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Crisis of Innovation: Looking elsewhere

A paper by Professor Trevor Barr,

Media and Communications

Swinburne University of Technology

A Principal Investigator,

ARC Centre of Excellence for Creative Industries and Innovation

tbarr@swin.edu.au

03 9214 8106

Considerable attention has been given in recent months to the complexity of issues surrounding broadband policy for Australia. While there appears to be widespread support that Australia needs to move from what might presently be called ‘rudimentary’ or possibly ‘adequate’ broadband, and largely only for urban dwellers, there are many calls for the urgent availability of ‘enabling’ broadband. The unravelling of these terms depends upon what users expect from broadband, what speeds they require, and how much they are prepared to pay for the service. There is widespread perception, however, that Australia currently remains in the slow lane for broadband by international comparison, and concerns in many quarters about how problems are being addressed to change this situation. There are policy and regulatory problems, complex issues facing system operators, reluctance by investors to risk the substantial capital required to build the infrastructure, tough choices relating to modes and practices of delivery, and doubts about the possible level of acceptance and take-up by the end users. This paper supports the view that while it is in the national interest to work towards a ‘broadband for all’ policy, it argues that Australia currently faces a crisis of innovation in telecommunications. The nature of this crisis in the context of broadband is discussed in this paper around three themes:

1. The ‘bottlenecks’ that have emerged subsequent to the introduction of the public policy model of Open Competition for Australian telecommunications from July 1997.
2. The issues associated with network access and investment, affordability and broadband speed .
3. The complexities facing system operators to understand and create user demand.

There are two parts to this paper: the first examines the domestic broadband scene, and the second offers a case study of a European broadband system from which lessons might emerge for Australia. The second part, which is work in progress, has emerged partly out of frustration with the tensions and conflicts that are so prevalent in the Australian broadband public policy scene.

Now to explore the three themes highlighted above:

1. Open competition bottlenecks and Telstra' postponement of a fibre to-the-node broadband network.

The new management team at Telstra sees broadband as a central peg of its business development strategy. The much awaited *Telstra Strategic Review*, announced by new Telstra chief executive Sol Trujillo on 15 November 2005, suggested that future fixed line business growth might be limited, that mobile communications was likely to continue to be an intensely competitive space, and that the future principal growth in telecommunications was in integrated IP based value added services. In the accompanying document, the *Telstra Technology Briefing*, Greg Winn outlined the technological vision related to broadband on behalf of the corporation:

‘The sort of things that will be available are things like high speed internet, voice over IP ..., the possibility of TV delivery over IP, telecommuting, video conferencing and video delivery of services in general... There’s really two dimensions key dimensions to access. What we are aiming to do is deliver a capability which is fast so speed is important. The second part of access is really about capacity. As more and more customers use more and more of these sorts of products they start to demand more and more of the infrastructure and the dimension of their actual core network and the access network... So what are we transforming access to? Well first of all we are transferring it to a high speed Broadband capability.’¹

Hence the announcement in August 2006 of the discontinuation of negotiations with the Australian Competition and Consumer Commission (ACCC) about Telstra’s investment in a fibre-to- the- node broadband network appeared to contradict this vision statement. The corporation announced that ‘until Telstra’s actual costs are recognised, and the ACCC’s regulatory practices change, Telstra will not invest in a fibre to –the -node broadband network’. The new management team at Telstra has defended their decision

¹ Transcript from *Telstra Technology Briefing* released by Douglas Gration, Telstra Company Secretary, 17November, 2005

on the grounds that the corporation could not achieve adequate guarantees of regulatory certainty to justify such substantial investment.²

One school of thought regarding this decision by Australia's largest telecommunications carrier was that their fibre-to-the-node stand-off demonstrates a serious breakdown of the overall current telecommunications public policy model in Australia. Arguably, what this decision by the principal telecommunications carrier shows, is a series of irreconcilable public policy problems, partly due to the inherent flaws in the regulatory policy model centred on open competition since 1997. Other observers point to problems associated with the subsequent partial privatisation of Telstra, notably where those 'minority' shareholders interests (those who own Telstra scrip), take precedent over the 'majority Australian shareholders' (those Australian citizens who do not actually own scrip) but who want long term network decision-making. In short, at the macro level, the sources of policy tensions within an apparently irreconcilable foursome are:

- a. The federal **government** wants a commercially successful Telstra because the share price has become embarrassingly low, and it wants to improve both the share price and dividend to enable it to sell the rest of the corporation. However having introduced open competition policy for the industry as a whole from 1997 the government also needs to ensure that the new players are also able to achieve strong financial returns.
- b. **Telstra** points to its new obligation post partial privatisation – satisfying formal shareholders – and argues that it must make highly commercial decisions. The new Telstra management alleges that the regulatory system in Australia is one of the most repressive in the world and wants the interconnection fees paid by competitors to access Telstra's networks to be levied at what it considers to be 'acceptable' rates otherwise the corporation is allegedly cross subsidising its competitors.

² D. Gration, Company Secretary, Telstra, *Fibre -to -the-node talks discontinued*, August 2006

- c. **The new competitive carriers** (i.e. Optus, AAPT, and Primus) want a low cost access regime, dependent on interconnection to Telstra's network, but which allows them to compete with Telstra on prices charged to consumers that enable them to build profitable businesses. They widely perceive Telstra as being an obstructionist incumbent which has no intention of facilitating the growth of a group of strong profitable rivals.

- d. The regulator, the **Australian Competition and Consumer Commission (ACCC)**, has the unenviable task of implementing the federal government's competition policy, facing a thicket of competing vested interests, and is often dependent on data supplied from the many different industry stakeholders that is difficult to assess or validate.

So how can all four of the above sets of interests and responsibilities possibly be met in the context of developing a coherent and workable broadband policy to serve the national interest ? Telstra's decision in July 2006 not to currently invest in a fibre-to-the node broadband network can be seen as symptomatic of irreconcilable policy bottlenecks. This unfortunate turn of events needs also to be seen in conjunction with other related policy break downs: notably other stalled major private sector network investments, the reduction of significant R&D tax incentives since 1996, the current skills problem in several major industries, and the limited overall major public investments in infrastructure. Collectively these are the seeds of an innovation crisis in Australian telecommunications policy. For the pessimists, the question arises as to whether Australia might ever be capable of building the necessary communications infrastructure it desperately needs for the future.

2. The issues associated with network access and investment, affordability and speed.

Telstra's recent decision not to proceed with a fibre- to- the node strategy has been held up as evidence that the national carrier is doing little in the broadband space. Not so, though its range of broadband services could only put it, at best, in the 'adequate' box .

Telstra's current broadband growth is centred around offering ADSL and cable broadband at speeds generally around 1.5 Mps, speeds often criticized as putting Australia in the slow lane by international comparison. However there is clearly substantial consumer demand for these current forms of broadband at those speeds. The data presented in the Telstra 2005-2006 Annual Report showed that the growth in broadband and mobile services during 05-06 offset the \$500 million decrease in the fixed line traditional telephone business. For the same period the number of Big Pond broadband subscribers increased by 620,000 to 1.48 million : wholesale revenue (based on the extra 30,000 broadband subscribers of competitors iiNet, Primus, Optus, TPG, Amcom, Transact) jumped 77% to \$461million.

Consumer broadband take up subsequently spiked early in 2006, especially when the price reductions to consumers of Telstra's Big Pond broadband service fell from its old days of around \$60 a month, to \$29.95 a month in 2005, and then for those consumers who entered into a 2006 two year agreement the cost was reduced to \$14.95 a month for the first year, rising by prior agreement to \$ 29.95 a month for the second year. As a result, in some weeks during mid 2006 Telstra saw the overall demand for broadband reaching 20,000 new subscribers per month.

Whether this growth pattern will continue is widely contested at the time of writing with divergent predications being made by industry consultants. Paul Budde suggests that 'by mid 2006 pent up demand for ADSL 2+ services is estimated by us at between 500,000 and 1 million subscribers'.³ On the other hand, Ovum's David Kennedy argues that quarterly broadband growth dropped to 13% in the last recorded quarter from a peak of 26% growth in the June 2006 quarter.⁴

The new Telstra management appears adamant that until major regulatory decisions are changed there will not be major broadband infrastructure upgrades. The crux of their argument is that the present regulated rules for wholesale unconditioned local loop (

