their cable television subscribers; several offer or plan to offer Internet access services.[17] Some operators in major urban centres also provide private line services for business telecommunication. Toward the end of 1995 no cable television operator in Canada provided switched telephone services over their cable television networks, although this is now permitted subject to regulated tariffs. Canada's largest cable television operator, Rogers Communications, owns one of Canada's two cellular telephone service providers -- Rogers Cantel -- and is a major shareholder in Unitel a long distance telecommunication carrier.

In the UK, CCO telecommunication licences do not place any restrictions on the provision of telephone services, but are generally contiguous with the franchise area(s) in which the companies are licensed to provide television services. However, there are no restrictions on applications for extension of these licences and several companies now provide telephone services beyond the boundaries of the initial franchise areas, and have also built network links between franchise areas. Applications for national PTO licences are anticipated by the UK Government.

In many parts of the US cable television operators may provide telecommunication services between the various states of the US without any restriction and free from FCC regulation. However, the telecommunication services provided wholly within each state of the US are regulated public utilities commissions within that state. The laws of the 50 states (and the District of Columbia) vary. Some states limit or even prohibit the competitive provision of certain telecommunication services by cable systems or any other entity. On the other hand, most states allow new firms to provide such services in competition with local exchange carrier incumbents. Legislation enacted in January 1996 pre-empts state laws barring competitive provision of all telecommunication services. States will still be allowed to control entry in rural areas, as well as impose competitively neutral requirements if thought necessary in areas such as universal service.

In Denmark, according to an Executive Order on broadband Networks and Services within Local Areas operators of cable television services may provide all telecommunication services within the boundaries of a municipality which is the current demarcation for any cable television network. In this regard, Denmark's policy situation is similar to Mexico where there is no regulatory of restrictions on providing local telecommunication services. The practical restriction, prior to forthcoming liberalisation in both countries, is that that there is no choice of long distance carrier to connect with in Denmark or Mexico, and that in both cases the incumbents own and manage local access networks. This was the major barrier to local competition in the UK prior to the end of the duopoly when the local market was technically more open than the long distance market but was far less competitive.

In Portugal the distribution of cable television is a regulated activity in the field of telecommunication (for broadcasting). In other words cable television distribution networks can only carry and deliver to the final user the television programmes (national broadcasted channels and channels received by satellite). In both cases, the distribution of programmes must be simultaneous with the original transmission and without any cuts. The activity of cable distribution network operator (i.e. an entity that can install and operate television distribution networks for public use) may only be exercised with a license. The granting of licences for this activity is governed by the principle of full accessibility and CCOs being able to

demonstrate the necessary technical and financial requirements. ICP regulates cable distribution in Portugal. Licences are granted by the government minister in charge of communications, based on a recommendation from ICP. In Portugal cable television distribution commenced in 1992 on the islands of Azores and Madeira. The first licence was awarded on mainland Portugal in 1994.

In all countries in the European Union cable television operators will be able to provide telecommunication services, which have already been liberalised, from January 1996. This is as a result of a Directive Under Article 90 entitled the 'Cable Directive'. In some EU countries this is already possible. In France the operators of cable television services can, on the proposal of municipalities or groups from within municipalities, provide telecommunication services with the exception of public switched telephony. In all but Finland, Sweden and the UK, carriage of switched telephony services will still be restricted after the 'Cable Directive' comes into effect. This means that for a country such as the Netherlands it is not expected that CCOs will be able to provide public voice telephony until 1st January 1998. Portugal appealed the European Commission decision to advance cable television infrastructure liberalisation on the provision of non-reserved services. In Portugal, the legal framework for this service was conceived with a view to cable television operators being restricted to a distribution role and therefore Portugal stated that this was not compatible with the delivery of other communication services.

In a number of countries the EU 'Cable Directive' will have little real impact in the short term because there is very limited cable infrastructure. The same applies to those countries where any future cable infrastructure will be developed under a monopoly concession to the incumbent PTO (*e.g.* Greece) or the existing infrastructure is already owned by the incumbent PTO (Germany). In the case of Greece this is because OTE has the exclusive right to own and operate cable television infrastructure. In the case of Germany this is because Deutsche Telecom has developed and owns one of the world's largest cable television distribution networks.

The EU countries where the 'Cable Directive' may have the most impact are Austria, Belgium and Luxembourg where the PTOs do not own cable infrastructure and Ireland and the Netherlands where cable companies will now be able to compete with PTOs for some services. The impact will not be so great in Denmark and France, where the way was already clear for CCOs to provide some telecommunication services under certain conditions. None of the foregoing is to understate the importance of the 'Cable Directive'. It is an important further step in liberalisation in the EU area. Yet it is necessary to recognise that in many EU countries the impact of the 'Cable Directive', without full liberalisation of switched public telephony services, will not be not be as significant as it might have been.

Of more concern is that there is an increasing trend amongst monopoly PTOs in the EU area, where they are free to do so in areas where they provide telecommunication services, to be expanding their share of the cable communication market **(Table 5)**. In the EU area, as with the overall OECD area, there is a trend toward PTO owned systems increasing their share of subscribers faster than independent CCOs. **In 1990, 52.7 per cent of subscribers in the EU area were customers of PTO owned cable networks and 47.3 to those owned by CCOs. By the end of 1994 the PTO share had increased to 58.5 per cent and the CCO share fallen to 41.5 per cent of total subscribers.**

In those countries where CCOs are free to offer cable telephony increasing PTO shares of cable markets can indicate increasing competition. This is true in the case of Telecom Finland where an expanded cable television network may add to that company's long term efforts to compete with the ATC members. **At the same time, in monopoly PSTN markets in the EU area, the increasing cable television market share of PTOs during a period in which CCOs are not permitted to provide competition in a full range of services could indicate that incumbent monopolists are further entrenching bottleneck control of access to customers. After having virtually identical market shares in 1990 in EU markets**

with PSTN monopolies, incumbent PTOs have increased their share to just under 60 per cent while the CCO's combined share has fallen to 40 per cent.

