

Looking Local on Broadband*

by

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This paper argues that broadband needs many local solutions, not a single national solution. It documents how the technologies, the user requirements and the broad investment costs of providing broadband vary considerably across localities. In contrast, current proposed solutions call for national strategies far removed from local circumstance.

Several conclusions are drawn. First, calls for universal service obligations to be imposed on national companies are false and likely to be costly in terms of reduced competition. Instead, local service obligations need to be established and the responsibility vested with local bodies to adopt solutions for improved broadband. Second, calls for protection of investors from competition are also false and likely to lead to higher user costs. Local groups such as councils could use the power of competitive tender to drive those costs down or to encourage multiple local providers. In areas with sufficient demand, that competition could be sustained. Finally, where there are areas of Australia not receiving minimally acceptable Internet access, the Federal government could continue or expand the use of targeted subsidies.

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1. Introduction

This year has seen a serious debate emerge in Australia about broadband provision – in particular, about investing in infrastructure to dramatically improve the quality of broadband Internet access. The debate is significant because it is clear that Australian broadband infrastructure lags well behind other countries, even though Australians are enthusiastic users of Internet services where they are available.

The move from dial-up to basic broadband has brought with it lifestyle changes. First, the ‘always on’ feature of broadband has allowed the Internet to be a regular companion at home: weather forecasts are easily accessible, traffic can be monitored before leaving for work, and delays in airline arrivals are easy to identify. Second, the greater transfer speeds have allowed more Australians to conduct work from home. This may have not yet changed real commuting patterns, but it has enabled connectivity to continue and offered more flexibility in managing home–work issues. Finally, there are moves towards the use of the Internet as a true alternative media outlet to traditional services including radio, television and newspapers. These applications and more have all been made possible by the move to broadband.

We do not know what applications a move from basic broadband to higher-speed connections might bring.¹ This paper speculates that like other changes in the technology of communication, the most significant applications are likely to be of a social nature, allowing interactivity and collaboration with others. In this respect, investments in broadband are akin to investments in social capital rather than in knowledge or informational capital. The paper also argues that the investments needed and the technologies offered are likely to differ between locations, meaning that decisions regarding broadband investment need to be geographically decentralised.

This stands in stark contrast to the current mechanisms for determining broadband investment. The main decision rights in terms of generating broadband infrastructure investment currently lie with telecommunications carriers, Telstra in particular. The

¹ Dial-up speeds are from 28kbps to 64kbps, basic broadband is for speeds between 128kbps and 1.5Mbps while higher-speed broadband is for speeds of 8Mbps to 100Mbps. Even the most ambitious proposals in Australia (such as Labor’s broadband plan) will lead to speeds of 24Mbps.

federal government has played some role in providing subsidies to regional providers but this is of a limited scale at present and directed at a minimum level of Internet access per se rather than at catching up to levels of investment seen elsewhere in the world.

Overseas, the strongest investors have been governments. Active government involvement has given Korea, Japan and Singapore leading technology broadband networks. In the US, the benefits have come from competition, most notably, between telecommunications and pay television companies. However, these cases are distinguished, first, by the greater degree of competition amongst broadband infrastructure providers, and second, by the fact that these governments are embarking on strategies based on broadband leadership rather than on catch up.

Australia is a laggard

Broadband infrastructure and its improvement is a matter of timing. There is little doubt that, decades from now, high speed broadband access will be provided throughout Australia. The question is whether we need that investment to take place sooner rather than later.

One thing is certain: Australia has *chosen* to be a laggard² in this regard and hence, we have given up any advantages from being a first-mover (for instance, by allowing local development of applications with global impact). Countries that are ahead of us are principally there because their governments have engaged in large scale investments in infrastructure.³ Being a laggard, however, is not without its advantages. First, we can take advantage of falling costs. Fibre and equipment prices are dropping and the longer we wait, the lower will be those costs. Second, investment raises issues associated with knowing the extent and nature of demand. Being a laggard allows us to observe that experience elsewhere and to make our decisions based on superior information.