³ Paul Budde, *Statistical Overview ADSL 2+ Market*, 12 September, 2006

⁴ *Broadband off the boil*, The Australian, September 5, 2006

ULL) – the copper wires connecting customers and exchanges related with ADSL- does not cover Telstra’s costs. Telstra’s objection is that its competitors can cheaply put DSLAMs into Telstra exchanges and rent the ULL at prices regulated at lower than the cost of supply. Moreover Telstra alleges that its competitors can build businesses in profitable metropolitan areas but those competitors, most of whom have also chosen not to build their own networks, do not have to properly subsidise the cost of Telstra’s regulated retail prices in regional and rural areas. These complex regulatory issues related to the economics of interconnection are a major inhibiting factor to the introduction of ‘enabling’ broadband networks for Australia.

However the current inertia cannot be entirely blamed on the regulator. Behind the Telstra decision of the stand off related to a major fibre- to- the- node investment resides a business conundrum. Why would Telstra rush to spend an estimated \$4 billion on a new fibre-to-the-node network when its existing modes of delivery appear to have the potential to attract another raft of new broadband customers? And with the growing wholesale broadband business, Telstra maintains network control because its competitors currently remain dependent on Telstra’s established copper-based infrastructure. Why would Telstra presently take the risk of changing policy direction and possibly undermining good existing business which probably has promising further growth potential for them?

Meanwhile Telstra’s competitors face daunting problems in growing their broadband businesses. Billion dollar capital investments are required to build what is seen in business terms as inherently ‘inefficient’ infrastructure – building new networks to pass many homes that similar to the long time loss making subscription cable television reject the provider’s service. There are likely to be long lead times of big investment but few short term rewards. There are often ‘messy’ problems involved with installation to homes and many possible council objections concerning network installation. As well, broadband presents the marketing staff of a provider with a complex service to sell. The new competitors also often find that they are competing in the field against an aggressive incumbent carrier in Telstra. Competition policy was never designed to facilitate co-

operation between the carriers. Hence the G9 fibre-to-the-premises project proposed in mid 2006, led by Optus, to create a company to be called Speedreach that would own, plan, and run the new network, appears doomed to failure. Telstra has indicated that it would not join such a consortium because it is not in its best interests. Meanwhile the member participants of the G9 admit that Speedreach could only ever have a chance of working if it was a G10 –so Telstra too would become a member. .

3. The complexities facing system operators in understanding and creating user demand.

More and more of the things we do now are dependent on the Internet. A new range of economic and social practices is emerging from Internet related practices. So how can more Australians be offered access to, and opportunities to benefit from, the burgeoning range of Internet based services?

This paper argues that broadband ought to be seen as more than merely a ‘pipeline’ where the premise of development is ‘build the networks and they will come’. A key assumption underpinning this analysis is that that broadband policy appears to work best where the end users’ needs are seen as the starting point of the development. Hence the call here, and the prime nature of further research investigation, is to seek out those innovative policies that have seen the evolution of high speed, *user centred* national broadband networks.

The notion of a ‘user centred’ broadband system needs to be explained further. There are three key components here:

- a. Whereas broadcasting platforms generally offer their listeners and viewers professionally produced programs, broadband platforms provide hybrid, diverse services, including great potential for users to create their own content i.e., through Internet based blogs, wikis, and social networks. A great deal of the burgeoning Web 2.0 services are based upon the notion of users as producers of content. So to what extent does the availability of broadband facilitate multiple forms of user led innovation, and how? How is programming, in its many new

- guises of user generated content, actually negotiated with the operator in successful broadband systems? What can be said about the possible links between the level of speed of broadband and the roll-out of new applications?
- b. Though there have been discussions in Australia about the desirability of structural separation between infrastructure and service provision in telecommunications, and some calls for a break up of the majority of ownership by Telstra of subscription television provider Foxtel, the status quo has been maintained. (Separation has occurred in broadcasting where the networks have hived off ownership of the transmitters). So is there evidence from this study that structural separation is beneficial to the stakeholders, especially end users, for broadband?
 - c. The ‘digital divide’ is often seen in narrow terms as merely encompassing the ‘pipes’, and much policy focus has been directed at a lack of access to the network, especially in regional and remote areas. So where urban broadband access to the network is comparatively high, have measures been undertaken to facilitate greater uptake by the non-users who do have access? Is price the critical determining factor in addressing the cause of the rejection of a service which may be on offer but largely rejected by subscribers?

