

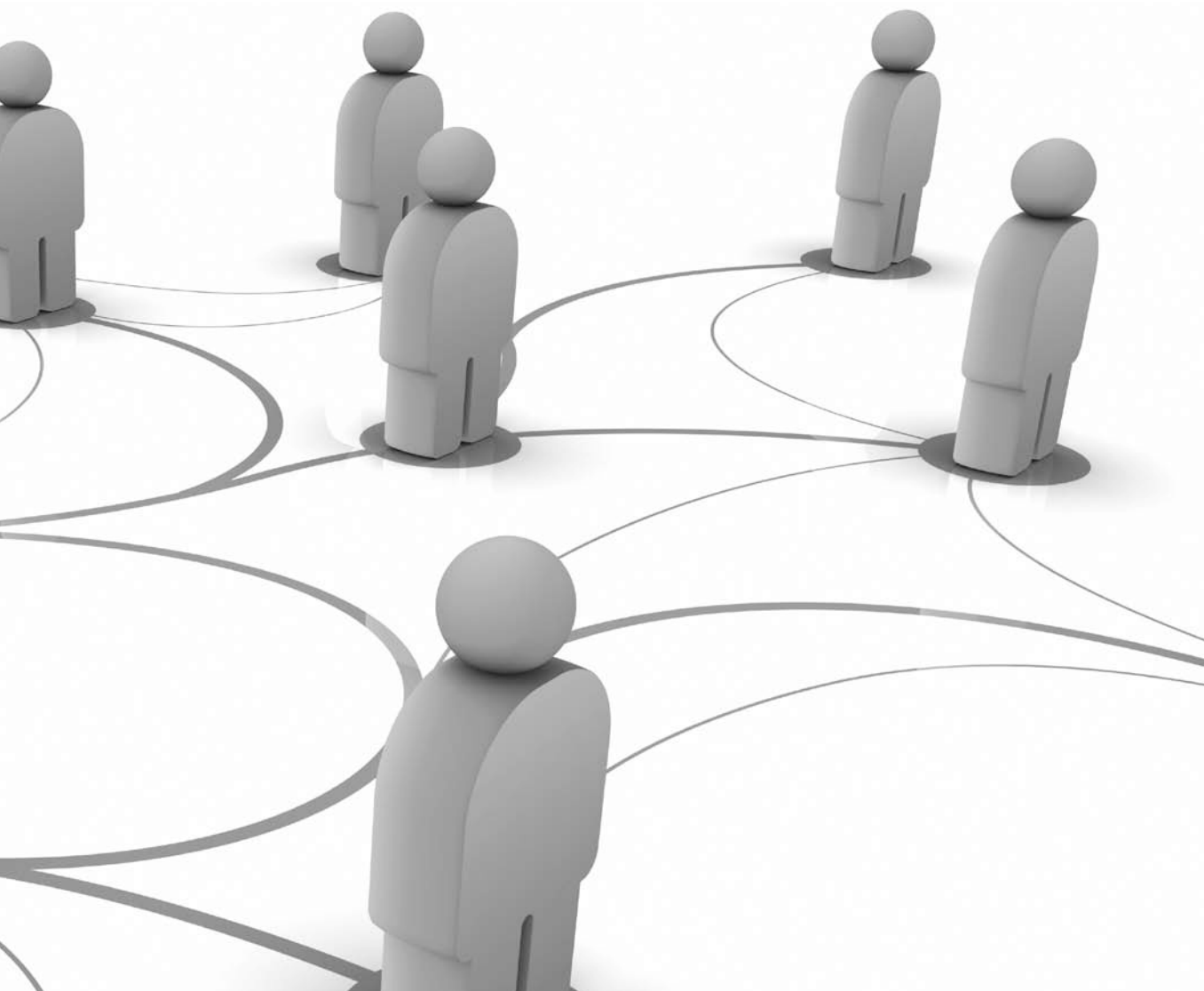


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on microeconomics, competition policy and innovation. He is the author of several textbooks and policy books, as well as numerous articles in economics journals. Gans received a Bachelor of Economics (Honours) and the University Medal from the University of Queensland before going to Stanford University to study for his PhD in Economics. He graduated from Stanford in 1995 and moved to Melbourne Business School in 1996 as an associate professor and became a full professor in 2000. In 2007, he received the inaugural Young Economist Award from the Economic Society of Australia. In 2008, he was elected as a Fellow of the Academy of Social Sciences, Australia. In 2006, he wrote a paper for CEDA called *Information Paper 67: The Local Broadband Imperative – Appropriate high-speed internet access for Australia*. This chapter follows on from that report.



3 Creating an efficient national broadband network



3.1 Introduction

In 2006 CEDA commissioned a study entitled *The Local Broadband Imperative* to examine the issue of the next generation of broadband in Australia, its economics and the best way to encourage investment in it. That report argued that broadband needed many local solutions, not a single national solution. It documented how the technologies, user requirements and the investment costs associated with providing broadband vary considerably across localities. This reality stood in contrast to many proposed solutions based on national strategies far removed from local circumstances.

The analysis led to several conclusions. The first was that then calls for universal service obligations to be imposed on national broadband providers were misplaced and likely to be costly in terms of reduced competition. Instead, what we need are local service obligations and a vesting of responsibility with local bodies to find and adopt solutions for improved broadband.

Second, the report argued that calls for protection of investors from competition are also misplaced and

will likely result in higher costs to end-users. Local bodies such as councils could, alternatively, use the power of competitive tendering to drive those costs down or to encourage multiple local providers. In areas with sufficient demand for broadband services, that competition could be sustained.

Finally, where there were areas in Australia not receiving minimally acceptable internet access, the federal government could continue or expand the use of targeted subsidies.