This suggests a number of countries with telecommunication monopolies should give urgent consideration to policy reform or an opportunity the more efficient development of local competition, may be lost. Already many parts of the EU area are at a tremendous disadvantage compared to Canada, Japan and the US in terms of the independent infrastructure available for the provision of local telecommunication competition because existing cable television is owned by incumbent monopolists. Some positive steps that could be taken to ameliorate this situation are:

-- immediately allowing cable communication operators and other alternate infrastructure providers the opportunity to offer public switched telephony services.

-- for those Member countries considering privatising an incumbent PTO to sell their cable subsidiaries as separate entities.

-- to prevent further acquisitions or mergers by PTOs in their 'home markets' where this will lead to an increase of dominance.

-- where they have not done so, introduce safeguards to ensure PTOs are not cross subsidising the expansion of cable television networks from monopoly PSTN services in advance of competition.

-- For the transition to a fully competitive market, ensuring a stable regulatory framework to encourage investment in alternative infrastructure and to ensure incumbent PTOs can not use their dominant positions in unfair ways.

Table 1. Cable Television Subscribers (000)

	1990	1991	1992	1993	1994
Australia (Telstra/Optus)	0.00	0.00	0.00	0.00	0.00
Austria	574.20	653.20	726.72	784.30	834.32
Belgium	3369.60	3451.12	3509.57	3549.11	3650.00
Canada	7122.51	7286.41	7463.48	7656.82	7833.19
Denmark (Cable Co.)	698.00	636.00	659.00	643.00	620.00
Denmark (TeleDenmark)	460.00	565.00	600.00	640.00	680.00
Finland (Cable Co.)	46.40	44.00	42.90	26.80	41.90
Finland (PTOs)	623.00	678.00	710.00	732.80	755.50
France (Cable Co.)2.	671.51	888.15	1156.29	1481.63	1683.33
France (France Telecom)3.	0	2.49	107.52	134.30	371.00
Germany (Deutsche Telekom)	8100.00	9899.00	11823.00	12580.00	14600.00
Greece(4)	0.00	0.00	0.00	0.00	0.00
Iceland	0.00	0.00	1.00	1.10	1.20
Ireland (Tel..Eir./Cable Co.)	NA	NA	365.00	430.00	440.00
Italy	0.00	0.00	0.00	0.00	0.00
Japan(5)	400.15	730.14	1075.36	1629.38	2212.87
Luxembourg	90.00	90.00	110.00	110.00	170.00
Mexico	610.45	761.25	867.56	1061.13	1187.53
Mexico (Telmex/Cablevision)6.	--	--	--	--	--
Netherlands (Cable Co.)	4100.00	4500.00	4600.00	4700.00	4600.00
Netherlands (KPN - CASEMA)	700.00	700.00	800.00	800.00	1100.00
New Zealand(7)	0.00	0.00	0.00	0.00	1.00
Norway (Cable Co.)	476.66	525.94	564.70	587.93	664.17
Norway (Telnor)	80.14	95.62	114.60	143.38	189.90
Portugal (Cable Co.)	0.00	0.00	0.00	0.00	300.00
Portugal (Telecom)	0.00	0.00	2885.00	9285.00	17075.00
Spain	110.00	122.00	122.00	130.00	310.00
Sweden (Cable Co.)	382.47	455.00	605.00	830.00	830.00
Sweden (Telia)	1100.00	1122.00	1195.00	1250.00	1300.00
Switzerland	1716.41	1844.88	1972.60	2107.16	2202.65
Turkey (PTT)	0.00	20.66	45.02	138.41	245.39
UK (Cable Co.)	148.95	267.43	434.46	610.26	915.59
UK(8)	--	--	--	--	--
US (Cable Co.)	50500.00	52600.00	54300.00	56200.00	58500.00
US (PTOs)9.	0.00	0.00	0.00	0.00	2.00
OECD	82430.46	88298.30	93973.67	98966.70	105958.65

1. Shaded squares show those subscribers who are supplied directly by PTOs, or where the incumbent PTO owns a share in the cable television supplier or infrastructure in an area where the PTO supplies telephone service. Investment links between PTOs and cable companies include Ireland (Telecom Eireann/Eircable/Cable Link), Mexico (Telmex/Cablevision).
2. France Telecom owns a stake in 12 cable systems because of the Plan-Cable project in the 64 largest urban areas. Private operators manage the programming and sales and since 1986 have been permitted to construct their own infrastructure. At the end of 1993 Plan-Cable networks provided 65 per cent of all homes passed and private networks 32 per cent. The remaining 3 per cent represented older cable systems in rural areas built prior to Plan-Cable.
3. Data for France is 1991-1995
4. Service is yet to commence in Greece but OTE has the exclusive rights to install cable television infrastructure and shares the exclusive rights to service provision with National Radiotelevision S.A. (ERT, S.A.)
5. Japanese data excludes subscribers to systems retransmitting free to air broadcasting systems. The data is for “Urban Type Cable TV with interactive Functions”.
6. Cablevision, a subsidiary of Televisa, is the largest cable television provider in Mexico. Subscribers are included in overall figures for Mexico.
7. In NZ CCOs Time Warner and TCI are partners with Ameritech and Bell Atlantic major shareholders in TCNZ.
8. BT provides cable service in Westminster. Bell Canada has a 20 per cent share in Mercury and several investments in UK cable companies. Jones Intercable, in which Bell Canada Enterprises has a stake, also provides service in the UK. Cable and Wireless the majority owner of Mercury has investments in a number of cable companies. The subscribers to all these systems are included under CCO subscribers for the UK.
9. The source for this data is Frost and Sullivan and the data is for the number of homes supplied by PTOs with interactive video. Frost and Sullivan say the number of homes passed will reach 300 000 in 1995 and 1.2 million in 1996. Some PTOs operate cable television systems in the US in areas where they offer telecommunication service if there is not a cable communication company operating in that area. The FCC estimates the number of subscribers at less that one million in 1995.