What we lose from this is not known. Business and educational opportunities could go by and we might never know it. But more critically, the use of these services

² See Gans (2006) for evidence on Australia's lagging status.

³ Japan and South Korea being the primary examples (Gans, 2006).

will be delayed. If the rate at which costs are falling and new information is being received drops, then the case for waiting to receive the benefits of broadband investment. The question is whether the factors driving a 'wait and see' attitude are still relevant today.

But pointing to countries that have made the decision to be leaders, as a way of justifying our own investment today, is of no value. Australia is a laggard and so those benefits are no longer available. Thus, to justify investment, we need to look elsewhere.

The false premises of the national debate

The broadband debate in Australia has proceeded on a set of premises that point to a national solution. This has led to calls for universal service obligations to be placed on companies such as Telstra, as well as to calls by Telstra (and others) for protection from competitive forces to justify the investments required. In this paper, I argue that those premises are false and that the issues are fundamentally local, requiring local solutions. Calls for universal service obligation type subsidies or competitive protection are, therefore, fundamentally misplaced.⁴ Instead, *moves should be made towards encouraging competitive alternatives at the local level.*

On every dimension, broadband in Australia is lagging behind services available in similar economies. Australia's comparative broadband deficits include investment in high-speed capabilities, the distribution of bandwidth, and the adoption of broadband. The issues are most significant outside central business districts and in regional Australia, where even basic broadband remains an issue.

For regional Australia, the federal government has adopted a series of targeted subsidies aimed at connecting disaffected households and establishments. For the rest of the country, plans to improve broadband lie solely with telecommunications carriers. Telstra's upgrade plans were shelved when it was unable to secure national protection from competition. An alternative proposal by a group of other telecommunication carriers (the so-called G9) rests on their ability to invest as a joint venture, another protection from competition. Labor has recently proposed a public-private partnership to lay a

⁴ Were the premises true, some of these national plans would perhaps be an appropriate response.

nation-wide fibre to the node (FTTN) network with a combination of competition (to select the private partner) and government funds (to subsidise investment directly). In each case, the respective plans are seen as the only way national broadband investment will take place.

These national plans rely on two premises. First, that the investments required are national in scope. Second, that the services which broadband will deliver will rely on national content sources, and that a lack of access by some part of the population will create a national ‘information divide’. If these premises are true, investment and services would appear to require a national firm to have responsibility for the required decision making.

However, this paper argues that each of these premises is false. The key technical bottlenecks are local, not national. For the bulk of the population, upgrades to the backbone infrastructure mean that improved services will only come about if there is investment from local exchanges to the home. However, the best means by which this connectivity is achieved is likely to differ from location. Moreover, the economies of scale involved in justifying investments are also local too. This means that there is scope for local competition to provide the necessary improved services.

The consumer value from improved broadband will not likely come from new content applications such as IP (Internet Protocol) television. These services are either available (with delay) or have good substitutes such as broadcast television. Instead, like improvements to Internet access in the past, the new applications are likely to involve interactivity, where quality data transfer is required in a timely manner. Because these applications invariably have a *social element*, broadband improvements should be seen as an investment in social capital. They are not going to materially close an informational divide (at least for Australians not in outlying areas).

2. The national broadband call

The current debate in Australia centres on a call for a national plan to improve broadband services and access. It is a very simple argument comprising three steps:

1. Australia’s broadband performance as a nation is poor.

2. National supply – broadband investments need to be made nationally, and ensuring investment cost recovery requires protection from competition⁵ or a government subsidy,⁶ or both.
3. National demand – the applications that will drive consumer broadband adoption are national in scope and need to be addressed that way so as to close an ‘information divide’. In other words, potential developers of useful applications will only develop them if there is sufficient national broadband access and adoption, and unless this is done there will be an increasing gulf between the information haves and have-nots.