The goal of the policies advocated in the 2006 report was not to compel local councils or other organisations to make broadband investments. Instead, it was to give them the ability to decide whether those investments should be made. The call was for mechanisms to ensure that the efficient path for investment is followed, whether that involves a ‘big band’ catch-up with other advanced economies, or a gradual rollout of broadband across Australia trading off local needs and local conditions. The issue for Australia is that no such mechanism exists.

Two years later, it continues to be the case – no such mechanism exists. However, we do now have a clear government policy in place that sets out some key investment parameters. The purpose of

this chapter is to examine that policy and to highlight some of the issues the government faces as a result of not choosing a mechanism that would allow for other investment paths to be considered.

The federal government proposes to invest up to \$4.7 billion in a new National Broadband Network (NBN), based primarily on fibre (at least to the node and perhaps beyond) being rolled out within five years to at least 98 per cent of the Australian population. The download speed is required to be at least 12 Mbps while upload speeds should be sufficient to allow video-conferencing. The government proposes to engage in a public-private partnership for the delivery of high-speed broadband services and so seeks to earn a return on its investment.

There are several features of this worth commenting on. The first and most obvious given by the 2006 report is that the proposal is for a *single* national solution. It is worthwhile highlighting once again the problems associated with that and how they are affecting the government's implementation of its policy. Second the policy involves a clear technological preference. One issue of concern back in 2006 was that different localities would likely require different technologies to deliver broadband. Once again, this reliance on a single technological solution is creating issues for the government in implementing its policy. Third, as noted in the 2006 report, there are important regulatory issues surrounding broadband. Those issues remain and are currently a major impediment to the implementation of broadband investment. Proposals are offered as to how those regulatory impediments might be overcome in an efficient manner. Finally, broadband is not simply about the basic infrastructure. To provide value to consumers there are other parts that require attention – most notably, broadband applications. This is something highlighted as a key priority in the Cutler Review of the National Innovation System which is a welcome emphasis by the government (Department of Innovation, Industry, Science and Research 2008).

