

**Implications of developments in
telecommunications for Indigenous
people in remote and rural Australia**

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Abbreviations and acronyms

ABA	Australian Broadcasting Authority
ABS	Australian Bureau of Statistics
ACA	Australian Communications Authority
ACCC	Australian Competition and Consumer Commission
AGPS	Australian Government Publishing Service
ANAO	Australian National Audit Office
ANU	The Australian National University
ATSIC	Aboriginal and Torres Strait Islander Commission
AUSTEL	Australian Telecommunications Authority
BRACS	Broadcasting for Remote Aboriginal Communities Scheme
CAAMA	Central Australian Aboriginal Media Association
CAEPR	Centre for Aboriginal Economic Policy Research
CDEP	Community Development Employment Projects
CHINS	Community Housing and Infrastructure Needs Survey
CSG	Customer Service Guarantee
DCITA	Department of Communications, IT and the Arts
EFTPOS	Electronic Funds Transfer at Point of Sale
GDP	Gross Domestic Product
HES	Household Expenditure Survey
IT	information technology
NATSEM	National Centre for Social and Economic Modelling
NIMAA	National Indigenous Media Association of Australia
NTN	Networking the Nation
ODN	Outback Digital Network
OEA	Office of Evaluation and Audit
OECD	Organisation for Economic Cooperation and Development
OTC	Overseas Telecommunications Commission
PC	Productivity Commission
PMG	Postmasters General's Department
RTIF	Regional Telecommunications Infrastructure Fund
TPA	Trade Practices Act
USO	Universal Service Obligation

Glossary

- Any-to-any connectivity: the requirement that customers using different service providers are able to communicate with each other.
- Content services: the services that are actually delivered over the network, for example television programs.
- Data transfer services: the movement of data, for example web pages and documents over the network.
- Declaration of services: under the *Trade Practices Act 1974* (TPA), the ACCC is able to declare essential infrastructure for use by other firms in the 'long-term interests of end-users'. For example, Telstra owns the local loop but must grant access to this infrastructure to other firms wishing to compete in the market for local telephone calls.
- Fixed voice services: services that are delivered by way of copper wires, that is the phone is physically connected to the network in contrast to a mobile voice service where the handset is not physically connected to the network but uses some form of wireless technology.
- Local loop: that part of the network which links an individual phone to the local exchange.

Summary

This paper considers the implications of changes in the technological and regulatory environment in the telecommunications industry in Australia for Indigenous Australians living in remote and rural areas. This group is particularly vulnerable to falling on the wrong side of the 'digital divide' because of their geographical location and their low socioeconomic status.

The paper surveys some of the important features of the industry that have implications for the provision of telecommunications services in rural and remote communities. These include economies of scale and scope, network externalities and the social and economic significance of the industry. The next section highlights some of the components of the regulatory environment that have particular implications for rural and remote Indigenous communities. These include price controls, the access regime, the Universal Service Obligation and the Customer Service Guarantee. Some of the government programs aimed at raising the quality of telecommunications services in rural and remote Australia are also discussed.

The paper presents evidence on the current availability and quality of services and the demand for these services in rural and remote Australia. The evidence suggests that the telecommunications services available to these communities are inferior to those in urban Australia but given the nature of the industry, particularly the economies of scale and scope, the substantial government intervention has helped to reduce the gap. The available evidence also shows that Australians in remote and rural areas are less likely to utilise the new services such as mobile phones and the internet than Australians in urban centres.

Technological developments offer the opportunity to reduce the disadvantages of location for rural and remote communities. For example, improved communications may be helpful in the provision of health and education services and for preserving Indigenous culture. There is also scope for expanding the export from these communities of arts and crafts and reducing the market power of suppliers of goods and services to these communities. However, it is important to recognise that technology alone will not solve all the problems facing rural and remote Indigenous communities in Australia. Recognition of the cultural and social environments of rural and remote Indigenous communities will be necessary to make these technological developments work for the people living there.

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Introduction

The last 20 years have seen enormous changes in the way telecommunications services are delivered in Australia. No longer are these services provided by a government-owned monopoly. In 1992 a regulated duopoly was introduced and since 1997 there has been open competition in the market. There have also been important changes in the types of services delivered. In addition to the standard fixed voice services, there is now a range of new services including mobile telephones, the internet and data transfer services. Technological change has brought the telecommunications and broadcasting sector together and the provision of pay TV services and telecommunications services are now closely linked.

The aim of this paper is to explore the implications of technological and regulatory developments for the provision of telecommunications services in remote and rural Australia. While technical developments offer the potential to reduce the disadvantages of geographical isolation, there is also the danger that those living outside the major urban centres will be excluded from the potential benefits of these developments. There has been much public discussion of the dangers of a 'digital divide' between those with and without access to the new information technologies (see for example Besley 2000; Lloyd & Hellwig 2000a; Productivity Commission (PC) 2001a). As a group with relatively low levels of income and education and a larger share of the population living outside metropolitan areas, Indigenous Australians are at risk of falling on the wrong side of the digital divide. An alternative view is that the increased accessibility to other cultures and ideas created by these technical changes may be detrimental to Indigenous culture (McConaghy 2000; Tafler 2000).

The paper begins with a discussion of some of the important features of the industry which have implications for the provision of services in remote and rural Australia, and the prices at which these might be delivered. Rural and remote Australia will be defined very broadly to include all non-metropolitan areas in Australia. Developments in the provision of telecommunications services in these areas and the extent of public support will be particularly important for Indigenous Australians. As the non-Indigenous population of rural and remote Australia declines, the Indigenous population continues to increase and accounts for a rising share of the total population in these areas (Taylor 2000).

The third section highlights some of the components of the regulatory environment in telecommunications that have implications for Indigenous communities. It also outlines some of the government programs that have a specific focus on improving access to telecommunications services in rural and remote Australia. In recognition of the convergence between the telecommunications and broadcasting industries, there is a brief discussion of government initiatives to promote access to these services in rural and remote Australia. The fourth section of the paper presents data on the use of telecommunications services in these areas. It has not been possible to separate out the figures for Indigenous communities, but the data highlight the differences

between urban and other areas. This section considers both the demand and supply sides of the market within the communities, and the opportunities which changes in this industry have created for reducing the locational disadvantage that many of these communities face.

In this paper the telecommunications industry will be taken to include the carriers who are owners of the networks including line links, radiocommunication links and satellite-based facilities; the carriage service providers who transport voice and data across the networks owned by the carriers; and content service providers who provide the material carried on the networks such as broadcasting or online information and entertainment services (PC 2001a: 3). The services provided by the industry include fixed voice, mobile, internet, data and content services. Appendix A presents a description of the basic telecommunications technology.

Features of the telecommunications industry

There are a number of particular features of this industry which have made it a focus for government regulation from its beginnings in Australia (see Appendix A for a brief history of the industry in Australia). These also have important implications for the way in which the industry has developed. They include the importance of economies of scale and scope, the role of network externalities and the social significance of the industry. More recently, technical change has brought the telecommunications and broadcasting industries closer together. Now one platform can be used to provide both kinds of services.