The logical conclusion from this argument is that Australia needs a *national* plan for broadband:

We need to ensure that as a nation the economic and social transformation that is taking place due to the internet will continue to be maintained.

If we can agree at least on national targets...we can have some idea where we are going and why.⁷

and

...the National Broadband Plan is an important foundation for national development. It is an opportunity for national infrastructure leadership that delivers next generation communications to all Australian businesses and families.

Telecommunications is a national responsibility.

Modern telecommunications infrastructure accessible to all Australians benefits the nation and consumers.⁸

This section demonstrates that each of the three steps set out above is based on a fallacy, and that there is no need for a national broadband solution. Instead, all indicators point to local solutions for what is fundamentally a local problem.

⁵ Telstra 2005, *Briefing Paper on the National Broadband Plan*, p. 6; Allen Consulting Group 2006, *A Competitive Model for a National Broadband Upgrade*.

⁶ *ibid.*, p. 7 (brochure) and p. 9 calling for government funding of \$2.6 billion.

⁷ Internet Industry Association 2006, *2010 National Broadband Targets: Maintaining Australia's Global Competitiveness*.

⁸ Telstra, *op.cit.*, p. 3 (brochure); emphasis in original.

Where is the performance poor?

It is well known⁹ that as a nation our broadband performance lags behind our peer group of economies. Such national aggregation, however, masks a significant amount of geographical variation within Australia.¹⁰

First, higher-speed broadband connections are available across Australia. The cable network passing over two million households now offers speeds for up to 17 Mbps, and DSLAM (Digital Subscriber Line Access Multiplexer) investments in exchanges allow faster ADSL2+ connections to many establishments.

Second, there are even better options for business. Most central business districts have high-speed broadband access with fibre connections right to the establishment, offering Internet access comparable with the best overseas services. Indeed, for researcher networks, AARNet provides 10Gb connectivity linking key health and education centres.

What this means is that where economic activity relies on high-speed broadband access, Australia has options. As in the early days of the Internet, it may be that businesses need to consider carefully their location to exploit them (Greenstein 2005). But if a business needed connectivity to compete, they could procure it from within Australia.¹¹

Broadband access is, however, an issue for households and businesses outside the central business areas. But this has very different implications for national economic growth and competitiveness.

⁹ See Gans (2006) for details.

¹⁰ Coonan, H (Federal Minister for Communications) 2006, 'Broadband's Tangled Web,' *The Age*, 9 August.

¹¹ In addition, business uses for the Internet could be quite different from households. For larger corporations, they will invest in their own networks to maintain connectivity. For medium ones, they can come to arrangements with carriers to make investments from the exchange. For some smaller businesses, their issues will be related to household issue but, again, if it is truly critical, their location choice will be tied to Internet access.

Where are the economies of scale?

The recent debate over a possible Telstra FTTN roll-out in Australia has centred on the vexing issue of ‘economies of scale’. Its advocates argue that FTTN requires a substantial lump of investment. And unless private firms can be assured of earning a decent rate of return on that entire lump, it is not worth investing. For this reason, therefore, no such investment is supposedly taking place.

It is very easy to be seduced by this argument. But one should be sceptical about equating plans for lots of investment with an argument based on economies of scale. Indeed, the early history of the Internet demonstrates the danger of assuming the existence of scale economies. A dial-up connection could be provided relatively easily and affordably to a small set of users. The end result: dial-up ISPs emerged all over the place (Greenstein, 2005).

Access to broadband poses a tougher task. However, it is not a national endeavour. If you want to build, say, a large base-load power plant, you need to be assured of demand from a million or more households or establishments. With broadband, each investment required is in the tens of thousands of users, in a very limited geographic area. With enhanced broadband, each investment (for example, a FTTN connection) requires revenue from several hundred customers. And when we get down to FTTH, it is one connection per home.