3.2 Do we need a single national solution?

The first assumption in the government's proposal is that the broadband network be national. Importantly, that does not mean that there is a single provider nationally. The tender allows for bids to provide the network in just a single state with other states being

BOX 1: THE SOURCE OF THE ESTIMATE

Peter Martin, then a journalist at *The Canberra Times*, investigated the source of the \$30 billion broadband estimate (Martin 2007). He discovered that it was stated originally in a 2003 report of the Howard government's Broadband Advisory Group. That report does not estimate the economic benefit itself but relies upon a 2001 presentation by Accenture which was not available online or elsewhere.

Martin obtained a copy and found that it had to do with basic, not high-speed, broadband and that, in effect, it appeared to be based on scaled-down US estimates.

covered by one or more providers as the case may be. This is a positive move although it is not clear why a state rather than a local area is the appropriate economic unit. Local areas have particular needs for which tailoring might be desirable. They also have different cost structures in deploying new technologies. All this might warrant a more disaggregated approach and by allowing providers to operate at a local level, more competition both for the market (in the tender) and in the market (later on) might be possible.

However, there is another issue with regard to having a national solution: do we need high-speed broadband everywhere and to every location? On the demand-side, a ubiquitous network can stimulate development of applications that leverage that network. However, much of that already comes from the existence of such networks around the world. It is much harder to identify lost opportunities for Australian-specific applications. If these were identified then surely it would be better to subsidise their development directly and use their success to stimulate the demand for broadband and its investment.

Moreover, to the extent that businesses that rely on high-speed broadband already have location options within Australia, that does not necessarily equate with the notion of providing that capability for every location. From that perspective, a tail is wagging a very large dog.

On the supply-side, while there are issues in overall network management, the nature of the internet allows for interconnectivity and so it does not need to be centralised. Instead, the investment required is kilometre by kilometre, dwelling by dwelling. Thus, there is little in the way of national or state-based scale issues.

Much has been written about the potential economic benefits from broadband and an oft-quoted figure is that it will yield between \$12 billion and \$30 billion in economic benefits to Australia each year.

Box 1 notes that there are doubts as to the validity of those estimates. These estimates have been publicised by Telstra (2008) among others. However, recently, Telstra appeared to have dramatically revised its estimates of the value of broadband. In August 2008, Telstra's CEO stated that delayed broadband investment was costing the Australian economy \$200 million a month in lost GDP (about \$2.4 billion per year). This is far less than the previous estimates and given the large government investment, and from an economic point of view, it is important to determine whether a proper cost-benefit study has been conducted (either within government or industry). Those benefits could be there, it could just be that they have not been appropriately quantified in a rigorous manner.

The concern is that the government is cutting off options for tailoring and economising based on location. Even in expressing the goal of a national network, it need not do this. As discussed below, building in inter-operability at as many points as possible on the network can allow for local options and solutions, and stimulate competition and entrepreneurship.

3.3 Should we be relying only on fibre?

While the backbone infrastructure of the internet is optic fibre, there are currently four means of taking that data into households. They are:

1. copper
2. cable
3. wireless
4. fibre.

The current plan is to have fibre at least to the node and then to use copper from that point on.

This is too restrictive a prescription. For example, cable can deliver speeds and does deliver speeds up to 40 Mbps without degradation as the cable is further from exchanges. Wireless technologies are improving constantly. Telstra's NextG wireless network is capable of speeds up to 14 Mbps but there are developments that suggest speeds in excess of 100 Mbps are possible on the existing spectrum (Kohler 2008). These technologies may not be technically superior to fibre; however, given the savings in the cost of a new rollout, they can be economically superior to fibre.

Add to this potential changes in how users access the internet, and the 'picking technological winners' issue becomes even more stark. This year Apple has sold more than 10 million iPhones around the world. The iPhone stands out because it has changed the

way mobile-phone users access the internet. For straight-out browsing, it is the most popular mobile device despite its relatively low penetration overall. In addition, within homes, users have opted for wireless (through WiFi) access rather than wired solutions. And device designers (for example, for game consoles) are increasingly building only wireless access options into their products. This suggests consumers might have a preference for lower-speed wireless access than higher-speed wired access.