Historically, the industry has been characterised as a natural monopoly because of the considerable economies of scale and scope available.¹ Firms face high set up costs and relatively low costs of supplying a marginal consumer (economies of scale). For example, it has been estimated that the average cost of providing a telephone service in a suburban area in the United Kingdom is about £400 for 10 per cent penetration of the local market and around £100 for 90 per cent penetration of the local market (Cave & Williamson cited in PC 2001a: 2.9). Economies of scale are particularly evident in urban areas where economies of density are also important. Cribbett (2000) estimated that the average cost of providing a line in low-density areas of Australia was between six and ten times the average cost per line in the rest of Australia. He found that the five per cent of the total number of lines in Australia which were located in low density areas accounted for 25 per cent of the total cost of providing local telephone services. Although technical change may reduce the costs of supplying services to sparsely settled areas of Australia in the future, currently the costs remain relatively high.

Economies of scope, where one firm can produce a range of goods more cheaply than two or more separate firms, are also important. The most obvious example of this is the economies of scope involved in providing local and long distance telephone services, but there are also important new examples in the converging environment of telecommunications and broadcasting. AUSTAR, the regional pay

TV provider, noted in its submission to the recent Productivity Commission inquiry into Telecommunications Competition Regulation:

AUSTAR's capacity to invest in infrastructure and in research and development for services like broadband internet, interactive services and, in the future, telephony services, is largely dependant on its ability to attract a critical mass of subscribers to its pay TV service. The ability to 'bundle' pay TV with other services, and the ability to offer more than one service over the same medium, is crucial to AUSTAR's strategy and on-going business performance (AUSTAR 2001: 4).

In the converging environment of telecommunications and broadcasting, the actual delivery platform is of little interest to a consumer. Technical change has increased the range of potential suppliers of telecommunications and broadcasting services and, as the above quote from AUSTAR shows, the interrelationship between markets is now very complex.

Another important feature of the industry is the network externalities which arise from the connection of additional consumers. For example, there is not much to be gained from owning a fax machine if no one else does. In this instance, every additional consumer who connects a fax machine to the network not only provides a benefit to themselves but to all existing consumers who now have an additional potential connection. In order to reap the full benefits of network externalities, there needs to be any-to-any connectivity; for example, it must be possible to connect from the Telstra network to the CWOptus network. In addition, unlike many networks, for example water and electricity supply, the connections on a telecommunications network must be two-way. The existence of network externalities and the need for any-to-any connectivity are therefore important reasons for some regulation of this industry.

The telecommunications industry has also been the subject of government regulations because of the social and economic importance of the services it provides. These services are a significant input to business and for private individuals. Following the model of the Post Office, access to a reliable and 'reasonably-priced' telecommunications service is now considered as a right for all Australians. This is a relatively recent phenomenon dating from the 1970s; prior to this access to a telephone had been considered a luxury. These rights have been protected by informal arrangements and more recently a formal universal service obligation (USO). The USO is currently defined in the *Telecommunications (Consumer Protection and Service Standards) Act 1999* as:

the obligation to ensure that standard telephone services, payphones and prescribed carriage services are 'reasonably accessible to all people in Australia on an equitable basis, wherever they reside or carry on business' (PC 2001a: 17.3).

The standard telephone service includes among other things, a voice service, access to untimed local calls and the Customer Service Guarantee (CSG) (to be discussed in more detail below).² A digital data service obligation is now included with the USO.

In summary, the significance of economies of scale and scope and network externalities has important implications for both the quantity and quality of

telecommunications services available to rural and remote Indigenous communities.³ These features have encouraged government involvement in the industry, initially as the owner of the monopoly supplier of telecommunications services and more recently in the establishment and regulation of a more competitive industry. In the new competitive environment in the Australian telecommunications industry, rural and remote locations are likely to be less attractive to potential entrants than more densely settled urban centres.⁴ The USO attempts to redress the shortfalls in access to the telecommunications network that would arise in an unregulated environment given the differences in incentives for commercial providers to cover the whole of Australia. However, the evidence presented in the Besley report (2000), to be discussed below, suggests that the services received in remote and rural Australia fall short of those available in the metropolitan centres.

Regulation of the telecommunications industry and policy initiatives

Microeconomic reform in this industry where economies of scale and scope are important, might be expected to reduce the quality and availability of services for those living in sparsely populated areas. These areas have benefited from extensive cross-subsidisation under the government-owned monopoly (Albon 1991) and a shift to the user pays principle could be expected to increase prices and reduce services (as, for example in the banking industry—see McDonnell & Westbury 2001). A full review of the implication of these changes is beyond the scope of this paper. Nor is it the purpose of this paper to describe in full all the regulations that cover the telecommunications and broadcasting industries in Australia.⁵ This section has the more limited focus of outlining four aspects of the regulatory environment in telecommunications which have important implications for rural and remote Indigenous communities: price controls, access to essential infrastructure, the USO, and the CSG.

The first two types of regulations are designed to prevent the exploitation of market power by the former government-owned monopoly, Telstra, and to protect consumer welfare. The USO and the CSG are aimed at creating equal access to telecommunications services and at raising the quality of service where the lack of competition in the market reduces the incentives for the incumbent to provide an adequate service. The section will conclude with a description of some of the additional policies designed to promote the availability of telecommunications and broadcasting services in rural and remote Australia.

Price controls

Formal price controls in the telecommunications industry were first introduced in 1989 in anticipation of the move from the government-owned monopoly provision of telecommunications services to open competition in the market. It was argued that competition would take time to develop and the dominant role of Telstra might result in excessively high prices above the cost of providing the service. A

complex system of price caps for Telstra has been established. (See the ACCC's (2001) report on price control arrangements.)

The major price caps of particular relevance to Indigenous consumers in rural and remote Australia are the 'local call parity provisions' and the cap on prices to 'low-spend' consumers (ACCC).⁶ The local call parity provisions require that the weighted average price of local calls in regional areas is not greater than the comparable price of local calls in metropolitan areas for both business and residential users. Low spending consumers are protected by the requirement that Telstra must have permission from the ACCC to change prices in a way which would increase the real average phone bill of this group, including both the fixed and variable components.

In its report on price controls, the ACCC (2001) is quite critical of both these controls on efficiency grounds—that is, the prices charged to consumers because of these controls do not reflect the cost of supply. The report argues that local call parity provisions result in Telstra supplying services to some rural users below cost. This is likely to discourage entry to these markets if potential competitors are unable to compete with the unrealistically low prices set by Telstra as a result of the price controls. This reduction in competition may be to the long-term disadvantage of rural consumers. The short run allocative efficiency costs of local call parity presented by the ACCC are estimated to be relatively small at \$9–19 million (ACCC 2001: 53) and need to be balanced against equity considerations. The ACCC acknowledges the important equity arguments for local call parity. In the current political climate, it seems unlikely that local call parity will be removed whatever the efficiency costs involved.

The controls protecting low spending consumers are designed to protect low income consumers. This is a very indirect method of assisting low income consumers as the group of low spending consumers includes some affluent households, for example those owning holiday houses. In the Indigenous context, many households do not have a phone precisely because low incomes and low usage are not correlated and the households may accumulate large bills they are unable to pay. A preferable method of increasing the access of low income consumers to telecommunications services would be greater targeting through the welfare system. There is currently an allowance paid only to all Pensioner Concession Card holders who are telephone subscribers (ACCC 2001: 112). In its final report on price controls, the ACCC recommended extending these benefits to Health Care Card holders. This would cover welfare recipients on other benefits. It would have the advantage of making an explicit subsidy to low income households rather than distorting telecommunication prices to other consumers in order to provide an implicit subsidy.