What this means is that to justify improvements to broadband infrastructure, a firm does not require a return over all areas. Instead, it must make an adequate return on an area-by-area basis. Not surprisingly (as with similar services), the prospects of making a return will vary from one location to the next. For the same reason, we should expect broadband infrastructure investments to vary between locations.

Such variation has an important implication for calls for universal service obligations for broadband. Put simply, to oblige or encourage any one company to make ubiquitous investments in broadband across the country would be foolish. This is not to say that a desire for universal access might not be warranted. It is just to say that obligating a single company to do this is unwarranted and unnecessary (Downes & Greenstein 2005).

If there are economies of scale that justify government protection from competition and/or funding, they are not national in scope. Indeed, for the investments needed to connect most households to higher-speed connections, the economies (if they exist) are local in nature, at the level of exchanges or even streets.

It is worth noting that one ‘national economy of scale’ argument that does not appear to be proffered is the idea that one technology will fit all locations. It appears that when it comes to this choice, the geographical issues are hard to ignore. Essentially, the chief bottleneck (at least in non-regional areas) appears to be on investment in the last mile connecting households with the broader network. Many different technologies can be used – including both wired and wireless solutions – and the best technology is likely to depend on – and has costs based on – local conditions. Consequently, the appropriate solution may differ from exchange to exchange. Efficient investment decision making will require mechanisms responsive to local conditions.

It should be noted that such arguments lead us away from relying on central methods of deciding on broadband infrastructure – whether by the federal government or the national telecommunications carrier. Even if the funding were centrally provided, decisions about broadband investments would need to take into account local information. That likely means that investment decision-making needs to be devolved.

Are the applications national?

Even if the investment required is not national, it is often argued that adoption needs to be national to encourage the development of applications that give value to Internet access and use. The argument is one that often seems rather compelling. First, without content, the Internet is just lines and equipment. Second, content development has economies of scale. Hence, it is argued that without sufficient access, content will not be developed – that the value of broadband adoption is subject to *network effects*.

Network effects have played a role in the adoption of many general purpose technologies including electricity and telecommunications. In the case of the latter, there were doubts that the need was there. When the first long-distance telegraph was introduced, Henry David Thoreau said ‘They tell us that Maine can now communicate

with Texas. But does Maine have anything to say to Texas?’ Not then, but soon enough it did, and the actual communications was the chicken that followed the egg of pre-emptive investment in telecommunications (Rosenberg 1979). Similarly, it was the development of reliable electric power flows that eventually convinced businesses to reorganise themselves around electric power (David 1990).

Network effects mean that early adopters may require subsidies because the full benefits of adoption only arise as more users come online. Network effects also mean that infrastructure providers will need to be patient because returns will be ‘back-loaded’ over time. There are, however, several layers of network effects. And the impact of these network effects determines how long the network providers will have to wait for adopters to place full value on broadband improvements.

To see this, consider the layers of network effects. The first layer is global: an application that utilises the Internet and the content available on it is “world wide” in its network effects. The more adopters there are around the world, therefore, the greater the case for an Australian to adopt. Similarly, for applications that require higher bandwidth, the more users there are with that bandwidth, the more likely it is that appropriate applications will be developed.

The good news for Australian investors is that Australia is a laggard. That means that if there are global network effects, they will already be realised as a result of demand and adoption elsewhere. Thus, there will be no reason to wait and subsidise early users. The value is already there. Indeed, it is well known that Australians are among the more prolific downloaders of music and video content. While this does not benefit copyright owners, the ability to do this can drive broadband adoption. This is how a global network effect can be exploited without the usual cost associated with delayed adoption.

Similarly, gaming applications that have grown with higher-speed broadband investments in Korea and Japan are available now, and with similar investments here, Australian residents would be able to access these applications. However, the value of that is person by person and not national in scope. Hence, the development of such content does not require high national broadband take-up within Australia.