Source: OECD, ITU, Analysys, Mercer Management.

Table 2. CATV Subscriber Trends for PTO and CCO systems the OECD area

	1990	1991	1992	1993	1994
Total Cable Co. Subscribers (000)	71717.32	75555.53	79010.64	82908.53	87356.78
Total PTO cable Subscribers (000)	10713.14	12742.77	14963.03	16058.18	18601.87
Total Cable %	87	86	84	84	82
Total PTO%	13	14	16	16	18
OECD	82430.46	88298.30	93973.67	98966.70	105958.65
PTO cable subscribers in Monopoly PSTN markets (000)	9690.14	11642.77	13858.025	14875.375	17643.365
Total cable subscribers in Monopoly PSTN markets (000)	18006.979	20615.316	23547.465	25330.641	28966.599
PTO cable subscribers as per cent of total cable subscribers in monopoly PSTN markets	54	56	59	59	61

Source: OECD

Table 3. PTO Provision of Cable Television Infrastructure and Services

Are PTOs allowed to provide cable television infrastructure and services?			
	Infrastructure	Services	Additional Comments
Australia	Yes	Yes	Telstra and Optus duopoly until 1997.
Austria	No	No	Technically PTOs can provide infrastructure and services but in reality this is not the case.
Belgium	No	No	
Canada	Yes	No	Expected that PTOs can offer services in 1996
Denmark	Yes	Yes	
Finland	Yes	Yes	
France	Yes	Yes	
Germany	Yes	Yes	Deutsche Telekom owns and operates cable infrastructure. Each Länder decides who can provide programmes over that network.
Greece	Yes	Yes	
Iceland	N/A	N/A	
Ireland	Yes	Yes	
Italy	No	No	No in the absence of regulatory authorisation
Japan	Yes	Yes	With the exception of NTT and KDD for services provision. CATV operators can provide telecommunication services by getting a Type I carrier licence and five have done so.
Luxembourg	No	No	
Mexico	Yes	Yes	
Netherlands	Yes	Yes	
New Zealand	Yes	Yes	
Norway	Yes	Yes	
Portugal	Yes	Yes	PTOs can distribute services if they have a licence under the same terms and conditions as cable television companies. There are no foreign ownership restrictions.
Spain	N/A	No	Carrier TV broadcasting is provided by “Ente Publico Retevisión” on a monopoly basis.
Sweden	Yes	Yes	
Switzerland	Yes	No	PTO has no legal basis to provide cable television services. The possibility to have partnerships with cable television providers is under consideration.
Turkey	Yes	Yes	
UK	Yes	Yes	BT, Mercury and Kingston are prohibited from delivering cable entertainment services on a national basis to retail customers. They are free to apply for licences for the regional provision of service and video on demand.
US	Yes	Yes	Local exchange carriers may offer video

			programming in their local service area.
OECD Countries answering “Yes”	18	17	

Table 4. **Cable Communication Company Provision of Public Switched Telecommunication Services**

	Can Cable Communication Companies provide public switched telecommunication services over their own infrastructures	Additional Comments
Australia	Yes	Telstra and Optus duopoly until 1997.
Austria	No	Cable companies can provide services using PTT infrastructure.
Belgium	No	
Canada	Yes	
Denmark	Yes	Within local municipal areas. TeleDenmark monopoly over long distance.
Finland	Yes	
France	No	Cable Co can't offer telephony. Other services permitted.
Germany	No	
Greece	No	
Iceland	No	
Ireland	No	
Italy	No	No cable operators in service. Regulation is expected.
Japan	Yes	If licensed as a Type I carrier
Luxembourg	No	
Mexico	Yes	Restricted to local service. Telmex monopoly over non-local.
Netherlands	No	Cable Co can't offer telephony. Other services permitted.
New Zealand	Yes	
Norway	No	
Portugal	No	
Spain	No	
Sweden	Yes	
Switzerland	No	Licences for multi-media trials have been granted.
Turkey	No	
UK	Yes	
US	Yes	
OECD "Yes" (%)	10	Excluding Denmark and Mexico, where in practice restrictions on long distance telecommunication precluded local competition 8 countries permit local competition.

Source: OECD

Table 5. **CATV Subscriber Trends in the EU Area for PTO and CCO owned systems**

	1990	1991	1992	1993	1994
Total CATV Subscribers in the EU Area, (000)	21524.14	24433.40	27569.35	29441.49	32918.75
EU Total as per cent of OECD	26.11	27.67	29.34	29.75	31.07
CATV Subscribers to PTO cable systems (000)	11333.00	13326.49	15603.41	16576.39	19263.58
CATV Subscribers to PTO cable systems as percent of EU Total	52.65	54.54	56.60	56.30	58.52
CATV subscribers to systems owned by CCO (000)	10191.14	11106.91	11965.94	12865.11	13655.17
CATV subscribers to systems owned by CCO as per cent of EU Total	47.35	45.46	43.40	43.70	41.48
Cable Subscribers in monopoly PSTN markets in EU area	19223.32	21866.97	24581.99	25991.63	29075.76
Subscribers to PTO owned cable systems in monopoly PSTN markets in the EU area	9610.00	11526.49	13698.41	14593.59	17208.08
Subscribers to PTO owned cable systems in monopoly PSTN markets in the EU area as a percent of all subscribers in monopoly PSTN markets in the EU area	49.99	52.71	55.73	56.15	59.18
Subscribers to CCO owned cable systems in monopoly PSTN markets in the EU area	9613.32	10340.48	10883.58	11398.05	11867.68
Subscribers to CCO owned cable systems in monopoly PSTN markets in the EU area as a percent of all subscribers in monopoly PSTN markets in the EU area	50.01	47.29	44.27	43.85	40.82

COMMUNICATION LEGISLATION IN THE OECD AREA

Telecommunication Legislation

Most legislation governing the provision of telecommunication infrastructure and services is of a recent vintage. At the close of 1995, the two major exceptions were **Norway**, where the primary piece of legislation is the Telegraph Act of 1889, and the **US** with the Communication Act of 1934. In both countries various initiatives were underway to change this situation. In **Norway** a new telecommunication act has been adopted and was expected to come into force in January 1996. In the **US** the Telecommunications Act of 1995 is in the last stage of finalisation and if enacted would fundamentally change the structure of telecommunication regulation in that country. Setting these two countries aside, the average date of telecommunication legislation, including the latest date of amendments, is 1991. In other words the majority of legislation is less than four years old **(Table 6)**. The only country without a specific piece of legislation governing telecommunication is **Belgium** where the Public Enterprise Law of 1993 is used as a cornerstone.