In summary, it would appear that rural and remote Indigenous communities benefit at least in the short run from local call parity although the long run implications are less clear cut. However, the net benefits from the 'low spend' price cap are less obvious.

The access regime

The second group of regulations to be discussed here are also administered by the ACCC and relate to the access regime for telecommunications presented in Part XIC of the *Trade Practices Act 1974* (TPA). The purpose of the access regime is to promote competition in situations where the ownership of a natural monopoly bottleneck may be to the detriment of consumer welfare. For example, Telstra's ownership of the local loop may prevent competitors from supplying alternative local and long distance telephone services where the costs of establishing their own local network is prohibitive. The declaration of Telstra's local loop as an essential service by the ACCC under the TPA enables other telecommunications firms to negotiate access to the local loop and provide competing services.

The ACCC is able to declare that infrastructure is essential if this promotes 'the long-term interests of end-users' (TPA s. 152AB(1)). In assessing this long-term interest, the ACCC must have regard to whether declaration would promote competition, achieve any-to-any connectivity and encourage the efficient use of, and investment in, infrastructure (TPA s. 152AB(3)). Once declared, the owner of the infrastructure is required to negotiate an access price in good faith and if agreement cannot be achieved by negotiation, accept a decision arbitrated by the ACCC. The evidence presented by the PC (2001a) suggests that the prices determined by arbitration have been below those agreed in commercial negotiations. This reflects the strong bargaining position of Telstra. New entrants may be willing to pay a higher price in direct negotiations with Telstra rather than face the long delays involved in the ACCC determination process.

The existence of the access regime is likely to encourage more competition than would otherwise exist. This could be to the long-term advantage of consumers.⁷ However, where it discourages further investment in infrastructure it may be to the detriment of consumers. It is therefore very important that access prices are set at a level that provides incentives for the owners of the infrastructure to maintain their investments. At this stage in the development of the telecommunications market, there have been few challenges to Telstra's dominant position in rural and remote Australia. The development of a successful access regime is therefore an important mechanism for promoting competition in these areas. It also acts as a check on Telstra's ability to use its market power in rural and remote Australia to set prices above the cost of supply. If Telstra were doing this, it would encourage new competitors into the market. As noted in the earlier quote from AUSTAR, the convergence of broadcasting and telecommunications technology provides another mechanism by which competition may be introduced in these non-metropolitan markets. New technologies may also reduce the importance of the local loop and economies of scale in the industry.

The Universal Service Obligation (USO)

The reality is, however, that Telstra remains the sole supplier in many rural and remote markets because it is currently not profitable for alternative suppliers to establish in those areas (see Table 3 below). Telstra operates in these markets

because of the USO. The purpose of the USO, as outlined above, is to ensure universal access to a standard telephone service.

As the heir of the former government monopoly of telecommunications, Telstra is currently responsible for the USO. In the past this has been supported by extensive cross subsidisation of rural services by urban consumers. Albon (1991) uses the example of the Rural and Remote Areas Program run by Telecom (now Telstra) to upgrade services to non-metropolitan users at the cost of about \$600 million in 1990 prices. He estimates that the average capital cost per connection under the scheme was about \$15,000 although the consumers paid between \$210 and \$1,410 for the connection.

Under the current arrangements, the costs of the USO are made explicit with all carriers contributing in proportion to their share in eligible telecommunications revenue. The USO is therefore still covered by an implicit tax on telecommunications users. The estimated cost of providing the USO is the subject of considerable controversy. In 1997–98, for example, Telstra claimed a net universal service cost of \$1.8 billion, the Minister for Communications, Information Technology and the Arts put a legislative cap of \$253.32 million on the USO, and the Australian Communications Authority (ACA) estimated the cost at over \$548 million (PC 2001a: 17.4–5). The Minister's view has prevailed and the USO for 1998–99 and 1999–2000 was set at about \$280 million. Given the ACA estimate, this figure is likely to be too low to cover the true costs of the USO which may have implications for the level of service provision. They are currently piloting the introduction of competition into the allocation of the USO with two pilot schemes, one in the Victorian and South Australian border region and the other in north-east New South Wales and the Queensland Downs. It will be interesting to see how successfully alternative suppliers can compete with the incumbent and how profitable it is for them to supply these services.

Many of the services provided to rural and remote communities do not cover their costs and are therefore subsidised via the USO by other activities. This raises important issues—for example, if there are no commercial incentives to introduce new services such as adequate internet connections, should they be included in the definition of a standard telephone service and therefore cross subsidised by other telecommunications users?⁸ What alternatives might be available to promote the long-term interests of end-users in remote and rural Australia? For example, would encouraging more competition between telecommunications providers reduce the need for the USO?

A further issue is the estimated cost of the USO. If the cost is really much higher than the Minister is willing to recognise, then it may be difficult to find a firm willing to act as the USO provider. Alternatively, the service that is provided may be below the metropolitan standard or require explicit government support. An example of this is the extra government funding to improve internet access in rural and remote Australia (see the discussion below about 'Networking the Nation' (NTN)). The continued recognition of a USO may be necessary to maintain

telecommunications services in remote communities although technological change may make alternative arrangements feasible in the future.

The Customer Service Guarantee (CSG)

A component of the USO is the CSG, which aims to guarantee the quality of the service received where competition in the market is not sufficient to maintain high quality services. It sets out standards for connection times and fault repairs. The Besley inquiry into regional telecommunications services found that Telstra and other carriers (CWOptus, Primus and AAPT) had improved their performance against the CSG targets. However, while data were presented which showed an improvement in the share of repairs in remote areas completed within the CSG standard of three working days from 66 per cent in September 1999 to 78 per cent in March 2000, the performance remained below that in urban and rural areas. Besley (2000: Ch. 5, p. 11) noted:

Telstra's performance until June 2000 in remote areas has been significantly below that in urban and rural areas. By the June quarter 2000, only 75 per cent of faults were being repaired within CSG timeframes in remote areas, compared with 84 and 86 per cent in urban and rural areas, respectively.

An argument which has been used against the CSG is that it may reduce competition in the long run by discouraging new entrants to the industry. Telstra has argued that it attracts resources to activities covered by the CSG and therefore away from other activities which consumers may value more highly (Besley 2000: Ch. 5). However, in areas where Telstra remains a monopoly with a low probability of competitors entering the market, there remains a case for some guarantees of service quality, especially where the service is being cross subsidised by other telecommunications users through the USO.

Commonwealth government programs to improve access to telecommunications services

The aim of extending high quality telecommunications services to remote and rural Australia has also been pursued through the Commonwealth Government's Regional Telecommunications Infrastructure Fund (RTIF) created as a result of the partial privatisation of Telstra in 1997. Two programs have been developed, NTN which is providing \$250 million of support over five years and the Social Bonus, an additional fund established after the second partial privatisation of Telstra. The Social Bonus package provides \$671 million for improvements in telecommunications services in remote, rural and regional Australia.

The NTN program was designed to:

assist the economic and social development of regional, rural and remote Australia by funding projects which:

- Enhance telecommunications infrastructure and services in regional, rural and remote areas;

- Increase access to, and promote use of, services available through telecommunications networks in regional, rural and remote areas; or
- Reduce disparities in access to such services and facilities between Australians in regional or remote areas and those in urban areas. (Department of Communications, IT and the Arts (DCITA) 2000: 1).