Looking Elsewhere

The author of this paper, as a Principal Investigator for the ARC Centre for Creative Industries and Innovation, decided to look at selected countries, other than Australia, which are successfully building broadband systems. Five countries have been selected, namely the Netherlands, Finland, Norway, the United Kingdom, and Canada. The basis of selection of those countries was that they are, according to OECD data, all in both the top 10 of broadband subscribers per 100 people and also among member countries with the highest total number of subscribers: Australia, with its proud historical record of telecommunications achievements, is not listed in the top 10 by either of these criteria.⁵ This research is work –in-progress at this stage, and its initial focus is on one of the most

⁵ OECD Broadband Statistics, December 2005, available from <http://www.oecd.org/sti/ict/broadband>

innovative broadband policy models in the world – the Kenniswijk project in the Netherlands.

OECD figures from December 2005 show the Netherlands leading broadband usage in Europe, with 25.3 subscribers per 100 inhabitants. Even more impressive is the broadband take-up per household – 54%.⁶ Such results do not occur by accident, and in the Netherlands they came about as the result of a concentrated drive towards broadband update which was piloted by the Dutch Government, and supported by a number of private corporations. This enterprise was called Kenniswijk, which translates as somewhere between ‘knowledge domain’ and ‘smart city’, and it has transformed the Dutch telecommunications industry.

Responsibility for Kenniswijk lay with the Dutch General Directorate of Telecommunications and Post (DGTP), part of the Ministry of Economics. When the DGTP initiated Kenniswijk in 2000, it did so on the understanding that the project would occupy a limited time frame of five years. Accordingly, Kenniswijk was planned tightly and carefully, with very specific objectives. The overriding aim was the creation of an ‘open consumer market of the future’, with an innovative nature and an international flavour. Subsidiary objectives were the strengthening of the Netherlands’ capacity to attract ICT companies, and the implementation of change through properly understanding the impact sophisticated technologies might have on ‘spatial, social and mobility patterns’. These objectives were to be achieved through combining broadband infrastructure and services in new and dynamic ways, as opposed to what the government saw as a ‘stalemate’ between infrastructure and services existing in the Netherlands at the start of the project. Above all, the Kenniswijk project was seen as a potent agent for energising Dutch society and commerce rather than as a technological end in itself. Its originators characterised it as ‘a national initiative with a regional format and an international image’.⁷

⁶ Paul Budde, *Netherlands – Broadband Market – Overview, Statistics & Forecasts*, 2006, p. 1.

⁷ *Learning by Experimenting: Five Years of Kenniswijk*, available from <http://www.kenniswijk.nl/site/en/Documents/52/66>, p. 8.

The DGTP wanted to create a living laboratory in the Kenniswijk experiment, in which its stated objectives could be tested and attempted in microcosm. It therefore called for tenders from municipalities wishing to participate in the trial, including among its criteria existing communications infrastructure, the presence of interactive services, a critical mass of the population, and the innovative qualities of the schemes submitted. It was also important that experiments undertaken in the 'living laboratory' be transferable to a wider scale, so the area chosen had to have a socio-economic composition similar to that of the country as a whole. The successful submission was that from Eindhoven, a thriving southern region with a population of more than 700,000. The city of Eindhoven is the largest city in the South Netherlands and has a population of more than 200,000 inhabitants. The market town of Nuenen, a few kilometres north-east of Eindhoven, was chosen as the site of one of the focal points of Kenniswijk. The Government formed an experimental partnership with the town's housing association and a group of civil engineers: this partnership set out to connect the entire town to broadband services.

The Dutch government was prepared to provide initial funding for Kenniswijk, and set aside around €45 million for this purpose. It was, however, clear from the beginning that investment costs were to be borne largely by private parties. Apart from the seeding money, government subsidies were to be supplied only where they were demonstrably essential to the success of the enterprise. The most important principle governing the project's operation was that of the customer's centrality: the bottom line was that Kenniswijk had to provide discernible added value for its users.⁸

During 2001, the project's planning phase, a decision was made to set up a corporation in which public and private shareholders could collaborate: Kenniswijk BV was accordingly established in early 2002. The Government's partners in this collaboration were Shell, Fontys, DHV, Simac, Alcatel, Infraconcepts, AM, Dura Vermeer, ROC, Philips, Ex'ovision BV, Kennisproject, the municipality of Eindhoven, TPG Post, Grontmij, SRE, Crescendo, Rabobank, Draka Comteq, the municipality of Helmond,

⁸ *Learning by Experimenting*, pp. 10-12.