Future Developments

In **Australia** the Government announced in August 1995 new policy principles for the regulation of telecommunication to apply from 1 July 1997. New legislation is being prepared to implement the policy principles that provide for full an open competition in telecommunication. This will mean that there is no limit on the number of persons who may install infrastructure or provide telecommunication services (including, subject to broadcasting legislation, pay television services); a requirement for carriers to provide interconnection for all other carriers and service providers; access of service providers to carriage services; and effective consumer protection and universal service arrangements.

In **Denmark** telecommunication is regulated by the Consolidate Act No. 501 of June 1995. The regulatory situation is planned to change in 1996 when the telecommunication sector is expected to be liberalised. In **Sweden** a new telecommunication act is planned for 1997. In **Switzerland** a review of a telecommunication bill is ongoing and an open market is expected to be introduced for 1998. In the **US** proposed legislation is intended to promote competition in all communication markets, to remove legal barriers to participation by certain firms in new markets, and to reduce government regulation of many communication providers and industries. At the time of writing the bills had to be reconciled in a conference procedure, and then presented to the President to be signed into law or vetoed.

Cable Television (Broadcasting) Legislation

In respect to cable television (broadcasting) most legislation, or the most recent amendments, are less than five years old. The main exceptions at the end of 1995 were the US Communications Act of 1934 and the Cable Television Broadcasting Act of 1972. All other pertinent legislation and amendments have been enacted after 1984 **(Table 7)**. In many cases cable television (broadcasting) legislation is separate from telecommunication legislation. Around two thirds of OECD countries have different regulatory authorities covering the entire spectrum of communication activities from carriage to content **(Table 8)**. A recent discussion paper by Oftel, in the UK, has highlighted some of the difficulties faced by separate regulatory authorities because of the convergence of different industries.[18]

Future Developments

In **Australia** there are no plans to introduce a new broadcasting act but the current Act requires that certain aspects of its operation be reviewed in the near future. Australia currently has spectrum available for a national sixth broadcast television network. There are currently two public and three commercial free-to-air broadcast television networks in Australia. The Government is required under the Act to conduct a review by the 1st July 1997 of the television broadcasting industry to assess the national benefits that would accrue if more than the current three commercial television services were permitted in licence areas. The Minister for Communications and Arts must also review the operation of the current legislative requirement that subscription television broadcasting (pay TV) licences devote 10 per cent of their expenditure on services devoted predominantly to new Australian drama programmes, with a view to increasing the level to 20 per cent.

In **Denmark** the current restrictions that prevent TeleDanmark from broadcasting by cable are expected to be abolished in 1996, concurrent with telecommunication liberalisation. In **France** a draft law concerning experimental projects could permit, under certain conditions, telephony services to be provided on cable networks. In **Germany**, new regulation came into effect in December 1995. It includes more rights for private cable-TV operators to distribute television programmes. Licences for alternative networks can be granted in July 1997, so that private operators are allowed to distribute television programmes. In **New Zealand**, a broadcasting amendment bill is before Parliament to amend the complaints and procedures broadcasters are required to uphold and strengthen the BSA's powers to deal with unacceptable content. In **Switzerland** the provision of cable television is an open market with the exception of the provision of PSTN services.

Table 6. **Telecommunication Regulation in the OECD area**

	Name of Act and Date of Enactment	Comment on Planned Action or Changes
Australia	Telecommunications Act, 1991	Increased liberalisation in 1997.
Austria	Telecommunications Act, 1994	
Belgium	Public Economic Enterprise Law,1993 but no specific legislation.	Adoption to European Union Directives
Canada	Telecommunications Act, 1993	
Denmark	Consolidate Act, No. 501, 1995	Increased liberalisation in 1996.
Finland	Telecommunications Act, 202, 1987	
France	Law No.90-1170, 1990	Trials of cable telephony underway.
Germany	DBP Constitution Act, 1989.	New Regulation came into effect in December 1995. It includes more rights for private cable-TV operators to distribute tv programmes. Licences for alternative networks can be granted in July 1997, so that private operators are allowed to distribute tv programmes.
Greece	Telecommunications Act, 1994	
Iceland	Telecommunication Law modified in 1993	
Ireland	Post and Telecommunications Services Act, 1983 and amendments in 1992	
Italy	Law No. 223, 1990 and Legislative Decree in 1991.	
Japan	Telecommunications Business Law, 1985	
Luxembourg	N/A	
Mexico	Telecommunications Act, 1995	
Netherlands	WTV (Dutch Telecoms Act)	Currently under revision with enactment expected in 1996.
NZ	Telecommunication Act, 1987. Telecommunication Amendment Act, 1988. Commerce Act 1986.	
Norway	Telegraph Act, 1899	A new telecommunication act has been adopted and is expected to be enacted in January 1996.
Portugal	Law No. 88/89 - Communications General Principles, 1989 Decree-Law No. 346/90 Complementary Telec. Services, 1990 Decree-Law No 329/90 Value Added Telec. Services, 1990	
Spain	Telecommunications Act, 1987 with amendments and decrees in 1992, 1993 and 1994.	
Sweden	Telecommunications Act, 1993	New Telecommunication Act in 1997
Switzerland	Telecommunication Act (FMG), 1991	Ongoing review. Open market expected in 1998.
Turkey	Telegraph and Telephone Law, No 406 and Law No. 4000	
UK	Telecommunications Act, 1984	
US	Telecommunications Act, 1996	