A broad definition of regional, rural and remote areas has been applied to include all areas outside the capital cities. Not-for-profit organisations such as local councils can apply for funding to support development of their local telecommunications capabilities under these programs. A potentially important development for remote Indigenous communities under NTN is the Outback Digital Network (ODN). The aim of this network is to use wireless and satellite links to establish a digital network between remote communities in Western Australia, the Northern Territory, South Australia and Queensland (ODN 2001). It is proposed that the ODN will provide a wide range of services including video conferencing, Electronic Funds Transfer at Point of Sale (EFTPOS), electronic commerce, health and education services and internet services. The project remains at a fairly early stage of development.

The list of successful applicants for funds from NTN also includes, on a smaller scale, a number of Indigenous community organisations. For example, Yapakurlangu Aboriginal and Torres Strait Islander Commission (ATSIC) Regional Council has been given funds for the Tennant Creek Regional Telecommunications Infrastructure Project and Galiwin'ku Community Incorporated has funds for a feasibility study of networking in their community (DCITA 1999).

The geographical extension of local call areas to 'Extended Zones' for those living in remote Australia has also been funded under NTN (Besley 2000; PC 2001a). Extended zones cover 80 per cent of the continent but a relatively small number of subscribers. Each extended zone has access to a 'Community Service Town' as nominated by Telstra for medical, public utility, banking and other services. Since 31 July 2001, all calls within an extended zone and to adjacent extended zones are charged at an untimed rate. Calls to the community service town can be made at the special rate of 27.5 cents per 12 minutes (PC 2001b). In the past, remote subscribers have been eligible for a rebate but the continuation of this scheme is still under discussion (PC 2001b).

In a similar vein, the Coalition government has recently issued its response to the Besley report's recommendations (Alston 2001a). These are designed to improve the quality of telecommunications services for Australians living outside the metropolitan areas. The response includes the commitment of \$52.2 million over four years to establish a National Communications Fund for the development of telecommunications projects in education and health for regional communities and a small allocation of funds for a study of the telecommunications requirements of remote Indigenous communities.

In addition to these special allocations of government funds to telecommunications, Telstra, still with the majority of shares in the hands of the

government, has responded to the criticisms of its performance in regional Australia. Following earlier similar commitments (House of Representatives Standing Committee on Aboriginal and Torres Strait Islander Affairs 1993), it has again committed itself to improved services in regional Australia through the establishment of the Country Wide business unit. It now has 28 area offices in regional centres with the aim of improving existing services and introducing new ones that are better adapted to local needs (Telstra 2001).

In April 2001, Telstra introduced untimed local call access for all customers of its BigPond internet services. Other internet service providers can now access wholesale products which will enable them to provide local call access to the internet throughout (PC 2001b).

Commonwealth government programs to improve access to broadcasting services

The provision of telecommunications and broadcasting services has become more closely related with recent technical developments. The Commonwealth government also has programs in the related area of broadcasting designed to improve the access of Indigenous Australians in remote communities to television and radio. An important vehicle for bringing television and radio to remote communities has been the government-owned ABC and SBS networks (see Table 2 below).

In addition, the Broadcasting for Remote Aboriginal Communities Scheme (BRACS) was introduced in 1987 and there are now 80 radio stations operating under it (ATSIC 1999). These stations include local programs in their broadcasting content. While the aims of BRACS have received wide support, there has been criticism of the implementation of the scheme (ATSIC 1999; Office of Evaluation and Audit (OEA) 1992; Turner 1998). BRACS communities have faced difficulties arising from inadequate operational funding and a lack of training. The most recent review noted:

Unfortunately, the roll-out of BRACS stations was poorly planned, consultation was minimal and training schemes, while valuable, need to be greatly expanded. Above all, arrangements for the funding of operational staff proved to be inadequate for the magnitude of the task (ATSIC 1999: 11).

In a similar vein, Turner commented:

The fact that local programmes are still being broadcast at all in more than 70 remote communities is testament to the dedication of community operators who are pursuing their vision despite totally inadequate wages, training and support (Turner 1998: 9).

He estimated that all but one of the 143 paid BRACS operators in remote communities were employed through the Community Development Employment Projects (CDEP) scheme under which they work part-time for their welfare benefits (Turner 1998: 17).

While there are a large number of radio stations owned by Indigenous organisations, ownership of television stations is far more limited. The Central Australian Aboriginal Media Association (CAAMA) owns *Imparja Television* which broadcasts throughout central Australia. Over 90 per cent of the program content is mainstream as the costs of local production limit their ability to develop their own programs. CAAMA receives an annual subsidy from ATSIC (ATSIC 1999).

Rural, remote and urban services compared

The available evidence suggests that the range and standard of services in rural and remote Australia remain below those available in metropolitan areas. However, on the supply-side of the market, the evidence suggests that there are many initiatives underway to reduce this gap. Technological change is increasing the commercial feasibility of improving the quality and range of services available in these areas. These developments are now closely linked with developments in broadcasting. The evidence presented in the recent reports prepared on the telecommunications industry suggests that while at this stage there may be few competitors with Telstra outside the major urban centres, this situation is changing (see for example Besley 2000: Ch. 7; PC 2001a: Ch. 3 and 4). Given technological advances, the pace of change is likely to remain rapid. However it seems unrealistic to expect that the services available in remote Australia will equal those available in metropolitan Australia in the foreseeable future. Regulation and direct government financial support remain important to ensure adequate services in remote areas.

The results of a recent benchmarking exercise conducted by the PC confirm many of the conclusions of earlier reports (PC 2001b). Compared with their urban counterparts, people in rural and remote Australia face slower fault repairs and connections and fewer and more expensive internet options. The focus of this PC study is a comparison of the quality and price of services for rural and remote consumers relative to urban consumers in Australia with relative services in other benchmark countries—Finland, France, New Zealand, Sweden, the United Kingdom and several Canadian provinces and American States. International comparisons are extremely complex and the PC faced major difficulties in collecting data from all these countries. It was hoped that, by confining the comparison to a within-country comparison of rural, remote and urban services, some of the problems involved in international benchmarking exercises would be avoided. The general conclusion of the comparisons that were possible was that services tended to be of lower quality in rural and remote areas than in urban areas. However the PC concluded:

Rural and remote telecommunications users are generally no worse off relative to urban users in Australia than their counterparts in other comparable countries. This is despite the generally higher cost of providing services in sparsely populated areas of Australia relative to the situation in those countries (PC 2001b: xii).

An interesting component of the study was a comparison of the cost of a basket of calls to an urban, rural and remote consumer in Australia. As a result of a \$160 rebate for those in remote areas, the cost of the basket of calls was in fact lower

in remote Australia than in urban and rural areas under the pricing arrangements which existed prior to August 2001. This result held following the change in pricing regime in July 2001. However, if the basket of calls was changed to include more long distance calls and less local calls, a reasonable assumption for those in remote areas, the cost was up to 22 per cent higher. In the absence of an explicit subsidy, this difference could be expected to be larger. It is not clear how extended zones will be funded in the future without NTN.