The proponents of a national broadband plan have recognised this and have argued that, in fact, the network effects are national in scope. For this reason, high-

definition television, video-on-demand and movie download services are often touted as reasons to improve Australian broadband. Proponents argue that without sufficient adoption, those services would not be possible. But as noted earlier, the case for such instant content provision to drive or justify broadband improvements is weak.¹²

The best contender for a national layer of network effect relates to the use of e-commerce. The more businesses that offer online services to consumers in particular country, the greater the value of adopting reliable Internet connections in that country. The issue is, however, that it is difficult to see these benefits as being substantially improved by improving broadband beyond current levels. Put simply, there is little evidence to suggest that bandwidth is the critical constraint here. The data flows required for transactions can be achieved without broadband.

If there are to be new network effects within Australia from better broadband, they are likely to be highly localised. As noted earlier, the applications most likely to make improvements in broadband valuable are social in nature. For activities such as video conferencing and business collaboration, these applications may appear to be largely independent of distance. Social Internet interactions, however, are likely to be driven by people you know and who are most likely located close to you:

Most communications are local, and the Internet is likely to increase the locality of its transmissions. (This phenomenon has happened in the past with some other services, such as the mail.) “The death of distance” is greatly exaggerated. Some of the venture capitalists who proclaim “the death of distance” the loudest are among those who insist that startups have to be based in easy driving distance of their offices on Sand Hill Road. An interesting example ... was the tech branch of an investment bank that moved from San Francisco to Menlo Park, because San Francisco was too far from the scene of the action in Silicon Valley! The value of locality is diminishing in some jobs (which are then migrating to India and other places) but is getting ever more important in other jobs. Broadband is encouraging the evolution, but there are no clear-cut rules for how it will evolve. As just one example, broadband is often promoted as a way to keep populations in rural areas from declining, by enabling telecommuting. Yet if a job can be exported to a farm in Manilla, Iowa, why couldn't it be exported at even lower cost to an office building in Manila, The Philippines? (Odlyzko 2003)

¹² Leigh & Atkinson (2001) argue similarly and suggest that adoption of Internet access would proceed (subject to geographic access issues) broadly along the lines of other appliances (such as television).

Most email exchanges (excluding spam) occur between people located in the same city (Greenstein, 2005). Teenagers who are engaging in instant messaging are doing so with their friends who attend the same local school. Thus, it would not be surprising that a medical diagnosis conducted over the Internet would be with your local doctor (to avoid waiting rooms), even if what we imagine is the greatest social value will be longer-distance diagnosis. Collaboration and conferencing tools will also assist in telecommuting, which will largely take place between users in the same city.

There is evidence that supports local effects from the adoption of home computers. Goolsbee and Klenow (2002) studied consumer purchasers of computers in the late 1990s, and found that a household was more likely to buy its first computer in local areas where lots of households already had them, or when a large share of friends and family already owned one. Purchases were not related to any particular computer program but the effects appeared to be tied to the use of email and the Internet. It is not unreasonable to expect that this same effect would continue for the adoption of higher speed broadband.

Consequently, when improved broadband services become available, the best predictor of adoption will be local rather than national or global adoption. One way to test this prediction would be to examine individual adoption of a MySpace web site or of blog readers, examining whether adoption is by users scattered around the globe or by a number of users united by a common locality. Such examination might provide an indication of what will drive socially oriented applications.

In summary, there is a case that the network effects from the adoption of improved broadband services are likely to be local. It is for this reason that countries that have led in the investment in these services have also led in the adoption of them. If the network effects were global, adoption would have lagged.

Summary

The case for a national broadband plan and roll out is fundamentally flawed. On the supply side, the investments that need to be made and the technologies chosen are fundamentally local. On the demand side, there is little case for a national approach – and

if there is a case, it is community-based around localities. Thus, it is take-up within a locality that will drive the development of content and applications rather than overall national adoption.