Source: OECD

Table 7. **Cable Television (Broadcasting) Regulation in the OECD area**

	Name of Act and Date of Enactment	Comment on Planned Action or Changes
Australia	Broadcasting Services Act, 1992	Aspects to be reviewed in near future.
Austria	Broadcasting Law, 1995(1)	
Belgium	Decree, 1987	Adoption to European Union Directives
Canada	Broadcasting Act, 1991	
Denmark	Broadcasting Act, No. 578, 1994 (amended by Act No. 377, 1995)	Abolition of restrictions on TeleDanmark from broadcasting by cable are expected to be abolished concurrently with increased telecommunication liberalisation in 1996.
Finland	Cable Transmission Act 307, 1987	
France	Law No.86-1067, 1986	
Germany	Numerous regional 'media laws'.	Refer Table 4.
Greece	Broadcasting Act, 1995	
Iceland	N/A	
Ireland	N/A	
Italy	No specific legislation	Regulation expected.
Japan	Cable Television Broadcast Law, 1972	
Luxembourg	N/A	
Mexico	N/A	
Netherlands	WTV (Dutch Telecoms Act)	Currently under revision with enactment expected in 1996.
New Zealand	Broadcasting Act, 1989. Copyright Act, 1994	A broadcasting amendment bill is before Parliament to amend the complaints and procedures broadcasters are required to uphold and strengthen the BSA's powers to deal with unacceptable content.
Norway	Broadcasting Act, 1992	This act regulates content. Carriage is regulated under telecommunication legislation.
Portugal	Law 58/90 - System for Television activities, 1990 Decree-Law No 292/91 Cable TV Dist. Network, 1991	
Spain	Spanish Constitution (1978) and Telecommunications Act	A Cable-TV act is under consideration(2)
Sweden	Cable Television Act, 1994	
Switzerland	Broadcasting Act (RTVG), 1991	An open market for communication services is expected in 1998.
Turkey	Law No. 3984	
UK	Cable and Broadcasting Act, 1984	
US	Communications Act, 1934. Cable Communications Policy Act, 1984 which was revised by the Cable Television Consumer Protection and Competition Act, 1992.	A number of bills are under consideration by the US Senate and House of Representatives which would substantially modify communication regulation in the US.

1. The date (27 September 1995) is that of a decision of the Austrian Constitutional Court making cable-TV a matter to be regulated by the "Rundfunkgesetz". Also refer to Rundfunkverordnung BGB1. Nr. 333/65 i.d.E. 345/77 u. 507/93
2. Communication Outlook 1995 Questionnaire.

Source: OECD

Table 8. **Communication Regulatory Authorities in the OECD area**

	Telecommunication	Cable Television (Broadcasting)
Australia	Australian Telecommunications Authority, (AUSTEL), Australian Competition and Consumer Commission (ACCC).	Australian Broadcasting Authority, (ABA) Australian Competition and Consumer Commission (ACCC).
Austria	Federal Ministry for Public Economy and Transport	Federal Chancellery
Belgium	Belgian Institute for Postal Services and Telecommunications (Federal responsibility)	Regional responsibility of "Communautés"
Canada	Canadian Radio-Television and Telecommunications Commission (CRTC)	
Denmark	Ministry of Research	Ministry of Culture
Finland	Ministry of Transport and Communications	
France	Ministère des Technologies de l'information et de la Poste: Direction Générale des Postes et Télécommunicatons (DRG)	Conseil superieur de l'audiovisuel (CSA)
Germany	Ministry of Posts and Telecommunications	Responsibility of regions (16 Länder)
Greece	Ministry of Transport and Communications	Ministry of Press and Information
Iceland	Post and Telecommunications Administration (Part of Ministry of Communications)	Ministry of Communications
Ireland	Department of Communications, Ministry of Transport Energy and Communications	Independent Radio and Television Commission
Italy	Ministry of Post and Telecommunication	
Japan	Ministry of Posts and Telecommunications	
Luxembourg	Ministère des Communications	Government Commissioner to the CLT, Municipalities responsible for selecting cable operators.
Mexico	Ministry of Transport and Communications	
Netherlands	Ministry of Transport & Public Works: Department of Post and Telecommunications	Commission for the Media ("Commissariat voor de Media")
NZ	No industry specific regulator. Ministry of Commerce oversees Act.	Broadcasting Standards Authority (BSA)
Norway	Ministry of Transport and Communication, Norwegian Telecommunication Authority	Ministry of Cultural Affairs, The Mass-media Authority
Portugal	Institute for Communications in Portugal (ICP)	
Spain	Ministry of Transport and Public Works: General Directorate of Communications	General Secretariat of Communications
Sweden	National Post and Telecom Agency	Radio and Television Agency
Switzerland	Federal Council with some tasks delegated to the Federal Office for Communications (OFCOM).	
Turkey	Turk Telekominikasyon, A.S.	
UK	Office of Telecommunications (OFTEL)	OFTEL (Carriage), Independent Television Commission (ITC), Department of Heritage
US	Federal Communications Commission (FCC) regulates interstate telecommunication and various state agencies regulate intra state telecommunications. The FCC has exclusive regulatory authority over radio and television broadcasting. Cable television is regulated by the FCC and various state and local authorities.	

1. Shaded squares indicate those countries where the same agencies are responsible for regulation of carriage and content of communication services. In practice the division of responsibilities is not always defined as shown above. In the Netherlands for example, some agency crossover occurs and other agencies are involved in some aspects of broadcasting;

Source: OECD

CABLE TELEVISION PRICING, REGULATION AND CURRENT MARKET STRUCTURES

Specific regulation of cable television pricing is not widespread in OECD countries. The only countries to have industry specific regulation of cable television pricing are Belgium, Canada, Germany, Turkey and the US (**Table 9**). The range of this regulation varies significantly from keeping increases in line with inflation to more complex forms of regulation. In the main OECD governments appear to have left cable television operators to set prices at their discretion. Since infrastructure competition is exceptional in OECD countries for the provision of cable television services (permissible only in Australia, Finland, New Zealand, Sweden, Japan and the US) this suggests that many governments believe there is enough competition from alternative sources of broadcast media distribution (satellite and terrestrial broadcasting).