The demand for telecommunications services in rural and remote communities

Outcomes reflect factors on both the demand and supply-side of a market and it is extremely difficult to separate these two influences. For example, the level of internet connection within a community may reflect barriers to supply of the services or the effects of high prices and low incomes on demand for these services. It is therefore important when considering the use of telecommunications services to focus not only on the supply-side of the market but also on the determinants of demand.

Access to basic telephony services is very widely available. According to the Besley report (2000), 96.8 per cent of Australian households have a standard telephone service. Of the remaining 3.2 per cent, some have mobile phone access. The committee also found that, on the whole, Australians were satisfied with the general level of fixed telecommunications service supported by the USO. However, they found that the USO in relation to the provision of payphones in remote Indigenous communities was not being met (Besley 2000: Ch. 5). Based on data from the Community Housing and Infrastructure Needs (CHINS) survey conducted for ATSI by the Australian Bureau of Statistics (ABS) in 1999, they found 24 per cent of discrete Indigenous communities with more than 50 inhabitants were without a public telephone (see Table 1). These communities were concentrated in New South Wales.

Access to broadcasting services is also widely available. According to the CHINS survey, only 3.2 per cent of discrete Indigenous communities in Australia with a population of 50 or more had no access to either radio or television broadcasts. The majority had access to both a radio and television service although the type of service available varied significantly between States. Access to Indigenous radio was greatest in the Northern Territory and Queensland and to Indigenous television in the Northern Territory and South Australia (see Table 2). The discrete communities in New South Wales had relatively limited access to both Indigenous radio and television services.

The fact that these services are potentially available does not mean that they are actually being used by Indigenous people. Unfortunately data are not available on connection rates for Indigenous households so the following discussion will focus on a comparison between urban, rural and remote households in general.

Table 1. Access to public telephones, communities with a population of 50 or more, 1999

	One telephone (%)	Two or more telephones (%)	No public Telephones (%)	Total (%)
New South Wales	3.4	0.8	12.4	16.6
Queensland	4.9	5.2	2.6	12.6
South Aust.	4.0	1.4	2.3	7.8
Western Aust.	13.2	9.2	2.0	24.4
Northern Territory	21.6	11.5	4.6	37.6
Australia ^a	47.7	28.2	24.1	100.0
Number				(348)

Notes: (a) Victoria and Tasmania are included in Australia to preserve confidentiality.

Source: ABS 1999a: Table 4.38.

Table 2. The share of communities with a population of 50 or more in each State by access to broadcasting services, 1999

Type of Broadcast	State ^b					Australia ^a (%)
	NSW (%)	QLD (%)	SA (%)	WA (%)	NT (%)	
Radio						
ABC	100	97.7	88.9	84.7	81.7	88.2
Commercial	98.3	47.7	55.6	82.4	55.7	68.7
Indigenous	17.2	79.5	63.0	48.2	70.2	56.0
Television						
ABC	100	86.4	88.9	89.4	87.0	89.9
Commercial	100	88.6	85.2	91.8	80.2	87.9
SBS	70.7	50.0	40.7	25.9	58.0	50.3
Indigenous	10.3	59.1	77.8	14.1	84.7	50.6
No broadcast	0	0	0	2.4	6.9	3.2
Total (%)	100	100	100	100	100	100
Total number	(58)	(44)	(27)	(85)	(131)	(348)

Notes: (a) Victoria and Tasmania are included in Australia to preserve confidentiality.

(b) Totals for each State add up to more than 100 as each community may specify more than one type of broadcast.

Source: ABS 1999a: Table 4.39.

There is limited public information about the household connection rates for fixed telephony services in remote areas perhaps because of the almost universal coverage at the national level. However, data at a more disaggregated level are available on other aspects of consumer demand. Since 1997, ACA has conducted

an annual survey of consumer satisfaction with telecommunications services by telephone so data only cover those who have a fixed telephone service. The results from the most recent 1999–2000 survey for which data are available, show the dominance of Telstra in remote Australia with 97 per cent of households using Telstra as their local call provider. Telstra held a similarly strong position in the local call markets in rural (94%) and urban areas. However Telstra retained a much larger share of the long distance and international markets in remote Australia compared with other locations (see Table 3).⁹ This was true for both households and small businesses.

Table 3. Telstra's share in the provision of telecommunications services by location, 1999–2000^a

	Local (%)	Long distance (%)	International ^b (%)	International ^c (%)
Households				
Urban	85	72	na	72
Rural	94	84	62	87
Remote	97	92	77	95
Small business				
Urban	80	69	na	69
Rural	86	73	63	75
Remote	95	90	76	93

Notes: (a) See endnote 11 for more details of the survey.

(b) Includes 'don't know'.

(c) Excludes 'don't know'.

Source: ACA (2000)

The ACA survey found a slightly lower rate of take-up of mobile telephones in non-urban Australia (47% of households) compared with urban Australia (52%). The particular problems noted by users of mobile phones in remote areas were the problems of call dropouts and the limited coverage areas (ACA 2000).

An important source of information on access to computers and the internet by Australian households is the Household Use of Information Technology Survey conducted by the ABS in 1998. Unfortunately the survey sample was not large enough for a more detailed breakdown of the data but Tables 4 and 5 provide some interesting comparisons between capital city households and other households by State. It is important to remember that things change very rapidly in this area and the current picture may differ substantially from that presented by 1998 data. The ABS survey conducted in November 2000 recorded that 56 per cent of Australian households had access to a computer at home and 37 per cent had home access to the internet (ABS 2001).

Table 4 shows that households outside the capital cities were less likely to have a computer than those located in the capital city although it is interesting to note that the differences between farms and capital city households was smaller. In

fact in some States, a higher proportion of farms had a computer than households in the capital city, for example, South Australia, Western Australia and the Northern Territory. However the survey found that the share of farms with computer access was lower than for other home-based businesses; 45 per cent compared with 70 per cent in the capital cities and 59 per cent of home-based businesses in other areas. The results of the latest survey which were only published on the basis of a metropolitan/non-metropolitan breakdown, also show a difference between metropolitan and other areas. Of households in metropolitan areas, 59 per cent had a computer compared with 52 per cent in other areas (ABS 2001).

Table 4. Households and farms with a computer by State, 1998

	NSW (%)	Vic (%)	Qld (%)	SA (%)	WA (%)	Tas (%)	NT (%)	ACT (%)	Aust (%)
Capital city households	45.7	46.4	48.8	42.0	42.3	38.0	45.6	65.1	45.9
Other households	34.9	39.2	37.3	32.3	40.6	29.1	44.2	na	36.4
Total	41.4	44.3	42.4	39.4	41.9	32.8	45.1	65.1	42.2
Farms	45.7	42.3	41.4	47.8	53.4	41.1	55.7	59.4	44.8

Source: ABS 2000; unpublished data, Agriculture Commodity Survey see ABS 1999b.

Table 5 presents the results from the ABS survey on internet access by State and location within the State. They show a lower percentage of households with internet access outside the capital cities. The share was particularly low in South Australia, Western Australia and Tasmania but the highest access rate outside the capital cities was in the Northern Territory. There was a similar gap between metropolitan and other households in late 2000 of 40 per cent compared with 32 per cent.