Casema, Eindhoven Technical University, Deloitte & Touche, Arcadis, KPN Telecom, and Wegener.⁹

The Dutch government established a Broadband Expert Group (BEG) in 2002 whose role was to monitor and review the project on a continuing basis, and to make recommendations as the need arose. One of the earliest and firmest recommendations of the BEG was the adoption of Fibre to the Home (FttH) technology, because of its speed, capacity and great potential to offer a plethora of new services: the BEG regarded an eventual move to FttH as inevitable, and thought it essential that FttH infrastructure be installed immediately within the living laboratory.¹⁰ Nuenen was central to this strategy. Approximately 8,000 Nuenen dwellings (housing around 15,000 people) were connected to a FttH network free of charge: this represented a 96% take-up. The Government subsidised the scheme for a total cost of €6.4 million (each connection cost €800).¹¹

The operator of the Nuenen network was City Net Fibre Amsterdam, itself a public/private partnership in which the city of Amsterdam was a major public shareholder. Use of the network infrastructure was available to a number of service providers: the Kenniswijk directors believed it was essential to ensure a separation between the party who operated the network from the parties offering services on the network. The open network which was thus created enabled healthy competition, a raft of high-quality services, and freedom of choice for the consumer. The fibre link was symmetrical and operated at a standard 10 Mbps, enabling 'fat pipe triple play services' (voice, video, and internet available through the one medium).

Unusually the residents of Nuenen themselves, rather than an ISP or telecom company, own the network: their ownership is formalised within a co-operative society called Ons Net (Our Network). One of the lessons learnt in the Nuenen experiment appears to have been the importance of gaining widespread community involvement. Advertisements

⁹ Ibid., p. 12.

¹⁰ Budde, pp. 9-10.

¹¹ 'Fibre to the Home', pdf document available from http://www.great-technology-company.co.uk/component/option.com_docman/task.cat_view/Itemid,/gid,25/orderby.dmdate_published/ascdesc.DESC/

concentrating on the technology itself – broadband, or FttH, or even the Internet itself – were less persuasive than a focus on local interaction and local ownership.¹² Kenniswijk project directors found that people were attracted to services which clearly related to activities they already engaged in or requirements they already had – sports, for instance, church, medical care, and education – rather than simply to activities suggested by or representing new technology. The technology took on meaning only as its application became evident, and it was important that its application was perceived as relevant.

What is remarkable about this model is the level of consultation with users about the kinds of services they might expect or want. Kenniswijk invited submissions for project ideas, and received more than 1,000, of which 300 became detailed proposals. These were evaluated and judged on various criteria, including their innovative quality, their focus on consumers as end-users, and the extent to which they involved practical application of the product rather than simply its technological development. 116 submissions were eventually approved and subsidised.¹³ The applications eventually shaped by these proposals included the following:

Digital Doctor	A twenty-four hour e-health advice service offering tailored advice related to specific complaints.
Ontdeknet	An educational service making it possible for schoolchildren to work with minimal supervision on projects by collaborating online with experts in a variety of fields.
Kidstoday	Website enabling students, teachers and parents to communicate online: works as a combination of school newspaper, bulletin board and discussion forum within and between schools.
Movie-on-Demand	Online video services. Two companies have established online video stores using different technologies.
Pilmo	Voice over IP telephone calls via broadband. Pilmo is said to have established itself so quickly that it is now comparable in every way to traditional telephone providers.

¹² ‘Fibre to the Home’.

¹³ *Learning by Experimenting*, pp. 17-19.