In the US, only rates for the 'basic tier' (the lowest tier of service that include local broadcast signals) are subject to affirmative, ongoing government regulation. Rates for 'cable programming service" (also known as 'expanded basic services', satellite programming services (like CNN, ESPN, WTBS, C-SPAN)) that are combined and marketed to subscribers at a separate monthly rate) may be regulated by the FCC only upon complaints about excessive rate increases. The 1996 Telecommunications Act modified previous law by permitting only cable regulators to file FCC complaints about excessive expanded basic rates. Government regulation is permitted only when a cable system does not face "effective competition". The 1996 Act added a new definition of effective competition providing that when a telephone company provides video programming in a community by any means other than DBS, the incumbent cable system is deemed to face effective competition, regardless of whether or not subscribers actually view the telephone company's offering as an effective substitute.

On average a cable television subscriber in the OECD area pays US$148 for a connection and US$17 for a monthly subscription to receive a 'basic service' (**Table 10**). If the connection is spread over five years and the monthly rental multiplied by 12 the average annual payment for a basic cable television services is US$238 per annum. It is difficult, of course, to undertake comparisons of cable television prices for a number of reasons including:

- -- large variations (for connection and sometimes subscription charges) exist based on factors such as whether a dwelling is an individual residence or in a building with a number of apartments.

- -- the extent to which services are included in basic or premium packages.

- -- the number of channels does not indicate the quality of the programming which is in any case a subjective criteria.

Government regulation may also impact on pricing. Some examples could be:

-- whether government regulation permits paid advertising.

-- whether government regulation requires a certain amount of content to be produced by operators.

-- whether there are 'must carry' rules that stipulate carriage requirements or coverage of geographical areas.

The pricing of cable television varies a great deal throughout the OECD area. Clearly some very inexpensive pricing appears to be for the reticulation of existing free-to-air services from national or international sources. To compensate for this, at least to a degree, **Table 10** excludes free-to-air channels from national sources in the same broadcasting area. While reference is made to the prices of premium services to give some indication of how operators are pricing services the main focus of **Table 10** is the cost of basic service. The aim is not to compare content pricing which, in relation to cable television and the pricing of premium services, can be very subjective. Rather **Table 10** provides an indication of how carriage, as part of the tariff for basic service, is priced in the OECD area.

The reason for focusing on carriage is to provide a starting point for policy makers considering liberalising cable communication infrastructure for telecommunication services. In future the pricing of CCO carriage, when it enables subscribers to obtain additional communication services (*e.g.* Internet access), can be expected to use the price of basic service as a starting point. This may not, of course, be the case because CCOs could price service independently. This is true in the UK where cable television subscribers can elect to take cable television and telecommunication services independently. On the other hand the UK example may not indicate future directions in pricing because, in most cases, separate infrastructure is used to provide telecommunication (copper wire) and cable television (co-axial cable) delivery into residential premises. As these services continue to converge, and the use of cable modems increase, the baseline price for basic cable service could include access to a range of services.

This development opens a range of new possibilities for policy makers to take advantage of existing and upgraded cable communication infrastructure to provide alternative pricing to that of PTOs. For example the price of access to the Internet via the PSTN in Switzerland is the most expensive in the OECD area [OCDE/GD(96)73]. On the other hand the price of receiving basic cable television services in Switzerland is the least expensive in the OECD area (Table 10). Indeed the per annum cost of receiving cable television in Switzerland (US$73) is less than 6 per cent of the annual price (US$1 246) of 240 hours of local calls (*i.e.* five hours on-line per week). Similarly the price of basic cable television service in Belgium (US$117) is less than 18 per cent of the cost of 240 hours of local calls per year (US$661). In Austria a basic cable television subscription costs US$204 compared to US$845 for 240 hours of local calls per year.

Obviously, the existing cable infrastructure in countries such as Austria, Belgium and Switzerland would need to be upgraded to provide access to services such as the Internet, which would mean that CCOs would need to recover this investment through new pricing structures. Nevertheless the potential for cable communication infrastructure to provide competitive platforms for new services would appear to be very propitious. Jones Intercable, the US cable operator is launching an Internet Channel on its Alexandria, Virginia system in early 1996, linking to the Internet at 10 Mbit/s, using cable modems, with unlimited usage at about US$1 a day.[19] Similarly Rogers Cablesystems is conducting a trial allowing customers to access on-line content, including the Internet, for US$32 per month.[20]

To put the price of access to on-line services over cable into perspective a user on the Jones Intercable system will be able to access the Internet for unlimited time at speeds up to 10 Mbit/s for half the cost to a PSTN subscriber in Belgium using a 14.4 kbit/s modem for 20 hours on-line time per month. Similarly the Jones cable subscriber would pay less than a third for 10 Mbit/s access to the Internet for unlimited time to what a PSTN subscriber would pay in Switzerland for 14.4 kbit/s access for 20 hours on-line per month.

The potential difference between cable pricing to access information infrastructure and ISDN access at 64 kbit/s is even wider than 'dial-up' access over the PSTN. If the per annum price for the Jones Intercable option was US$365 per annum it would be less expensive than the fixed charge for Basic Rate ISDN in most OECD countries. In January 1995 the OECD average for Basic Rate ISDN fixed charges was US$505.[21] The average fixed price of Primary Rate ISDN in the OECD area was US$6 071 in January 1995. These ISDN prices do not include usage charges which are in general set at the price of standard PSTN tariffs. Accordingly timed ISDN usage charged at local and long distance rates would in most cases need to be added to the price for an ISDN user compared to unlimited access at higher speeds for a cable communication user.