These results of lower internet connection rates outside urban centres were confirmed by the ACA 1999–2000 survey. The interconnection rates reported were higher than those recorded by the ABS, perhaps reflecting the use of telephone interviews and the later date of the ACA survey. It found that 19 per cent of both remote and rural households had an internet connection compared with 30 per cent in urban areas. The major reason given in remote areas for not connecting were ‘no computer’ (45%) and ‘not interested’ (27%). The main uses given for the internet in remote areas were email (44%), school research (18%) and business research (16%) (ACA 2000).

In the wider context Lloyd and Hellwig (2000) have investigated the determinants of take-up of new telecommunications technologies, particularly the internet and mobile phones. Their analysis is based on data from the ABS and a survey of 700 households conducted by the KPMG Centre for Consumer Behaviour. Using regression analysis, they found that educational qualifications and income were

the major determinants of internet access at home. Tertiary qualified people with high incomes were the group most likely to have internet access at home. With respect to the use of mobile phones, younger people and those without tertiary qualifications were more likely to use them, holding other variables constant. For both internet access and mobile phone usage, the finding that the region of residence had no independent effect was surprising.

Table 5. Households and farms with internet access by State, 1998

	NSW (%)	Vic (%)	Qld (%)	SA (%)	WA (%)	Tas (%)	NT (%)	ACT (%)	Aust (%)
Capital city households	20.3	16.1	15.7	11.6	13.9	12.7	15.0	26.6	16.9
Other households	7.8	8.2	8.3	6.5	5.6	4.7	10.8	na	7.7
Total	15.4	13.9	11.6	10.2	11.8	8.0	13.6	26.6	13.5
Farms	13.2	10.6	11.2	13.0	10.2	13.0	23.6	20.3	11.8

Source: ABS 1999b.

It is unfortunate that Lloyd and Hellwig were unable to include the price and availability of access to both mobile and internet services in the regression equations. These are likely to be key determinants of take-up rates and the omission of these variables may bias the regression results. However, the results highlight the importance of demand-side factors such as income and education in take-up rates for new technologies.

At the level of an individual household in a remote Indigenous community, these demand determinants are likely to be extremely important. Indigenous Australians have, on average, lower levels of education and income than other Australians and these factors are likely to reduce their demand for telecommunications services regardless of the availability to a community as a whole.

As an extremely rough indicator of home access to the internet for Indigenous adults, data from the National Centre for Social and Economic Modelling (NATSEM) on the percentage of adults with home internet access by postcode has been correlated with the percentage of Indigenous Australians in the postcode at the time of the 1996 Census.¹⁰ The result is a negative correlation of -0.14 ; that is those postcodes with a high proportion of Indigenous people were likely to have a lower internet connection rate. The data also show that in the 44 postcodes where Indigenous people accounted for more than 20 per cent of the population, the percentage of the adult population estimated to have home access to the internet was below the national average, 38 per cent compared with 41 per cent. It is however important to remember that the data set is a synthetic one and the predictions for particular subcategories may not accurately reflect the true position. There are reasons to expect that the method used may over predict the

proportion of adults with internet access in remote regions as additional factors not incorporated in the matching process used for creating the data set may be at work in these locations.

The results on access to the internet from the ABS and ACA surveys and the more detailed study by Lloyd and Hellwig reflect a range of both demand and supply factors—for example, the availability of local call access to the internet, household incomes and education levels. The result based on postcode data shows a weak statistical association which has no behavioural interpretation. It cannot be argued on the basis of this result that there is something about being Indigenous per se (e.g. cultural preferences) which is likely to reduce access to the internet. A full regression model would be required to test such a hypothesis. The results show that Indigenous Australians are less likely to live in locations where internet access at home is commonplace. This may have important implications for the development of computer skills, for example where the ‘demonstration effect’ influences people’s interest in taking-up new technologies.

Community opportunities arising from improved telecommunications services

Perhaps rather than trying to boost access to the new technologies at the household level, the more realistic approach is to focus on the potential of technological developments for the community as a whole and for the organisations servicing the communities. In this context improved communications open a wide range of possibilities. These include better access to health and education services and improved social interaction. In the education area, access to the internet greatly increases sources of information beyond a poorly resourced local library. It can improve health outcomes by the use of telemedicine clinics for diagnosis and treatment and the training of health workers in remote locations. Teleconferencing can be used by relatives at a distance to ‘visit’ prison inmates. Improved communications may also open commercial possibilities, for example in the sale of Indigenous art.

Key issues here include availability of skills and resources. Reviews of the BRACS program have emphasised the need for training in the skills required for broadcasting and a similar point could be made with respect to information technology (IT) skills (ATSIC 1999; OEA 1992; Turner 1998). In addition, coordination of any government input is important. Any provision of hardware needs to be matched by the required training for operators. The hard physical environment of many remote communities must also be acknowledged when establishing sensitive computer and telecommunications equipment. The reliability of the electricity supply is also an important issue.

It is also necessary to recognise that technology will not overcome significant underlying problems by itself. One example cited in Indigenous Management Australia’s (1998) full report of Indigenous media and communications policy for ATSIC was of the failure of a Northern Territory Correspondence School pilot of web-based teaching because of a lack of eligible students, their high mobility and

poor attendance. These problems, which have been widely faced in Indigenous education, will not just disappear with the arrival of new technology (Schwab 1999).

Developments in telecommunications and broadcasting offer the opportunity for Indigenous Australians to promote their culture. The National Indigenous Media Association Australia (NIMAA) supports developments in broadcasting and communications in remote communities. The satellite radio network established over a year ago now makes it possible to broadcast nationally through all Indigenous communities outside the capital cities (but includes Brisbane). Preliminary discussions with several media organisations in remote communities suggests that training people in the communities with the relevant broadcasting and communications skills is still an issue although it was felt that there is plenty of enthusiasm for developing these skills. NIMAA has also established an Indigenous portal which links Indigenous internet sites covering a range of areas including health, culture, tourist activities and business.¹¹

Potential e-commerce developments

There are now some excellent web sites run by Indigenous community arts associations which aim to promote both Indigenous culture and the sales of Indigenous art.¹² Preliminary discussions with a few of these organisations suggest that, at this stage, these sites are not a major source for generating sales of Indigenous art. However the development and maintenance of these sites is considered important. They act as significant marketing tools making potential customers aware of the types of art available and the locations of exhibitions and galleries stocking Indigenous art. Among the difficulties faced by the site owners are the limited resources available to maintain sites and the limited technical expertise present in the community.

On-line shopping is in its early stages in Australia but is continuing to grow rapidly. According to two surveys of on-line retailing conducted by Ernst and Young (2000, 2001), and the ABS survey on internet usage (ABS 2001), the main items purchased over the internet by Australian consumers are books, computers and related products, CDs and other recorded music, tickets and reservations, clothing, videos, financial services, small electronic goods and food and drink. The typical on-line consumer has a high household income (over \$70,000 per year) and about half have a tertiary qualification. These results confirm the findings of Lloyd and Hellwig (2000) on internet connections reported above. The ABS (2001) survey found that those in employment and living in a metropolitan area were more likely to engage in internet shopping. The consumers interviewed by email by Ernst and Young emphasised the importance of a good product range, a good site, competitive prices, good after sales service and site security in their decisions to make a purchase. The most important reasons identified for not purchasing on the internet were the high costs of shipping and the need for personal sizing or fitting.