What this means for the National Broadband Network is that interoperability between different technologies should be a key criterion. At various points from the exchange to the home, it should be possible for alternative means of providing that service into the household to be connected. For instance, a WiMax tower could be built on an exchange or a business could interconnect with a node to bring WiFi services to a number of dwellings at once and manage their network for them. To be sure, we do not know whether this is possible or economic everywhere. But we do not know this yet about fibre either. And, by being prescriptive, we deny ourselves the possibility of finding out.

3.4 What sort of regulation do we need?

There is a strong possibility that the proposed National Broadband Network will be the dominant mode of delivery for high-speed and perhaps basic broadband services in Australia. Consequently, as it will not be under competitive pressure to actually generate value for users, its price and other conditions will need to be regulated. The question is: what will the nature of this regulation be?

If this were a purely greenfields investment, the regulation could consist of a price to consumers (\$x per month) for a service with a minimum broadband speed. That price would drive the rate of return of the investment (both to the private provider and to the government).

However, we are not starting afresh here. In particular, any provider proposing a fibre to the node network will also need access to the copper tails of Telstra. Moreover, this type of provider, as well as those proposing a fibre to the home network, will need access to backhaul services from the exchange. Clearly, this is less of an issue for existing providers and, in particular, for Telstra for whom no access

arrangement need be negotiated. In addition, if an access arrangement did have to be negotiated and regulated, experience from other sectors (eg airports) shows that this can take up to seven years to resolve itself through the legal system. There is a risk of major delay to a rollout from this.

In this regard, possibly the key bottleneck will be to ensure open access to the conduits which house the fibre along our streets. These need to be placed under public control to ensure any provider can access them for infrastructure and maintenance. To do otherwise is to invite regulatory delay and cost.

The federal government should favour proposals that allow for a competitive approach to regulating prices and product quality rather than ongoing regulation. In this respect, access regulation should be transparent and simple. The government should view itself as designing a market rather than a regulatory bureaucracy and process.

The key to this is to allow competition to occur as much as possible. As a first step, any regulatory structure should ensure that the existing basic broadband and ADSL services can still be supplied by their current providers. That is, back-stop competition must be possible. While this might mean that this is done in full or in part with new infrastructure, this should be a basis for ongoing competition with the new high-speed network and provide some constraint on prices for a given period of time (eg five to seven years).

Of course, if the provider is an incumbent with a dominant share of market, some additional regulation might be needed to ensure back-stop competition from existing services. In the UK, the notion of 'anchor product regulation' has been argued to provide this purpose (de Ridder 2008). Under this form of regulation, the basic broadband products of the provider (eg up to 2 Mbps and 3 GB per month downloads) are regulated at a fixed monthly fee. However, that is the only product regulated. This gives consumers the choice of a standard option but also freedom to price on other options, including those at higher speeds. It is a simple means of regulation that can be ongoing and allow the rest of the market to flourish.

As a second step, interoperability should be built in. This would allow other providers – especially as technologies emerge – to connect into the NBN and compete with it on an infrastructure basis. This interoperability should exist at the exchange, node and street. Moreover, the basis for pricing to the remaining parts of the network should be the efficient components pricing rule that compensates the provider for ongoing costs of accessing the network and lost profits from customers it will no longer supply. While this rule can be abused in unregulated settings,

so long as there is sufficient back-stop competition from existing services or anchor product regulation of those services, it can be appropriately applied and utilised.

Finally, there are concerns that whoever provides the NBN may have their returns challenged as a result of competitors building alternative networks that compete with them. While it is true that infrastructure returns may be affected negatively by competition, the competitors themselves will have to earn a return on their investments in order to compete. Consequently, over-build is only a real concern if it is profitable for competitors, and if it is profitable for competitors it should be profitable for a provider who is at least as efficient in the market. While over-build might require some flexibility in pricing across different localities and regions, it is preferable to allow this than to restrict over-build directly. Multiple competing networks should be seen as a positive outcome in this process.