What this means is that broadband improvements are not a national public good logically deserving national government intervention. They are in fact local public goods. They share more in common with garbage collection than with defense. Yet the rhetoric of the debate obscures this important fact. As is demonstrated here, the way we go about formulating broadband policy fundamentally changes when a proper local perspective is adopted.

3. A way forward

This section sketches a potential way forward that takes into account all of the considerations discussed in the previous sections. The goal here is not to justify improvements to broadband but to outline a framework for decision making and targeted subsidies that will lead to efficient outcomes.

The core of the proposal is a framework to enable local decision-making on broadband investment. This requires:

- ensuring cost-effective connectivity of localities to the broader network;
- empowering local groups such as councils to encourage competitive local solutions to broadband access and speed issues; and
- ensuring that where there are gaps, the federal and state governments step in to fill them.

Cost-effective connectivity

The main task in obtaining broadband improvements is to encourage investment in customer connection to the Internet. As noted earlier, this is a problem for households and establishments outside the central business districts of major capital cities.

Whether it is by improving Internet access from the exchange (in suburban areas) or from trunk lines (in outlying areas), any infrastructure provider will need to access existing telecommunications networks on efficient pricing terms. In this regard, it is

instructive to focus on *access to the exchange*. For a provider to serve an area out of an exchange, it will need to be able to set up equipment at that exchange and pay a reasonable rate for data transportation. Because exchanges are owned by one company – Telstra – this means regulation. These services are regulated at present by the ACCC. But my contention is that moving forward will require effective regulation, and encouragement of exchange-to-the-customer solutions.¹³

It is worth noting the reasons national telecommunications carriers are unlikely to represent the solution to local infrastructure investment for improved broadband. While network unbundling has led to investment in infrastructure in central business areas and to competing billing platforms for DSL in households, Telstra remains the dominant provider of wireline broadband services and certainly the dominant investor in infrastructure. What this means is that broadband infrastructure investment is largely in Telstra's hands and will take place according to its objectives.

The key problem with this situation is that Telstra's integrated nature gives rise to conflicts. The clearest example of this comes from the threat that VOIP poses to Telstra's (and Optus's) fixed line revenues. If FTTN or better was implemented around Australia, the bandwidth it would allow would permit VOIP of mobile telephone quality or better. However, VOIP essentially minimises revenue to telecommunications carriers. Even where VOIP is costly (as in calls to mobiles), this is largely due to the high prices charged by mobile carriers. What this means is that ubiquitous broadband at 20 Mbps or better may remove fixed-line revenues entirely.

Of course, these revenues would be replaced by revenues accruing to broadband providers. However, this would represent a different business model and would be more commonly subscription rather than usage-based. For that reason, it appears logical to suppose that the fixed-line telecommunications carriers will strongly resist higher-bandwidth broadband.¹⁴

The lack of competition and the potential conflicts of interests of existing telecommunications providers mean that the cost of encouraging them to invest in

¹³ See Wallsten (2006) for a review of such regulations across the OECD.

¹⁴ The lack of competition combined with this is what is giving rise to a conflict. In the US, wireline companies make investments in high speed broadband in competition with one another. Here in Australia, the lack of competition adds up to investment inertia.

broadband infrastructure is much higher. As Hausman, Sidak and Singer (2001) have shown, cable television providers have been a stronger force for investment in broadband in the US than elsewhere (see also Hausman, 2003). One reason for this is that they have not been engaged in telecommunications and instead have the complementary incentive of competing for viewer attention. Australia lacks this separation between alternative communications modes, and this has limited the development of cable as an alternative to DSL services (Gans & Hausman, 2006).¹⁵

It is worth pointing out here an inadequacy in the ‘G9’ proposal for FTTN. The good thing about this proposal is that it will result in investment from the exchange to the node. The problem with it is that the connection from the node to the customer will require access to the Telstra copper lines. There remains considerable uncertainty about those services, and hence the G9 proposal really only gets us half way to the type of broadband investment we need. Moreover, it creates a serial monopoly situation with two complementary parts of a service owned by different monopolists. That is generally worse than a single monopolist.