The characteristics of on-line consumers identified in these surveys suggest that there may be scope for expanding sales of Indigenous art, artifacts and cultural material such as videos and CDs on the internet. Affluent well-educated households may be the type of household most likely to buy these items. However, the personalised nature of an art purchase and the problems of shipping from remote locations may act as a deterrent to potential consumers.

Looking at on-line shopping from the point of view of those living in the remote communities, low incomes, low levels of education and high shipping costs are likely to inhibit the growth of on-line shopping in these areas. The need for a credit card to make these purchases is also likely to reduce the number of Indigenous people able to make use of on-line shopping.¹³ However the development of e-commerce will increase the range of goods available to those in remote areas and offer challenges to traditional suppliers of goods to remote communities.

Summary and conclusion

This paper has surveyed a wide range of issues related to the telecommunications industry. Technical and regulatory changes on the supply-side of the market have altered the services now available to remote and rural Indigenous communities and introduced the possibility of competition in the industry. However the former government-owned monopoly, Telstra, remains the dominant supplier in rural and remote Australia. The nature of the economies of scale and scope in this industry are such that it seems that without substantial government intervention of various kinds, the services available to non-metropolitan consumers are unlikely to match those available to metropolitan consumers. This intervention has involved a large investment in infrastructure and the introduction of specific regulations such as the USO, the CSG, a range of price controls and an access regime for essential infrastructure. While the evidence suggests that the telecommunications services available in remote and rural Australia are inferior to those available in the urban areas, given the nature of the industry, these explicit interventions in the market appear to have reduced the discrepancy that might otherwise have existed. A further issue is the development of an appropriate regulatory environment in the era of converging telecommunications and broadcasting technologies.

On the demand side of the market, the evidence suggests that consumers outside the urban areas have lower take-up rates of the new services such as mobile phones and the internet than those in urban areas. This may reflect supply factors such as the cost and availability of connection to the networks. However factors such as income and education levels are also likely to be important in take-up rates. In this rapidly changing environment, the demonstration effect of access to new technologies is also likely to be important.

The developments in telecommunications and broadcasting offer the opportunity to reduce some of the disadvantages associated with remote locations, for

example through improved access to education and health facilities and access to new markets for goods and services created in remote communities. While new technologies will not solve all the problems these communities face, it is important that Indigenous Australians are given the opportunity to develop the skills which will enable them to adapt the technologies to their needs. Given the nature of this industry and the historical legacy of government involvement, it is important to remember that the technology does not exist in a vacuum but operates in a regulatory environment that needs to promote the long-term interests of all end users.

In the context of Indigenous people living in rural and remote Australia, this requires recognition of their particular social and cultural environments and the level of relevant skills within the communities. Initially the best options for promoting the introduction of new technologies lie in the provision of training and equipment for community organisations such as the local land councils, CDEP scheme offices, health clinics and stores.

This background paper suggests a number of avenues for further research. One possibility is a series of case studies of communities surveying the availability of services, the problems faced in accessing these services, the types of services people would like to be able to access and the scope for introducing new services. Another possibility is to focus on a particular sector, such as health or banking, and consider how the new technology might assist in the delivery of these services to rural and remote communities. From the point of view of community exports, another project might examine the scope for using the new technology to promote the sale of Indigenous arts and crafts. This is a relatively under-researched area that has a range of exciting possibilities.

Appendix A: Background to the telecommunications industry

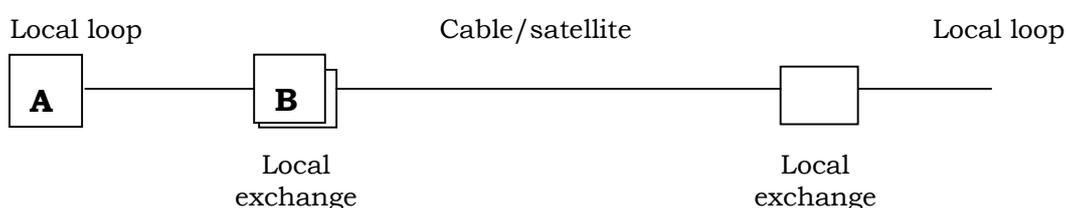
This appendix outlines some of the basic features of telecommunications delivery relevant for the discussion in the paper and provides some historical perspective on industry developments in Australia.

The process of making a 'fixed voice' telephone call, that is a call between telephones connected to the network by wires, can be summarised in Fig. A1. Person A wishes to call person B in another city. The call first goes down the copper wires of the local telephone loop to the local exchange. From the local exchange the call is then transferred via cable or satellite to the local exchange in the other city. It then travels down the wires to Person B.

In this example, while there are a number of options for transferring the telephone call over a long distance, the local telephone loop must be used to transfer the call from the local exchange to the final customer. Access to the local loop therefore becomes a major issue for any competitor in the long distance call market. For example when CWOptus was established as a competitor with Telstra in the Australian long distance market, Telstra was required to grant access to its local loop for CWOptus calls. The local loop is sometimes described as a

bottleneck service in telecommunications, meaning that the owner of the local loop has considerable market power over the extent of competition in the whole network. If the owner of the local loop is unwilling to grant access to other firms, competition will be prevented in the market for long distance calls. In recognition of the importance of the local loop, the ACCC has declared it an essential service under Part XIC of the *TPA*. Telstra therefore must negotiate in good faith with any company requiring access to the local loop to establish either a long distance or local telecommunications service. The growth in mobile technologies is likely to reduce the importance of the local loop in the future.

Figure A1



The importance of any-to-any connectivity can also be illustrated using the above example. Suppose Person A uses Telstra as a service provider and Person B uses CWOptus. In order that the two people can communicate, the technologies used by Telstra and CWOptus must be compatible. Without this, many of the benefits of a network would be lost as it would only be possible to communicate with people using the same service provider.

As a result of technical change there are now far more options available for communication. New services such as the internet and facsimile services transfer data over the telephone system which in the past was exclusively used to transfer voice. Voice services can now be supplied without accessing the local loop and are bundled with a wide range of options including pay TV, video on demand, high speed internet and video conferencing. These changes have raised the whole question of how the two separate industries of broadcasting and telecommunications will relate and be regulated in this converging environment.

A very brief history of the telecommunications industry in Australia

The following provides a very brief outline of the history of the telecommunications industry in Australia. Interested readers can find fuller discussions in Besley (2000), PC (2001a) and Quiggin (1996). The industry continues to grow rapidly and is highly capital intensive. In 2000 revenue from telecommunications services accounted for about 5 per cent of Australian Gross Domestic Product (GDP) (PC 2001a: 3.1).

The telecommunications industry was established in Australia as a government monopoly like the Post Office. Until 1975 when Australia Post and Telecom Australia were separated and became statutory authorities, it was run by a public

service department, the Postmaster-General's Department (PMG). Telecom, as the PMG before it, was a monopoly provider installing, maintaining and operating the domestic network exclusively. It was also the regulator for the industry. The Overseas Telecommunications Commission (OTC) remained responsible for international services. Dissatisfaction with the performance of Telecom, resulted in the establishment of the Davidson Committee under the Prime Minister of the day, Malcolm Fraser, to review the performance of the industry. Its final report was critical of Telecom's performance and recommended change but the process was stalled by the election of the Hawke Labor government and union opposition to reform.