In summary, it is possible to regulate the NBN so as to allow the option for competition to flourish in the future. To achieve this government must:

- mandate open access to the conduits
- ensure back-stop competition or anchor product regulation of basic broadband services
- build in interoperability so that connections by alternative providers are possible at the exchange, node and street
- resist restrictions on competition under the name of preventing over-build.

3.5 What other investments should be made?

The NBN provides for the infrastructure for high-speed internet connections. However, that does not necessarily create demand for such connections. Indeed, evidence from Japan and South Korea, where fast internet connections are available, suggests that where there is demand it is mainly for video downloads and gaming.

The recent National Innovation review recognised that there was a gap between the government's broadband investment and applications to utilise it effectively:

With the National Broadband Network, Australia needs to ensure that the relevant applications – specific to local needs – are developed to leverage that infrastructure for the purpose of

government policy. This includes applications in open democracy, database and privacy standards for health information, tools to facilitate educational use of broadband, traffic systems and standards, and national collections of information and knowledge. (Department of Innovation, Industry, Science and Research 2008)

This is a welcome call for the federal government to complement its infrastructure investment on two fronts. First, it needs to encourage applications that leverage the network. These could be in e-health, e-education or video-conferencing (that might save on commuting costs). In each of these, active reviews of government legislation, information assets and policies need to be taken to ensure there are no governmental bottlenecks to the development of such applications (eg medical liability laws preventing off-site health diagnosis and treatment).

To explore this further, consider e-health. Usually, what is envisaged is a surgeon in Sydney operating on a critically injured patient at some outback station. However, it is far more likely that e-health will be most critical for the routine and mundane medical issues rather than the most specialised and exceptional. Consider the following scenario: your child has a sore ear at 6pm. Panadol and other pain treatments have not been doing much good. Without broadband, you would have to take the child (and perhaps other children as well if there is not another adult around) and go to the doctor. That time is out of hours and the waiting time is much longer. If lucky, you are back home by 8pm with some antibiotics (if the ear is infected) or perhaps some reassurance (if it is not too bad).

With broadband, you might do something different. You login and email your complaint to a GP online. They then ask you to take the child's temperature and also to send them a picture of the inside of the ear using a device. The GP then diagnoses the illness and emails a prescription to the pharmacist. Then you leave the house for 15 minutes to pick up antibiotics or you can have another adult do it. All done by 6.30pm with minimal disruption to you and the GP. And what is more, at no time in this story did we need high-speed broadband to get all of this.

Why isn't this service being offered? The technologies exist to transmit the relevant information to doctors at a low cost. The problem is that the liability laws and health regulations (including Medicare reimbursement) do not envisage this situation and stand in their way. Clearly, this is a low-cost way for the government to stimulate innovation in this regard.

The second complementary investment involves computers themselves. The government needs to investigate the price of computing equipment

that households need to access the new network. Computer equipment in Australia is priced substantially higher than in the US and Asia, for example. It has persistently been this way. However, if this pricing is not competitive, the acquisition of a computer will prove a constraint for many lower-income households in utilising the broadband network. And if this occurs, they will be paying for the network through their taxes but not gaining any of the benefit.

3.6 Conclusion

Clear constraints are emerging in the implementation of the government's proposed National Broadband Network. By respecting fundamental facts about the nature of broadband demand and supply, the government's policy can be adjusted and those impediments removed to a large degree. There is opportunity to allow for multiple providers, to improve interoperability requirements so as to avoid picking technological winners, and there is ample room to design a regulatory framework that substitutes for a lack of competition and otherwise does not stand in the way of competition emerging in the future. Finally, regardless of implementation, the government needs to focus on efforts to provide applications and hardware so that users can utilise the new broadband infrastructure efficiently. Only by addressing these issues head on can Australia move ahead on broadband.

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