First Mile TV	Service in which television programs can be downloaded and watched at any time of the day or night.
3D Helmond	Offers the viewer the capacity to ‘wander’ online through a construction or renovation site to experience the finished product.
My Photo	Enables viewing, swapping, and editing of photographs.
Video4all	Facilitates video telephone calls. Used increasingly as a discussion tool in various forums.
Webtrainer	Online interactive training for athletes, providing personalised programs which (for instance) assist preparation for a particular event. ¹⁴

Kenniswijk also employed its own market development team and commissioned market and consumer research. It ran public relations and communication facilities and regarded itself as having a specifically educative role in the community. It used a variety of methods to create and maintain contact with residents – Kenniswijk ‘corners’ (specially designated centres within locations such as libraries and schools, where volunteers advised and assisted people on using computers), newsletters, the official website, and a Visitors’ Centre. Kenniswijk also launched computer skill courses and instituted a free help-desk; it formed the Kenniswijk Consumer Council (a collection point for residents’ interests and thus an informed adviser to the project), and made available a wide range of test panels and research facilities. The emphasis, while testing consumers, was squarely on the experimental nature of the endeavour: researchers were careful to accentuate the importance of a negative outcome in terms of eventual improvement, so that participants were not disappointed or disheartened if apparently poor results were produced while evaluating services.¹⁵ In its pursuit of an objective of national significance, Kenniswijk recognised the importance of individuals, and expended time and energy in keeping paths of communication open and ensuring that individual members of the community were given every opportunity to feel that they were engaging actively with the project; that they had the capacity to participate with it in meaningful ways; and that it was possible for them to affect real outcomes.

¹⁴ Ibid., pp. 50-55 (for all applications).

¹⁵ Ibid., p. 37.

And what other key measures might we examine as evidence of satisfaction and perceived success as judged by the users of the system? When the period of free access had finished, at the end of 2005, product pricing for these services ranged from €60 to €75 per month, depending on bundling discounts. So how did the users respond when they could no longer have access to the system for free? At this point, at the beginning of 2006, **80% of Nuenen residents chose to continue their subscriptions on a paying basis**, providing overwhelming evidence of the scheme's success.¹⁶ Wow!

Kenniswijk is a remarkable experimental broadband model, incorporating both supply and demand strategies, and worthy of further analysis by other countries. While there can always be reservations about the relevance of what we might learn from an experiment in the Netherlands, or whether much of their model could ever successfully be transferred to a different culture in Australia, analysis of the Kenniswijk, together with later studies of Canada, Norway, Finland and the United Kingdom, may provide leads in helping to overcome our crisis of innovation. Some of the Kenniswijk 'lessons' may be that broadband policy works best when there is a coalescence of several key factors – imaginative leadership by government, publicly funded seeding capital to 'kick start' systems and services, and strong private sector commitment. But the uniqueness of the model surely resides in their capacity to conceptualise and implement a wide range of user centred services. It is highly unusual for a communications service provider, in any medium, to devise a model based around prior consultation with prospective users about the kind of services they might want or need.

There is no comparable precedent in Australia of this aspect of the Kenniswijk user centred model. Given the complexities of broadband, this may be Kenniswijk's prime lesson and one which will ultimately not only benefit broadband subscribers but also necessarily ensure the long term commercial viability of the system operator. The notion of providing a trial period free to users to build demand is indeed rarity for commercial

¹⁶ <http://euotelcoblog.blogspot.com/2006/01/2006-euotelco-odyssey-happy-new-year.html> dated 3 January 2006

operators in Australia. Interestingly though the Victorian government's FTTH project based in the northern Melbourne suburb of Aurora, currently offers a period of free internet access both to suppliers and users.¹⁷

The other more contentious lesson of Kenniswijk is whether structural separation was crucial to its success. The Netherlands model was constructed with a clear plan that there must be ownership separation between infrastructure and services. This is unusual in a world where the common institutional model for telecommunications and broadband is that a system operator primarily builds a model around an engineering paradigm and where important network considerations are seen as paramount over an exploration of understanding prospective users. The Australian telecommunications industry is highly vertically integrated and it is most improbable that this will change during the next period of moving to fully privatise Telstra. There is the prospect, however, that some examples of structural separation may eventually emerge from the government's Broadband Connect program.

There can be little doubt that the systematic consultation processes about preferred services, and the consequent sense of ownership engendered by the end users in the Kenniswijk model, was crucial to the experiment's success. This may be the prime lesson we can take from such a highly innovative model of contemporary communications.

Note: Acknowledgment is made of the research contribution by Viv Kelly to the Kenniswijk section of this paper.

¹⁷ Chris Jenkins, 'Fibre to the home built into McMansions', The Australian, 12 September, 2006