Aussat had been launched in 1981 to complement Telecom's land-based network and to improve the provision of telecommunications services throughout Australia. The increased pressure toward microeconomic reform and problems with Aussat led to changes in the Labor Party position on maintaining a government-owned monopoly of all telecommunications services. The *Telecommunications Act 1989* opened the market for competitors in add-on services and separated the regulatory functions of Telecom into a new authority, the Australian Telecommunications Authority (AUSTEL).

Further changes to the industry were introduced by the *Telecommunications Act 1991*. Telecom and OTC were merged to become Telstra which remained in government ownership. Aussat was sold to CWOptus and a protected duopoly was established in the industry. CWOptus initially competed with Telstra in the long distance market before entering the market for local calls in 1994 with rollouts of cable in the major capital cities. Three mobile telephone licenses were issued to Telstra, CWOptus and Vodafone in 1993.

The telecommunications market was not opened to competition from other sources until 1997 under the *Telecommunications Act 1997*. Although Telstra remains the dominant carrier, competition has increased substantially, especially in the new parts of the market. In March 2001, the Telecommunications Industry Ombudsman listed as members 54 carriers, 81 telephone service providers, 50 providers of both telephone and internet services and 867 internet service providers (PC 2001a: 3.5). As the experience with One Tel illustrates, the industry is in a state of flux and these numbers could be expected to change in the future.

Another aspect of the program of microeconomic reform in the industry focused on the ownership of Telstra. Initially, the aim of the Coalition government elected in 1996 was the full privatisation of Telstra. In 1997, one-third of the shares were sold to private investors and a further 16 per cent were sold in 1999. These sales have been the subject of intense political debate with strong opposition from non-metropolitan constituencies. Further plans to complete the privatisation of Telstra have been shelved and the company continues with 51 per cent government ownership. Some commentators, including Telstra management, see this result as the worst of both worlds.

The aim of the Australian reforms to improve the performance of the telecommunications industry have been pursued in other Organisation for

Economic Cooperation and Development (OECD) countries, for example New Zealand, the United States and the United Kingdom, through a variety of mechanisms. These have included the privatisation of government-owned monopolies, the introduction of competition, and the breaking up of national monopolies. In all these countries the government retains an important role in the industry through its control of the regulatory environment. This includes regulations and programs to maintain access to telecommunications services for disadvantaged groups. In conjunction with significant technical developments, the reforms have changed the operation of the industry on a global scale.

Notes

1. A natural monopoly exists where the market can be supplied at the lowest cost by one rather than many producers. It occurs in industries such as water, gas and electricity supply where there are substantial costs in setting up a network but the marginal cost of connecting one more consumer to the network is small. So for example, in the provision of local telecommunications services there are considerable fixed costs involved in laying cables and establishing an exchange even before the first customer is connected. Once the network is established, the cost of connecting an additional consumer is small. There is considerable debate in the literature whether in the light of technical changes a natural monopoly continues to exist in the telecommunications industry (Albon, Hardin & Dee 1997; PC 2001a; Spulber 1995). While natural monopoly elements remain important at the local level, they are less important for long distance communications.
2. The Customer Service Guarantee (CSG) was introduced in 1998 and sets out standards for connection times, rectification of faults and other matters relating to the supply of services. Carriers can be fined if the quality of their service falls below certain benchmarks. For example, as of July 2001 rural and remote connections where there is existing infrastructure should be completed within 15 days of a request (Besley 2000: Ch. 3).
3. For a fuller discussion of the telecommunications industry in a broader context see Laffont and Tirole (2000).
4. In its report on declaration of the local loop, the Australian Competition and Consumer Commission (ACCC) documented the growth of competition in the local call market in the central business districts of Sydney, Melbourne, Brisbane and Adelaide and commented on the dearth of competition outside these areas (ACCC 1999). The PC also commented on the limited extent of competition outside the capital cities (PC 2001a). This may change with new entrants to regional markets. However it seems likely that it will take longer for competitors to enter the market in the sparsely populated areas.
5. For a full description of the regulatory environment in the telecommunications industry see Besley (2000) and PC (2001a). Various reports of the ACCC cover particular aspects of the regulatory regime in detail, for example price controls and the access regime. These are available on the ACCC web site at www.accc.gov.au. The ACA web site also contains reports on particular aspects of the more technical side of the regulatory environment (www.aca.gov.au). The Australian Broadcasting Authority (ABA) regulates the broadcasting industry. A summary of regulations in this industry

is available in PC (2000) and Grainger (1999). The interface between the regulatory environment in broadcasting and telecommunications is discussed in PC (2001a) and PC (2000).

6. The Coalition government has announced that it will make no changes to the Telstra price caps for 12 months to allow further refinement of the ACCC's proposals and to take into account the final recommendations of the PC inquiry (Alston 2001b).
7. Where competition is limited, the addition of one new firm in the market may make little difference to the price and quality of service to the consumer. Strategic behaviour by oligopolists may protect monopoly profits and not be in the consumers' best interests (Daly & Stoeckl 2000).
8. The Besley report (2000) argued that a data speed of between 14.4 kbps and 28.8 kbps was necessary to provide a reasonable service for most residential customers. However they found that 'approximately 5 per cent of lines in urban and regional areas and 15 per cent of lines in rural and remote areas will not be capable of data speeds of 14.4 kbps or above' (Besley 2000: Ch. 6:5). This is about 6 per cent of Telstra's lines. Additional government support will be required to ensure that these consumers have access to the reasonable data speeds.
9. The ACA survey included 1,509 interviews of households and small business consumers. The latter were defined as businesses employing less than 20 people in non-manufacturing industries and less than 100 in manufacturing industries. The geographical divisions into urban, rural and remote were based on the following criteria; urban included all centres with a population of 10,000 or more, rural included urban centres of less than 10,000 or a locality of 200 or more people, remote included all other areas. There were 254 urban households interviewed, 257 rural ones and 285 remote ones. The small business sample included 251 urban, 251 rural and 211 remote businesses. While the use of a telephone interview technique seems appropriate for a survey of consumer satisfaction with telecommunications services, there is one exception in the area of payphones. Households without their own telephone did not have an opportunity to comment on their satisfaction with the payphone service.
10. The data for this exercise were kindly provided by NATSEM from the NetInfo data set. NetInfo is a synthetic data set constructed from the Household Expenditure Survey (HES), the basic community profiles from the Population Census and the KPMG Centre for Consumer Behaviour's household survey. As there were a smaller number of observations in the KPMG data set (700 persons) than in the HES (17,271 persons), the files were merged by matching the most similar record from the KPMG survey data chosen on the basis of a set of characteristics with individuals in the HES. This implied that the same observation in the KPMG data set could be used more than once as a match. For a more detailed discussion of the data see Hellwig & Lloyd 2000; Lloyd & Hellwig 2000.
11. The web address is www.indigenoustralia.com.au. The NIMAA web site can be accessed via this portal. Another useful portal address is www.ciolek.com/wwwvl-Aboriginal.htm.
12. These include the sites of Maningrida Arts and Culture in Arnhem Land (www.bu.aust.com/~maningrida/) and the Warlukurlangu Artists in Central Australia (www.warlu.com/home.htm).
13. For a discussion of many of the problems faced in delivering banking and financial services to rural and remote areas see McDonnell & Westbury (2001).

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