At the same time, an upgraded PSTN may in future be able to provide competition to CCOs who presently in many cases have unregulated monopolies. However if government regulation restricts CCOs and PTOs from entering each others markets, or allows incumbents in either field to merge existing operations and infrastructure in the same geographical area, the enormous potential of competition to bring down prices could be placed in jeopardy. There is little incentive for a PTO with a monopoly over telecommunication infrastructure provision to bring down the price of local call prices, leased lines prices, or ISDN prices for access to information infrastructure. Similarly unregulated monopoly CCOs, while having to bear in mind substitute broadcasting mediums, will not bring down the cost of accessing existing cable television services unless they face competition. The available evidence from the US, based on comparisons between those parts of the country where there is competitive supply of cable television infrastructure with those with a monopoly, suggests that where subscribers have a choice of CCOs they enjoy lower prices and a greater number of channels.[22]

Table 9. **Regulation of Cable Television Pricing**

	Are cable television prices for subscription service specifically regulated by government	Additional comments or major reasons for regulation.
Australia	No	Cable companies must operate in a manner which is consistent with the Trade Practices Act (1974) which specifically prohibits misuse of market power and anti-competitive behaviour.
Austria	No	
Belgium	Yes	Regulated by the Ministry of Economic Affairs.
Canada	Yes	Basic service regulated but not discretionary services
Denmark	No	
Finland	No	
France	No	
Germany	Yes	
Greece	Service yet to commence	
Iceland	N/A	
Ireland	N/A	
Italy	Service yet to commence	
Japan	No	
Luxembourg	N/A	
Mexico	N/A	
Netherlands	No	
New Zealand	No	
Norway	No	
Portugal	No	
Spain	N/A	
Sweden	No	
Switzerland	No	
Turkey	Yes	Regulated with reference to inflation.
UK	No	
US	Yes	Effective competition yet to develop for basic service.

Source: OECD

Table 10. **Cable Television Pricing in OECD countries**

	Basic Service				Premium Service	
	Connection	Monthly	Total per annum(1)	Number of channels(2)	Monthly	Number of channels(2)
Australia (3)	14.67	29.38	355.49	15	5.11	1
Australia(4)	22.03	18.38	224.99	6	29.01	11
Austria	285.00	12.29/ 13.64	204.48/ 220.68	33	0	0
Belgium	54.00	8.85	117.00	32	0	0
Canada	39.00	12.14	153.48	33	26.16	23
Denmark (5)	64.00/ 570.00	6.27/ 10.83	88.04/ 243.96	6	15.85/ 23.38	15
Finland (6)	116.00/ 743.00	23.10/ 82.51	300.40/ 1138.72	6	9.90/ 23.27	14/ 2
France (7)	107.00	22.82	295.24	14	27.87/ 34.92/ 37.98	30/ 31/ 31
Germany(8)	31.23	7.44	95.54		NA	NA
Greece	No Service					
Iceland	NA	NA	NA	NA	NA	NA
Ireland	NA	NA	NA	NA	NA	NA
Italy	No Service					
Japan	285.00	21.99	320.88	32	14.23/ 10.24	1/ 1
Luxembourg	NA	NA	NA	NA	NA	NA
Mexico(9)	63.00/ 48.00	21.34	268.68	19	5.74	5
Netherlands	32.00	9.01	114.52	24	33.46	2
NZ	Service commencing.					
Norway	NA	NA	NA	NA	NA	NA
Portugal	Service commencing.					
Spain	NA	NA	NA	NA	NA	NA
Sweden(10)	0.00	11.09	133.08	11	6.00/ 7.93/ 20.14/ 17.19	6/ 9/ 1/ 1
Switzerland (11)	218.00	2.35	71.80	11	6.10	30
Turkey (12)	197.00/ 79.00	7.87	149.64	35	0	0
UK (13)	0.00	18.71	224.52	43	32.84	3
US (14)	27.00/ 13.52	10.67	133.44/ 130.74	19	24.75	51
OECD	148.02	17.39	238.23	--	--	--

1. Connection divided by five and monthly subscription times by 12
2. Excluding free to air channels.
3. Prices for Optus Vision.
4. Prices for FoxTel.
5. Prices shown are for an individual private household subscription. The second example is for an individual subscriber in an apartment block.
6. The prices show the range for connecting households de[ending on the amount of individual households to be connected at the same time and whether it is an apartment building.
7. Prices for France are for Tele-Cable in Paris.
8. German prices are for 'basic service' not 'average service prices', Telekom is only responsible for the physical infrastructure.
9. The second connection fee is for an initial start up charge for the premium services. Prices are an average for Mexico.
10. Prices for STJARNTV. There is no connection fee for basic service but a US$25 start-up fee for the two movie channels.
11. The Swiss prices show the situation for an individual subscriber in a building with eight apartments. Prices are an average for Switzerland.
12. The initial fee is for connection and the second fee is for the building connection.
13. Prices are for Cable Corporation.
14. The second connection fee applies if a cable has previously been installed in a dwelling. Prices are an average for the US.
15. Shaded squares are not included in the OECD average.

Source: OECD

CABLE COMMUNICATION INDUSTRY DIMENSIONS

Reported data on the dimensions of the cable communication industry ranges from excellent to non existent in the OECD area. This is regrettable since cable communication infrastructure is expected to form an integral part of future information infrastructure developments. Fortunately some data are available in Member countries responsible for 79 per cent of all cable television subscribers in the OECD area **(Table 11)**. This is primarily because data are available from regulators and national statistical agencies in Canada, Japan, the Netherlands and the US. These four countries account for 69 per cent of all cable television subscribers. In eight other OECD some data are available to policy makers but it tends not to cover aspects of the cable communication industry that would be readily available for telecommunication markets. Data are also not generally available in a lengthy time series outside of Canada and the US.

The size of the market for cable television in the OECD area, extrapolating from available data, can be estimated to be well in excess of US$30 billion in 1995. In 1994, the cable communication industry probably invested around US$10 billion in cable infrastructure and employed more than 200 000 people. By the end of 1995 over US$ 7.8 billion had been invested to build cable networks passing over 6 million homes. This is part of total investment projected at over US$ 15.7 billion in 10 years from 1991, by when cable networks will cover perhaps 80-85 per cent of the UK's population. In all these areas the market for cable television services is less than 10 per cent of the public telecommunication market in the OECD area. All indications, for those countries where data are available in time series, are that:

- -- revenue is increasing.