It would be a different matter if customers either owned their own copper pair right to the node or paid Telstra a fixed rental amount for that copper pair to the node. Customers could then use that line however they chose. That would break the serial monopoly situation by placing the customer as a decision-maker further up the network.

What we want to encourage is exchange-to-the-customer solutions. Note that these need not be wired, but could be wireless solutions. We need to ensure that the declared services support such solutions. . Specifically, clear access to interconnection at the exchange needs to be given long-term certainty.¹⁶

¹⁵ In areas where both Telstra and Optus cables are rolled out, the need for regulation might be diminished, but only if it were clear that both firms were providing viable competition. This would likely require separation of Telstra’s cable and copper network ownership, something unlikely to happen in the wake of the third Telstra share offer.

¹⁶ See Hall & Lefr (2002) for a similar view.

Local competition

Having established a clear means of interconnection with the Internet at the exchange, as noted above, the investments that must be made and the technologies that are optimal are highly location-specific decisions. This means that those investments do not require Telstra, or even an existing telecommunications carrier as providers. They could be undertaken by others.

The primary issue is coordination. One option is to let the market operate largely unmediated, with potential providers assessing demand in a location and investing accordingly. Because these providers would be subject to competition via any alternative option into the home from Telstra, there would be no need to regulate them. A simple market test might then determine viability.

One problem with a purely market solution is that these investments will potentially have other impacts on the local area. We should not forget the broadband infrastructure build-out of a decade ago when Optus rushed to string cable across power lines – a build-out which was frequently thwarted by local governments, and which eventually left Optus without options to extend its network (Telstra controlled the other conduits). Regulations and conduit ownership may, therefore, limit the ability to provide a market solution, and local governments and others will have to be part of the picture.

This opens up a scenario where local governments play a role in procuring local broadband access. In this scenario, local governments would put to tender the task of providing broadband connectivity to households in an exchange area. Where that area crossed local government boundaries, a joint tender would have to be organised. As with any other procurement activity, the local authority could rely on competing bids to keep costs down and on local area submissions to assist in finding what households and businesses might really want. The local authority could also engage in solutions to maintain aesthetics, including coordinating fibre roll outs with the movement of power and other lines underground.

The economics of broadband provision are such that the coordination of broadband provision falls naturally to local government. Some direction from the federal government could aid in this process, and targeted subsidies may have a role. Issues of conduit ownership would also need to be resolved.

Interestingly, state and local governments around Australia are exploring initiatives along these lines. In each case, they are taking advantage of new developments to bring fibre into the home as a solution for telephony and Internet services. They have also sought to resolve conduit and backhaul issues. With these pilot cases, they are moving precisely in the direction advocated in this paper.¹⁷

Like many other local public goods – parks, sanitation, child care and good schools – improved and cost-effective broadband access will affect land values. This has been shown to be the case for business Internet access in certain circumstances (Greenstein 2005). Home Internet access could have a similar effect, especially if the types of social applications discussed earlier become increasingly important. If Internet access influences the marginal purchaser of property in an area, it will have an impact on land values. This will in turn affect council rates and provide a means of competition between local councils. Such competition already works to improve the local quality of many public facilities, and there is reason to consider that the local public good of broadband Internet access could have a similar effect.

This decentralises the responsibility for making decisions on broadband, bringing that responsibility closer to the people most affected by the decisions. It encourages local solutions that match local conditions and local needs. And it provides a means of expanding competition for Telstra in local areas.