- -- capital expenditure is increasing in the cable communication industry. In Canada capital expenditure has increased from US$291 to US$401 million between 1992 and 1994. In the UK investment in 1994 was 33 per cent greater than the combined investment in 1992 and 1993. In the US capital expenditure is up from US$2.2 in 1992 to US$3.8 billion in 1994.

- -- employment is increasing with largest gains over recent years being recorded in countries where service has just commenced (Australia), or cable providers have been allowed to enter new markets such as telephony (the UK and US). Austria has also seen significant growth with employment growing from 1240 in 1992 to 1500 in 1994.

Table 11. **Selected Data for Cable Communication (Television) in the OECD area, 1994**

	Revenue (US$PPP)	Expense (US$PPP)	Capital Expenditure (US$PPP)	Total Employment
Australia	0	0	514705882 (1)	4760(2)
Austria	142857143	NA	50000000	1500
Belgium	268096515	NA	214477212	4000
Canada	1863572000	1599863200	403463200	9385
Finland	53795380	NA	NA	341
France	306278714	NA	NA	2240
Japan	383977901	499447514	369060773	3968
Netherlands	529761905	492857143	166666667	1300
Portugal	5347508	9481142	65649183	147
Sweden	8138352	NA	NA	600(3)
Turkey	25872992	NA	147037795	450
UK	NA	NA	1880877743	20000(4)
US	22800000000	12900000000	3800000000	141600 (5)
Total	26119601894	NA	7611938456	190291

1. This figure is for the total actual expenditure for Telstra Multi-media (including Telstra and Foxtel) as at 30 September 1995 and an estimate for Optus Vision based on projected investment. By mid 1999 a total US$2.86 billion will have been invested by Telstra Multi-media on network construction and service development. Optus Vision expects to invest around US$2.2 billion by mid-1998.
2. This figure is the total number of people employed in the construction, installation and maintenance and subscriber management functions associated with cable television operations for Telstra Mutli-media (including Telstra and Foxtel) as at 30 September 1995. Data was unavailable on Optus Vision employment but the company expects to employ 3000 people by 1998 in network construction and service development.
3. Estimated employment based on national industry sources.
4. UK employment is based on a 1994 research by the Cable Communications Association which estimated that 24 000 jobs would be created between 1994 and 1997. Some 14 000 of these jobs would be with the cable companies (mainly in sales, marketing and customer services) and a further 10 000 jobs created indirectly in programming and engineering.
5. Employment for cable television sector as recorded by the BLS at August 1994.

Source: OECD

NOTES

[1] "State Competition Moving Despite Federal Debates", Telecommunication Reports, 6 November 1995.

[2] Oftel, "The UK Telecommunications Industry: Market Information", London, February 1995. Market shares for 1993/94 fiscal year.

[3] As measured by Dial Equipment Minutes reported to the FCC.

[4] "New Jersey BPU opts to open local toll calling to competition", *AT&T News Release*, 8 December 1995. The states with equal access dialling are Arizona, Connecticut, Florida, Georgia, Hawaii, Illinois, Kentucky, Michigan, Minnesota, New York, West Virginia, Wisconsin, and Wyoming.

[5] Robert Allan, "Backing Off the Brakes: Opening Telecommunications to Real Competition", Address by the CEO of AT&T to Networked Economy Conference, Washington DC, 12 September 1995. Refer http://www.att.com/news/speeches/95/950912.raa.htm

[6] *Ibid*

[7] OECD, "Telecommunication Infrastructure: The Benefits of Competition", ICCP No. 35, 1995.

[8] Refer, for example, to "The Enduring Local Bottleneck: Monopoly Power and the Local Exchange Carriers" by Economics and Technology Inc. and Hatfield Associates, Boston, 1994.

[9] Delphi Net News reported on the 2 December 1995 that "Cable Television Labs, joined by officials from Intel, Hewlett-Packard, Zenith, Nortel, General Instruments, and Motorola, announced at the Western Cable Show an industry plan to create cable modem protocols to bring broadband data to home PCs. The final specs should be ready by April. Modems will hit stores late 1996, priced in the $200 to $300 range. Three cable operators - TCI, Time Warner and Comcast - said they have placed orders for 350,000 cable modems worth $175 million from Motorola. Meanwhile, General Instrument Corp says it will test a device called Surfboard that allows PCs to connect to its set-top boxes to access cable's data transmission speed."

[10] "Swedish Web", Delphi News, 8 December 1995.

[11] Niall Hickey, "The Case for Cable", Cable Communications Association, London, November 1994.

[12] OECD, "Telecommunication Infrastructure: The Benefits of Competition", Op.cit.

[13] Telstra, "Telstra passes 600 000 home milestone", *Press Release*, 5 October 1995.

[14] "New Alliances to Lay Groundwork for Interactive Broadband Services", Data Channels via NewsPage, 29 June, 1995.

[15] John Ridding, "Cable TV battle goes underground", *Financial Times*, 1995.

[16] a) the head-end; b) amplifiers; and c) subscriber drops.

[17] Rogers Cable systems is offering Internet access in a trial in Newmarket.

[18] Oftel, "Beyond the Telephone, The Television and the PC", Office of Telecommunications, London 1995.

[19] "Cable Links", Delphi Net News, 5 December 1995. Refer Jones Intercable homepage http://www.jic.com

[20] "Rogers brings Information Highway to Newmarket", News Release, 28 November 1995. Refer http://www.rogers.com/RCI/wave.htp

[21] For a discussion on ISDN pricing refer to "Pricing and Information Infrastructures", DSTI/ICCP/TISP(95)5

[22] Thomas Hazlett, "Regulating Cable Television Rates: An Economic Analysis", Institute of Government Affairs Working Paper Series, No. 3, University of California, July 1994. p 207