Subsidies

While the previous section advocates increased local level involvement in finding and procuring broadband solutions, as with all telecommunications services, regional disparities exist and arguments could be made that universal coverage is desirable. Indeed, the federal government has already accepted this argument and is currently

¹⁷ An example is the new development at Aurora in Victoria is showing how local solutions to broadband issues might work. As part of the new development of residential land, FTTH connections are being built in at a cost of \$1800 per household to provide Internet and telephony services. Along with good introductory rates for basic broadband (free initially), residents will be able to have world-leading 100 Mbps connections. The project has involved competitive tendering, developer coordination, conduit ownership issues, and issues associated with backhaul (in some cases beyond local exchanges and to the Melbourne central business district). The project demonstrates local solutions that are possible but also the constraints currently in place.

subsidising broadband provision in regional areas through its Broadband Connect program.

The Broadband Connect program provides a payment for the provision of a broadband service to customers who do not currently have access to that service. It is for 'basic' broadband (256 kbps down and 64 kbps up) with a cap on the pricing of that service over the first three years, although the cap is generous by metropolitan standards. It is available for connecting households, small businesses and not-for-profit organisations.

The good thing about this policy is that it targets new connections. From an economics perspective, new connections have the biggest bang for the efficiency buck (Goolsbee 2003). They provide a new good, and new goods provide the greatest increment to consumer surplus. By providing a connection rather than a usage subsidy, the policy provides maximum incentives for potential providers to convince users to agree to take connections. Invariably, this involves making usage cost-effective and charging consumers a connection or subscription fee to cover other costs. Finally, it encourages local technological solutions for local conditions.¹⁸

A key issue is whether a similar type of scheme could be used to improve broadband services across the country. As with basic broadband, there is a case for universal coverage. But there is also a case for a more gradual roll out. By securing regulation and encouraging local competition, urban and suburban areas could gain the broadband services that best suit their needs. Only later, when those services and applications have become clearer, will it be possible to set subsidy rates for the rest of the country.

4. Conclusion

In industries where there is an economic justification for government intervention, economists look to find what are called positive spillovers. These are consequences of individual actions that create benefits for others. This is important: if we rely on

¹⁸ The Queensland Government has recently proposed similar subsidies for improved broadband across the state. It is unclear whether the roll out will be state-wide or whether it will reflect local considerations.

individuals to bear the costs of their adoption choices while benefits flow to all, we will drive adoption at a socially suboptimal rate. Thus, there is a case for government intervention to alleviate those adoption costs and generate a socially optimal level of adoption.

But as this paper has outlined, higher-speed broadband is unlikely to create national spillovers. One individual's choice to adopt a higher-speed connection has almost no impact on the national economy, economic growth, or the benefits to other individuals in other parts of the country. We do not need to share at a national level either the costs of the necessary infrastructure or of the applications that run on it.

Instead, *if* there are spillovers from individual acquisition of higher-speed broadband, those spillovers are limited to the area connected to the local exchange or node. Almost certainly, if more households in a locality can adopt high-speed broadband, this will defray the local investment costs of connections from the exchange to the home. In addition, the benefits realised from greater connectivity are predominantly local and are social. If your friends, family and neighbours adopt broadband, this is more decisive in your own decision. For these reasons, any government intervention should occur at a local rather than a national level.

This perspective significantly reformulates the current debate on broadband. Without a national imperative, there is little need for a national roll out plan, and little need to subsidise or protect national telecommunications carriers. And without national spillover effects, there is unlikely to be an 'informational divide.'

Instead, we need local solutions – and with them, the prospect of local competition. Local councils represent one potential institution for organising the local provision of broadband. If they do it correctly, house prices and rate collections will rise. If they do it efficiently, they will win votes. And regardless of how it is done, the timing of investment is more likely to reflect local need and local costs. We may ultimately want a national solution to fill in gaps that emerge. But right now, we need a national strategy to empower local solutions.¹⁹

¹⁹ Governments around Australia are beginning to recognise these issues. On the 7th December, 2006, the Federal government presented its "Broadband Blueprint." It documents many initiatives including ones to promote broadband investments in new developments (in many cases, involving local governments). However, it is far from a solid policy foundation and a reformulation of the debate around the country.

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